

CA MICS® Resource Management

Hardware and SCP Analyzer Guide

Release 12.9



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Chapter 1: OVERVIEW

In today's large computer installations the systematic planning, monitoring, control, and evaluation of system resources has become increasingly vital. The CA MICS Hardware and SCP Analyzer was developed to assist in these activities by providing a unified and easily understood approach to the management of system resources.

The CA MICS Hardware and SCP Analyzer was developed to process RMF information and integrate it with the other data maintained by CA MICS using the standard CA MICS facilities. In addition to the standard RMF reports, the Hardware and SCP Analyzer provides a set of management and operational reports. Online data analysis is also provided through the CA MICS Information Center Facility (MICF). MICF provides a full screen, menu-based system that enables you to perform data analysis, inquiry, data retrieval and report functions.

This section contains the following topics:

[1.1 Primary Areas of Application](#) (see page 12)

[1.2 Major Features](#) (see page 13)

[1.3 Reporting and Inquiry Facilities](#) (see page 15)

[1.4 Files Overview](#) (see page 18)

[1.5 Product Prerequisites and Considerations](#) (see page 21)

1.1 Primary Areas of Application

The CA MICS Hardware and SCP Analyzer provides data and reporting capabilities that aid in the management of z/OS system resources in the following areas:

- o Performance Management - Performance data is available to pinpoint specific system problems. The identification of these problems and their subsequent correction can result in significant improvement in system performance. The ability to monitor resource consuming subsystems is an important aspect of any performance management effort.
- o Capacity Planning - The Hardware and SCP Analyzer maintains a database of historical CPU, memory, channel, and device usage and performance data. This greatly facilitates growth/trend projections at the system level.
- o Problem Resolution - When a system problem occurs, it is often necessary to use the data provided by the RMF monitors to resolve it. The database maintained by the Hardware and SCP Analyzer can be used to determine when a problem first occurred, how severe the problem was and what caused the problem. Depending on the RMF parameters in use, this determination can be made to the service class period level or the actual job level.
- o Management Reporting - Users can extract, group, and summarize information directly from the database to create useful management reporting measures. Management can establish objectives for system resource utilization and performance, and then generate reports or one-page management summaries that compare actual performance against the objective. In addition to the standard management reports that are distributed with the system, users can easily create custom reports by using online facilities. Additional tools allow resummation when the summarized data in the database do not directly address reporting needs.

1.2 Major Features

The major features of the Hardware and SCP Analyzer can be grouped into these categories:

Report Facilities

The Hardware and SCP Analyzer provides the following reports:

- o Management Objective reports are run on a daily, weekly, and/or monthly basis as part of the standard CA MICS processing. These reports summarize the activities of the IT organization and are designed to assist in tracking system resource utilization and planning for future requirements.
- o RMF Postprocessor reports provide information on z/OS system resource consumption and performance. These reports can be produced at a detail level and at a summarized level. Typically these reports are run on an as-needed basis.
- o Exception reports allow you to define, capture, and report on exceptional conditions recorded in the RMF data.
- o Ad hoc reporting facilities allow you to access information in the CA MICS database, either interactively or in batch, via MICF, a panel-oriented productivity tool.

See Section 1.3 for more detailed information on Hardware and SCP Analyzer reports.

Interface Capabilities

The Hardware and SCP Analyzer integrates its data into the CA MICS database, thus providing an interface with a number of other CA MICS products, including:

- o CA MICS Capacity Planner - The Hardware and SCP Analyzer maintains a database of historical system hardware usage and performance data. The CA MICS Capacity Planner can use this data to make growth/trend projections at both the system and user level.
- o CA MICS Performance Manager - The Hardware and SCP Analyzer provides data for z/OS system tuning. CA MICS Performance Manager uses workload characterization and

batch initiator simulation methodology and software to accomplish workload analysis. In addition, it performs z/OS behavior tracking by using information about batch activity for analysis of the Real Storage Manager (RSM) and for tape drive simulation analysis.

Comprehensive Use of RMF Data

Another feature of the Hardware and SCP Analyzer is its comprehensive use of RMF data. The Hardware and SCP Analyzer:

- o Consolidates data from multiple data centers into an information database and then provides a common access method for reporting on system activity.
- o Interprets encoded values in the input data through the use of SAS features. Thus, information is immediately usable in a logical form without further conversion and/or translation.
- o Consolidates usage and resource consumption data at both the system and service class levels.

General Product Flexibility

The Hardware and SCP Analyzer also offers a number of flexibility features, such as:

- o A wide range of standard exits to tailor the product to your enterprise's specific needs.
- o Calculation and derivation of useful measurement statistics not available from the RMF data to further characterize response, service, and utilization of the measured systems.
- o A Data Dictionary, which describes the information found in the CA MICS Hardware (HAR), System Control Program (SCP), and Workload Management (WLM) Information Area files and how that information was derived.
- o Support for the SAS compression option, which minimizes the amount of space needed to retain information in the CA MICS data base.

1.3 Reporting and Inquiry Facilities

The Hardware and SCP Analyzer's reports and inquiries provide concise, comprehensive information to help you manage your hardware configuration. They provide a reporting base to which you can add your own reports. Several types of reports are provided: Postprocessor, MICF Inquiries, Management Objective, and Exception. In addition, the standard SAS language interface makes generalized inquiry and analysis readily available.

The Hardware and SCP Analyzer provides the following reports, which are briefly described here and discussed in greater detail in Chapters 3 and 4 of this guide:

Report Category	Report Name
Post Processor	Cache Subsystem Activity Detail Report
	Cache Subsystem Activity Summary Report
	Channel Path Activity Report
	Coupling Facility Report
	CPU Activity Report
	Crypto Hardware Activity Report
	Device Activity Report
	Enqueue Activity Report
	Enterprise Disk Systems Report
	FICON Director Activity Report
	I/O Queuing Activity Report
	Page Data Set Activity Report
	Paging Activity Report
	RMF Summary Report
	Serialization Delay Report
	Shared Device Activity Report
	Storage Group Device Report
	USS Kernel Activity Report
	Virtual Storage Summary Report
	Virtual Storage Detail Report
	Workload Manager Goal Mode Report
	XCF Activity Report
MICF Inquiries	Daily Logical Control Unit Activity
	DASD Response Time Components
	Daily Channel Utilization Analysis
	Daily System, Demand and Swap Paging
	Weekly Track of JES Real Memory Use
	Sysplex Aggregation Compliance Report

(plus all Post Processor reports)

Management Objective	Top Service Classes Service Units Consumers Report Detail Service Unit Consumption Report Resource Consumption Report
Exception	Hardware Exception Value Analysis Report SCP Exception Value Analysis Report

POSTPROCESSOR REPORTS

Postprocessor reports provide reports equivalent to those produced by the IBM RMF postprocessor.

MICF INQUIRIES

The CA MICS Information Center Facility (MICF) is a panel-oriented productivity tool that gives you access to information in the CA MICS database. When you define input, selection criteria, and report options, MICF dynamically builds an inquiry program to fulfill your request. The inquiry program is executed either in batch mode or interactive mode. The results of the request are displayed at the terminal, and either printed or cataloged for later replay according to your specifications.

The Hardware and SCP Analyzer includes standard MICF inquiries that are immediately useful. You can either use these inquiries directly from the MICF shared inquiry catalog or copy inquiries to your private inquiry catalog and tailor them to your specific needs.

MANAGEMENT OBJECTIVE REPORTS

Management Objective reports summarize the activities of the IT organization. These reports provide status information, trend information, or a comparison of planned and actual results. The management control reports that accompany this product can help you track system performance and service, and plan for future resource requirements.

The Management Objective reports provide a concise, graphical or tabular representation of the data center's processing objectives and how well they have been met. You define the

objectives for the reports through a series of parameters. The reports are produced during normal CA MICS processing on a daily, weekly, and monthly basis. These reports can be activated or deactivated for a timespan (DAILY, WEEKLY, or MONTHLY).

EXCEPTION REPORTS

The CA MICS exception process provides management and technical personnel with a means to identify deviations from data center objectives that require the attention of the technical staff. CA MICS operational exception reports organize and report problems in terms of their severity and user-defined thresholds. The operational exceptions also associate the problems with their respective management areas.

The Hardware and SCP Analyzer defines numerous exceptions that are used by the CA MICS exception process.

1.4 Files Overview

The CA MICS Hardware and SCP Analyzer divides its data into the following information areas:

- o Hardware Information Area (HAR): Input data sources and output files are summarized in Figure 1-1.
- o SCP Information Area (SCP): Input data sources and output files are summarized in Figure 1-2.
- o Workload Management Information Area (WLM): Input data sources and output files are summarized in Figure 1-3.

The files and data elements that comprise the HAR, SCP, and WLM information areas are described in detail in Chapter 5.

Input Data Source	Output Files
RMF CPU Activity record (type 70 subtype 1)	CPU Activity File (HARCPU) Individual Processor Activity File (HARIPU) PR/SM LPAR Configuration and Activity File (HARLPC) PR/SM LPAR Logical Processor Activity File (HARVPA) Physical Hardware File (HARPHY)
RMF Cryptographic Hardware Activity record (type 70 subtype 2)	Crypto Accelerator Activity File (HARCRA) ICSF Services Activity File (HARCRF) Crypto CCA Coprocessor Activity File (HARCRP) Crypto PKCS11 Coprocessor Activity File (HARCRK)
RMF Channel Path Activity record (type 73)	Physical Channel Activity File (HARPCA)
RMF Device Activity record (type 74 subtype 1)	Device Activity File (HARDVA) Device Type Activity File (HARDTA) Storage Group Activity File (HARSGA) Physical Hardware File (HARPHY)
RMF Coupling Facility Activity record (type 74 subtype 4)	CF Configuration and Activity File (HARCFP) CF Connectivity File (HARCFC) CF Structure File (HARCFSS) CF Request File (HARCFR) CF Cache Structure Activity File (HARCFH) CF Duplexing Activity File (HARCFD) CF Channel Path File (HARCFA)
RMF Cache Subsystem Activity record (type 74 subtype 5)	Cache Control Unit Activity File (HARCCU) Cache Volume Activity File (HARCVA) RAID Rank Activity File (HARRRA)
RMF FICON Director Statistics record (type 74 subtype 7)	FICON Director Connector File (HARFDC) FICON Director Port Activity File (HARFDP)
RMF Enterprise Disk System Statistics record (type 74 subtype 8)	ESS Link Statistics File (HARELS) ESS Extent Pool Statistics File (HARXPS) ESS Rank Statistics File (HARERS)
RMF Monitor II Activity record: Reserve Data (type 79 subtype 6)	Hardware Reserve Activity File (HARRSV)
Hardware capacity, reporting, and statistics record (type 113 subtype 2)	CPU Measurement Facility Engine File (HARCME) CPU Measurement Facility EngType File (HARCMT) CPU Measurement Facility LPAR File (HARCMT)

Figure 1-1. Hardware Information Area Structure

Input Data Source	Output Files
RMF Paging Activity record (type 71)	Paging Activity File (SCPPAG) Swap Activity File (SCPSWP)
RMF Serialization Delay record (type 72 subtype 5)	Serialization Delay Details File (SCPSRD) Serialization Delay System File (SCPSRS)
RMF Device Activity record (type 74 subtype 1)	Logical Control Unit Activity File (SCPLCU)
RMF XCF Activity record (type 74 subtype 2)	XCF System Activity File (SCPXCY) XCF Member Activity File (SCPXCM) XCF Path Activity File (SCPXCA)
RMF USS Kernel Activity record (type 74 subtype 3)	USS Kernel Activity File (SCPKRN)
RMF Page Data Set Activity record (type 75)	Page Data Set Activity File (SCPPSD)
RMF Trace Activity record (type 76)	RMF Trace Activity File (SCPTRC)
RMF Enqueue Activity record (type 77)	Resource Enqueue Activity File (SCPENQ)
RMF I/O Queuing Activity record (type 78 subtype 3)	Logical Channel/CU Activity File (SCPLCA) I/O Queuing Configuration File (SCPIOC) Logical Control Unit Activity File (SCPLCU) I/O Processor Activity File (SCPIOP)
RMF Virtual Storage Activity record (type 78 subtype 2)	Virtual Storage System Usage File (SCPVSM) Virtual Storage Private Usage File (SCPVSU)
RMF Monitor II Activity record: ARD Data (type 79 subtype 2)	Address Space Activity File (SCPARD)
RMF Monitor II Activity record: SRCS Data (type 79 subtype 3)	Real Storage/CPU/SRM File (SCPSRC)

Figure 1-2. SCP Information Area Structure

Input Data Source	Output Files
RMF Workload Activity record (type 72 subtype 3)	Service Definition File (WLMSE) Resource Group File (WLMRGP) Service Client File (WLMSCV) Service Class Subsystem Delay States File (WLMSEDS) Report Class Subsystem Delay States File (WLM_EW) Service Class File (WLMSEA) Report Class File (WLM_EA) Service Class Resource Consumption File (WLMSEC) Report Class Resource Consumption File (WLM_EC) Service Class Response Time File (WLMSEM) Report Class Response Time File (WLM_EM) Service Class General Execution Delay File (WLMSED) Report Class General Execution Delay File (WLM_ED)

Figure 1-3. WLM Information Area Structure

1.5 Product Prerequisites and Considerations

The Hardware and SCP Analyzer runs in a CA MICS environment operating under z/OS.

You must have IBM's Resource Measurement Facility (RMF) active on your system. To ensure full Hardware and SCP Analyzer functionality, certain record types must be recorded (see Figures 1-1 through 1-3). RMF Trace Activity records (type 76) will only be recorded when an RMF trace is being run. RMF Monitor II Activity records (type 79) will only be recorded if an RMF Monitor II background session is being run.

The RMF Monitor III data gatherer must be started and properly configured if you want to use these files:

HARCFP	SCPXY
HARCFB	SCPXM
HARCFB	SCPXA
HARCFR	
HARCFH	
HARCFD	

Chapter 2: USAGE GUIDELINES

The CA MICS database contains RMF performance and utilization data for the following:

- o CPU activity including PR/SM LPAR
- o Channel path activity
- o I/O queuing
- o Device activity
- o Paging and swapping activity
- o Page data set activity
- o Central, expanded, and auxiliary storage
- o Virtual storage
- o Workload activity
- o Enqueue activity
- o Reserve activity
- o Caching activity
- o Unix System Services activity
- o Cryptographic hardware activity
- o FICON director activity
- o Storage subsystems activity
- o Physical hardware
- o Serialization delays

The following sections describe methods for using the Analyzer's data and the interfaces between the Hardware and SCP Analyzer and other CA MICS products:

- 1 - Data Analysis
- 2 - CA MICS Product Interfaces

This section contains the following topics:

[2.1 Data Analysis](#) (see page 24)

[2.2 CA MICS Product Interfaces](#) (see page 25)

2.1 Data Analysis

The following identifies methods of analyzing the CA MICS Hardware and SCP Analyzer's data:

Capacity

The Hardware and SCP Analyzer provides utilization and workload information that is essential for determining current and future capacity requirements. System resources such as central processors, channel paths, devices, central storage, expanded storage, the I/O subsystem, and the paging subsystem can be examined to be sure they are not approaching site-determined capacity thresholds.

Performance

The Hardware and SCP Analyzer can be used to evaluate the performance of system resources. Transaction response times (as defined by RMF) can be evaluated. Device I/O times and IOS queuing times can be analyzed to ensure they are not causing response-time problems. Central and expanded storage use and paging subsystem performance can be evaluated to ensure they are not detracting from system throughput.

Workload Characterization

A necessary task in any capacity evaluation effort is workload characterization. The Hardware and SCP Analyzer can provide data to determine a system's primary workload components and the amount of resources consumed by those components. It is possible to determine, on a per-transaction basis, average CPU utilization, number of I/Os, storage requirements, etc.

Trends

You can identify trends by comparing measurements taken in the current month with similar measurements from the previous month. Some uses of trend analysis include analyzing CPU utilization, I/O counts, workload, and, to some degree, transaction response time (as defined by RMF).

Configuration

You can use the Hardware and SCP Analyzer to support utilization studies to determine if the configuration is adequate for the needs of the enterprise. If the utilization is inappropriate for the users' needs, appropriate budgetary actions can be taken.

Such analysis, performed daily or weekly, will indicate unused hardware on the system and provide the necessary information for operations to properly distribute the work over all the resources. This will minimize the under- or over-utilization of devices.

Problem Resolution

When system-related problems occur, it is not always easy to determine where and how they originated and what is impacted. The Hardware and SCP Analyzer can be used to assist in determining when a problem first occurred, what workload component was responsible, and the system components affected by the problem.

Bottlenecks

The Hardware and SCP Analyzer can be a valuable tool in analyzing bottlenecks to identify the causes that result in poor usage of the data center's capacity. The analysis can be used to maximize system usage and balance the distribution of the workload over the available resources.

2.2 CA MICS Product Interfaces

Data from the CA MICS Hardware and SCP Analyzer lends significant value to the use of other CA MICS products. These uses are described briefly in the following sections:

- 1 - Capacity Planner Interface
- 2 - Performance Manager Interface

CA MICS Accounting and Chargeback does not use any data elements from the Hardware and SCP Analyzer. RMF data cannot be associated with a particular user of system resources. Because of this, RMF data is not useful for accounting purposes.

2.2.1 Capacity Planner Interface

The CA MICS Capacity Planner can make extensive use of the CA MICS Hardware and SCP Analyzer for studies that characterize a system's workloads, track CPU utilization, track LPAR utilization, analyze I/O workload, analyze paging and swapping activity, and implement numerous other analyses.

See the CA MICS Capacity Planner Guide for information on what files and elements from the Hardware and SCP Analyzer are used.

2.2.2 Performance Manager Interface

The CA MICS Performance Manager product can make extensive use of the CA MICS Hardware and SCP Analyzer for studies that characterize a system's workloads; analyze the installation performance parameters; analyze central, expanded, and auxiliary storage activity; analyze virtual storage usage; and implement numerous other analyses.

See the Performance Manager Guide for information on what files and elements from the Hardware and SCP Analyzer are used.

Chapter 3: REPORTS

The CA MICS Hardware and SCP Analyzer produces reports using the batch and interactive reporting facilities of CA MICS. The reports can be categorized as postprocessor, MICF inquiry, management, exception reports, CSV (Comma Separated Value) extracts, and NSM Performance Trend data extracts.

Postprocessor reports provide a concise representation of a data center's workload, resource use, and response to the workload.

MICF inquiries are printer reports and color graphics that are accessed via the CA MICS Information Center Facility (MICF). MICF inquiries help you quickly and easily produce meaningful reports from the data in the CA MICS database and provide the flexibility to code and save your own report formats.

Management reports provide a concise graphic or tabular representation of the data center's processing objectives and how well they have been met.

Exception reports contain an integrated and itemized list of the problems affecting a data center's effectiveness in terms of availability, service, workload, standards, security, and performance. Exception reports are discussed in Chapter 4 of this guide.

CSV extracts are a list of data extracted from the CA MICS database and stored in Comma Separated Value (CSV) format. The information extracted is accessible via the Q&R Workstation and can automatically generate charts using the CA MICS Reporting application.

This section contains the following topics:

[3.1 Postprocessor Reports](#) (see page 28)

[3.2 MICF Inquiries](#) (see page 101)

[3.3 Management Objective Reports](#) (see page 242)

[3.4 CSV Extracts](#) (see page 261)

[3.5 NSM Performance Trend Data Extracts](#) (see page 279)

3.1 Postprocessor Reports

The postprocessor reports are used to provide information about hardware and system software in a format similar to the output of the IBM RMF Postprocessor Program. The purpose of these reports is to provide RMF data in a format already familiar to analysts, but to do so from the CA MICS database rather than from raw SMF records, and to provide summarization capabilities not present in the IBM product.

Since the format and contents of a given report frequently vary with different operating system releases and CPU models, the CA MICS Hardware and SCP Analyzer reporting software detects these variables for each SYSID in the unit database, and formats the reports accordingly. Thus, reports for multiple SYSIDs with different characteristics are correctly produced in a single report run.

The following sections describe the reports and their operation.

- 1 - Report Descriptions
- 2 - Running the Postprocessor Reports

3.1.1 Report Descriptions

The postprocessor reports depend on some non-essential elements being in the CA MICS database. The reports cannot be produced if the CA MICS database contains essential elements only. One way to verify that the CA MICS database contains non-essential elements is to specify `ESSENTIAL ALL` in `sharedprefix.MICS.PARMS(CPLXDEF)`. See section 2.3.1.8 of the PIOM for more information on the `ESSENTIAL` option. An alternative is to specify `COMPOPT ALL` in `sharedprefix.MICS.GENLIB(RMFGENIN)`. See section 4.2.4 of the System Modification Guide for more information on the `COMPOPT` option.

The postprocessor reports are described in the following sections:

- 1 - CPU Activity Report
- 2 - Channel Path Activity Report
- 3 - I/O Queuing Activity Report
- 4 - Device Activity Report
- 5 - Paging Activity Report
- 6 - Enqueue Activity Report
- 7 - Page Data Set Activity Report
- 8 - Virtual Storage Activity Report
- 9 - RMF Summary Report
- 10 - Cross-System Coupling Facility Reports
- 11 - Coupling Facility Reports
- 12 - Workload Activity Goal Mode Report
- 13 - Cache Subsystem Activity Summary Report
- 14 - Cache Subsystem Activity Detail Report
- 15 - USS Kernel Activity Report
- 16 - Crypto Hardware Activity Report
- 17 - FICON Director Activity Report
- 18 - Shared Device Activity Report
- 19 - Enterprise Disk Systems Report

3.1.1.1 CPU Activity Report

Figure 3-1 shows a sample of the output produced when the CPU Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFCPU4 - for all systems

The CA MICS files used to generate the report are:

- o HARCPU
- o HARIPU
- o HARLPC
- o HARVPA

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****  
**   Note: This report cannot be produced if the CA MICS   **  
**   database contains essential data elements only.       **  
*****
```

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P A R T I T I O N D A T A R E P O R T															Page 002			
z/OS		System ID SYS1						Date mm/dd/yy				Interval 0:30:00.00						
Release VnRn		RMF Version 770						Time 23:59:00				Cycle 1.000 Seconds						
MVS Partition Name		SYS1						Number of Physical Processors				18		Group Name		CAPGRPT		
Image Capacity		598						CP				8		Limit		100		
Number of Configured Partitions		4						ICF				4		Available		23		
Wait Completion		NO						AAP				5						
Dispatch Interval		DYNAMIC						IFL				0						
								IIP				1						
----- Partition Data ----- -- Logical Partition Processor Data -- -- Average Processor Utilization Percentages --																		
Name	S	Wgt	Def	Act	Def	WLM%	Processor- Num	Type	Effective	Total	Logical Processors Effective	Total	LPAR Mgmt	Effective	Total			
SYSZ	A	500	0	15	NO	0.0	6	CP	0.05.40.385	0.06.01.435	3.15	3.35	0.15	2.36	2.51			
SYS1	A	10	0	0	NO	0.0	8	CP	0.00.00.000	0.00.00.000	0.00	0.00	0.00	0.00	0.00			
PHYSICAL									0.03.27.385				1.44		1.44			
TOTAL									0.05.40.385		0.09.28.821		1.59		2.36		3.95	
COUPLE1	A	DED					2	ICF	0.59.59.895	0.59.59.903	100.0	100.0	0.00	50.00	50.00			
COUPLE2	A	10					2	ICF	0.00.02.627	0.00.03.800	0.07	0.11	0.02	0.04	0.05			
PHYSICAL									0.02.52.920				2.40		2.40			
TOTAL									1.00.02.523		1.02.56.624		2.42		50.04		52.45	
SYSZ	A	500					3	AAP	0.00.17.567	0.00.49.645	0.33	0.92	0.30	0.16	0.46			
PHYSICAL									0.01.20.910				0.75		0.75			
TOTAL									0.00.17.567		0.02.10.556		1.05		0.16		1.21	
SYS1	A	10					1	IIP	0.00.00.703	0.00.02.357	0.01	0.03	0.03	0.01	0.04			
PHYSICAL									0.00.05.810				0.09		0.08			
TOTAL									0.00.00.703		0.00.08.167		0.12		0.01		0.12	
DUMMY1	D																	
DUMMY2	D																	

Figure 3-1. CPU Activity Report - PR/SM LPAR Partition Data (Part 2 of 4)

3.1.1.2 Channel Path Activity Report

Figure 3-2 shows a sample of the output produced when the Channel Path Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFCHA2 - for all systems

The CA MICS file used to generate the report is:

- o HARPCA

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****  
** NOTE: This report cannot be produced if the CA MICS      **  
**          database contains essential data elements only.  **  
*****
```

CHANNEL PATH ACTIVITY REPORT																Page 001			
z/OS				System ID SYS1				Date mm/dd/yy				Interval 0:10:00.00							
Release VnRn				RMF Version 790				Time 9:50:00				Cycle 1.000 Seconds							
IODF = 02				Created: ddmmyy:14:48:33.00				ACT: Activate				CPMF: Extended Mode				CSSID: 0			
OVERVIEW FOR DCM-MANAGED CHANNELS																			
Channel		Utilization(%)				Read (MB/Sec)		Write (MB/Sec)											
Group	G	No	Part	Total	Bus	Part	Total	Part	Total										
OSD		5	0.03	0.22	0.00	0.07	0.34	0.04	0.47										
FC_S	13	7	0.88	5.73	0.96	1.61	11.49	2.29	3.88										
DETAILS FOR ALL CHANNELS																			
Channel Path		Utilization(%)				Read(MB/Sec)		Write(MB/Sec)		FICON Operations				zHPF Operations					
ID	Type	G	Speed	SHR	Part	Total	Bus@	Part	Total	Part	Total	Part	Total	Rate	Active	Defer	Rate	Active	Defer
00	CFP			Y	-----	-----													
01	CFP			Y	-----	-----													
08	OSD		1.6G	Y	0.11	0.47	0.00	0.28	0.97	0.09	1.49								
09	OSD		1.6G	Y	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
18	OSM		1G	Y	0.01	2.03	0.00	0.00	0.00	0.00	0.00								
19	OSM		1.6G	Y	0.01	0.18	0.00	0.00	0.00	0.00	0.00								
1B	OSX		25.6G	Y	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
30	FC_S	13	8G	Y	2.87	18.58	0.50	0.48	3.09	0.88	4.90	1242.0	20.51	0.00	287.73	2.14	0.00		
31	FC_S	13	8G	Y	0.04	0.91	0.13	0.07	0.61	0.27	1.51	57.46	1.11	0.00	38.00	2.03	0.00		
CF	CIB				OFFLINE														
E2	IQD			Y	See Hipersocket Section of Report														
E3	IQD			Y	See Hipersocket Section of Report														
DETAILS FOR HIPERSOCKETS																			
Channel Path		Write(B/Sec)				Message Rate		Message Size		Send Fail		Receive Fail							
ID	Type	G	SHR	Part	Total	Part	Total	Part	Total	Part	Total	Part	Total	Part	Total	Part	Total		
E2	IQD		Y	0	0	0	0	-----	-----	0.00		0.00		0.00		0.00			
E3	IQD		Y	34.78K	138.42K	97	187	356.81	737.34	0.00		0.00		0.00		0.00			

Figure 3-2. Channel Path Activity Report

3.1.1.3 I/O Queuing Activity Report

Figure 3-3 shows a sample of the output produced when the I/O Queuing Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFIOQ3 - for all systems

The CA MICS files used to generate the report are:

- o SCPIOC
- o SCPLCA
- o SCPIOP

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****  
** NOTE: This report cannot be produced if the CA MICS      **  
**          database contains essential data elements only.  **  
*****
```

I / O Q U E U I N G A C T I V I T Y R E P O R T															Page 013	
z/OS Release VnRn			System ID SYS1 RMF Version 719			Date mm/dd/yy Time 9:00:00			Interval 0:30:00.00 Cycle 0.100 Seconds							
Total Samples:		17,975	IODF: D5		CR-Date/Time: ddmmyy:09:23:54					CSSID: 1						
IOP	- Initiative Queue -		IOP Utilization			-- % I/O Requests Retried --					Retries / SSCH					
	Activity Rate	Avg Q Lngth	% IOP Busy	I/O Start Rate	Interrupt Rate	All	CP Busy	DP Busy	CU Busy	DV Busy	All	CP Busy	DP Busy	CU Busy	DV Busy	
00	575.255	0.00	18.27	575.255	1489.450	18.0	16.8	0.0	0.0	1.2	0.22	0.20	0.00	0.00	0.01	
01	2369.890	0.01	30.23	2369.889	3359.100	37.7	28.0	9.7	0.0	0.0	0.61	0.45	0.16	0.00	0.00	
02	2531.555	0.01	13.41	2531.555	2402.674	35.7	32.8	2.7	0.1	0.0	0.55	0.51	0.04	0.00	0.00	
03	3659.823	0.13	24.64	3659.822	5537.112	38.7	36.4	2.3	0.0	0.0	0.63	0.59	0.04	0.00	0.00	
04	1515.511	0.01	12.19	1515.511	2877.294	38.6	35.0	3.4	0.1	0.0	0.63	0.57	0.06	0.00	0.00	
05	2290.376	0.01	22.98	2290.376	2806.142	43.3	37.3	5.6	0.3	0.1	0.76	0.66	0.10	0.00	0.00	
SYS	12942.409	0.04	20.29	12942.407	18471.773	38.1	33.6	4.4	0.1	0.1	0.62	0.54	0.07	0.00	0.00	
LCU	CU	DCM Group			Chan. Paths	CHPID Taken	% DP Busy	Avg		Contention Rate	Delay Queue Lngth	Avg CSS Delay	HPAV		Avg Open Exch	Data Xfer Conc
		Min	Max	Def				% CU Busy	CUB Delay				Wait	Max		
0037	3000				*All*	0.030	0.00	0.00	0.0	0.6	0.000	0.00	0.7	0.883	315	1.37
					C3 PF	0.010	0.00	0.00	0.0	0.3						
					C5 NP	0.000	0.00	0.00	0.0	0.0						
					C6 PF	0.005	0.00	0.00	0.0	0.7						
					C7 NP	0.000	0.00	0.00	0.0	0.0						
					C9 PF	0.010	0.00	0.00	0.0	0.8						
					CA NP	0.000	0.00	0.00	0.0	0.0						
004A	5400				*All*	0.355	0.16	0.00	0.0	0.0	0.000	0.00	0.2			
		1	1	1	*DCM*	0.000	0.00	0.00	0.0	0.0						
					0F	0.075	0.00	0.00	0.0	0.0						
					11	0.035	0.00	0.00	0.0	0.0						
					12	0.040	0.00	0.00	0.0	0.0						
					16	0.060	0.00	0.00	0.0	0.0						
					1F	0.050	0.00	0.00	0.0	0.0						
					20	0.045	0.00	0.00	0.0	0.0						
					*30	0.000	0.00	0.00	0.0	0.0						
					44	0.045	1.19	0.00	0.0	0.0						

Figure 3-3. I/O Queuing Activity Report

3.1.1.4 Device Activity Report

Figure 3-4 parts 1 through 4 show a sample of the output produced when the Device Activity Report is requested. Figure 3-4 part 5 shows a sample of the output produced when the Storage Group Device Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE members:

- o @RMFDEV4 - for all systems
- o @RMFDSG4 - for all systems (device/storage group report).

The CA MICS file used to generate the report is:

- o HARDVA

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****  
** NOTE: This report cannot be produced if the CA MICS      **  
**          database contains essential data elements only.  **  
*****
```

C O M M U N I C A T I O N S D E V I C E A C T I V I T Y																	
z/OS			System ID SYSB			Start ddmmyy:23:59:00.00			Page 001								
Release VnRn			RMF Version 780			End ddmmyy:23:58:59.72			Interval 24:00:00.25								
Number of Samples			43,068	IODF: 08			Created: ddmmyy:10:17:19.00			Act: POR							
Dev	Device	Volume	Device	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	%	%	%	Avg	%	%
Num	Type	Serial	LCU	Rate	Resp	IO	CMR	DB	Int	Pend	Disc	Conn	Dev	Dev	Nmbr	Any	Mount
					Time	Time	Dly	Dly	Dly	Time	Time	Time	Conn	Util	Alloc	Alloc	Pend
																	Ready
0080	CTC		005	0.067	1.03	.000	.220	.000	.000	.354	.017	.659	0.00	0.00	0.0	0.0	100.0
0081	CTC		005	0.020	.405	.000	.064	.000	.000	.171	.000	.235	0.00	0.00	0.0	0.0	100.0
0082	CTC		005	0.032	1.04	.000	.088	.000	.000	.216	.552	.274	0.00	0.00	0.0	0.0	100.0
0083	CTC		005	0.147	1.49	.000	.117	.000	.000	.255	.773	.463	0.01	0.02	0.1	1.0	100.0
0084	CTC		005	0.183	1.25	.000	.135	.000	.000	.274	.655	.323	0.01	0.02	0.0	0.0	100.0
0085	CTC		005	0.166	.900	.000	.051	.000	.000	.192	.411	.297	0.00	0.01	0.1	0.0	100.0
0086	CTC		005	0.042	1.62	.000	.179	.000	.000	.323	1.03	.266	0.00	0.01	0.0	0.0	100.0
0087	CTC		005	0.000	.000	.000	.000	.000	.000	.000	.000	.000	0.00	0.00	0.0	0.0	100.0
0088	CTC		005	0.042	.748	.000	.354	.000	.000	.495	.000	.253	0.00	0.00	0.0	0.0	100.0
0089	CTC		005	0.093	1.10	.000	.216	.000	.000	.354	.439	.309	0.00	0.01	0.0	26.0	100.0
008A	CTC		005	0.158	.579	.000	.075	.000	.000	.224	.000	.354	0.01	0.01	0.0	4.0	100.0
			LCU	0.950	.924	.000	.136	.000	.000	.260	.352	.312	0.01	0.04	0.0	2.8	100.0

Figure 3-4. Device Activity Report (Communications Device, Part 1 of 5)

D I R E C T A C C E S S D E V I C E A C T I V I T Y																				Page 003	
z/OS Release VnRn				System ID SYSB RMF Version 780				Start ddmmyy:23:59:00.00 End ddmmyy:23:58:59.16				Interval 23:59:59.52 Cycle 2.000 Seconds									
Number of Samples				42,794		IODF: 08		Created: ddmmyy:10:17:19.00 Act: POR													
Storage Group	Dev Num	Device Type	Number of Cyl	Volume Serial	PAV	LCU	Device Actvty Rate	Avg Resp Time	Avg IOSQ Time	Avg CMR Dly	Avg DB Dly	Avg Int Dly	Avg Pend Time	Avg Disc Time	Avg Conn Time	% Dev Conn	% Dev Util	% Dev Resv	Avg Nmbr Alloc	% Any Alloc	
WORK	0132	33909	10017	WRK001		00B7	0.012	1.41	.000	.220	.000	.047	.354	.017	.659	0.00	0.00	0.0	0.0	100.0	
WORK	0133	33909	10017	WRK002		00B7	0.012	1.66	.000	.064	.000	.361	.171	.000	.235	0.00	0.00	0.0	0.0	100.0	
PROD	0134	33909	10017	PROD01	2	00B7	0.012	.215	.000	.088	.000	.000	.216	.552	.274	0.00	0.00	0.0	0.0	100.0	
PROD	0135	33909	10017	PROD02	2	00B7	0.011	2.96	.000	.117	.000	.181	.255	.773	.463	0.01	0.02	0.1	1.0	100.0	
	0136	33909	10017	ESS001	2	00B7	0.052	.795	.000	.135	.000	.000	.274	.655	.323	0.01	0.02	0.0	0.0	100.0	
TEST	0137	33909	10017	TEST11	1.0H	00B7	0.010	1.11	.000	.051	.000	.000	.192	.411	.297	0.00	0.01	0.1	0.0	100.0	
TEST	0138	33909	10017	TEST02	1.0H	00B7	0.010	1.65	.000	.179	.000	.000	.323	1.03	.266	0.00	0.01	0.0	0.0	100.0	
SYSTEM	0139	33909	10017	SYS008	1	00B7	0.010	.235	.000	.000	.000	.000	.000	.000	.000	0.00	0.00	0.0	0.0	100.0	
	013A	33909	10017	MDBC43	1	00B7	0.012	1.44	.000	.354	.000	.000	.495	.000	.253	0.00	0.00	0.0	0.0	100.0	
PROD	013B	33909	10017	PROD03	2	00B7	0.012	1.56	.000	.216	.000	.000	.354	.439	.309	0.00	0.01	0.0	26.0	100.0	
	013C	33909	10017	STSAD3	1	00B7	0.010	.132	.000	.075	.000	.000	.224	.000	.354	0.01	0.01	0.0	4.0	100.0	
	013D	33909	10017	ERDD25	1	00B7	0.010	.405	.000	.078	.000	.000	.220	.000	.261	0.03	0.03	0.0	0.2	100.0	
PROD	013E	33909	10017	PROD66	2	00B7	0.010	.948	.000	.148	.000	.000	.287	.000	.267	0.02	0.02	0.0	1.1	100.0	
PROD	013F	33909	10017	PROD23	4*	00B7	0.010	1.58	.000	.078	.000	.000	.219	.688	.419	0.07	0.19	0.0	0.8	100.0	
TEST	0140	33909	10017	TEST24	1	00B7	0.010	.294	.000	.106	.000	.000	.239	.618	.298	0.00	0.01	0.0	0.0	100.0	
PROD	0141	33909	10017	PRDD4	13*	00B7	0.010	.395	.000	.047	.000	.000	.192	1.14	.410	0.00	0.01	0.0	0.0	100.0	
						LCU	00B7	0.209	1.04	.000	.122	.000	.125	.251	.395	.318	0.01	0.02	0.0	2.1	100.0
TEMP	0180	33909	10017	TMP001	1	00B8	0.042	.906	.000	.071	.000	.000	.212	.424	.269	0.00	0.00	0.0	0.0	100.0	
TEMP	0181	33909	10017	TMP002	1	00B8	10.299	.774	.000	.088	.000	.000	.238	.016	.520	0.54	0.55	0.0	6.0	100.0	
	0182	33909	10017	POKEM1	2	00B8	0.038	.493	.000	.120	.000	.000	.252	.000	.241	0.00	0.00	0.0	0.0	100.0	
PROD	0183	33909	10017	PROD82	2	00B8	11.673	.487	.000	.131	.000	.000	.273	.002	.211	0.25	0.25	0.0	46.7	100.0	
						LCU	00B8	22.052	.665	.000	.102	.000	.000	.244	.111	.310	0.20	0.19	0.0	13.1	100.0

Figure 3-4. Device Activity Report (Direct Access Device, Part 2 of 5)

MAGNETIC TAPE DEVICE ACTIVITY																			Page 008	
z/OS			System ID SYSB			Start ddmmyy:23:59:00.00			Interval 23:59:59.52											
Release VnRn			RMF Version 780			End ddmmyy:23:58:59.72			Cycle 2.000 Seconds											
Number of Samples		4856		IODF: 08		Created: ddmmyy:10:17:19.00		Act: POR												
Dev Num	Device Type	Volume Serial	Device LCU	Actvty Rate	Avg Resp Time	Avg IOSQ Time	Avg CMR Dly	Avg DB Dly	Avg Int Dly	Avg Pend Time	Avg Disc Time	Avg Conn Time	% Dev Conn	% Dev Util	% Dev Resv	# of Mnts	Avg Tape Mount Time	Time Device Alloc		
0A8D	3480		003B	OFFLINE																
0A8E	3480		003B	OFFLINE																
0A8F	3480		003B	OFFLINE																
		LCU	003B	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0	0:00	0:00		
0A00	3490E	028584	003C	6.502	38.5	.000	.000	4.21		.000	12.1	6.55	1.15	1.55	0.0	17	0:33	8:14		
0A01	3490E	028624	003C	5.285	19.0	.000	.000	.605		.000	4.44	1.29	6.98	7.57	0.0	42	0:24	3:55		
0A02	3490E	028657	003C	5.406	18.4	.000	.000	1.11		.000	5.97	.764	6.46	6.86	0.0	38	0:38	3:76		
0A03	3490E	029265	003C	4.881	15.3	.000	.000	.485		.000	3.00	.386	4.89	5.03	0.0	26	0:29	3:68		
0A04	3490E	004183	003C	1.439	32.1	.000	.000	5.78		.000	14.5	2.22	2.08	2.38	0.0	15	0:23	1:43		
0A05	3490E	018616	003C	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0	0:00	0:00		
0A06	3490E		003C	OFFLINE																
		LCU	003C	25.513	20.5	.000	.000	2.03		.000	6.66	1.86	3.59	3.89	0.0	138	0:31	3:56		

Figure 3-4. Device Activity Report (Tape Device, Part 3 of 5)

GRAPHICS DEVICE ACTIVITY																	Page 015			
z/OS			System ID SYSB			Date ddmmyy			Interval 0:15:00.20											
Release VnRn			RMF Version 750			Time 10:44:00			Cycle 0.500 Seconds											
Number of Samples			1,800																	
Dev	Device	Volume	Device	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	%	%	%	Avg	%	%	%		
Num	Type	Serial	LCU	Actvty	Resp	IOSQ	CMR	DB	Int	Pend	Disc	Conn	Dev	Dev	Dev	Nmbr	Any	Mount	Not	
				Rate	Time	Time	Dly	Dly	Dly	Time	Time	Time	Conn	Util	Resv	Alloc	Alloc	Pend	Ready	
0280			042	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0.0	0.0	0.0	0.0	
0281			042	0.778	.756	.000	.000	1.35		.000	5.52	67.4	3.42	0.26	5.5	0.0	0.0	0.0	0.0	
0282			042	0.211	13.2	.000	.000	15.3		.000	88.4	40.2	3.25	0.07	0.9	0.0	0.0	0.0	0.0	
0283			042	0.184	1.07	.000	.000	17.3		.000	70.6	32.9	3.18	0.06	0.6	0.0	0.0	0.0	0.0	
0284			042	0.186	123	.000	.000	21.3		.000	76.7	43.1	3.30	0.06	0.8	0.0	0.0	0.0	0.0	
0285			042	0.779	11.5	.000	.000	9.02		.000	74.0	38.5	2.88	0.22	3.2	0.0	0.0	0.0	0.0	
0286			042	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0.0	0.0	0.0	0.0	
0287			042	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0.0	0.0	0.0	0.0	
0288			042	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0.0	0.0	0.0	0.0	
0289			042	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0.0	0.0	0.0	0.0	
028A			042	0.000	.000	.000	.000	.000		.000	.000	.000	0.00	0.00	0.0	0.0	0.0	0.0	0.0	
		LCU	042	2.138	29.9	.000	.000	12.8		.000	63.0	44.4	3.20	0.13	2.2	0.0	0.0	0.0	0.0	

Figure 3-4. Device Activity Report (Graphics Device, Part 4 of 5)

D I R E C T A C C E S S D E V I C E A C T I V I T Y																			Page 003		
z/OS Release VnRn				System ID SYSB RMF Version 750				Start ddmmyy:23:59:00.00 End ddmmyy:23:58:59.16				Interval 23:59:59.52 Cycle 2.000 Seconds									
Number of Samples				42,794	IODF: 08		Created: ddmmyy:10:17:19.00				Act: POR										
Storage Group	Dev Num	Device Type	Number of Cyl	Volume Serial	PAV	LCU	Device Actvty Rate	Avg Resp Time	Avg IOSQ Time	Avg CMR Dly	Avg DB Dly	Avg Pend Time	Avg Disc Time	Avg Conn Time	% Dev Conn	% Dev Util	% Dev Resv	Avg Nmbr Alloc	% Any Alloc	% Mount Pend	
	0136	33909	10017	ESS001	2	00B7	0.016	.452	.000	.005	.000	1.10	.201	3.63	0.21	0.03	0.0	10.4	100.0	0.0	
	013A	33909	10017	MDBC43	1	00B7	0.427	.235	.000	.074	.000	.335	1.94	13.4	0.66	0.18	0.0	0.0	100.0	0.0	
	013C	33909	10017	STSD3	1	00B7	0.034	.206	.000	.065	.000	.257	.002	32.2	0.50	0.00	0.0	0.0	100.0	0.0	
	0182	33909	10017	POKEM1	2	00B8	0.421	.314	.000	.030	.000	.291	.105	1.02	0.08	0.00	0.0	11.7	100.0	0.0	
							0.898	.301	.000	.043	.000	.495	.562	12.5	0.36	0.05	0.0	11.7	100.0	0.0	
PROD	0134	33909	10017	PROD01	2	00B7	0.067	1.03	.000	.220	.000	.354	.017	.659	0.00	0.00	0.0	11.7	100.0	0.0	
	0135	33909	10017	PROD02	2	00B7	0.020	.405	.000	.064	.000	.171	.000	.235	0.12	0.12	0.0	0.1	100.0	0.0	
	013B	33909	10017	PROD03	2	00B7	0.032	1.04	.000	.088	.000	.216	.552	.274	0.02	0.02	0.0	0.0	100.0	0.0	
	013F	33909	10017	PROD23	4*	00B7	0.147	1.49	.000	.117	.000	.255	.773	.463	0.00	0.00	0.0	2.0	100.0	0.0	
	0141	33909	10017	PRODD4	13*	00B7	0.183	1.25	.000	.135	.000	.274	.655	.323	0.00	0.00	0.0	0.0	100.0	0.0	
	0183	33909	10017	PROD82	2	00B8	0.166	.900	.000	.051	.000	.192	.411	.297	0.12	0.12	0.0	0.1	100.0	0.0	
PROD							0.615	1.02	.000	.115	.000	.244	.401	.375	0.04	0.04	0.0	11.7	100.0	0.0	
SYSTEM	0139	33909	10017	SYS008	1	00B7	16.125	.205	.000	.087	.000	.352	.774	.328	0.13	0.14	0.0	4.1	100.0	0.0	
SYSTEM							16.125	.205	.000	.087	.000	.352	.774	.328	0.13	0.14	0.0	4.1	100.0	0.0	
TEMP	0180	33909	10017	TMP001	1	00B8	0.067	1.03	.000	.220	.000	.354	.017	.659	0.00	0.00	0.0	78.0	100.0	0.0	
	0181	33909	10017	TMP002	1	00B8	0.020	.405	.000	.064	.000	.171	.000	.235	0.07	0.08	0.0	0.0	100.0	0.0	
TEMP							0.087	.717	.000	.142	.000	.262	.008	.447	0.07	0.08	0.0	0.0	100.0	0.0	
TEST	0137	33909	10017	TEST11	1.0H	00B7	0.032	1.04	.000	.088	.000	.216	.552	.274	0.18	0.21	0.0	0.1	100.0	0.0	
	0138	33909	10017	TEST02	1.0H	00B7	0.147	1.49	.000	.117	.000	.255	.773	.463	0.00	0.01	0.0	13.7	100.0	0.0	
	0140	33909	10017	TEST24	1	00B7	0.183	1.25	.000	.135	.000	.274	.655	.323	0.00	0.00	0.0	1.0	100.0	0.0	
TEST							0.362	1.26	.000	.113	.000	.248	.660	.353	0.00	0.00	0.0	1.0	100.0	0.0	

Figure 3-4. Storage Group Device Activity Report (Direct Access Report, Part 5 of 5)

3.1.1.5 Paging Activity Report

Figure 3-5 shows a sample of the output produced when the Paging Activity Report is requested. The CA MICS files used to generate the report are:

- o SCPPAG
- o SCPSWP

The SAS source code used is in sharedprefix.MICS.SOURCE members named @RMFPAG7.

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****  
** NOTE: This report cannot be produced if the CA MICS      **  
**      database contains essential data elements only.    **  
*****
```

P A G I N G A C T I V I T Y R E P O R T										Page 001
z/OS		System ID SYS1				Date mm/dd/yy		Interval 0:30:02.49		
Release VnRn		RMF Version 780				Time 2:29:00		Cycle 1.000 Seconds		
OPT = IEAOPTNA LFAREA Size = 3221225K Central Storage Paging Rates - in Pages per Second										

		Page In				Page Out				
		-- Non Swap --		--- Total ---				--- Total ---		
		Non				Non				
Category	Swap	Block	Block	Rate	%	Swap	Non Swap	Rate	%	

Pageable System										
Areas (Non-VIO)										
LPA		0.00	0.00	0.00	0.0					
CSA		0.00	0.00	0.00	0.0		0.00	0.00	0.0	

Sum		0.00	0.00	0.00	0.0		0.00	0.00	0.0	
Address Spaces										
Hiperspace		0.00		0.00	0.0		0.00	0.00	0.0	
VIO		0.00		0.00	0.0		0.00	0.00	0.0	
Non-VIO	0.00	0.00	0.00	0.00	0.0	0.00	1.48	1.48	100	

Sum	0.00	0.00	0.00	0.00	0.0	0.00	1.48	1.48	100	
Total System										
Hiperspace		0.00		0.00	0.0		0.00	0.00	0.0	
VIO		0.00		0.00	0.0		0.00	0.00	0.0	
Non-VIO	0.00	0.00	0.00	0.00	0.0	0.00	1.48	1.48	100	

Sum	0.00	0.00	0.00	0.00	0.0	0.00	1.48	1.48	100	
Shared										
			0.00	0.00			0.00	0.00		

Page Movement Within Central Storage				6323.8						
Page Movement Time %				0.0						
Average Number of Pages per Block				0.0						
Blocks per Second				0.00						
Page-in Events (Page Fault Rate)				0.00						

Figure 3-5. Paging Activity Report - (Part 1 of 4)

P A G I N G A C T I V I T Y R E P O R T										Page 002
z/OS		System ID SYS1		Date mm/dd/yy		Interval 0:30:02.49				
Release VnRn		RMF Version 780		Time 2:29:00		Cycle 1.000 Seconds				
OPT = IEAOPTNA LFAREA Size = 3221225K Central Storage Movement and Request Rates - in Pages per Second										

System UIC: Min = 65535		Max = 65535		Avg = 65535						

Central Storage	Page Write	Page Read	----- Frame Counts -----							
-----	-- Rate --	-- Rate --	-- Min --	-- Max --	-- Avg --					
Hiperspace	0.00	2,354.23	25,687	25,687	25,687					
VI0	0.65	0.65	14	18	14					
----- GETMAIN -----										
Storage Requests	Requests	Frames Backed	Req < 2GB	Frames < 2GB	1st	Non-1st				
Rate	383,231	160,089	593	9,705	34,401	4				

Frame and Slot Counts										

Samples = 181	Valid Samples = 177	Valid Samples CSA/Region = 169								

Central Storage Frames	Total	Available	SQA	LPA	CSA	LSQA	Regions+SWA	HV Shared	HV Common	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Min	52,428,800	33439000	59,787	13,212	85,950	488,547	16,446,237	522,450	207,532	
Max	52428800	34613932	60,493	13,212	86,772	510,328	17,622,419	529,529	207,532	
Avg	52428800	33993394	60,098	13,212	86,296	490,634	17,067,625	524,447	207,532	
Fixed Frames	Total	Nucleus	SQA	LPA	CSA	LSQA	Regions+SWA	<16 MB	16MB-2GB	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Min	1,160,779	2,827	54,085	85	9,823	141,656	951,773	119	93,968	
Max	1,230,685	2,827	54,788	85	9,824	142,608	1,021,777	300	97,082	
Avg	1,196,537	2,827	54,395	85	9,823	142,147	987,258	125	95,026	
Shared Frames	Total Slots	Central Storage	Fixed Tot	Fixed Bel	Aux DASD	Aux SCM				
-----	-----	-----	-----	-----	-----	-----				
Min	93,357	83,454	336	0	0	4,224				
Max	93,421	83,518	353	0	0	6,304				
Avg	93,390	83,487	345	0	0	4,645				
Local Page Data Set Slots	Total	Available	Bad	Non-VI0	VI0					
-----	-----	-----	-----	-----	-----					
Min	1,439,995	1,436,138	0	3,702	0					
Max	1,439,995	1,436,293	0	3,857	0					
Avg	1,439,995	1,436,228	0	3,767	0					

Figure 3-5. Paging Activity Report (Part 2 of 4)

P A G I N G A C T I V I T Y R E P O R T							Page 003
z/OS	System ID SYS1		Date mm/dd/yy		Interval 0:30:02.49		
Release VnRn	RMF Version 780		Time 0:00:00		Cycle 1.000 Seconds		
OPT = IEAOPTNA LFAREA Size = 3221225K Memory Objects and Frames							

Memory Objects	Common	Shared	1 MB				
-----	-----	-----	-----				
Min	47	9	388				
Max	47	9	388				
Avg	47	9	388				
1 MB Frames	----- Fixed -----		----- Pageable -----				
-----	Total	Available	In-Use	Total	Available	In-Use	
Min	4,096	2,008	2,088	8,192	5,456	2,736	
Max	4,096	2,008	2,088	8,192	5,471	2,721	
Avg	4,096	2,008	2,088	8,192	5,461	2,731	
High Shared Frames	Total	Central Storage		Aux DASD	Aux SCM		
-----	-----	-----		-----	-----		
Min	13692515	13,167		137678	2,293,760		
Max	13692515	13,168		191365	2,445,312		
Avg	13692515	13,168		164522	2,379,776		
High Common Frames	Total	Central Storage	Fixed 4K	Aux DASD	Aux SCM		
-----	-----	-----	-----	-----	-----		
Min	17301504	10,162	2,999	8,736	4,224		
Max	17301504	10,187	2,999	8,747	4,352		
Avg	17301504	10,176	2,999	8,740	4,258		

Figure 3-5. Paging Activity Report (Part 3 of 4)

PAGING ACTIVITY REPORT												Page 003							
z/OS		System ID SYS2				Date mm/dd/yy		Interval 0:30:02.49											
Release VnRn		RMF Version 715				Time 2:29:00		Cycle 0.333 Seconds											
OPT = IEAOPT00												S W A P P L A C E M E N T A C T I V I T Y							

--- Auxiliary Storage -----												*--- Log. Swap ---*	*----- Expanded Storage -----*	* Log Swap/					
Via														Exp. Stor					
Total												Total	Effective	Direct	Total	Migrated	Effective	Effective	
-----													-----	-----	-----	-----	-----	-----	-----
Terminal	Ct	997	0	0	0	951	929	46	68	0	68	997							
Output	Rt	0.55	0.00	0.00	0.00	0.53	0.52	0.03	0.04	0.00	0.04	0.55							
Wait	%	23.2%	0.0%	0.0%	0.0%	95.4%	97.7%	4.6%	6.8%	0.0%	100.0%	100.0%							
Terminal	Ct	212	3	0	0	199	165	13	47	3	44	209							
Input	Rt	0.12	0.00	0.00	0.00	0.11	0.09	0.01	0.03	0.00	0.02	0.12							
Wait	%	4.9%	1.4%	0.0%	0.0%	93.9%	82.9%	6.1%	22.2%	6.4%	93.6%	98.6%							
Long	Ct	1,641	16	6	9	1,566	1,457	69	169	1	168	1,625							
Wait	Rt	0.91	0.01	0.00	0.00	0.87	0.81	0.04	0.09	0.00	0.09	0.90							
	%	38.2%	1.0%	37.5%	56.3%	95.4%	93.0%	4.2%	10.3%	0.6%	99.4%	99.0%							
Detected	Ct	1,435	156	17	120	1,417	1,227	1	71	19	52	1,279							
Wait	Rt	0.80	0.09	0.01	0.07	0.79	0.68	0.00	0.04	0.01	0.03	0.71							
	%	33.4%	10.9%	10.9%	76.9%	98.7%	86.6%	0.1%	4.9%	26.8%	73.2%	89.1%							
Unilateral	Ct	1	0	0	0	1	1	0	0	0	0	1							
	Rt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
	%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%							
Transition	Ct	12	0	0	0	0	0	12	12	0	12	12							
To Non-	Rt	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01							
Swappable	%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%	100.0%							
Total	Ct	4,298	175	23	129	4,134	3,779	141	367	23	344	4,123							
	Rt	2.38	0.10	0.01	0.07	2.29	2.10	0.08	0.20	0.01	0.19	2.29							
	%	100.0%	4.1%	13.1%	73.7%	96.2%	91.4%	3.3%	8.5%	6.3%	93.7%	95.9%							
Auxiliary Storage - Average Pages per Swap Out -						115	Occurrences of Terminal Output Wait -				997								
Average Pages per Swap In -						123													

Figure 3-5. Paging Activity Report (Part 4 of 4)

3.1.1.6 Enqueue Activity Report

Figure 3-6 shows a sample of the output produced when the Enqueue Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFENQ1 - for all systems

The CA MICS file used to generate the report is:

- o SCPENQ

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****
** NOTE: This report cannot be produced if the CA MICS      **
**          database contains essential data elements only.  **
*****
```


ENQUEUE ACTIVITY REPORT															Page 001	
z/OS		System ID SYSA				Date mm/dd/yy				Interval 0:14:59.99						
Release VnRn		RMF Version 712				Time 8:45:00				Cycle 1.000 Seconds						
ENQUEUE DETAIL ACTIVITY																
- Name -	----	Contention Time	-----	-- Jobs at Maximum Contention --		- Pct Queue Length -		Average	- Request Type -					Total		
Major	Min=	Tot=		----- Own -----	Wait -----	--- Distribution ---		Queue	- EXC.-	-SHR.-				Event		
Minor	Max=	Avg=		Tot Name/Sysnm	Tot Name/Sysnm	1 2 3 4+		Length	Min Max	Min Max						

SYSIGGV2																
USERCAT.VTEST01(Systems)																
	Min=	0.046	Tot= 0.172	1 CATALOG (E)	1 CATALOG (S)	100 0.0 0.0 0.0		1.00	0 0	1 1				3		
	Max=	0.079	Avg= 0.057	SYSA	SYSA											
SYSZTIOT																
ASID=001C																
	Min=	0.128	Tot= 0.128	1 SMET204 (E)	1 SMET204 (S)	100 0.0 0.0 0.0		1.00	0 0	1 1				1		
	Max=	0.128	Avg= 0.128	SYSA	SYSA											
SYSZVVD5																
SYSA.MSTRCAT																
	Min=	0.000	Tot= 0.058	1 CATALOG (E)	1 CATALOG (E)	100 0.0 0.0 0.0		1.00	1 1	0 0				3		
	Max=	0.038	Avg= 0.019	SYSA	SYSA											
M204DEV2																
00B61188																
	Min=	0.003	Tot= 0.003	1 SDB400ND(E)	1 SMET204 (E)	100 0.0 0.0 0.0		1.00	1 1	0 0				1		
	Max=	0.003	Avg= 0.003	SYSA	SYSA											
M204PRD2																
00B615C8																
	Min=	0.001	Tot= 0.013	1 SDB400ND(E)	1 SMA100ND(E)	100 0.0 0.0 0.0		1.00	1 1	0 0				5		
	Max=	0.004	Avg= 0.003	SYSA	SYSA											
M204PROD																
00B613C0																
	Min=	0.000	Tot= 0.005	1 SDB400ND(E)	1 SME120ND(E)	100 0.0 0.0 0.0		1.00	1 1	0 0				3		
	Max=	0.004	Avg= 0.002	SYSA	SYSA											
M204QAT1																
00B6C0C8																
	Min=	0.000	Tot= 0.012	1 SDB430ND(E)	1 SMAU1 (E)	100 0.0 0.0 0.0		1.00	1 1	0 0				9		
	Max=	0.003	Avg= 0.001	SYSA	SYSA											
M205-MVS																
M204DEV2																
	Min=	1.938	Tot= 9.985*	1 SMET204 (E)	1 SDB440ND(E)	100 0.0 0.0 0.0		1.00	1 1	0 0				2		
	Max=	8.047	Avg= 4.992	SYSA	SYSA											
M204PRD2																
	Min=	1.668	Tot= 67.824	1 SMA100ND(E)	1 SDB420ND(E)	100 0.0 0.0 0.0		1.00	1 1	0 0				4		
	Max=	43.816	Avg= 16.956	SYSA	SYSA											
M204PROD																
	Min=	2.403	Tot= 528.563*	1 SME120ND(E)	1 SDB410ND(E)	100 0.0 0.0 0.0		1.00	1 1	0 0				2		
	Max=	526.214	Avg= 264.281	SYSA	SYSA											
M204QAT1																
	Min=	2.000	Tot= 386.188	1 SMAU1 (E)	1 SDB430ND(E)	100 0.0 0.0 0.0		1.00	1 1	0 0				4		
	Max=	361.577	Avg= 96.547	SYSA	SYSA											

Figure 3-6. Enqueue Activity Report

3.1.1.7 Page Data Set Activity Report

Figure 3-7 shows a sample of the output produced when the Page Data Set Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFPSD1 - for all systems

The CA MICS file used to generate the report is:

- o SCPPSD

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****
** NOTE: This report cannot be produced if the CA MICS      **
**          database contains essential data elements only.  **
*****
```

PAGE DATA SET ACTIVITY REPORT														Page 001
z/OS Release VnRn		System ID SYSA RMF Version 780				Date mm/dd/yy Time 9:45:00			Interval 0:15:00.00 Cycle 1.000 Seconds					
Number of Samples		900												
PAGE DATA SET AND SCM USAGE														
Page Space Type	Serial Number	Dev Num	Device Type	Slots Alloc	---- Min	Slots Used Max	---- Avg	Bad Slots	Pct. in Use	Page Trans Time	Number of I/O Reqs.	Pages Trans- ferred	V I 0 Data Set Name	
PLPA	MVPP31	4D4D	3390	7500	2601	2601	2601	0	0.00	0.000	1	0	SYS1.PLPA.APAGE1	
COMMON	MVPP31	4D4D	3390	15000	28	28	28	0	0.00	0.000	0	0	SYS1.COMMON.APAGE1	
LOCAL	MVP31A	4BFC	3390	15000	272	296	272	0	0.11	0.010	6	102 Y	SYS1.LOCAL1.APAGE1	
LOCAL	MVP31B	49D7	3390	15000	264	264	264	0	0.00	0.000	4	6 Y	SYS1.LOCAL2.APAGE1	
LOCAL	MVP31C	4745	3390	15000	187	217	187	0	0.11	0.008	7	120 Y	SYS1.LOCAL3.APAGE1	
SCM	N/A	N/A	N/A	15000	187	217	187	0	0.11	0.008	7	120 Y	N/A	

Figure 3-7. Page Data Set Activity Report

3.1.1.8 Virtual Storage Activity Reports

These reports are produced when the Summary Virtual Storage Activity Report and Detail Virtual Storage Activity Report are requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFVSS2 - for all systems

The CA MICS file used to generate the report is:

- o SCPVSM

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****  
** Note: This report cannot be produced if the CA MICS      **  
**      database contains essential data elements only.    **  
*****
```

VIRTUAL STORAGE ACTIVITY REPORT											
z/OS			System ID SYSA			Date mm/dd/yy			Interval 0:15:00.00		
Release VnRn			RMF Version 712			Time 9:45:00			Cycle 1.000 Seconds		
Page 009											
COMMON STORAGE SUMMARY											
Number of Samples			90								
===== STATIC STORAGE MAP =====											
Area	Address	Size	===== ALLOCATED CSA/SQA =====								
-----			----- Below 16M -----			----- Extended (Above 16M) -----					
			Min	Max	Avg	Min	Max	Avg			
-----			-----								
EPVT	2C00000	2004M									
ECSA	23E0000	8320K	SQA	428K 9:45:00	444K 9:57:20	430K	2072K 9:45:00	2076K 9:57:50	2072K		
EMLPA	23D2000	56K	CSA	432K 9:45:00	432K 9:45:00	432K	4336K 9:45:00	4340K 9:49:40	4338K		
EFLPA	23CE000	16K									
EPLPA	1C86000	7456K	ALLOCATED CSA BY KEY								
ESQA	1356000	9408K	0	244K 9:45:00	244K 9:45:00	244K	300K 9:45:00	300K 9:45:00	300K		
ENUC	1000000	3416K	1	128K 9:45:00	128K 9:45:00	128K	48K 9:45:00	48K 9:45:00	48K		
----- 16 Meg Boundary -----			2	0K 9:45:00	0K	0K	816K 9:45:00	816K 9:45:00	816K		
Nucleus	FB3000	308K	3	0K 9:45:00	0K	0K	0K 9:45:00	0K	0K		
SQA	E93000	1152K	4	4K 9:45:00	4K 9:45:00	4K	64K 9:45:00	64K 9:45:00	64K		
PLPA	BD6000	2804K	5	12K 9:45:00	12K 9:45:00	12K	36K 9:45:00	36K 9:45:00	36K		
FLPA	0	0K	6	40K 9:45:00	40K 9:45:00	40K	976K 9:45:00	980K 9:49:40	978K		
MLPA	BC9000	52K	7	0K 9:45:00	0K	0K	0K 9:45:00	0K	0K		
CSA	800000	3876K	8-F	4K 9:45:00	4K 9:45:00	4K	2096K 9:45:00	2096K 9:45:00	2096K		
Private	1000	8188K	SQA EXPANSION INTO CSA								
PSA	0	4K		0K 9:45:00	0K	0K	0K 9:45:00	0K	0K		
LOST PLPA SPACE:											
Intermodule Space:			4K	in PLPA and	12K	in EPLPA					
MLPA/FLPA Redundancy:			56K	in PLPA and	18K	in EPLPA					
			----- Below 16M -----			----- Above 16M -----					
			Min	Max	Avg	Min	Max	Avg			
-----			-----								
CSA											
Free Pages (Bytes)			3444K 9:45:00	3444K 9:45:00	3444K	3980K 9:49:40	3984K 9:45:00	3981K			
Largest Free Block			3444K 9:45:00	3444K 9:45:00	3444K	3980K 9:49:40	3984K 9:45:00	3981K			
Allocated Area Size			432K 9:45:00	432K 9:45:00	432K	4336K 9:45:00	4340K 9:49:40	4338K			
SQA											
Free Pages (Bytes)			708K 9:57:20	724K 9:45:00	721K	7332K 9:57:50	7336K 9:45:00	7335K			
Largest Free Block			708K 9:57:20	724K 9:45:00	721K	7120K 9:45:00	7120K 9:45:00	7120K			
Allocated Area Size			428K 9:45:00	444K 9:57:20	430K	9408K 9:45:00	9408K 9:45:00	9408K			
Maximum User Region Below: 8036K											
Above: 1995M											

Figure 3-9. Virtual Storage Activity Report (Summary, Part 1 of 2)

VIRTUAL STORAGE ACTIVITY REPORT												Page 010
z/OS		System ID SYSA				Date mm/dd/yy		Interval 0:15:00.00				
Release VnRn		RMF Version 712				Time 9:45:00		Cycle 1.000 Seconds				
COMMON STORAGE DETAIL												
Number of Samples		90										
===== ALLOCATED CSA BY SUBPOOL BY KEY (Below 16 Meg) =====						=== ALLOCATED SQA BY SUBPOOL (Below 16 Meg) ===						
Key	Subpool 227		Subpool 228		Subpool 231		Subpool 241		Subpool	Min	Max	Avg
----- Minimum -----												
0	16K	9:45:00	4K	9:45:00	52K	9:45:00	172K	9:45:00	226	104K	9:45:00	106K
1			12K	9:45:00	52K	9:45:00	64K	9:45:00	239	140K	9:45:00	140K
2									245	184K	9:45:00	184K
3												
4							4K	9:45:00				
5			4K	9:45:00			8K	9:45:00				
6	20K	9:45:00			12K	9:45:00	8K	9:45:00				
7												
8-F							4K	9:45:00				
ALL	36K	9:45:00	20K	9:45:00	116K	9:45:00	260K	9:45:00				
----- Maximum -----												
0	16K	9:45:00	4K	9:45:00	52K	9:45:00	172K	9:45:00				
1			12K	9:45:00	52K	9:45:00	64K	9:45:00				
2												
3												
4							4K	9:45:00				
5			4K	9:45:00			8K	9:45:00				
6	20K	9:45:00			12K	9:45:00	8K	9:45:00				
7												
8-F							4K	9:45:00				
ALL	36K	9:45:00	20K	9:45:00	116K	9:45:00	260K	9:45:00				
----- Average -----												
0	16K		4K		52K		172K					
1			12K		52K		64K					
2												
3												
4							4K					
5			4K				8K					
6	20K				12K		8K					
7												
8-F							4K					
ALL	36K		20K		116K		260K					

Figure 3-9. Virtual Storage Activity Report (Detail, Part 2 of 2)

3.1.1.9 RMF Summary Report

Figure 3-10 shows a sample of the output produced when the Summary Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFSUM2 - for all systems

The CA MICS files used to generate the report are:

- o HARCPU
- o HARDVA
- o SCPPAG

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****
** Note: This report cannot be produced if the CA MICS      **
**      database contains essential data elements only.    **
*****
```

R M F S U M M A R Y R E P O R T																		Page 001	
Z/OS			System ID SYS1				Start mm/dd/yy- 0:15:00			Interval 0:15:00									
Release VnRn			RMF Version 770				End mm/dd/yy- 3:30:00			Cycle 1.000 Seconds									
Number of Intervals 14			Total Length of Intervals 3:30:00																
Date	Time	Int	CPU	DASD	DASD	Tape	Job	Job	TSO	TSO	STC	STC	ASCH	ASCH	USS	USS	Swap	Demand	
MM/DD	HH.MM.SS	MM.SS	Busy	Resp	Rate	Rate	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Rate	Paging	
06/11	0:15:00	15:00	11.5	0.8	29.1	0.0	4	4	1	1	85	84	0	0	4	4	0.00	0.00	
06/11	0:30:00	15:00	10.8	0.9	21.7	0.5	4	4	1	1	84	84	0	0	4	4	0.00	0.00	
06/11	0:45:00	15:00	10.3	0.8	22.0	0.0	4	4	1	1	84	84	0	0	4	4	0.00	0.00	
06/11	1:00:00	15:00	12.1	0.8	21.9	0.0	4	4	1	1	84	84	0	0	4	4	0.00	0.00	
06/11	1:15:00	15:00	11.3	0.9	22.4	0.0	4	4	1	1	84	84	0	0	4	4	0.00	0.00	
06/11	1:30:00	15:00	11.5	0.8	21.8	0.0	4	4	1	1	84	84	0	0	4	4	0.00	0.00	
06/11	1:45:00	15:00	10.7	0.8	22.7	0.0	4	4	2	1	84	84	0	0	4	4	0.00	0.00	
06/11	2:00:00	15:00	15.3	0.9	123.7	0.0	4	4	3	2	87	85	0	0	4	4	0.00	0.00	
06/11	2:15:00	15:00	12.2	0.7	29.5	0.0	4	4	3	3	86	86	0	0	4	4	0.00	0.00	
06/11	2:30:00	15:00	11.2	0.7	33.6	0.0	4	4	3	3	86	86	0	0	4	4	0.00	0.00	
06/11	2:45:00	15:00	13.4	0.9	133.5	0.0	4	4	3	3	87	86	0	0	4	4	0.00	0.00	
06/11	3:00:00	15:00	10.9	0.6	34.2	0.0	4	4	2	2	86	86	0	0	4	4	0.00	0.00	
06/11	3:15:00	15:00	10.6	0.7	29.2	0.0	4	4	2	2	86	86	0	0	4	4	0.00	0.00	
06/11	3:30:00	15:00	11.8	0.8	41.9	0.0	4	4	3	3	86	86	0	0	4	4	0.00	0.00	
Total/Average			11.7	0.8	41.9	0.1	4	4	3	2	87	85	0	0	4	4	0.00	0.00	

Figure 3-10. Summary Report

3.1.1.10 Cross-System Coupling Facility Reports

Figures 3-11, 3-12, and 3-13 show samples of the reports produced for the Cross-System Coupling Facility: XCF Usage by System, XCF Usage by Member, XCF Path Statistics. The SAS source code used is in `sharedprefix.MICS.SOURCE` members:

- o @RMFXCFS for the XCF Usage by System report
- o @RMFXCFM for the XCF Usage by Member report
- o @RMFXCFP for the XCF Path Statistics report
- o @RMFXCF7 for all three reports

The CA MICS files used to generate the reports are:

- o SCPXCY (XCF System Activity)
- o SCPXCM (XCF Member Activity)
- o SCPXCA (XCF Path Activity)

For further information on the report format and contents, see *z/OS RMF Report Analysis (SC33-7991)*.

```
*****
** Note: This report cannot be produced if the CA MICS      **
**           database contains essential data elements only. **
*****
```

X C F A C T I V I T Y														
z/OS		System ID GFL1							Date mm/dd/yy		Page 001			
Release VnRn		RMF Version 715							Time 23:00:00		Interval 0:15:00.00			
											Cycle 1.000 Seconds			
XCF USAGE BY SYSTEM														
----- REMOTE SYSTEMS -----													LOCAL	
----- OUTBOUND From GFL1 -----										INBOUND To GFL1			GFL1	

To System	Transport Class	Buffer Length	Req Out	----- % SML	Buffer % FIT	% BIG	% OVR	All Paths Unavail	Req Reject	From System	Req In	Req Reject	Transport Class	Req Reject
GFL2	POSH	43,008	100,923	100	0	0	0	0	1	GFL2	100,889	0	POSH	0
	DEFAULT	5,120	0	0	0	0	0	0	0				DEFAULT	0
GFL3	POSH	43,008	101,050	100	0	0	0	0	11	GFL3	101,081	0	POSH	0
	DEFAULT	5,120	0	0	0	0	0	0	0				DEFAULT	0
Total			----- 201,973							----- 201,970				

Figure 3-11. XCF Usage by System Report

X C F A C T I V I T Y									
z/OS		System ID GFL1		Date mm/dd/yy		Page 002			
Release VnRn		RMF Version 715		TIME 23:00:00		Interval 0:15:00.00			
						Cycle 1.000 Seconds			
XCF USAGE BY MEMBER									
Members Communicating With GFL1					Members On GFL1				
Group	Member	System	Req From GFL1	Req To GFL1	Group	Member	Req Out	Req In	
E0000045	MEMBER1	GFL3	0	0	E0000045	MEMBER3	0	0	
Total			0	0				0	0
E0000046	MEMBER1	GFL3	0	0	E0000046	MEMBER3	0	0	
Total			0	0				0	0
GROUP00W	GRPW@@@GFL2	GFL2	44	2	GROUP00W	GRPW@@@GFL1	371	271	
	GRPW@@@GFL3	GFL3	170	111					
Total			214	113				371	271
F0000001	SDFVPPM1	GFL3	0	0					
Total			0	0					
					C0000004	ACCEPTOR	0	0	
					Total		0	0	
C0000007	DONOR	GFL3	*NOW INACTIVE		C0000007	ACCEPTOR	*NOW INACTIVE		
					MEMBER3		0	0	
					Total		0	0	
SYSGRS	GFL2	GFL2	100,832	100,832	SYSGRS	GFL1	201,660	201,660	
	GFL3	GFL3	100,833	100,833					
Total			201,665	201,665	Total		201,660	201,660	
SYSMCS	GFL2	GFL2	47	55	SYSMCS	GFL1	94	192	
	GFL3	GFL3	47	137					
Total			94	192	Total		94	192	

Figure 3-12. XCF Usage by Member Report

X C F A C T I V I T Y													
z/OS		System ID GFL1				Date mm/dd/yy				Page 003			
Release VnRn		RMF Version 715				Time 23:00:00				Interval 0:15:00.00			
										Cycle 1.000 Seconds			
Total Samples =		900		XCF PATH STATISTICS									

OUTBOUND From GFL1									INBOUND To GFL1				

From Dev Num	To System	Transport Class	To Dev Num	Req Out	Avg Q Length	Susp	Busy	Retry	To Dev Num	From System	From Dev Num	Req In	Buffers Unavail
04C1	GFL2	POSH	04C1	100,924	0.06	100,873	46	0	04C3	GFL2	04C3	100,889	0
04C5	GFL3	POSH	04C3	101,050	0.05	100,975	75	0	04C7	GFL3	04C7	101,081	0
0FAD	*UNKNOWN	POSH		0	1.00	0	0	0	0FAF	*UNKNOWN		0	0
0FB5		POSH		0	0.00	0	0	0		*UNKNOWN		0	0
				-----					-----				
Total				201,974					201,970				

Figure 3-13. XCF Path Statistics Report

3.1.1.11 Coupling Facility Reports

Figures 3-14 through 3-17a show samples of the reports produced for the Coupling Facility: Coupling Facility Usage Summary, Coupling Facility Structure Activity, Coupling Facility Subchannel, and CF-to-CF Activity. The SAS source code used is in sharedprefix.MICS.SOURCE members:

- o @RMFXESU for the CF Usage Summary report
- o @RMFXESS for the CF Structure Activity report
- o @RMFXESC for the CF Subchannel report
- o @RMFXESR for the CF-to-CF Activity report
- o @RMFXES7 for all four reports

The CA MICS files used to generate the report are:

- o HARCFA (CF Channel Path File)
- o HARCFD (CF Duplexing Activity)
- o HARCFAH (CF Cache Structure Activity)
- o HARCFCP (CF Configuration and Activity)
- o HARCFCR (CF Request)
- o HARCFCFS (CF Structure)

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****
** Note: This report cannot be produced if the CA MICS      **
**           database contains essential data elements only. **
*****
```

COUPLING FACILITY ACTIVITY																Page 001
z/OS		Sysplex AMXT		Date mm/dd/yy				Interval 0:06:00.00								
Release VnRn		RMF Version 780		Time 18:04:00				Cycle 2.000 Seconds								

Coupling Facility Name = CF01A																

Total Samples(Avg) = 180 (Max) = 180 (Min) = 180																

COUPLING FACILITY USAGE SUMMARY																

STRUCTURE SUMMARY																
Type	Structure Name	Status	C H G	% of Alloc Size	% of CF Stor	Tot Reqs	% of All Reqs	% of CF Util	Avg Req/ Sec	-List Entries -Tot-	Dir- Entries -EOI-	---Data--- Elements -Tot-	---Lock--- Entries -EOI-	---Dir--- Reclaims -Rec-	---XIs	

UNSERIAL	IXC_PATH2	100.00% ACTIVE		9M	4.8	4815	27.0	7.9	5.35	2065	1	2037	17	N/A	N/A	
SERIAL	IEFAUTOS	100.00% ACTIVE		256K	0.1	8	0.1	0.0	0.01	268	8	267	8	16	0	
	ISTGENERIC	100.00% ACTIVE		10M	5.5	5015	28.1	9.7	5.57	56k	7	1110	1	4	0	
	JES2_CKPT2	100.00% ACTIVE		13M	7.0	7847	43.9	69.2	8.72	3154	361	3119	361	2	1	
LOCK	IRLM_RF00	100.00% ACTIVE		16M	9.0	20	0.1	0.0	0.02	62k	0	0	0	4194k	0	
CACHE	IRRXCF00_P001	100.00% ACTIVE		2M	1.1	149	0.8	11.3	0.17	486	466	470	466	N/A	N/A	
	OSAM_RF00	100.00% ACTIVE		2M	1.1	0	0.0	0.0	0.00	10k	0	0	0	N/A	N/A	
STRUCTURE TOTALS				52.0M	28.6	17.9k	100	98.1	19.84							

STORAGE SUMMARY																
			Alloc	% of CF	----- Dump Space -----								LEGEND			
			Size	Storage	% in Use Max % Requested											
Total CF Storage Used by Structures			52.0M	28.73%									K= 1024			
Total CF Dump Storage			6M	3.31%	33.33% 66.67%								M=1048576			
Total CF Storage Available			123M	67.96%									k= 1000			
Total CF Storage Size			181M										m=1000000			
			Alloc	% Allocated												
			Size													
Total Control Storage Defined			165M	32.04%												
Total Data Storage Defined			16M	8.84%												

PROCESSOR SUMMARY																
Coupling Facility		2094	Model S08		CFLEVEL	15	DYNDISP		ON							
Average CF Utilization (% Busy)		28.05%	Logical Processors:		Defined	2	Effective		2.0							

Figure 3-14. Coupling Facility Usage Summary Report

COUPLING FACILITY ACTIVITY															
z/OS		Sysplex		AMXT		Date mm/dd/yy		Interval 0:06:00.00							
Release VnRn		RMF Version 780				Time 18:04:00		Cycle 2.000 Seconds							

Coupling Facility Name = CF01A															

COUPLING FACILITY STRUCTURE ACTIVITY															

Structure Name = IEFAUT05				Type = LIST-SERIAL				Status = ACTIVE							
# Req		-----		Requests		-----		Delayed Requests		-----		LIST			
System	Total		Tot	% of	-Service Time (MS)-	Delay	Dly	Per	% of	--Delay	Time	MicroSec-	# Req with		
Name	Avg/Sec		Reqsts	All	Avg Std_Dev	Reason	Total	Sec	All	Avg	S_Dev	All/Req	Contention		

SYS1	8	Sync	8	100.0%	260.0	148.6	No Sch	0	0.00	0.0%	0.0	0.0	0.0	Tot Req	8
	0.01	Async	0	0.0%	0.0	0.0	Pr Wt	0	0.00	0.0%	0.0	0.0	0.0	Def Req	0
		Chngd	0	0.0%	Included in Async		Pr Comp	0	0.00	0.0%	0.0	0.0	0.0		
							Dump	0	0.00	0.0%	0.0	0.0	0.0		

Total	8	Sync	8	100.0%	260.0	148.6	No Sch	0	0.00	0.0%	0.0	0.0	0.0	Tot Req	8
	0.01	Async		0.0%	0.0	0.0	Pr Wt	0	0.00	0.0%	0.0	0.0	0.0	Def Req	0
		Chngd		0.0%			Pr Comp	0	0.00	0.0%	0.0	0.0	0.0		

Structure Name = IRRXCF00_P001				Type = CACHE				Status = ACTIVE							
# Req		-----		Requests		-----		Delayed Requests		-----					
System	Total		Tot	% of	-Service Time (MS)-	Delay	Dly	Per	% of	--Delay	Time	MicroSec-			
Name	Avg/Sec		Reqsts	All	Avg Std_Dev	Reason	Total	Sec	All	Avg	S_Dev	All/Req			

SYS1	149	Sync	149	100.0%	211.0	65.8	No Sch	0	0.00	0.0%	0.0	0.0	0.0		
	0.17	Async	0	0.0%	0.0	0.0	Pr Wt	0	0.00	0.0%	0.0	0.0	0.0		
		Chngd	0	0.0%	Included in Async		Pr Comp	0	0.00	0.0%	0.0	0.0	0.0		
							Dump	0	0.00	0.0%	0.0	0.0	0.0		

Total	149	Sync	149	100.0%	211.0	65.8	No Sch	0	0.00	0.0%	0.0	0.0	0.0	--Data Access-	
	0.17	Async		0.0%	0.0	0.0	Pr Wt	0	0.00	0.0%	0.0	0.0	0.0	Reads	21
		Chngd		0.0%			Pr Comp	0	0.00	0.0%	0.0	0.0	0.0	Write	85
							Dump	0	0.00	0.0%	0.0	0.0	0.0	Castout	0

Figure 3-15. Coupling Facility Structure Activity Report

COUPLING FACILITY ACTIVITY															Page 001	
z/OS		Sysplex AMXT					Date mm/dd/yy				Interval 0:06:00.00					
Release VnRn		RMF Version 780					Time 18:04:00				Cycle 2.000 Seconds					

Coupling Facility Name = CF01A																

SUBCHANNEL ACTIVITY																

Overall							Requests			Delayed Requests						
System	Total	Per/	--	CF Links	--	Path	#	-Srv	Time(Mic)-		Tot	% of	--	Avg Time (Mic)-		
Name	Reqs	Sec	Type	Gen	Use	Busy	Reqs	Avg	St_Dev		Req	All	/Del	St_Dev	/All	

SYS1	10328	11.48	ICP	2	2	0	Sync	0	0.0	0.0	List/Cache	0	0.0%	0.0	0.0	0.0
			CIB	1	1		Async	7286	1189.6	1531.3	Lock	0	0.0%	0.0	0.0	0.0
			CFP	1	1		Changed	0	*INCL IN ASYNC*	Total	0	0.0%				
			Subch	56	28		Unsucc	0	0.0	0.0						

CHANNEL PATH DETAILS																

System Name	ID	Type	Operation Mode			Degraded	Distance (Km)		PCHID	HCA ID	HCA Port	IOP IDs				

SYS1	F6	ICP														
	F7	CIB	12X	IFB3	HCA3-0	N	474		131	00FB	0C	01	02	03	04	
	F8	ICP														
	F9	CFP	2GBIT			N	878		021	0002	06	01	02	03	04	

Figure 3-16. Coupling Facility Subchannel Activity Report

COUPLING FACILITY ACTIVITY														Page 001
z/OS		Sysplex HAL		Date mm/dd/yy		Interval 0:10:00.00								
Release VnRn		RMF Version 780		Time 18:15:00		Cycle 2.000 Seconds								

Coupling Facility Name = STAN1														

CF TO CF ACTIVITY														

Overall					Requests					Delayed Requests				
Peer	Total	Per/	-- CF Links	--		#	-Srv Tm	(MICS)-		Tot	% of	-- Avg Time	(MIC)--	
CF	Reqs	Sec	Type	Use		Reqs	Avg	St_Dev		Req	All	/Del	St_Dev	/All

STAN1	25062	41.8	ICP	6	Sync	25062	1.6	0.0	Sync	1683	6.3%	8.2	0.0	0.0
			CIB	1										
			CFP	1										
KUBR1	25294	42.2	ICP	6	Sync	25294	0.8	0.0	Sync	2371	8.6%	1.0	0.0	0.0
			CIB	2										

CHANNEL PATH DETAILS														

Peer CF	ID	Type	Operation Mode			Degraded	Distance (Km)							

STAN1	F6	ICP												
	F7	ICP												
	F8	CIB	1X	IFB	HCA3-0 LR	N	55							
	F9	ICP												
	FA	CFP	2GBIT			N	30							
	FB	ICP												
	FC	ICP												
	FD	ICP												
KUBR1	A6	ICP												
	A7	ICP												
	A8	ICP												

Figure 3-17. CF-to-CF Activity Report

3.1.1.12 Workload Activity Goal Mode Report

Figure 3-17b shows a sample of the output produced when the Workload Activity Goal Mode Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFWL81 - for service class related reports
- o @RMFWL82 - for report class related reports

The CA MICS files used to generate the report are:

- o WLMRGP - Resource Group
- o WLM_EA - Report Class
- o WLMSEA - Service Class
- o WLM_EC - Report Class Resource Consumption
- o WLMSEC - Service Class Resource Consumption
- o WLM_ED - Report Class General Exec Delay
- o WLMSED - Service Class General Exec Delay
- o WLM_EM - Report Class Response Time
- o WLMSEM - Service Class Response Time
- o WLMSE - Service Definition
- o WLM_EW - Report Class Subsystem Delay States
- o WLMSEDS - Service Class Subsystem Delay States
- o WLMSEVC - Service Client

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

USAGE CONSIDERATIONS:

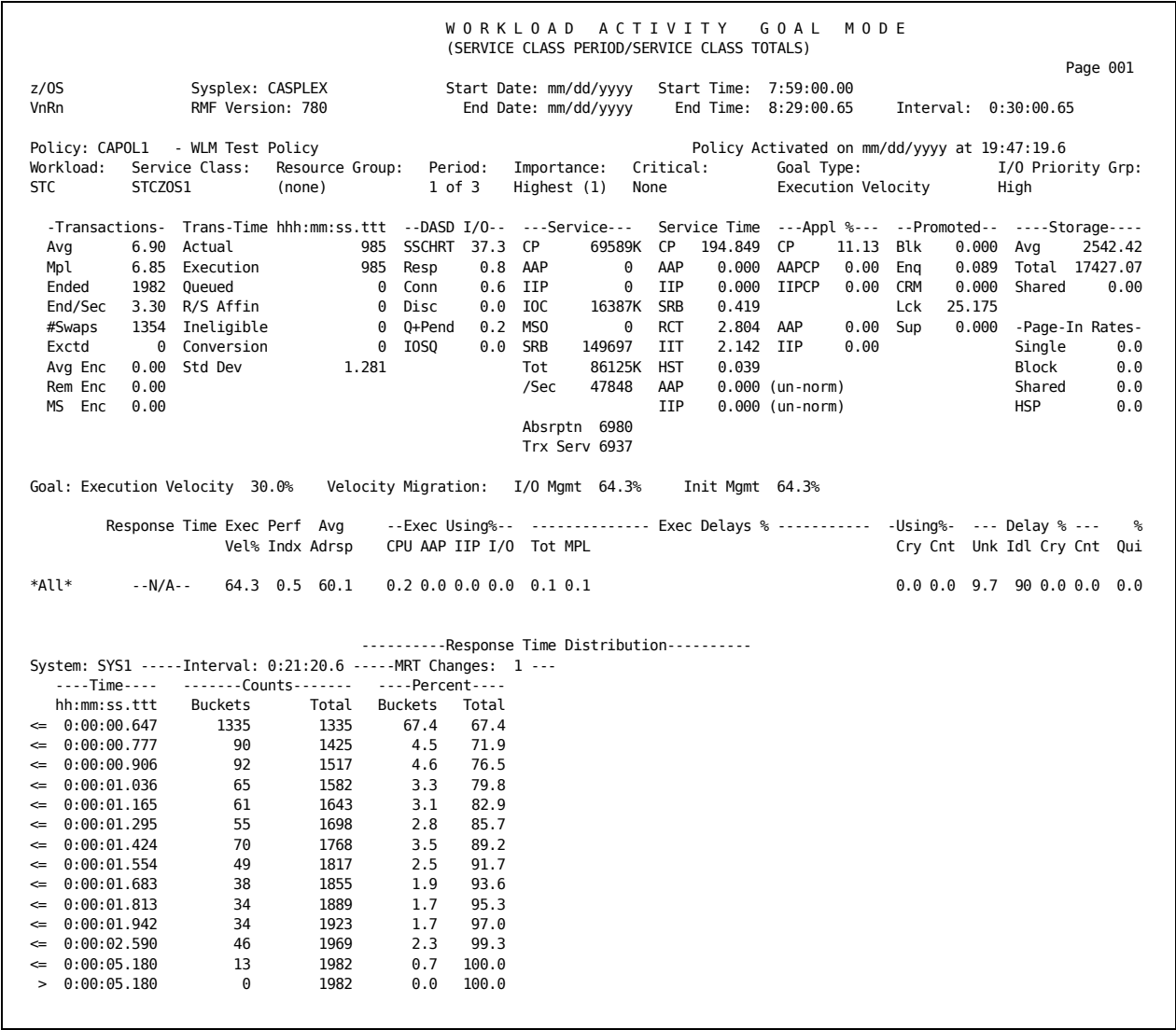
The following suboptions can be specified when the Workload Activity Goal Mode report is requested:

- o SCPER : Produces a service class period level report, as well as a service class summary.
- o SCLASS: Produces a service class level summary report.
- o WGROUP: Produces a workload level summary report.
- o POLICY: Produces a policy level summary report.
- o RCPER : Produces a report class period level report, as well as a report class summary.
- o RCLASS: Produces a report class level summary report.
- o none : Produces all of the above reports.

These optional suboptions must be enclosed in parentheses and separated by commas, as shown in the example below:

```
%LET REPORTS = WLMGL ;  
%LET REPORTS = WLMGL(SCPER,RCPER) ;  
%LET REPORTS = WLMGL(SCLASS,RCLASS) ;
```

```
*****  
** Note: If the CA MICS database contains essential data **  
** elements only, the value for the transaction response **  
** time standard deviation field will be missing. **  
*****
```

3.1.1.13 Cache Subsystem Activity Summary Report

The Cache Subsystem Summary inquiry provides subsystem level information on caching performance. Following the subsystem summary is an overview providing a single line of information on each volume attached to the subsystem.

A RAID Rank Activity section follows the device overview for each 2105 Enterprise Storage Server.

Figure 3-18 shows a sample of the output produced when the Cache Subsystem Activity Summary report is requested. The SAS source code used is in `sharedprefix.MICS.SOURCE` member:

- o @RMFCAC8 - for all systems producing the SMF type 74 subtype 5 Cache Subsystem Activity record.

The CA MICS files used to generate the report are:

- o HARCVA - Cache Volume Activity
- o HARCCU - Cache Control Unit Activity
- o HARRRA - RAID Rank Activity

Note: The HARCVA file is required to produce the single-line volume overview (page 2) of this report. If you attempt to produce this report from a CA MICS timespan where the HARCVA file is not active, the report generator will produce a Cache Subsystem level report (page 1) only.

The HARRRA file is required to produce the Raid Rank Activity section (page 3) of this report. If you attempt to produce this report from a CA MICS timespan where the HARRRA file is not active, the report generator will produce a Cache Subsystem level report with device overview (pages 1 and 2) only.

For further information on the report format and contents, see *z/OS RMF Report Analysis (SC33-7991)*.

USAGE CONSIDERATIONS: The information recorded in the type 74 subtype 5 cache subsystem activity record, the data source for the HARCVA Cache Device Activity, HARCCU Cache Control Unit Activity and HARRRA RAID Rank Activity files, contains total cache subsystem activity. Only one system in a shared DASD environment needs to collect this record type.

If you collect type 74 subtype 5 records with more than one system sharing a particular caching subsystem, then process

these records in CA MICS, your CA MICS database will contain redundant information. To avoid unnecessary processing and excessive print volume, you can restrict your subsystem reporting to a single SYSID by coding a "%LET SELECT" statement after the //CONTROL DD * as follows:

```
//CONTROL DD *
%LET REPORTS = CACHESUM ;
%LET TSPAN = DAYS ;
...
...
%LET SELECT=%STR(IF SYSID='SYS1');) ;
```

This SELECT statement restricts reporting to cache subsystem statistics gathered by system SYS1.

To further reduce print volume, you can restrict reporting to a particular cache subsystem. There are several ways of selecting a cache subsystem:

```
CCSUBID=122, CCSUBAD='007A', CUDEVNUM=3137, CUADDR='0C41'
```

These four assignment statements all refer to the same caching subsystem. SUBSYSID contains the decimal representation of subsystem ID. CCSUBAD is a character representation of the hexadecimal value of subsystem ID. CUDEVNUM contains the decimal representation of the cache subsystem device address as known by the system that collected the data. CUADDR is a character representation of the hexadecimal value of the subsystem device address.

To enhance the SELECT statement to report only on the above subsystem, from data collected by SYS1, any of the following SELECT statements would work:

```
%LET SELECT=%STR(IF SYSID='SYS1' AND CCSUBID=122;) ;
%LET SELECT=%STR(IF SYSID='SYS1' AND CCSUBAD='007A');) ;
%LET SELECT=%STR(IF SYSID='SYS1' AND CUDEVNUM=3137;) ;
%LET SELECT=%STR(IF SYSID='SYS1' AND CUADDR='0C41');) ;
```

```
*****
*** Note: If using a SELECT statement to subset by      ***
***          caching subsystem, as shown above, you cannot ***
***          include any other report in the %LET REPORTS= ***
***          statement. The only report selected must be ***
***          either CACHESUM or CACHEDTL.                ***
*****
```

C A C H E S U B S Y S T E M A C T I V I T Y												Page 001	
z/OS		Sysplex: PLEXPROD		System: SYS1		Start Date		Start Time		End Time		Duration	
Release: VnRn		RMF Ver: 715				RMF Interval: mm/dd/yyyy		0:29:00.00		0:59:00.28		0:30:00.28	
Subsystem: 2105-01		CU-ID: AD10		Sub-ID: 2D00		Cache Interval: mm/dd/yyyy		0:28:44.72		0:58:44.72		0:30:00.00	
Type-Model: 2105-800		Manuf: IBM		Plant: 13		Serial Number: 000000059229							
=====													
C A C H E S U B S Y S T E M S T A T U S													
=====													
Subsystem Storage		Non-Volatile Storage		Volumes	Min	Max	Total	Status					
-----		-----						-----					
Configured	12,288 MB	Configured	1,024 MB	Caching	84	84	84	Caching	- ACTIVE				
Available	11,062 MB	Pinned	0 MB	Inactive	0	0	0	Non-Volatile Storage	- ACTIVE				
Pinned	0 MB			Total	84	84	84	Cache Fast Write	- ACTIVE				
Offline	0 MB							IML Device Available	- YES				
=====													
C A C H E S U B S Y S T E M O V E R V I E W													
=====													
Total I/O	5936	Cache I/O	5936	Cache Offline	0								
Total H/R	98.89%	Cache H/R	98.89%										
CACHE I/O	-----READ I/O REQUESTS-----						-----WRITE I/O REQUESTS-----						%
REQUESTS	Count	Rate	Hits	Rate	Hit %	Count	Rate	Fast	Rate	Hits	Rate	Hit %	Read
Normal	3006	1.7	2941	1.6	97.84	656	0.4	656	0.4	656	0.4	100.00	82.09
Sequential	201	0.1	200	0.1	99.50	2073	1.2	2073	1.2	2073	1.2	100.00	8.84
CFW Data	0	0.0	0	0.0	N/A	0	0.0	N/A	N/A	0	0.0	N/A	N/A
Totals	3207	1.8	3141	1.7	97.94	2729	1.5	2729	1.5	2729	1.5	100.00	54.03
-----CACHE MISSES-----							-----MISC-----			-----NON-CACHE I/O-----			
REQUESTS	Read	Rate	Write	Rate	Tracks	Rate	Count		Rate	Count		Rate	
Normal	65	0.0	0	0.0	442	0.2	DFW Bypass		0	0.0	ICL	0	0.0
Sequential	1	0.0	0	0.0	98	0.1	CFW Bypass		0	0.0	Bypass	0	0.0
CFW Data	0	0.0	0	0.0			DFW Inhibit		0	0.0			
Totals	66	0.0	0	0.0	540	0.3	Async (Trks)		1163	0.6	Totals	0	0.0
---CKD STATISTICS---													
---RECORD CACHING---													
Write	71	Read Misses		0									
Write Hits	70	Write Proms		1075									

Figure 3-18. Cache Subsystem Activity Summary Report (3990 and 2105, Part 1 of 5)

C A C H E S U B S Y S T E M A C T I V I T Y															Page 002				
z/OS		Sysplex: PLEXPROD		System: SYS1		Start Date		Start Time		End Time		Duration							
Release: VnRn		RMF Ver: 715				mm/dd/yyyy		0:29:00.00		0:59:00.28		0:30:00.28							
Subsystem: 2105-01		CU-ID: AD10		Sub-ID: 2D00		Cache Interval: mm/dd/yyyy		0:28:44.72		0:58:44.72		0:30:00.00							
Type-Model: 2105-800		Manuf: IBM		Plant: 13		Serial Number: 000000059229													
=====																			
C A C H E S U B S Y S T E M D E V I C E O V E R V I E W																			
=====																			
Volume	Dev	Rank	%	I/O	--	Cache	Hit	Rate	--	-----	Dasd	I/O	Rate	-----	Async	Hit %	Hit %	Hit %	Read %
Serial	Num	Id	I/O	Rate	Read	DFW	CFW	Stage	DFWBP	ICL	BYP	OTHER	Rate	Total	Reads	Writes	Of Tot		
*ALL			100.00	50.26	27.67	0.00	0.00	0.95	0.00	0.00	0.00	21.64	0.00	55.05	96.89	0.00	56.89		
*INACT			0.12	0.06															
*ACT			99.88	50.20	27.67	0.00	0.00	0.89	0.00	0.00	0.00	21.64	0.00	55.11	96.89	0.00	56.89		
VMCHI3	AD00	0100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	100.00		
VM9325	AD01	0100	0.97	0.49	0.25	0.00	0.00	0.03	0.00	0.00	0.00	0.21	0.00	50.68	88.09	0.00	57.53		
VM9326	AD02	0100	4.80	2.41	2.40	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	99.58	99.58	---	100.00		
MINI06	AD03	0100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	---	---	---		
MINI08	AD04	0100	4.65	2.34	0.90	0.00	0.00	0.00	0.00	0.00	0.00	1.43	0.00	38.53	100.00	0.00	38.57		
SYS001	AD05	0100	3.17	1.59	0.18	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00	11.04	99.37	0.00	11.11		
VMCHI4	AD06	0100	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	8.33	100.00	0.00	8.33		
VM9327	AD07	0100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	---	---	---		
VM9328	AD08	0100	0.12	0.06	0.04	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	70.91	70.91	---	100.00		
VM9329	AD09	0100	0.12	0.06	Caching Not Active														
VMCHI5	AD0A	0100	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	---	0.00	0.00		
VMCHI7	AD0B	0100	3.31	1.66	0.65	0.00	0.00	0.08	0.00	0.00	0.00	0.94	0.00	38.89	89.25	0.00	43.57		
VMCHI8	AD0C	0100	0.08	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	97.37		
VMU001	AD0D	0100	11.10	5.58	5.43	0.00	0.00	0.02	0.00	0.00	0.00	0.13	0.00	97.34	99.65	0.00	97.69		
VMU013	AD10	0100	0.09	0.05	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00	26.19	57.89	0.00	45.24		
VMU002	AD11	0100	1.06	0.53	0.07	0.00	0.00	0.08	0.00	0.00	0.00	0.39	0.00	12.29	46.09	0.00	26.67		
VMU003	AD12	0100	0.68	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	---	100.00		
VMU004	AD13	0100	0.91	0.46	0.44	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	96.11	97.30	0.00	98.79		
VMU005	AD14	0100	0.15	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	74.63	96.15	0.00	77.61		

Figure 3-18. Cache Subsystem Activity Summary Report (3990 and 2105, Part 2 of 5)

C A C H E S U B S Y S T E M A C T I V I T Y											Page 003				
z/OS		Sysplex: PLEXPROD		System: SYS1		Start Date		Start Time		End Time		Duration			
Release: VnRn		RMF Ver: 715				RMF Interval: mm/dd/yyyy		0:29:00.00		0:59:00.28		0:30:00.28			
Subsystem: 2105-01		CU-ID: AD10		Sub-ID: 2D00		Cache Interval: mm/dd/yyyy		0:28:44.72		0:58:44.72		0:30:00.00			
Type-Model: 2105-800		Manuf: IBM		Plant: 13		Serial Number: 000000059229									
=====															
R A I D R A N K A C T I V I T Y															
=====															
ID	RAID	DA	HDD	Sect	-----	Read	Req	-----	-----	Write	Req	-----	-----	Highest Utilized Volumes	-----
	Type			Size	Rate	Avg MB	MB/S	RTIME		Rate	Avg MB	MB/S	RTIME		
*ALL					57	0.047	2.6	18		9	0.103	1.2	32		
0100	RAID-5	01	7	512	57	0.047	2.6	18		9	0.103	1.2	32	VSE100 VMS001 VMU001 VMU008 VM9326 MINI08	

Figure 3-18. Cache Subsystem Activity Summary Report (3990 and 2105, Part 3 of 5)

C A C H E S U B S Y S T E M A C T I V I T Y													Page 004	
z/OS		Sysplex: PLEXPROD		System: SYS1		Start Date		Start Time		End Time		Duration		
Release: VnRn		RMF Ver: 715				RMF Interval: mm/dd/yyyy		0:29:00.00		0:59:00.28		0:30:00.28		
Subsystem: 2107-01		CU-ID: AE00		Sub-ID: 2E00		Cache Interval: mm/dd/yyyy		0:28:44.72		0:58:44.72		0:30:00.00		
Type-Model: 2107-921		Manuf: IBM		Plant: 13		Serial Number: 000000027129								
=====														
C A C H E S U B S Y S T E M S T A T U S														
=====														
Subsystem Storage		Non-Volatile Storage		Volumes	Min	Max	Total	Status						
-----		-----						-----						
Configured	12,288 MB	Configured	1,024 MB	Caching	84	84	84	Caching	- ACTIVE					
Available	11,062 MB	Pinned	0 MB	Inactive	0	0	0	Non-Volatile Storage	- ACTIVE					
Pinned	0 MB			Total	84	84	84	Cache Fast Write	- ACTIVE					
Offline	0 MB							IML Device Available	- YES					
=====														
C A C H E S U B S Y S T E M O V E R V I E W														
=====														
Total I/O	39409	Cache I/O	39409	Cache Offline	0									
Total H/R	99.94%	Cache H/R	99.94%											
C A C H E I / O		---READ I/O REQUESTS---					---WRITE I/O REQUESTS---					% Read		
REQUESTS	Count	Rate	Hits	Rate	Hit %	Count	Rate	Fast	Rate	Hits	Rate	Hit %	Read	
Normal	15664	8.7	15644	8.7	99.87	8524	4.7	8524	4.7	8524	4.7	100.00	64.76	
Sequential	14593	8.1	14590	8.1	99.98	628	0.3	628	0.3	628	0.3	100.00	95.87	
CFW Data	0	0.0	0	0.0	N/A	0	0.0	N/A	N/A	0	0.0	N/A	N/A	
-----		-----		-----		-----		-----		-----		-----		
Totals	30257	16.8	30234	16.8	99.92	9152	5.1	9152	5.1	9152	5.1	100.00	76.78	
---CACHE MISSES---							---MISC---		---NON-CACHE I/O---					
REQUESTS	Read	Rate	Write	Rate	Tracks	Rate	Count	Rate	Count		Rate			
Normal	20	0.0	0	0.0	66	0.0	DFW Bypass	0	0.0	ICL	0	0.0		
Sequential	3	0.0	0	0.0	29	0.0	CFW Bypass	0	0.0	Bypass	0	0.0		
CFW Data	0	0.0	0	0.0			DFW Inhibit	0	0.0	-----		-----		
-----		-----		-----		-----		-----		-----		-----		
Totals	23	0.0	0	0.0	95	0.1	Async (Trks)	711	0.4	Totals	0	0.0		
---CKD STATISTICS---		---RECORD CACHING---						---HOST ADAPTER ACTIVITY---		---DISK ACTIVITY---				
Write	29057	Read Misses	0					Bytes /Req	Bytes /Sec	Resp Time	Bytes /Req	Bytes /Sec		
Write Hits	29055	Write Proms	1490					Read	505	8.5K	Read	607.17	17.9K	10.0K
								Write	2.3K	11.8K	Write	870.04	21.9K	11.1K

Figure 3-18. Cache Subsystem Activity Summary Report (1750 and 2107, Part 4 of 5)

C A C H E S U B S Y S T E M A C T I V I T Y														
z/OS														
Release: VnRn Sysplex: PLEXPRD System: SYS1 Start Date Start Time End Time Duration														
Subsystem: 2107-01 RMF Ver: 715 RMF Interval: mm/dd/yyyy 0:29:00.00 0:59:00.28 0:30:00.28														
Type-Model: 2107-921 CU-ID: AE00 Sub-ID: 2E00 Cache Interval: mm/dd/yyyy 0:28:44.72 0:58:44.72 0:30:00.00														
Manuf: IBM Plant: 13 Serial Number: 000000027129														
=====														
C A C H E S U B S Y S T E M D E V I C E O V E R V I E W														
=====														
Volume	Dev	Xtnt	%	I/O	--	Cache	Hit	Rate	--	-----	Dasd	I/O	Rate	-----
Serial	Num	Pool	I/O	Rate	Read	DFW	CFW	Stage	DFWBP	ICL	BYP	OTHER	Rate	Hit %
*ALL			100.00	50.26	27.67	0.00	0.00	0.95	0.00	0.00	0.00	21.64	0.00	55.05
*INACT			0.12	0.06										96.89
*ACT			99.88	50.20	27.67	0.00	0.00	0.89	0.00	0.00	0.00	21.64	0.00	0.00
TZQ@02	AE00	0100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
TZQ@03	AE01	0100	0.97	0.49	0.25	0.00	0.00	0.03	0.00	0.00	0.00	0.21	0.00	57.53
TZQ@04	AE02	0100	4.80	2.41	2.40	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	100.00
TZQ@05	AE03	0100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---
TZQ@06	AE04	0100	4.65	2.34	0.90	0.00	0.00	0.00	0.00	0.00	0.00	1.43	0.00	38.57
TZQ@07	AE05	0100	3.17	1.59	0.18	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00	11.11
TZQ@08	AE06	0100	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	8.33
TZQ@09	AE07	0100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---
TZQ@0A	AE08	0100	0.12	0.06	0.04	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	70.91
TZQ@0B	AE03	0100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.91
TZQ@0C	AE0A	0100	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	---
TZQ@0D	AE0B	0100	3.31	1.66	0.65	0.00	0.00	0.08	0.00	0.00	0.00	0.94	0.00	0.00
TZQ@0E	AE0C	0100	0.08	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	89.25
TZQ@0F	AE0D	0100	11.10	5.58	5.43	0.00	0.00	0.02	0.00	0.00	0.00	0.13	0.00	0.00
TZQ@10	AE10	0100	0.09	0.05	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00	97.37
TZQ@11	AE11	0100	1.06	0.53	0.07	0.00	0.00	0.08	0.00	0.00	0.00	0.39	0.00	99.65
TZQ@12	AE12	0100	0.68	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.67
														100.00

Figure 3-18. Cache Subsystem Activity Summary Report (1750 and 2107, Part 5 of 5)

3.1.1.14 Cache Subsystem Activity Detail Report

The Cache Subsystem Activity Detail report includes all information provided by the Cache Subsystem Activity Summary report (see previous report, Figure 3-18). In addition, a report similar to the subsystem level report is provided for each device attached to the control unit that had caching activated over the RMF measurement interval.

Figure 3-19 shows a sample of the detailed output produced for each device when the Cache Subsystem Activity Detail report is requested. The SAS source code used is in `sharedprefix.MICS.SOURCE` member:

- o @RMFCAC8 - for all systems producing the SMF type 74 subtype 5 Cache Subsystem Device Activity record.

The CA MICS files used to generate the report are:

- o HARCVA - Cache Volume Activity
- o HARCCU - Cache Control Unit Activity
- o HARRRA - RAID Rank Activity

Note: The HARCVA file is required to produce the Cache Detail report. If you attempt to produce this report from a CA MICS timespan where the HARCVA file is not active, the report generator will produce a Cache Subsystem overview report only.

The HARRRA file is required to produce the Cache Detail report. However, if you attempt to produce this report from a CA MICS timespan where the HARRRA file is not active, the only missing information in the Detail Report will be the RAID Rank Activity section located after the Device Overview section.

For further information on the report format and contents, see *z/OS RMF Report Analysis (SC33-7991)*.

USAGE CONSIDERATIONS: The information recorded in the type 74 subtype 5 cache subsystem activity record, the data source for the HARCVA Cache Device Activity, HARCCU Cache Control Unit Activity and HARRRA RAID Rank Activity files, contains total cache subsystem activity. Only one system in a shared DASD environment needs to collect this record type.

If you collect type 74 subtype 5 records with more than one system sharing a particular caching subsystem, and process

these records in CA MICS, your CA MICS database will contain redundant information. To avoid unnecessary processing and excessive print volume, you can restrict your reporting to a single SYSID as shown in section 3.1.1.14.

This report can be voluminous. The summary report (CACHESUM) avoids printing detailed information for each attached volume. It should be used to identify subsystems where more detail is required. Once a subsystem is identified as interesting, you can use a SELECT statement to restrict detail reporting to a particular subsystem. Examples of restricting the cache reporting to a single subsystem are shown in section 3.1.1.14.

C A C H E S U B S Y S T E M A C T I V I T Y													Page 001			
z/OS		Sysplex: PLEXPROD		System: SYS1		Start Date		Start Time		End Time		Duration				
Release: VnRn		RMF Ver: 715				RMF Interval: mm/dd/yyyy		0:29:00.00		0:59:00.28		0:30:00.28				
Subsystem: 2105-01		CU-ID: AD10		Sub-ID: 2D00		Cache Interval: mm/dd/yyyy		0:28:44.72		0:58:44.72		0:30:00.00				
Type-Model: 2105-800		Manuf: IBM		Plant: 13		Serial Number: 000000027229										
Volser: VMCHI3		Num: AD00		RRID: 0D00												
=====																
C A C H E D E V I C E S T A T U S																
=====																
Cache Status				Duplex Pair Status												
Caching - ACTIVE				Duplex Pair - NOT ESTABLISHED												
DASD Fast Write - ACTIVE				Status - N/A												
Pinned Data - NONE				Dual Copy Volume - N/A												
=====																
D E V I C E O V E R V I E W																
=====																
Total I/O		12	Cache I/O		12	Cache Offline		0								
Total H/R		100.00%	Cache H/R		100.00%											
CACHE I/O REQUESTS		Count	Rate	READ I/O REQUESTS		Hits	Rate	Hit %	WRITE I/O REQUESTS		Fast	Rate	Hits	Rate	Hit %	% Read
Normal		12	0.0	12		0.0	100.00		0	0.0	0	0.0	0	0.0	N/A	100.00
Sequential		0	0.0	0		0.0	N/A		0	0.0	0	0.0	0	0.0	N/A	N/A
CFW Data		0	0.0	0		0.0	N/A		0	0.0	N/A	N/A	0	0.0	N/A	N/A
Totals		12	0.0	12		0.0	100.00		0	0.0	0	0.0	0	0.0	N/A	100.00
-----CACHE MISSES-----							-----MISC-----			-----NON-CACHE I/O-----						
REQUESTS		Read	Rate	Write	Rate	Tracks	Rate	Count		Rate	Count		Rate			
Normal		0	0.0	0	0.0	0	0.0	DFW Bypass		0	0.0	ICL		0	0.0	
Sequential		0	0.0	0	0.0	0	0.0	CFW Bypass		0	0.0	Bypass		0	0.0	
CFW Data		0	0.0	0	0.0			DFW Inhibit		0	0.0	-----				
Totals		0	0.0	0	0.0	0	0.0	Async (Trks)		12	0.0	Totals		0	0.0	
---CKD STATISTICS---				---RECORD CACHING---												
Write		0	Read Misses		0											
Write Hits		0	Write Proms		0											

Figure 3-19. Cache Subsystem Activity Detail Report (1750 and 2107, Part 2 of 2)

3.1.1.15 USS Kernel Activity Report

Figure 3-20 shows a sample of the output produced when the USS Kernel Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFUSS1 - for all systems producing the SMF type 74 subtype 3 USS Kernel Activity record.

The CA MICS file used to generate the report is:

- o SCPKRN - USS Kernel Activity

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****
**   Note: This report cannot be produced if the CA MICS   **
**   database contains essential data elements only.       **
*****
```

U S S K E R N E L A C T I V I T Y												
z/OS	System ID SYS1			Date mm/dd/yy			Page 001					
Release VnRn	RMF Version 715			Time 23:50:00			Interval 0:10:00.00					
Number of Samples	394						Cycle 1.500 Seconds					
U S S S Y S T E M C A L L A C T I V I T Y												

	Minimum	Average	Maximum									

Syscalls (N/S)	32.667	251.513*	1726									
CPU Time (H/S)	0	0.302*	2.667									
U S S P R O C E S S A C T I V I T Y												

Processes			Users			Processes per User						

Maximum (Tot)	3000			200			1000					

	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum			

Current (Tot)	73	854	1200	8	14	25						
Overruns (N/S)	0	5.5*	333	0	0	0	0	0	0			
U S S I N T E R - P R O C E S S C O M M U N I C A T I O N												

Message Queue IDs			Semaphore IDs			Shared Memory IDs			Shared Memory Pages			

Maximum (Tot)	4096			20000			500			2621.4K		

	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum

Current (Tot)	50	78	100	15.333	16.103	18.333	10	10.85	12	9159	9221.94	9875
Overruns (N/S)	0	0	0	0	0	0	0	0	0	0	0	0
U S S M E M O R Y M A P												

	Memory Map Storage Pages			Shared Storage Pages			SHARED LIB REGION			QUEUED SIGNALS		

Maximum (Tot)	4096			32.7M			16M			100K		

	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum

Current (Tot)	1347	1376.47	2694	0	0	0	6M	16M	16M			
Overruns (N/S)	0	0	0	0	0	0	0	0	0	0	50K	99K
Units: (Tot) = Total Value, (N/S) = Number per Second, (H/S) = Hundredth of Seconds per Second												

Figure 3-20. USS Kernel Activity Report

3.1.1.16 Crypto Hardware Activity Report

Figure 3-21 shows a sample of the output produced when the Crypto Hardware Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFCRY1 - for all systems producing the SMF type 70 subtype 2 Cryptographic Hardware Activity record.

The CA MICS files used to generate the report are:

- o HARCRA - Crypto Accelerator Activity
- o HARCRA - ICSF Services Activity
- o HARCRA - Crypto PKCS11 Coprocessor Activity
- o HARCRA - Crypto CCA Coprocessor Activity

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****
**   Note: This report cannot be produced if the CA MICS   **
**   database contains essential data elements only.       **
*****
```

CRYPTO HARDWARE ACTIVITY												Page 001	
z/OS		System ID SYS1				Date mm/dd/yy		Interval 0:10:00.35					
Release VnRn		RMF Version 790				Time 9:50:00		Cycle 2.000 Seconds					
----- CRYPTOGRAPHIC CCA COPROCESSOR -----													
----- Total -----					Key-Gen								
Type	Id	Rate	Exec Time	Util%	Rate								
CEX4C	0	1.49	9.936	1.5	0.75								
	1	0.05	9.439	0.2	0.00								
----- CRYPTOGRAPHIC PKCS11 COPROCESSOR -----													
----- Total -----					Operations Details -----								
Type	Id	Rate	Exec Time	Util%	Function	Rate	Exec Time	Util%					
CEX4P	2	16.06	33.56	53.9	Asym Fast	3.14	69.61	21.9					
					Asym Gen	3.51	42.84	15.1					
					Asym Slow	3.23	9.522	3.1					
					Symm Complete	2.64	25.85	6.8					
					Symm Partial	3.53	20.01	7.1					
----- CRYPTOGRAPHIC ACCELERATOR -----													
----- Total -----					-- ME-Format RSA Operations --				-- CRT-Format RSA Operations --				
Type	Id	Rate	Exec Time	Util%	Key	Rate	Exec Time	Util%	Rate	Exec Time	Util%		
CEX4A	0	0.53	0.064	0.0	1024	0.31	0.049	0.0	0.00	0.000	0.0		
					2048	0.21	0.086	0.0	0.00	0.000	0.0		
					4096	0.00	0.000	0.0	N/A	N/A	N/A		
	1	0.00	0.000	0.0	1024	0.00	0.000	0.0	0.00	0.000	0.0		
					2048	0.00	0.000	0.0	0.00	0.000	0.0		
					4096	0.00	0.000	0.0	N/A	N/A	N/A		
	5	0.00	0.000	0.0	1024	0.00	0.000	0.0	0.00	0.000	0.0		
					2048	0.00	0.000	0.0	0.00	0.000	0.0		
					4096	0.00	0.000	0.0	N/A	N/A	N/A		
	7	0.00	0.000	0.0	1024	0.00	0.000	0.0	0.00	0.000	0.0		
					2048	0.00	0.000	0.0	0.00	0.000	0.0		
					4096	0.00	0.000	0.0	N/A	N/A	N/A		
----- ICSF SERVICES -----													
----- Encryption -----				----- Decryption -----			----- MAC -----		----- Hash -----			----- PIN -----	
	SDES	TDES	AES	SDES	TDES	AES	Generate	Verify	SHA-1	SHA-256	SHA-512	Translate	Verify
Rate	0.00	28.47	69.43	0.03	27.53	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Size	0.00	1954	265.07	1224	2000	180.09	0.00	0.00	0.00	0.00	0.00		

Figure 3-21. Crypto Hardware Activity Report

3.1.1.17 FICON Director Activity Report

Figure 3-22 shows a sample of the output produced when the FICON Director Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFFCD1 - for all systems producing the SMF type 74 subtype 7 FICON Director Statistics record.

The CA MICS files used to generate the report are:

- o HARFDC - FICON Director Connector
- o HARFDP - FICON Director Port Activity

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

```
*****
** Note: This report cannot be produced if the CA MICS **
** database contains essential data elements only.      **
*****
```

F I C O N D I R E C T O R A C T I V I T Y										Page 001
z/OS		System ID SYS1			Date mm/dd/yy			Interval 0:02:29.14		
Release VnRn		RMF Version 770			Time 13:39:50			Cycle 1.000 Seconds		
IODF =11 Created: ddmmyy:16:24:54.00 Act: POR										
Switch Device: 0002		Switch Id: 02		Type: 006064		Model: 001		Man: MCD		Plant: 01 Serial: 000083120625
Port	-----Connection-----			Avg Frame	Avg Frame Size		Port Bandwidth (MB/Sec)		Error	
Addr	Unit	Id	Serial Number	Pacing	Read	Write	-- Read --	-- Write --	Count	
04	CHP-H	02		0	701	707	0.70	0.60	0	
05	CHP	12		0	708	931	1.41	1.94	0	
06	CHP	44		0	973	984	1.81	1.74	1	
07	----	----		0	0	0	0.00	0.00	0	
08	----	----		0	1164	1001	0.42	0.43	0	
09	----	----		0	1043	986	2.19	2.30	0	
0A	CHP	41		0	1097	960	0.14	0.15	0	
0B	CU	F16A	900083120317	0	724	540	1.52	1.05	0	
	CU	F16B								
	CU	F16C								
	CU	F16D								
0C	----	----		0	0	0	0.00	0.00	0	
0D	----	----		0	0	0	0.00	0.00	0	
0E	----	----		0	0	0	0.00	0.00	0	
0F	----	----		0	0	0	0.00	0.00	0	

Figure 3-22. FICON Director Activity Report

3.1.1.18 Shared Device Activity Report

Figure 3-23 shows a sample of the output produced when the Shared Device Activity Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE member:

- o @RMFSDV1 - for all systems

The CA MICS file used to generate the report is:

- o HARDVA

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

USAGE CONSIDERATIONS:

This report is only available as a MICF inquiry and, thus, cannot be requested with the batch report selection statement. See section 3.2.24 for information on running the Shared Device Activity Report under MICF.

```
*****
** Note: This report cannot be produced if the CA MICS      **
**      database contains essential data elements only.    **
*****
```

S H A R E D D I R E C T A C C E S S D E V I C E A C T I V I T Y																	Page 1	
z/OS			Sysplex			PLEXPRD			Date mm/dd/yy			Interval 0:15:01.033						
Release VnRn			RMF Version 750						Time 9:44:00			Cycle 1.000 Seconds						
Total Samples(Avg) =			900		(Max) =		901		(Min) =		899							
Dev Num	Device Type	Volume Serial	PAV	SMF Sys id	IODF Suff	LCU	Device Activity Rate	Avg Resp Time	Avg IOSQ Time	Avg CMR Dly	Avg DB Dly	Avg Pend Time	Avg Disc Time	Avg Conn Time	% Dev Conn	% Dev Util	% Dev Resv	Avg Number Alloc
2000	33909	MVB000		*ALL			2.911	1.559	0.000	0.000	0.004	0.304	0.118	1.138	0.08	0.09	0.0	10.6
			2	SYS1	57	003D	0.841	2.044	0.000	0.000	0.011	0.327	0.307	1.410	0.12	0.14	0.0	15.0
			2	SYS2	57	003D	0.013	1.230	0.000	0.000	0.000	0.267	0.017	0.946	0.00	0.00	0.0	11.0
			2	SYS3	57	003D	0.006	1.318	0.000	0.000	0.000	0.282	0.026	1.011	0.00	0.00	0.0	5.0
			2	SYS4	57	003D	2.045	1.848	0.000	0.000	0.007	0.309	0.227	1.312	0.27	0.31	0.0	16.0
			2	SYS5	57	003D	0.006	1.357	0.000	0.000	0.000	0.333	0.013	1.011	0.00	0.00	0.0	6.0
2001	33909	MVB001		*ALL			0.030	1.384	0.000	0.000	0.000	0.322	0.018	1.045	0.00	0.00	0.0	4.2
			2	SYS1	57	003D	0.006	1.395	0.000	0.000	0.000	0.269	0.013	1.114	0.00	0.00	0.0	4.0
			2	SYS2	57	003D	0.006	1.344	0.000	0.000	0.000	0.307	0.013	1.024	0.00	0.00	0.0	6.0
			2	SYS3	57	003D	0.006	1.318	0.000		0.000	0.269	0.038	1.011	0.00	0.00	0.0	6.0
			2	SYS4	57	003D	0.006	1.357	0.000	0.000	0.000	0.307	0.013	1.037	0.00	0.00	0.0	5.0
			2	SYS5	57	003D	0.006	1.510	0.000	0.000	0.000	0.461	0.013	1.037	0.00	0.00	0.0	0.0

Figure 3-23. Shared Device Activity Report (DASD, Part 1 of 2)

S H A R E D M A G N E T I C T A P E D E V I C E A C T I V I T Y																	Page 1
z/OS		Sysplex		PLEXTST		Date mm/dd/yy		Interval 0:30:00.100									
Release VnRn		RMF Version 712				Time 9:00:00		Cycle 0.100 Seconds									
Total Samples(Avg) = 17985 (Max) = 18000 (Min) = 17952																	
Dev	Device	SMF	Device	Avg	Avg	Avg	Avg	Avg	Avg	Avg	%	%	%	Number	Avg	Time	
Num	Type	Volume	Sys	IO	LCU	Activity	Resp	IO	CMR	DB	Pend	Disc	Conn	Dev	Dev	Dev	
		Serial	id	Suff		Rate	Time	Time	Dly	Dly	Time	Time	Time	Conn	Util	Resv	
BB50	3590L	ABC917	*ALL			0.039	8339	0.000		7750	7771	567.1	1.346	0.01	2.21	0.0	
		ABC917	TS1	D5	003F	0.003	12986	0.000	0.000	12732	12774	210.6	1.331	0.00	0.06	0.0	
		ABC917	TS2	D5	0047	0.003	12075	0.000	0.000	11768	11832	242.0	1.306	0.00	0.07	0.0	
		ABC917	TS3	D5	0047	0.003	5947	0.000	0.000	5312	5324	621.6	1.280	0.00	0.17	0.0	
		ABC917	TS4	D5	003F	0.003	13164	0.000	0.000	12909	12945	217.6	1.357	0.00	0.06	0.0	
		ABC917	TS5	D5	00C7	0.003	5365	0.000	0.000	4520	4524	839.6	1.408	0.00	0.23	0.0	
		ABC917	TS6	D5	0058	0.003	7633	0.000	0.000	7211	7221	410.3	1.382	0.00	0.11	0.0	
		ABC917	TS7	D5	0058	0.003	8461	0.000	0.000	8016	8039	421.5	1.434	0.00	0.12	0.0	
		ABC917	TS8	D5	003B	0.003	7227	0.000		6802	6812	413.9	1.331	0.00	0.12	0.0	
		ABC917	TS9	D5	00C7	0.003	4520	0.000	0.000	3484	3487	1031	1.408	0.00	0.29	0.0	
		ABC917	TSA	D5	00C7	0.003	6402	0.000	0.000	5965	5969	431.4	1.306	0.00	0.12	0.0	
		ABC917	TSB	D5	00C7	0.003	3477	0.000	0.000	1216	1219	2257	1.357	0.00	0.63	0.0	
		ABC917	TSC	D5	00C7	0.003	6800	0.000	0.000	6379	6386	411.7	1.357	0.00	0.11	0.0	
		ABC917	TSD	D5	0047	0.003	11753	0.000	0.000	11482	11532	219.6	1.306	0.00	0.06	0.0	
		ABC917	TSE	D5	003F	0.003	10941	0.000	0.000	10698	10727	212.4	1.280	0.00	0.06	0.0	

Figure 3-23. Shared Device Activity Report (DASD, Part 2 of 2)

3.1.1.19 Enterprise Disk Systems Report

Figure 3-24 shows a sample of the output produced when the Enterprise Disk Systems Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE members:

- o @RMFESS1 - for all systems

The CA MICS file used to generate the report is:

- o HARELS - ESS Link Statistics
- o HARXPS - ESS Extent Pool Statistics
- o HARERS - ESS Rank Statistics

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

USAGE CONSIDERATIONS:

This report is only available as a MICF inquiry and, thus, cannot be requested with the batch report selection statement. See section 3.2.24 for information on running the Enterprise Disk Systems Report under MICF.

```
*****
** Note: This report cannot be produced if the CA MICS    **
**           database contains essential data elements only. **
*****
```

3.1 Postprocessor Reports

ESS LINK STATISTICS							Page 001
z/OS	Sysplex: PLEXPRD	System: SYS1	Start Date	Start Time	End Time	Duration	
Release: VnRn	RMF Ver: 770		mm/dd/yyyy	23:59:00.00	0:13:59.99	0:14:59.99	
Serial Number 0000062252	Type-Model	2107-932	Cache Interval: mm/dd/yyyy	23:58:39.15	0:13:39.15	0:15:00.00	
-----Adapter-----	--Link Type--	Bytes	Bytes	Operations	Resp Time	I/O	
SAid Type		/Sec	/Operation	/Sec	/Operation	Intensity	
0200 Fibre 2Gb	NO DATA TO REPORT OR ZERO						
0201 Fibre 2Gb	SCSI READ	651.9K	27.3K	23.9	0.7	15.9	
	SCSI WRITE	116.4K	9.1K	12.8	0.3	3.9	

						19.8	
0232 Fibre 2Gb	ECKD READ	2.3M	2.3K	993.8	0.0	28.1	
	ECKD WRITE	11.8M	20.7K	570.5	0.2	135.6	

						163.6	
0302 Fibre 2Gb	ECKD READ	2.3M	2.3K	1008.5	0.0	28.1	
	ECKD WRITE	11.9M	20.6K	577.2	0.2	136.5	

						164.6	
0330 Fibre 2Gb	SCSI READ	428.5K	31.3K	13.7	0.7	9.7	
	SCSI WRITE	55.2K	9.4K	5.9	0.3	1.8	

Figure 3-24. Enterprise Disk Systems Report (Part 1 of 3)

ESS EXTENT POOL STATISTICS							Page 002
z/OS	Sysplex: PLEXPRD	System: SYS1	Start Date	Start Time	End Time	Duration	
Release: VnRn	RMF Ver: 770		mm/dd/yyyy	23:59:00.00	0:13:59.99	0:14:59.99	
Serial Number 0000062252	Type-Model	2107-932	Cache Interval: mm/dd/yyyy	23:58:39.15	0:13:39.15	0:15:00.00	
--Extent Pool--	----- Real -----						
Id Type	Capacity	Extents					
0000 CKD 1GB	769	873					
0001 CKD 1GB	769	873					
0002 CKD 1GB	769	873					
0003 CKD 1GB	769	873					
0004 CKD 1GB	896	1018					
0005 CKD 1GB	896	1018					
0006 CKD 1GB	896	1018					
0008 FB 1GB	779	779					
0009 FB 1GB	779	779					
000A CKD 1GB	769	873					
000B CKD 1GB	769	873					
000C FB 1GB	909	909					

Figure 3-24. Enterprise Disk Systems Report (Part 2 of 3)

ESS RANK STATISTICS																	Page 003
z/OS		Sysplex: PLEXPRD		System: SYS1		Start Date		Start Time		End Time		Duration					
Release: VnRn		RMF Ver: 770				RMF Interval: mm/dd/yyyy		23:59:00.00		0:13:59.99		0:14:59.99					
Serial Number 0000062252		Type-Model		2107-932		Cache Interval: mm/dd/yyyy		23:58:39.15		0:13:39.15		0:15:00.00					
		----- Read Operations -----					----- Write Operations -----										
--Extent Pool--		Ops	Bytes	Bytes	RTime	Ops	Bytes	Bytes	RTime	----Array-----			Min	Rank	RAID		
Id	Type	RRID	/Sec	/Op	/Sec	/Op	/Sec	/Op	/Sec	/Op	SSD	Num	Width	RPM	Cap	Type	
0000	CKD 1GB	0000	59.1	55.2K	3.3M	7.4	8.0	564.2K	4.5M	98.6	Y	1	6	15	876G	RAID 5	
		0002	139.2	55.1K	7.7M	9.2	8.7	935.7K	8.2M	113.0	Y	1	6	15	876G	RAID 5	
		0004	171.6	55.0K	9.4M	8.3	6.7	1.0M	6.8M	115.6		1	7	15	1022G	RAID 5	
		0006	269.3	55.7K	15.0M	14.3	24.9	844.9K	21.1M	107.5		1	7	15	1022G	RAID 5	
		0008	186.2	55.7K	10.4M	12.1	13.0	895.6K	11.6M	118.1		1	6	15	876G	RAID 5	
		000A	75.1	55.4K	4.2M	8.4	17.2	562.6K	9.7M	101.5		1	6	15	876G	RAID 5	
		000C	134.4	54.1K	7.3M	7.7	29.3	521.5K	15.3M	82.7		1	7	15	1022G	RAID 5	
		000E	34.1	56.3K	1.9M	10.8	5.3	593.7K	3.1M	86.2		1	7	15	1022G	RAID 5	
		POOL	1069.1	55.3K	59.1M	10.6	113.2	709.6K	80.3M	100.6	Y	8	52	15	7592G	RAID 5	
0001	CKD 1GB	0001	0.0	0.0	0.0	0.0	0.6	5.9K	3.7K	9.3		1	6	15	876G	RAID 5	
		0003	0.1	41.9K	3.5K	9.9	0.3	63.5K	17.3K	13.8		1	6	15	876G	RAID 5	
		0005	0.0	48.3K	1.5K	10.1	60.3	15.9K	4.6K	12.9		1	7	15	1022G	RAID 5	
		0007	0.0	53.6K	2.0K	9.5	0.7	92.8K	66.2K	14.8		1	7	15	1022G	RAID 5	
		0009	0.0	131.1K	218.5	16.0	0.2	14.0K	2.4K	12.4		1	6	15	876G	RAID 5	
		000B	7.8	56.0K	434.1K	7.8	2.7	479.4K	1.3M	51.0		1	6	15	876G	RAID 5	
		000D	9.6	56.1K	537.8K	8.4	2.3	1.2M	2.7M	72.3		1	7	15	1022G	RAID 5	
		000F	0.1	37.4K	3.1K	8.8	1.8	307.9K	561.4K	33.0		1	7	15	1022G	RAID 5	
		POOL	17.6	55.9K	982.2K	8.1	8.9	526.7K	4.7M	43.8		8	52	15	7592G	RAID 5	

Figure 3-24. Enterprise Disk Systems Report (Part 3 of 3)

3.1.1.20 Serialization Delay Report

Figure 3-8 shows a sample of the output produced when the Serialization Delay Report is requested. The SAS source code used is in sharedprefix.MICS.SOURCE members:

- o @RMFSDR1 - for all systems

The CA MICS file used to generate the report is:

- o SCPSRD - Serialization Delay Details
- o SCPSRS - Serialization Delay System

For further information on the report format and contents, see z/OS RMF Report Analysis (SC33-7991).

USAGE CONSIDERATIONS:

This report is only available as a MICF inquiry and, thus, cannot be requested with the batch report selection statement. See section 3.2.26 for information on running the Serialization Delay Report under MICF.

```
*****  
** Note: This report cannot be produced if the CA MICS    **  
**           database contains essential data elements only. **  
*****
```


SERIALIZATION DELAY REPORT

z/OS

Release VnRn

System ID SYS2

RMF Version 780

Date mm/dd/yy

Time 11:29:00

Interval 0:15:00.05

Cycle 1.000 Seconds

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SERIALIZATION DELAY DETAILS

CMS Lock Details

Lock Type	ASID	Job Name	Service Class	Period Number	Tot Contention Time (Millisec)	Avg Contention Time (Millisec)	Total Contention Count	Contention Count with Q Len>1
CMS	0180	IMS8	STCI2V50	1	2309	0.05	45425	2658
	0193	QTMULTI8	STCOMVS	3	248	0.04	5737	334
	002A	NETVIEW	SYSSTC	1	246	0.04	5933	435
	0176	AONVIEW	DISCRSTC	1	153	0.04	3396	260
CMSEQDQ	0007	GRS	SYSTEM	1	906	3.41	265	46
	030C	MPR8TNFA	BATI2V50	1	245	15	16	3
	026E	MPR8TN05	BATI2V50	1	219	14	15	3
	0268	MPR8TN03	BATI2V50	1	213	15	14	4
CMSLatch	04B7	U0300914	STCOMVS	1	0	0.00	2	0
	04D7	BPXAS	SYSSTC	1	0	0.00	2	0
	0316	BPXAS	SYSSTC	1	0	0.00	1	0
	04F9	BPXAS	SYSSTC	1	0	0.00	1	0
CMSSMF	0019	IXGLOGR	SYSTEM	1	0	0.00	35	0
	0178	DBW1DBM1	STCI2V50	1	0	0.00	18	0
	048B	USSWORK1	STCOMVS	3	0	0.00	10	0
	01BC	CICS3A8C	STCI2V60	1	0	0.00	1	1

CML and Local Lock Details

Lock Type	ASID	Job Name	Service Class	Period Number	Tot Contention Time (Millisec)	Avg Contention Time (Millisec)	Total Contention Count	Contention Count with Q Len>1
CML Lock Owner	0180	IMS8	STCI2V50	1	33027	0.03	840036	180429
	0149	DBS1MSTR	STCI2V50	1	10348	0.00	1276715	247154
	0178	DBW1DBM1	STCI2V50	1	5355	0.05	96027	9240
	0143	RRS	SYSSTC	1	4338	0.01	361514	40218
Local Lock	003F	BCDPTITR	DISCRBAT	1	79880	0.06	1144041	538297
	0057	BCDPTITR	DISCRBAT	1	45796	0.06	687689	321128
	01B8	DBWGWLJM	STCI2V50	1	36718	0.01	1923928	535355
	0342	CSQ8CHIN	STCI2V40	1	26624	0.01	1728688	328156
CML Lock Requestor	017B	DBW1DIST	STCI5V05	1	1295	0.01	70913	4930
	002A	NETVIEW	SYSSTC	1	1287	0.01	80848	8957
	0176	AONVIEW	DISCRSTC	1	1168	0.01	67446	8443
	031C	BUYZJ8B	STCI1V40	1	832	0.01	75900	12702

Figure 3-8. Serialization Delay Report (Part 2 of 3)

z/OS

Release VnRn

System ID SYS2

RMF Version 780

Date mm/dd/yy

Time 11:29:00

Interval 0:15:00.05

Cycle 1.000 Seconds

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SERIALIZATION DELAY DETAILS

GRS Latch Details (GRS Mode: STAR)

Latch Type	ASID	Job Name	Service Class	Period Number	Tot Contention Time (Millisec)	Avg Contention Time (Millisec)	Std Dev of Contention Time	Total Contention Count
Latch Set Creator	0016	RACFDS	SYSTEM	1	98981	1.97	5.36	50069
	0011	OMVS	SYSSTC	1	33467	2.96	11	11277
	0143	RRS	SYSSTC	1	19636	0.72	4.95	27265
	000D	WLM	SYSTEM	1	16633	8.79	2.11	1891
Latch Requestor	0147	RMFGAT	SYSSTC	1	15865	9.01	1.72	1760
	0057	BCDPTJ2C	DISCRBAT	1	6239	4.90	5.37	1272
	003F	BCDPTJ2C	DISCRBAT	1	5443	5.21	6.17	1044
	001F	USSWORK5	STCOMVS	3	2280	8.23	14	277

GRS Enqueue Details (GRS Mode: STAR)

Enqueue Scope	ASID	Job Name	Service Class	Period Number	Tot Contention Time (Millisec)	Avg Contention Time (Millisec)	Std Dev of Contention Time	Total Request Count	Total Contention Count
Step	003F	BCDPTITR	DISCRBAT	1	16202	52	29	1364	311
	0057	BCDPTITR	DISCRBAT	1	11387	48	29	911	234
	0058	BCDPTC2J	DISCRBAT	1	11335	48	27	670	234
	0057	BCDPTJ2C	DISCRBAT	1	7624	26	23	656	288
System	0008	SMSPDSE	SYSTEM	1	3630	31	201	1295	116
	002C	SMS	SYSSTC	1	156	26	14	162	6
	0009	SMSPDSE1	SYSTEM	1	110	0.57	0.08	1293	190
	0015	ALLOCAS	SYSTEM	1	44	3.66	2.23	1055	12
Systems	0146	DFHSM	SYSSTC	1	151677	101	86	3042	1491
	0017	IOSAS	SYSTEM	1	42256	14085	24151	194	3
	0038	PDSETST8	DISCRBAT	1	40820	669	650	1086	61
	0041	TDMFJ80A	BATI2V50	1	1947	30	12	116	64

Figure 3-8. Serialization Delay Report (Part 3 of 3)

3.1.2 Running the Postprocessor Reports

The Postprocessor Reports are created in a single job step that consists of the following logical steps:

- o Control statement validation
 - Verify that at least one cycle is specified.
 - Verify that at least one report has been requested and that all requests are valid.
 - Verify that a valid database timespan has been specified.
 - Establish a list of database files and cycles in the timespan requested.
 - Verify that a summarization break variable has been specified and that it is valid for the database timespan specified.
 - Abort the report run if any control errors were encountered.
- o Acquire SYSID characteristics
 - Read the desired cycle of the HARCPU file in the timespan specified; find all SYSIDs and their respective CPU models.
 - Create SAS global MACRO variables to control report production, including the CPU models of each SYSID, and flags indicating the presence or absence of SYSID data systems.
 - Write environment report.
- o Produce individual reports
 - Verify that the database file cycles needed to produce the reports exist in the specified timespan.
 - Create selected working input files.
 - Generate the reports.

The areas discussed are:

- 1 - Report Control Statements
- 2 - Postprocessor Control Card Examples

See section 3.2 for information on running the postprocessor reports under MICF.

3.1.2.1 Report Control Statements

Postprocessor report generation is controlled by means of SAS global variable assignments and the invocation of one SAS MACRO. In addition, source and MACRO listing options are available for debugging purposes.

Example: To produce an RMF postprocessor report, complete the job card, EXEC statement, SYSIN data set name and specify the control statements:

```
//jobname JOB ...  
//RMFPP EXEC MICSSHRx  
//SYSIN DD DISP=SHR,DSN=sp.MICS.INCLLIB(RMFRPTS)  
//CONTROL DD *  
%LET REPORTS = value; /* REQUIRED */  
%LET TSPAN = value; /* REQUIRED */  
%LET CYCLES = value; /* REQUIRED */  
%LET SUMBY = value; /* optional */  
%LET SUMTYPE = value; /* optional */  
%LET SELECT = value; /* optional */  
%RMFPP; /* REQUIRED */  
/*
```

The control statements are documented in the following sections:

- 1 - Specifying Reports to be Produced (REPORTS)
- 2 - Selecting the Database Timespan (TSPAN)
- 3 - Selecting the Database File Cycles (CYCLES)
- 4 - Controlling Summarization (SUMBY and SUMTYPE)
- 5 - Selecting Data (SELECT)
- 6 - Generating Reports & SAS Listing Options (RMFPP)

3.1.2.1.1 Specifying Reports to be Produced (REPORTS)

Postprocessor report selection is accomplished by means of a SAS global variable assignment statement. The statement is required and must be present after the //CONTROL DD statement in the report JCL. The report selection statement has the following format:

```
%LET REPORTS = rpt1 rpt2 ... rptn;
```

Multiple report requests must be delimited by a blank. The valid requests are:

- o CACHEDTL - Cache Subsystem Activity Detail Report
- o CACHESUM - Cache Subsystem Activity Summary Report
- o CHANNEL - Channel Path Activity Report
- o CPU - CPU Activity Report
- o CRYPTO - Crypto Hardware Activity Report
- o DEVICE - Device Activity Report
- o DEVSG - Storage Group Device Activity Report
- o ENQUEUE - Enqueue Activity Report
- o FCD - FICON Director Activity Report
- o IOQ - I/O Queuing Activity Report
- o PAGESP - Page Data Set Activity Report
- o PAGING - Paging Activity Report
- o SUMMARY - RMF Summary Report
- o USS - USS Kernel Activity Report
- o VSTORDTL - Virtual Storage Detail Report
- o VSTORSUM - Virtual Storage Summary Report
- o WLMGL - Workload Activity Goal Mode Reports (see Note below)
- o XCF
 - XCF Usage by System Report
 - XCF Usage by Member Report
 - XCF Path Statistics Report
- o XES
 - Coupling Facility Usage Summary Report
 - XES Structure Activity Report
 - Coupling Facility Subchannel Report

Note: The WLMGL report supports additional options described in section 3.1.1.13.

The following reports are only available as MICF inquiries and, thus, cannot be requested with the batch report selection statement:

- o Shared Device Activity Report
- o Enterprise Disk Systems Report
- o Serialization Delay Report

See section 3.2 for information on running the postprocessor reports under MICF.

Invalid report requests are ignored. If no valid report requests are found, the report run is aborted with a message indicating a control statement error.

Examples: `%LET REPORTS = CPU;`
`%LET REPORTS = PAGING PAGESP;`

3.1.2.1.2 Selecting the Database Timespan (TSPAN)

The CA MICS database timespan from which the postprocessor reports are to be generated is selected by means of a SAS global variable assignment statement. It is required and is provided after the `//CONTROL DD *` statement in the report JCL. The following statement shows the format of a SAS global variable assignment statement.

```
%LET TSPAN = timespan;
```

Following are the valid timespans:

- o DETAIL
- o DAYS
- o WEEKS
- o MONTHS
- o YEARS

The specification of an invalid timespan will result in a control statement error, and the report run will be aborted. Note that the YEARS timespan is not normally active for the Hardware and SCP Analyzer.

Example: `%LET TSPAN = DAYS;`

3.1.2.1.3 Selecting the Database File Cycles (CYCLES)

The CA MICS database file cycles from which the postprocessor reports are to be generated are selected by means of a SAS global variable assignment statement. The statement is required, and must be present after the `//CONTROL DD *` statement in the report JCL. The format of the statement is:

```
%LET CYCLES = c1 c2 ... cn;
```

Multiple cycles must be delimited by blanks. Any cycle value less than ten requires the presence of a leading zero.

No check is made to verify that the cycles specified are actually present in the CA MICS database. However, the first cycle specified is used during the report setup phase to identify the HARCPU file (in the timespan identified by the `%LET TSPAN = control` statement) to be read in order to determine the environment of each SYSID. If this cycle is not present, the report run is aborted.

Example: `%LET CYCLES = 03 02 01;`

3.1.2.1.4 Controlling Summarization (SUMBY and SUMTYPE)

CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities require that a data element be defined as a control break variable, and that the summarized files be sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes. In addition to identifying the data element, you can also control how it is used to create the sort key list.

For example, you may want to generate a report from the last three cycles of the DETAIL timespan and summarize the information by HOUR. As it stands, this report request would be ambiguous. Do you want each hour of each day reported separately, or do you want the same hour of all days included in the input data to be summarized together? The postprocessor reports allow either method.

The summarization data element is defined by means of a SAS global variable assignment statement. The statement is required and must be present after the CONTROL DD * statement in the report JCL. The format of the statement is:

```
%LET SUMBY = data-element-name;
```

The data element name must be one of the following:

- o STARTTS
- o HOUR
- o ZONE
- o DAY
- o WEEK
- o MONTH
- o YEAR
- o SYSID

Any other specification will result in a control statement error and an aborted report run.

The summarization technique is defined by means of another SAS global variable assignment statement. The statement is not required, but, if present, must be included after the CONTROL DD * statement in the report JCL. The statement can be either of the following:

```
%LET SUMTYPE = DETAIL;
```

```
%LET SUMTYPE = COMPOSITE;
```

The specification of COMPOSITE forces ALL occurrences of the same value of the SUMBY variable to be summarized and reported together. DETAIL, on the other hand, will cause the input files to be processed and reported in date/time order. In the previous example, the sort key lists would be:

```
SYSID HOUR                (COMPOSITE)
SYSID YEAR MONTH DAY HOUR  (DETAIL)
```

DETAIL is the default, so unless COMPOSITE summarization is required, the statement can be omitted. Note that a change in the value of SYSID always forces a control break.

In addition, remember that some combinations of database timespans and summarization elements are not valid. For example, although STARTTS is present in all timespans, it can be used as the summarization element only for the DETAIL timespan. Also, the data element WEEK is not present in the MONTHS timespan, so this combination will not be processed.

An invalid combination will result in a control statement error and an aborted report run.

Examples:

1. %LET SUMBY = HOUR;
 %LET SUMTYPE = COMPOSITE;
2. %LET SUMBY = HOUR;
 %LET SUMTYPE = DETAIL;

In example 1, if three cycles of the DETAIL timespan were also specified, this combination would result in a report with 24 control breaks. Hour 0 of each of the three days (the hour from midnight to 1 a.m.) would be summarized together into a single report, as would hours 1, 2, and so on. Example 2, assuming the same cycle and timespan specifications, would result in a report with 72 control breaks. Each hour of the day in the first cycle would be reported, followed by each hour of the day in the second cycle, followed by the same for the third cycle.

3.1.2.1.5 Selecting Data (SELECT)

During the creation of the work files used to generate the reports, user specified SAS code may be included to modify or subset the data. These program statements are specified by means of a SAS global variable assignment statement. The statement is optional, but if specified must be present after the `//CONTROL DD *` statement in the report JCL. The format of the statement is:

```
%LET SELECT = %STR(SAS program code);;
```

No validity checking is done on the defined code. If the user code contains syntax or logic errors, the report job will either terminate abnormally or will produce unpredictable results.

Note the use of the `%STR MACRO` function. This allows the use of semicolons as statement terminators within the SAS code being defined; otherwise, the first semicolon found within the code terminates the global assignment statement.

Be sure to include both the semicolon that terminates the last SAS statement that is part of the data selection or modification code as well as the semicolon used to terminate the assignment statement.

Examples: `%LET SELECT = %STR(IF SYSID="SYS1");;`
`%LET SELECT = %STR(IF DEVTYPE="3380");;`

3.1.2.1.6 Generating Reports & SAS Listing Options (RMFPP)

After the required control statements have been entered, the report generation process is begun by means of a SAS MACRO. The statement is required and must be present as the last control statement following the `//CONTROL DD *` statement in the report JCL. The format of the statement is:

```
%RMFPP(options);
```

The options permitted are:

- o CHECK=ON or CHECK=OFF

CHECK=ON allows for syntax checking of control statements and the analysis of each SYSID's environment without actually producing reports. CHECK=OFF is the default.

- o SOURCE=ON or SOURCE=OFF

SOURCE=ON causes the SAS log to contain the source statements executed to produce the reports. The default is SOURCE=OFF.

- o MPRINT=ON or MPRINT=OFF

MPRINT=ON causes the SAS log to contain the statements produced by SAS MACRO expansion. The default is MPRINT=OFF.

- o DEBUG=ON or DEBUG=OFF

DEBUG=ON causes the SAS log to contain diagnostic messages related to SAS Macro execution. This option is helpful in troubleshooting report failures. The default is DEBUG=OFF.

Multiple options should be separated by commas.

Examples: `%RMFPP;`
`%RMFPP(CHECK=ON,MPRINT=ON);`

3.1.2.2 Postprocessor Control Card Examples

1. Print CPU Activity Postprocessor report from DETAIL timespan using latest cycle.

```
//jobname JOB ...
//RMFPP EXEC MICSSHRx
//SYSIN DD DSN=sharedprefix.MICS.INCLLIB(RMFRPTS),
// DISP=SHR
//CONTROL DD *
%LET TSPAN = DETAIL;
%LET CYCLES = 01;
%LET REPORTS = CPU;
%RMFPP;
/*
```

2. Print Workload Activity Goal Mode Postprocessor report from DAYS timespan using latest cycle and summarizing to day. A summarization technique of DETAIL is used by default.

```
//jobname JOB ...
//RMFPP EXEC MICSSHRx
//SYSIN DD DSN=sharedprefix.MICS.INCLLIB(RMFRPTS),
// DISP=SHR
//CONTROL DD *
%LET TSPAN = DAYS;
%LET CYCLES = 01;
%LET SUMBY = DAY;
%LET REPORTS = WLMGL;
%RMFPP;
/*
```

3. Print Device Activity Postprocessor report from DETAIL timespan using latest cycle and selecting 3390 device types only.

```
//jobname JOB ...
//RMFPP EXEC MICSSHRx
//SYSIN DD DSN=sharedprefix.MICS.INCLLIB(RMFRPTS),
// DISP=SHR
//CONTROL DD *
%LET TSPAN = DETAIL;
%LET CYCLES = 01;
%LET REPORTS = DEVICE;
%LET SELECT = %STR(IF DEVTYPE=:'3390'););
%RMFPP;
/*
```

4. Print Channel Path Activity Postprocessor report from DAYS timespan using cycles 03,02,01. Summarize to zone. Specify a summarization technique of DETAIL so that each zone of each day is summarized separately.

```
//jobname JOB ...
//RMFPP EXEC MICSSHRx
//SYSIN DD DSN=sharedprefix.MICS.INCLLIB(RMFRPTS),
// DISP=SHR
//CONTROL DD *
%LET TSPAN = DAYS;
%LET CYCLES = 03 02 01;
%LET SUMBY = ZONE;
%LET SUMTYPE = DETAIL;
%LET REPORTS = CHANNEL;
%RMFPP;
/*
```

5. Print Channel Path Activity Postprocessor report from DAYS timespan using cycles 03,02,01. Summarize to zone. Specify a summarization technique of COMPOSITE so that the same zone of all days is summarized together.

```
//jobname JOB ...
//RMFPP EXEC MICSSHRx
//SYSIN DD DSN=sharedprefix.MICS.INCLLIB(RMFRPTS),
// DISP=SHR
//CONTROL DD *
%LET TSPAN = DAYS;
%LET CYCLES = 03 02 01;
%LET SUMBY = ZONE;
%LET SUMTYPE = COMPOSITE;
%LET REPORTS = CHANNEL;
%RMFPP;
/*
```

6. Print Paging Activity Postprocessor report from DETAIL timespan using latest cycle. Display SAS source statements, SAS MACRO expansion statements, and diagnostic messages in the SAS log.

```
//jobname JOB ...
//RMFPP EXEC MICSSHRx
//SYSIN DD DSN=sharedprefix.MICS.INCLLIB(RMFRPTS),
// DISP=SHR
//CONTROL DD *
%LET TSPAN = DETAIL;
%LET CYCLES = 01;
%LET REPORTS = PAGING;
```

```

%RMFPP (DEBUG=ON,SOURCE=ON,MPRINT=ON);
/*

7. Print Cache Subsystem Detail report from DETAIL timespan
   using latest cycle for control unit '01AC'
   (CUADDR='01AC', CUDEVNUM=428).

//jobname JOB ...
//RMFPP EXEC MICSSHRx
//SYSIN DD DSN=sharedprefix.MICS.INCLLIB(RMFRPTS),
// DISP=SHR
//CONTROL DD *
%LET TSPAN = DETAIL;
%LET CYCLES = 01;
%LET REPORTS = CACHEDTL ;
%LET SELECT = %STR(IF CUADDR='01AC');
or %LET SELECT = %STR(IF CUDEVNUM=428);
%RMFPP;
/*

```

3.2 MICF Inquiries

The MICF inquiries provided with the Hardware and SCP Analyzer are listed in Figure 3-20.

For postprocessor inquiries, the value of 't,' report frequency, is always set to 'P' since those reports can be run with a variable frequency.

For postprocessor coupling facility inquiries, the guidelines for the 'p,' 't,' and 'n' fields are waived.

For example, an inquiry named RMFCDA would be interpreted as:

```

RMFCDA
---||+-- differentiates this inquiry
| || from other color graphics
| || inquiries run at the DAYS
| || timespan
| |+-- can be run daily
| +-- a color graphics inquiry
+-- a Hardware and SCP Analyzer inquiry

```

MICF Distributed Inquiries					
Report Class	Report Name	Report Identifier			
		Color	List	Printer	
Graphics				Graphics	
General	DASD Response Time Components	RMFCDB			
Performance	Daily Logical Control Unit Act. (Color)	RMFCDA			
	Daily Logical Control Unit Activity			RMFPDA	
	Post Processor CPU Activity		RMFLPA		
	Post Processor Channel Path Activity		RMFLPB		
	Post Processor Device Activity		RMFLPC		
	Post Processor Enqueue Activity		RMFLPD		
	Post Processor I/O Queuing Activity		RMFLPE		
	Post Processor Page Data Set Activity		RMFLPF		
	Post Processor Paging Activity		RMFLPG		
	Post Processor RMF Summary		RMFLPH		
	Post Processor Virtual Storage Summary		RMFLPJ		
	Post Processor Virtual Storage Detail		RMFLPK		
	Post Processor Storage Group Device Activity		RMFLPL		
	Post Processor Cross-System Coupling Facility		RMFXCF		
	Post Processor Coupling Facility Reports		RMFXES		
	Post Processor Workload Activity Goal Mode		RMFLPM		
	Post Processor Cache Subsystem Summary		RMFLPN		
	Post Processor Cache Subsystem Detail		RMFLPO		
	Post Processor USS Kernel Activity		RMFLPP		
	Post Processor Crypto Hardware Activity		RMFLPQ		
	Post Processor FICON Director Activity		RMFLPR		
	Post Processor Shared Device Activity		RMFLPS		
	Post Processor Enterprise Disk Systems Report		RMFLPT		
	Sysplex Aggregation Compliance Report		RMFLPU		
	Serialization Delay Report		RMFLPV		

Figure 3-20. MICF Distributed Inquiries

If you want to run the Hardware and SCP Analyzer MICF inquiries, access them through the database inquiries option of MICF, which is part of the CA MICS Workstation Facility (MWF).

The Hardware and SCP Analyzer MICF inquiries are described in the following sections:

- 1 - DASD Response Time Components
- 2 - Daily Logical Control Unit Activity (Color)
- 3 - Daily Logical Control Unit Activity
- 4 - Post Processor CPU Activity
- 5 - Post Processor Channel Path Activity
- 6 - Post Processor Device Activity
- 7 - Post Processor Enqueue Activity
- 8 - Post Processor I/O Queuing Activity
- 9 - Post Processor Page Data Set Activity
- 10 - Post Processor Paging Activity
- 11 - Post Processor RMF Summary
- 12 - Post Processor Virtual Storage Summary
- 13 - Post Processor Virtual Storage Detail
- 14 - Post Processor Storage Group Device Activity
- 15 - Cross-System Coupling Facility Reports
- 16 - Coupling Facility Reports
- 17 - Post Processor Workload Activity Goal Mode
- 18 - Post Processor Cache Subsystem Summary
- 19 - Post Processor Cache Subsystem Detail
- 20 - Post Processor USS Kernel Activity
- 21 - Post Processor Crypto Hardware Activity
- 22 - Post Processor FICON Director Activity
- 23 - Post Processor Shared Device Activity
- 24 - Post Processor Enterprise Disk Systems Report
- 25 - Sysplex Aggregation Compliance Report
- 26 - Serialization Delay Report

3.2.1 DASD Response Time Components

The DASD Response Time Components inquiry produces a stacked bar chart, broken down to connect time, disconnect time, pending time and IOS queue time. One chart is produced per LCU. The chart is in color graphics format.

This inquiry produces no output unless the data is from the previous day.

INTENDED USE:

The chart can be used to determine the hours of the day when DASD response time is not satisfactory for an LCU. The hour-by-hour trend of response times, by component, may assist in determining why it is unsatisfactory.

Note: Because this is a color graphics chart, no sample of the chart is provided.

REPORT FORMAT:

In the stacked bar chart produced, each vertical bar represents an hour of the day. Response time is represented by the height of each bar.

INQUIRY ID:

RMFCDB

DATA SOURCE (file/timespan):

HARDVA at the DAYS timespan

DATA ELEMENTS USED:

DEVADDR - Device Address
DVAACNN - Average Device Connect Time
DVAVDIS - Average Device Disconnect Time
DVAAPEN - Average Device Pending Time
DVAAVIOS - Average Device IOS Queue Time
LCUID - LCU Identifier
SYSID - System Identifier

CALCULATIONS:

None

USAGE CONSIDERATIONS:

Not applicable

3.2.2 Daily Logical Control Unit Activity (Color)

The Daily Logical Control Unit Activity (Color) inquiry produces a vertical bar chart by SYSID and LCU showing the SSCH rate by hour. The chart is in color graphics format.

This inquiry produces no output unless the data is from the previous day.

INTENDED USE:

The chart can be used to determine the peak hours for an LCU's I/O rate and the trend throughout the day.

Note: Because this is a color graphics chart, no sample of the chart is provided.

REPORT FORMAT:

The inquiry produces a vertical bar chart in which each bar represents the SSCH rate during the indicated hour.

INQUIRY ID:

RMFCDA

DATA SOURCE (file/timespan):

SCPLCU at the DAYS timespan

DATA ELEMENTS USED:

DURATION - Recording Interval Time

LCUID - LCU Identifier

LCUSSC - Start Subchannel Count

SYSID - System Identifier

CALCULATIONS:

Calculates the SSCH rate.

USAGE CONSIDERATIONS:

Not applicable

3.2.3 Daily Logical Control Unit Activity

The Daily Logical Control Unit Activity inquiry produces a vertical bar chart by SYSID and LCU showing the SSCH rate by hour. The chart is in printer graphics format.

This inquiry produces no output unless the data is from the previous day.

INTENDED USE:

The chart can be used to determine the peak hours for an LCU's I/O rate and the trend throughout the day.

REPORT FORMAT:

The inquiry produces a vertical bar chart in which each bar represents the SSCH rate during the indicated hour.

INQUIRY ID:

RMFPDA

DATA SOURCE (file/timespan):

SCPLCU at the DAYS timespan

DATA ELEMENTS USED:

DURATION - Recording Interval Time
LCUID - LCU Identifier
LCUSSC - Start Subchannel Count
SYSID - System Identifier

CALCULATIONS:

Calculates the SSCH rate.

USAGE CONSIDERATIONS:

Not applicable

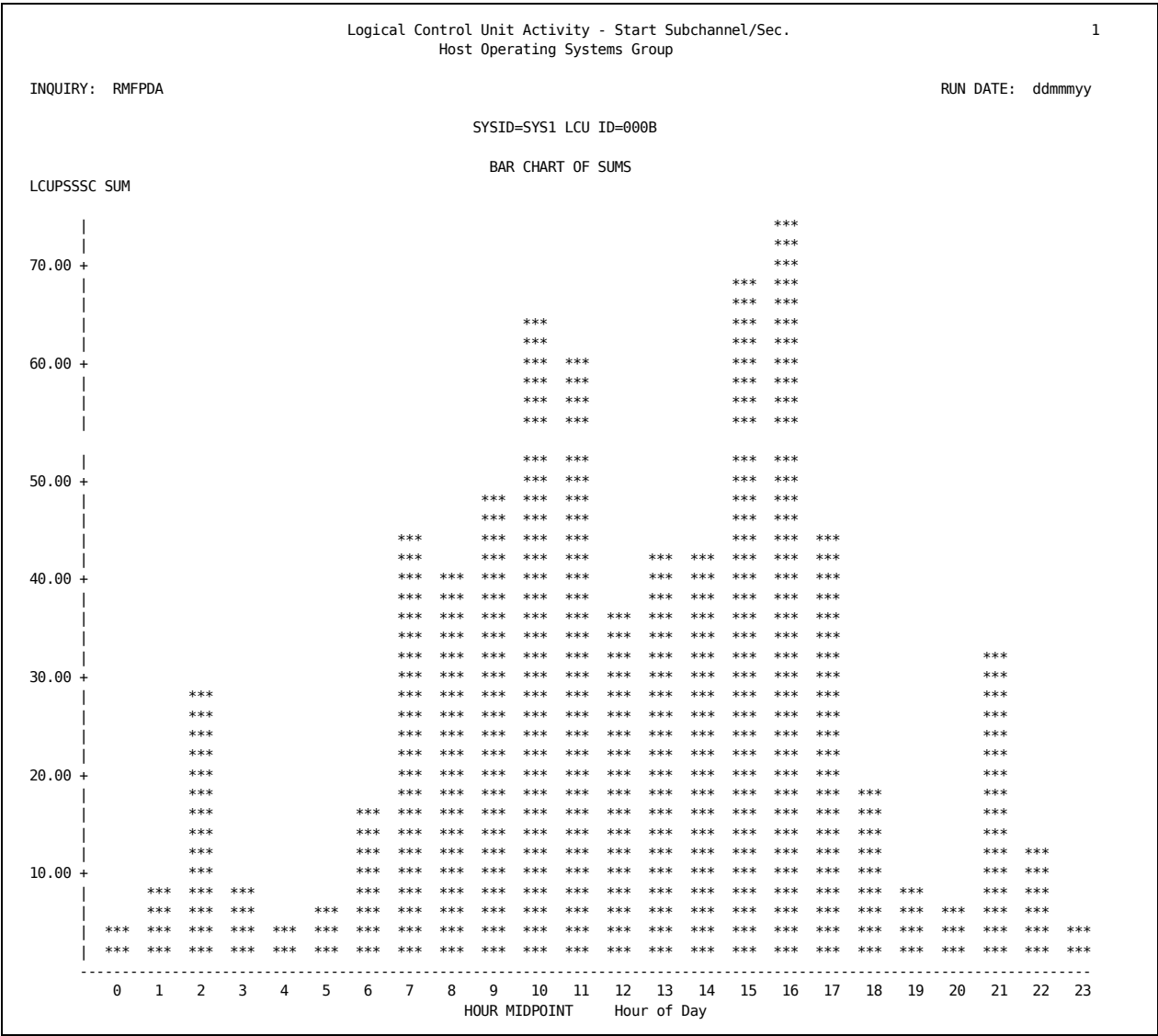


Figure 3-21. Daily Logical Control Unit Activity

3.2.4 Post Processor CPU Activity

The CPU Activity report provides information about each processor on a given SYSID as well as on system address space activity. Additional reports are provided for PR/SM environments, including a Partition Data report, an LPAR Cluster Report, and a Group Capacity Report.

INTENDED USE:

The CPU Activity section of the report helps with the analysis of processor utilization, including busy and wait times, percentages busy, and I/O interrupt rate. The system address space analysis can be used to detect problems such as a backlog of address spaces waiting for access to a processor.

The Partition Data report produced for a PR/SM LPAR environment can be used to examine the partition configuration and dispatching activity. Moreover, it allows data centers to have a better understanding of their true resource utilization by showing the resource consumptions separately, by type of physical processor assigned to each partition. The type can be general purpose processor (CP), internal coupling facility (ICF), integrated facility for Linux (IFL), System z Application Assist Processor (zAAP), or System z Integrated Information Processor (zIIP). Finally, separate total lines are provided for each pool of processors.

For logical partitions managed by WLM, additional information related to the Intelligent Resource Director (IRD) is provided in both the Partition Data and the LPAR Cluster sections of the report.

The Group Capacity section of the report provides all information to understand how the CPU resources (MSUs) are consumed in the various capacity groups.

See chapter 6 for more information about total system utilization percentages in configurations where multiple processor types are used.

REPORT FORMAT:

See section 3.1.1.1 for an example of the output generated by the CPU Activity report.

DATA SOURCE (file/timespan):

HARCPU, HARIPU, HARLPC and HARVPA (PR/SM LPAR systems only)
at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in
sharedprefix.MICS.SOURCE member:

- o @RMFCPU4 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPA, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor CPU Activity Report -----|
| Command ==>                                     |
|                                                  |
| Composing Inquiry: RMFLPA - Post Processor CPU Activity Rpt |
| Database ==> _____                         |
| Cycle(s) ==> __ - __                            |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
|                                                  |
| Data Selection:                                |
|          dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date   ==> _____ - _____ - _____ - _____ |
| Hour   ==> __ - __ |
| Zone   ==> _____ |
| Sysid  ==> _____ |
|                                                  |
| Summarization Break Variable ==> _____ |
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE) |
|                               |
| SAS Subsetting Statements ==> _____ |
|                               |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.

Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.

Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.

Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTYPE EQ: "3390";
```


USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.5 Post Processor Channel Path Activity

The Channel Path Activity report provides information about channel path usage. Channel paths provide the interface that allows for control units and I/O devices to be physically connected to the I/O subsystem.

INTENDED USE:

The report is designed to help analyze each channel path by path ID. For each ID, the type of path and the percent path usage is reported. If a path is offline, this is reported in place of the percent usage. The report can help detect bottlenecks in the I/O subsystem caused by excessive path utilization.

An additional section presents a summary of all the channel paths managed by the Dynamic Channel-Path Management function of the Intelligent Resource Director (IRD).

For systems using hipersockets, detailed traffic information is provided in a separate section, at the end of the report.

REPORT FORMAT:

See Section 3.1.1.2 for an example of the output generated by the Channel Path Activity report.

DATA SOURCE (file/timespan):

HARPCA at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFCHA2 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPB, whose Catalog Group is PERFORM.

- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Channel Path Activity Report -----|
| Command ==>                                           |
|                                                       |
| Composing Inquiry: RMFLPB - Post Proc. Channel Path Act. Rpt |
| Database ==> _____ |
| Cycle(s) ==> __ - __ |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
|                                                       |
| Data Selection: |
|               dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date   ==>  __ - __ - __ - __ - __ - __ - __ - __ - __ - __ |
| Hour   ==>  __ - __ |
| Zone   ==>  _____ |
| Sysid  ==>  _____ |
|                                                       |
| Summarization Break Variable ==> _____ |
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE) |
|                               |
| SAS Subsetting Statements ==> |
| _____ |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.

Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;
  IF SYSID NE: 'T';
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****
**  Note:  This report cannot be produced if the CA MICS  **
**          database contains essential data elements only.**
*****
```

3.2.6 Post Processor Device Activity

The Device Activity report provides detailed information on the I/O activity for the different devices attached to your system. Separate reports are produced for each class of devices (DASD, Magnetic Tape, and so on). Within each report the devices are grouped and summarized by logical control unit since related devices can be identified in this manner.

INTENDED USE:

The report is designed to help analyze the I/O activity, both by device and by logical control unit. It can assist with the investigation of bottlenecks caused by a particular device or LCU.

REPORT FORMAT:

This inquiry produces a listing of devices within each LCU and a summary line reflecting activity for the entire LCU. See section 3.1.1.4 for an example of the output generated.

DATA SOURCE (file/timespan):

HARDVA at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFDEV4 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPC, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below.

(Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Device Activity Report -----|
| Command ==>                                         |
|                                                     |
| Composing Inquiry: RMFLPC - Post Processor Device Activity Rpt |
| Database ==> _____ |
| Cycle(s) ==> __ - __ |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
|                                                     |
| Data Selection: |
|               dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date   ==>  __ - __ - __ - __ - __ - __ - __ - __ - __ - __ |
| Hour   ==>  __ - __ |
| Zone    ==>  _____ |
| Sysid   ==>  _____ |
|                                                     |
| Summarization Break Variable ==> _____ |
| Summarization Technique       ==> _____ (DETAIL or COMPOSITE) |
|                                                     |
| SAS Subsetting Statements ==> |
| _____ |
|                                                     |
| Specify Extended Options ==> N (Y/N/R) |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.

Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.

Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.

Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTYPE EQ: "3390";
```

Specify Extended Options - Required. Defaults to N (No).

This parameter is used to specify extended options parameters for the inquiry function. It is displayed at the bottom of the panel. Specify Y to display the Extended Options Menu. Extended options parameters are used to perform additional selections for the report being defined. Extended options are never required; default values are provided. A flag will appear to the right of this parameter if ANY extended option has been specified. To restore the extended options to their default values, specify R (Reset).

- o Optionally, complete the extended option panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Device Activity Report -----|
| Command ==>                                         |
|                                                     |
| Extended Options for: RMFLPC - Post Processor Device Activity Rpt |
|                                                     |
| Include the Following Device Classes in Report:      |
| Character Reader Devices (CHRRDR)    ==> Y (Y/N)    |
| Communication Equipment (COMM)       ==> Y (Y/N)    |
| Direct Access Storage Devices (DASD) ==> Y (Y/N)    |
| Graphics Devices (GRAPH)             ==> Y (Y/N)    |
| Magnetic Tape Devices (TAPE)         ==> Y (Y/N)    |
| Unit Record Devices (UNITR)          ==> Y (Y/N)    |
|                                                     |
| Additional Devices to Include in Report:             |
| Device Number List ==> ____ ____ ____ ____ ____   |
| or/and                                                  |
| Device Range(s)   ==> ____ - ____ ____ - ____ ____ - ____ |
+-----+

```

Include the Following Device Classes in Report:

Specify N for each class of devices you do not want to see in your report. The default report includes all device classes.

Additional Devices to Include in Report:

You can specify up to seven individual device addresses or/and four device address ranges, in hexadecimal, to include in your report, regardless of the device class they belong to. For example, you can produce a report containing all your DASD devices and only specific magnetic tape units in the range of B500 to B5FF. The

extended options will look like:

```
+-----+
| Include the Following Device Classes in Report: |
| Character Reader Devices (CHRD)  ==> N (Y/N) |
| Communication Equipment (COMM)  ==> N (Y/N) |
| Direct Access Storage Devices (DASD) ==> Y (Y/N) |
| Graphics Devices (GRAPH)        ==> N (Y/N) |
| Magnetic Tape Devices (TAPE)    ==> N (Y/N) |
| Unit Record Devices (UNITR)     ==> N (Y/N) |
|                                     |
| Additional Devices to Include in Report: |
| Device Number List ==> ____ ____ ____ ____ |
| or/and |
| Device Range(s)   ==> B500 - B5FF ____ - ____ |
+-----+
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.7 Post Processor Enqueue Activity

The Enqueue Activity report provides information about resources that, from time to time, will have more than one requestor waiting to use that resource. The ENQ and DEQ macro instructions are a means for jobs or tasks to gain access to shared resources. This analysis reports on the contention caused by utilization of these macros.

INTENDED USE:

The report is designed to help analyze enqueue contention that may tend to degrade system throughput. In particular, it can help to identify resources that are consistently causing bottlenecks so that appropriate action can be taken.

REPORT FORMAT:

See Section 3.1.1.6 for an example of the output generated by the Enqueue Activity report.

DATA SOURCE (file/timespan):

SCPENQ at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFENQ1 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPD, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Enqueue Activity Report -----|
| Command ==>                                         |
|                                                     |
| Composing Inquiry: RMFLPD - Post Processor Enqueue Act. Rpt |
| Database ==> _____ |
| Cycle(s) ==> __ - __ |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
|                                                     |
| Data Selection: |
|               dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date   ==>  __ - __ - __ - __ - __ - __ - __ - __ - __ - __ |
| Hour   ==>  __ - __ |
| Zone   ==>  _____ |
| Sysid  ==>  _____ |
|                                                     |
| Summarization Break Variable ==> _____ |
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE) |
|                                                     |
| SAS Subsetting Statements ==> _____ |
| _____ |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.

Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.

Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.

Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
  IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.8 Post Processor I/O Queuing Activity

The I/O Queuing Activity report provides information by logical control unit (LCU) on the configuration and utilization of the I/O subsystem. Items reported include activity rates, queue lengths, and percentage of time when one or more I/O components were busy. Additional data is provided at the LCU level related to the Dynamic Channel Path Management function of the Intelligent Resource Director (IRD).

INTENDED USE:

The report is designed to help analyze the I/O configuration and to ascertain the reason for delays associated with device, control unit, and channel path contention. It is most often used after a problem has been detected by the channel path and/or device activity reports.

REPORT FORMAT:

See Section 3.1.1.3 for an example of the output generated by the I/O Queuing Activity report.

DATA SOURCE (file/timespan):

SCPIOC, SCPIOP, and SCPLCA at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFIOQ3 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPE, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF

Reference Guide.)

- o Complete the specification panel illustrated below.
(Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor I/O Queuing Activity Report -----|
| Command ==>                                           |
|                                                       |
| Composing Inquiry: RMFLPE - Post Proc. I/O Queuing Act. Rpt |
| Database ==> _____ |
| Cycle(s) ==> __ - __ |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
|                                                       |
| Data Selection: |
|               dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date   ==>  __ - __ - __ - __ - __ - __ - __ - __ - __ - __ |
| Hour   ==>  __ - __ |
| Zone   ==>  _____ |
| Sysid  ==>  _____ |
|                                                       |
| Summarization Break Variable ==> _____ |
| Summarization Technique       ==> _____ (DETAIL or COMPOSITE) |
|                               |
| SAS Subsetting Statements ==> |
|                               |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.

Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.

Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together.

See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYP EQ: "3390";
```

USAGE CONSIDERATIONS:

This report cannot be produced in environments running MVS under VM. In such environments, the SCPIOP file is not supported.

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```


3.2.9 Post Processor Page Data Set Activity

The Page/Swap Data Set Activity report provides information about the number of slots used in terms of minimums, maximums, and averages (based on sampling) for each page or swap data set in the auxiliary storage subsystem.

INTENDED USE:

The report is designed to help analyze the sizing and placement of the data sets making up the paging environment. With the report generated, it is possible to detect such critical situations as PLPA or common data sets approaching their maximum available slots (these data sets cannot overflow into the local data sets) or the over-allocation of local data sets.

REPORT FORMAT:

See Section 3.1.1.7 for an example of the output generated by the Page Data Set Activity report.

DATA SOURCE (file/timespan):

SCPPSD at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFPSD1 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Select option 2, CA MICS Information Center Facility (MICF).
- o Select option 2, Database Inquiries.
- o Select RMFLPF, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below.

(Descriptions of the fields follow the panel.)

```
+-----+
|----- Post Processor Page Data Set Activity Report -----|
| Command ==>                                              |
| Composing Inquiry: RMFLPF - Post Proc. Page Data Set Act. Rpt |
| Database ==> -----|
| Cycle(s) ==> -- - --|
| Timespan ==> ----- (DETAIL/DAYS/WEEKS/MONTHS) |
| Data Selection:                                         |
|   dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy      |
| Date  ==> -- - -- - - - - - - - - - - - - - - - - - |
| Hour  ==> -- - -- - - - - - - - - - - - - - - - - - |
| Zone  ==> -- - -- - - - - - - - - - - - - - - - - - |
| Sysid ==> -- - -- - - - - - - - - - - - - - - - - - |
| Summarization Break Variable ==> -----|
| Summarization Technique ==> ----- (DETAIL or COMPOSITE)|
| SAS Subsetting Statements ==>              |
| -----|
+-----+
```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by

the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;
  IF SYSID NE: 'T';
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****
**  Note: This report cannot be produced if the CA MICS  **
**              database contains essential data elements only.**
*****
```

3.2.10 Post Processor Paging Activity

The Paging Activity report provides information about central storage page frame allocations, auxiliary storage page slot allocations, and movement between them. Information is also provided on swapping and its impact on the paging subsystem.

INTENDED USE:

The report is intended to help detect performance problems caused by the paging subsystem. Such problems might include excessive page-ins resulting in an overcommitment of central storage. Another problem might be periods of high VIO slot usage caused by a specific job using that particular resource.

REPORT FORMAT:

See section 3.1.1.5 for an example of the output generated by the Paging Activity report.

DATA SOURCE (file/timespan):

SCPPAG and SCPSWP at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFPAG7 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPG, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not

familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)

- o Complete the specification panel illustrated below.
(Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Paging Activity Report -----|
| Command ==>                                         |
|                                                     |
| Composing Inquiry: RMFLPG - Post Processor Paging Act. Report |
| Database ==> _____                           |
| Cycle(s) ==> __ - __                               |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
|                                                     |
| Data Selection:                                     |
|           dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date   ==> _____ - _____ - _____ - _____ |
| Hour   ==> __ - __ |
| Zone   ==> _____ |
| Sysid  ==> _____ |
|                                                     |
| Summarization Break Variable ==> _____ |
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE) |
|                                                     |
| SAS Subsetting Statements ==> _____ |
| _____ |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.

Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.

Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.

Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.11 Post Processor RMF Summary

The RMF Summary report provides an overview of system activity for each interval meeting user-specified selection criteria.

INTENDED USE:

The report is intended to help detect performance problems at a very high level so other reports might be used to further analyze a given situation. Information provided includes CPU utilization, average DASD response, average I/O rates for both DASD and TAPE, average and maximum task activity, and paging activity indicators.

REPORT FORMAT:

See Section 3.1.1.9 for an example of the output generated by the RMF Summary report.

DATA SOURCE (file/timespan):

HARCPU, HARDVA, SCPPAG at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFSUM2 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPH, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```
+-----+
|----- Post Processor RMF Summary Report -----|
| Command ==>                                     |
| Composing Inquiry: RMFLPH - Post Processor RMF Summary Report |
| Database ==> _____                         |
| Cycle(s) ==>  __ - __                           |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
| Data Selection:                                   |
|      dd mmm yy  dd mmm yy  dd mmm yy  dd mmm yy  |
| Date  ==>  ____ - ____ - ____ - ____           |
| Hour  ==>  __ - __                               |
| Zone  ==>  ____ - ____                           |
| Sysid ==>  ____ - ____ - ____ - ____ - ____ - ____ |
| Summarization Break Variable ==> _____      |
| Summarization Technique    ==> _____ (DETAIL or COMPOSITE) |
| SAS Subsetting Statements ==> _____          |
|-----+
+-----+
```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYP EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by

the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;
  IF SYSID NE: 'T';
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****
**  Note: This report cannot be produced if the CA MICS  **
**              database contains essential data elements only.**
*****
```

3.2.12 Post Processor Virtual Storage Summary

The Virtual Storage Activity Summary provides an overview of the entire virtual storage environment including the nucleus, SQA, PLPA, FLPA, MLPA, CSA, private and PSA, as well as their extended counterparts. In particular, the CSA and SQA allocation activity is covered.

INTENDED USE:

The report contains information intended to help understand current virtual storage usage. Over time, the report can be used to detect storage constraint problems.

REPORT FORMAT:

See Section 3.1.1.16 for an example of the output generated by the Crypto Hardware Activity report.

DATA SOURCE (file/timespan):

HARCRA, HARCRCF, HARCRCR, and HARCRCP at the DETAIL, DAYS, WEEKS or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE members:

o @RMFCRY1 - for all systems generating the SMF type 70 subtype 2 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MMF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPQ, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)


```
+-----+
|----- Post Processor Crypto Hardware Activity Report -----|
| Command ==> |
| Composing Inquiry: RMFLPQ - Post Processor Crypto Act. Report |
| Database ==> |-----|
| Cycle(s) ==> |-- - --|
| Timespan ==> |----- (DETAIL/DAYS/WEEKS/MONTHS) |
| Data Selection: |
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date  ==> |-- -- -- - -- -- -- - -- -- -- - -- -- -- |
| Hour  ==> |-- - --|
| Zone  ==> |-----|
| Sysid ==> |-----|
| Summarization Break Variable ==> |-----|
| Summarization Technique      ==> |----- (DETAIL or COMPOSITE) |
| SAS Subsetting Statements ==> |-----|
|-----+
+-----+
```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

The data shown in the CRYPTOGRAPHIC CCA COPROCESSOR, CRYPTOGRAPHIC PKCS11 COPROCESSOR, and CRYPTOGRAPHIC ACCELERATOR sections of the report always reflect the total activity in your CPC, while the data in the ICSF SERVICES is only for the recording logical partition.

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
  IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.13 Post Processor Virtual Storage Detail

The Virtual Storage Detail Report provides information on allocated CSA and SQA by subpool and by key, including minimum, maximum, and average allocation sizes, as well as the time of occurrence for the minimums and maximums.

INTENDED USE:

This report is usually generated after the Virtual Storage Summary indicates that a problem exists with Common Storage below the 16 MB line. CSA subpools 227, 228, 231, and 241 are detailed, as are SQA subpools 226, 239, and 245.

REPORT FORMAT:

This inquiry produces a single page table for each reported interval. See Section 3.1.1.8 for an example of the output generated.

DATA SOURCE (file/timespan):

SCPVSM at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFVSS2 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPK, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```
+-----+
|----- Post Processor Virtual Storage Detail Report -----|
| Command ==>                                              |
| Composing Inquiry: RMFLPK - Post Processor Virt. Stg. Detail |
| Database ==> -----|
| Cycle(s) ==> -- - --|
| Timespan ==> ----- (DETAIL/DAYS/WEEKS/MONTHS) |
| Data Selection:                                           |
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy   |
| Date  ==> ----- - ----- - ----- - -----|
| Hour  ==> -- - --|
| Zone  ==> -----|
| Sysid ==> -----|
| Summarization Break Variable ==> -----|
| Summarization Technique    ==> ----- (DETAIL or COMPOSITE)|
| SAS Subsetting Statements ==> -----|
|-----+
+-----+
```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```


USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.14 Post Processor Storage Group Device Activity

The Storage Group Device Activity report provides the same information as the standard Device Activity report except the devices are grouped and summarized by the DFSMS (Data Facility Storage Management Subsystem) Storage Group name. Unlike the standard device activity report, which reports on other device classes (magnetic tape devices, communication equipment, and so on), this report is specifically designed for the DASD and tape environment.

INTENDED USE:

The report is designed to help analyze the I/O activity, both by device and by storage group. It can assist with investigation of bottlenecks caused by a particular device or storage group.

The Storage Group Device Activity report provides the same information as the standard Device Activity report except the devices are grouped and summarized by the DFSMS (Data Facility Storage Management Subsystem) Storage Group name. Unlike the standard device activity report, which reports on other device classes (magnetic tape devices, communication equipment, and so on), this report is specifically designed for the DASD and tape environment.

INTENDED USE:

The report is designed to help analyze the I/O activity, both by device and by storage group. It can assist with investigation of bottlenecks caused by a particular device or storage group.

REPORT FORMAT:

This inquiry produces a listing of devices within each defined DFSMS storage and a summary line reflecting activity for the entire storage group. See section 3.1.1.4 for an example of the output generated.

DATA SOURCE (file/timespan):

HARDVA at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFDSG4 - for all systems

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPL, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Storage Group Device Activity Report -----|
| Command ==> |
| |
| Composing Inquiry: RMFLPL - Post Processor Stg. Group Activity |
| Database ==> |
| Cycle(s) ==> |
| Timespan ==> | (DETAIL/DAYS/WEEKS/MONTHS) |
| |
| Data Selection: |
|   dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date  ==> |
| Hour  ==> |
| Zone  ==> |
| Sysid ==> |
| |
| Summarization Break Variable ==> |
| Summarization Technique      ==> | (DETAIL or COMPOSITE) |
| |
| SAS Subsetting Statements ==> |
| |
| Specify Extended Options ==> N (Y/N/R) |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

Specify Extended Options - Required. Defaults to N (No).
This parameter is used to specify extended options parameters for the inquiry function. It is displayed at the bottom of the panel. Specify Y to display the Extended Options Menu. Extended options parameters are used to perform additional selections for the report being defined. Extended options are never required;

default values are provided. A flag will appear to the right of this parameter if ANY extended option has been specified. To restore the extended options to their default values, specify R (Reset).

- o Optionally, complete the extended option panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Storage Group Device Activity Report -----|
| Command ==> |
|-----|
| Extended Options for: RMFLPL - Post Processor Stg. Group Device Rpt |
|-----|
| Storage Group (STORNAME) Selection: |
| Name(s) ==> |-----| |-----| |-----| |-----| |
| |
| or/and |
| Range(s) ==> |-----| - |-----| |-----| - |-----| |
| |-----| - |-----| |-----| - |-----| |
|-----+

```

Storage Group (STORNAME) Selection:

You can specify up to six individual storage group names or/and four storage group ranges to include in your report. An input observation is selected if its STORNAME value is strictly equal to any of the entries specified in the Name(s) fields, or if it falls in any of the specified Range(s) fields.

For example, to only produce a report for storage group CICS and all storage groups starting with the IM characters, you would specify:

```

Name(s) ==> CICS   |-----| |-----| |-----|
or/and
Range(s) ==> IM0   - IM9   IMA   - IMZ

```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.15 Cross-System Coupling Facility Reports

The reports provided for the Cross-System Coupling Facility (XCF) are:

- o XCF Usage by System, which displays information about XCF traffic to, from, and within its particular system.
- o XCF Usage by Member, which displays information about signals sent to and from each remote system in the XCF.
- o XCF Path Statistics, which displays information about each signalling path connecting the local system to all remote systems in the XCF.

See Section 3.1.1.10 for more information about these reports.

INTENDED USE:

These reports help you analyze your XCF environment.

REPORT FORMAT:

See section 3.1.1.10 for report samples.

DATA SOURCE (file/timespan):

SCPXCY, SCPXCM and SCPXCA at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in `sharedprefix.MICS.SOURCE(@RMFXCF7)`.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFXCF, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)

- o Complete the specification panel illustrated below.
(Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor XCF Activity -----|
| Command ==>                               |
|-----|
| Composing Inquiry: RMFXCF - Post Processor XCF Activity |
| Database ==> _____ |
| Cycle(s) ==>  __ - __ |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
|-----|
| Data Selection: |
|      dd mmm yy  dd mmm yy  dd mmm yy  dd mmm yy |
| Date  ==>  __ - __ - __ - __ - __ - __ - __ - __ |
| Hour  ==>  __ - __ |
| Zone  ==>  _____ |
| Sysid ==>  _____ |
|-----|
| Summarization Break Variable ==> _____ |
| Summarization Technique ==> _____ (DETAIL or COMPOSITE) |
|-----|
| SAS Subsetting Statements ==> _____ |
|-----|
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification.

Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.16 Coupling Facility Reports

The reports provided for the Coupling Facility (CF) are:

- o Coupling Facility Usage Summary, which displays information about the CF, including its name, the amount of storage installed and used, and the number and utilization of processors. It describes the hardware paths between the CF and this particular system. It also shows the Cross-System Extended Services (XES) request activity through the CF.
- o XES Structure Activity, which displays information about the name and storage resources of all structures allocated in the CF.
- o Coupling Facility Subchannel Activity, which displays summary information about all the requests processed by the CF, for each system attached to it.
- o CF-to-CF Activity, which displays information about all remote coupling facilities connected to the subject CF.

INTENDED USE:

These reports help you analyze coupling facility activity for performance analysis and capacity planning.

REPORT FORMAT:

See section 3.1.1.11 for report samples.

DATA SOURCE (file/timespan):

HARCFA, HARCFA, HARCFA, HARCFA, HARCFA, and HARCFA at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in `sharedprefix.MICS.SOURCE(@RMFXES7)`.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.

- o Select RMFXES, in the PERFORM Catalog Group.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Coupling Facility Report -----|
| Command ==> _____|
| Composing Inquiry: RMFXES - Post Processor Coupling Fac. Rpt.|
| Database ==> _____|
| Cycle(s) ==> -- - - - -|
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS)|
|
| Data Selection:
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy
| Date  ==> -- - - - - - - - - - - - - - - - - - - - -
| Hour  ==> -- - - - -
| Zone  ==> -- - - - -
| Sysid ==> -- - - - -
|
| Summarization Break Variable ==> _____
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE)
|
| SAS Subsetting Statements ==> _____
|_____
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.17 Post Processor Workload Activity Goal Mode

The Workload Activity Goal Mode report provides information about how well system resources are being managed by the Workload Manager (WLM) to meet the performance objectives of your business enterprise.

INTENDED USE:

The report is intended to help monitor workload activity in terms of resource consumption and response time, and to help analyze how subsystem server address space status affects client work requests and transactions. Information in the report can be used to track the effects of changes to the WLM service definitions.

REPORT FORMAT:

For an example of the output generated by the Workload Activity Goal Mode report, see section 3.1.1.12.

DATA SOURCE (file/timespan):

WLMRGP, WLMSEA, WLMSEC, WLMSED, WLMSEM, WLMSEDE, WLMSEDS, WLMSSVC, WLM_EA, WLM_EC, WLM_ED, WLM_EM, WLM_EW at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

See the SAS source code used to generate this report in `sharedprefix.MICS.SOURCE` members:

- o @RMFWL81 - for service class related reports
- o @RMFWL82 - for report class related reports

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Select option 2, CA MICS Information Center Facility (MICF).
- o Select option 2, Database Inquiries.
- o Select RMFLPM, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below.

(Descriptions of the fields follow the panel.)

```

+-----+
|----- Workload Manager Goal Mode Report -----|
| Command ==>                                     |
|-----|
| Composing Inquiry: RMFLPM - Workload Manager Goal Mode Report |
| Database ==> _____|
| Cycle(s) ==>  -  -  -|
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS)|
|-----|
| Data Selection:                                     |
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy|
| Date  ==>  -  -  -  -  -  -  -  -  -  -  -  -  -  -|
| Hour  ==>  -  -  -  -  -  -  -  -  -  -  -  -  -  -|
| Zone  ==>  -  -  -  -  -  -  -  -  -  -  -  -  -  -|
| Sysid ==>  -  -  -  -  -  -  -  -  -  -  -  -  -  -|
|-----|
| Summarization Break Variable ==> _____|
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE)|
|-----|
| SAS Subsetting Statements ==> _____|
|-----|
| Specify Extended Options ==> N (Y/N/R)|
|-----|
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.

Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.

Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.

Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";
```

```
IF DEVTYPE EQ: "3390";
```

Specify Extended Options - Required. Defaults to N (No).

This parameter is used to specify extended options parameters for the inquiry function. It is displayed at the bottom of the panel. Specify Y to display the Extended Options Menu. Extended options parameters are used to perform additional selections for the report being defined. Extended options are never required; default values are provided. A flag will appear to the right of this parameter if ANY extended option has been specified. To restore the extended options to their default values, specify R (Reset).

- o Optionally, complete the extended option panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Workload Manager Goal Mode Report -----|
| Command ==>                                     |
|-----|
| Extended Options for: RMFLPM - Workload Manager Goal Mode Report |
|-----|
| Select the Type of Report(s) to Generate:          |
|-----|
| Policy Summary (POLICY)      ==> Y (Y/N)           |
| Policy Names      ==> _____|
|-----|
| Workload Group (WGROUP)      ==> Y (Y/N)           |
| Workload Names  ==> _____|
|-----|
| Service Class (SCLASS)       ==> Y (Y/N)           |
| Service Classes ==> _____|
|-----|
| Service Class Period (SCPER) ==> N (Y/N) Response Times ==> Y |
| Service Classes ==> _____|
|-----|
| Report Class (RCLASS)        ==> Y (Y/N)           |
| Report Classes  ==> _____|
|-----|
| Report Class Period (RCPER)  ==> Y (Y/N) Response Times ==> Y |
| Report Classes  ==> _____|
|-----|
+-----+

```

Policy Summary (POLICY) - Defaults to Y (Yes).

Specify Y to produce a summary report for each selected policy. You can select up to five policy names or "wild cards" (described later in this section). If no policy name is entered, all available policies will be selected for the report.

Workload Group (WGROUP) - Defaults to Y (Yes).

Specify Y to produce a summary report for each selected workload group. You can select up to five workload group names or "wild cards" (described later in this section). If no name is entered, all available workload groups will be selected for the report.

Service Class (SCLASS) - Defaults to Y (Yes).

Specify Y to produce a summary report for each selected service class. You can select up to five service class names or "wild cards" (described later in this section). If no name is entered, all available service classes will be selected for the report.

Service Class Period (SCPER) - Defaults to Y (Yes).

Specify Y to produce a detailed report on the service class periods defined for each selected service class. You can select up to five service class names or "wild cards" (described later in this section). If no name is entered, all available service classes will be selected for the report.

Response Times - Defaults to Y (Yes).

Specify Y to include the response time distributions in the Service Class Period (SCPER) detailed report. Response times are only available for service classes with response time or execution velocity goals.

Report Class (RCLASS) - Defaults to Y (Yes).

Specify Y to produce a summary report for each selected report class. You can select up to five report class names or "wild cards" (described later in this section). If no name is entered, all available report classes will be selected for the report.

Report Class Period (RCPER) - Defaults to Y (Yes).

Specify Y to produce a detailed report on the report class periods defined for each selected report class. You can select up to five report class names or "wild cards" (described later in this section). If no name is entered, all available report classes will be

selected for the report.

Response Times - Defaults to Y (Yes).

Specify Y to include the response time distributions in the Report Class Period (RCPER) detailed report. Response times are only available for report classes with response time or execution velocity goals.

Wild Cards Specifications:

You can specify "wild cards" for names of policies, workload groups, service classes, and report classes. A wild card is a character string containing only one asterisk (*). For example, specifying "CIC*" as a service class name would produce a report for all service classes starting with "CIC". Similarly "*BAT" would select every service class name ending with "BAT", as "IMS*PRD" would select every service class starting with "IMS" and ending with "PRD".

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or

will produce unpredictable results.

```
*****
** Note: If the CA MICS database contains essential data **
**           elements only, the value for the transaction **
**           response time standard deviation field will be **
**           missing.                                     **
*****
```

3.2.18 Post Processor Cache Subsystem Summary

The Cache Subsystem Summary inquiry provides subsystem level information on caching performance. Following the subsystem summary is an overview providing a single line of information on each volume attached to the subsystem, and a RAID Rank Activity section.

INTENDED USE:

The report is intended to help monitor caching performance in terms of I/O rates and hit percentages for various types of I/O access. Information in the report can be used to track the effects of changes to the overall caching subsystem options.

REPORT FORMAT:

See Section 3.1.1.13 for an example of the output generated by the Cache Subsystem Summary report.

DATA SOURCE (file/timespan):

HARCCU, HARCVA and HARRRA at the DETAIL, DAYS, WEEKS or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFCAC8 - for all systems generating the SMF type 74 subtype 5 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPN, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

Cache Subsystem Activity Summary Report -----
Command ==>

Composing Inquiry: RMFLPN - Cache Subsystem Act. Summary Rpt
Database ==> -----
Cycle(s) ==> -- - --
Timespan ==> ----- (DETAIL/DAYS/WEEKS/MONTHS)

Data Selection:
                dd mmm yy      dd mmm yy      dd mmm yy      dd mmm yy
Date   ==> ----- - -- -- -- -- -- -- -- --
Hour   ==> -- - --
Zone   ==> -----
Sysid  ==> -----

Summarization Break Variable ==> -----
Summarization Technique      ==> ----- (DETAIL or COMPOSITE)

SAS Subsetting Statements ==>

-----
Specify Extended Options ==> N (Y/N/R)

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

Specify Extended Options - Required. Defaults to N (No).
This parameter is used to specify extended options parameters for the inquiry function. It is displayed at the bottom of the panel. Specify Y to display the Extended Options Menu. Extended options parameters are used to perform additional selections for the report being defined. Extended options are never required;

default values are provided. A flag will appear to the right of this parameter if ANY extended option has been specified. To restore the extended options to their default values, specify R (Reset).

- o Optionally, complete the extended option panel illustrated below. (Descriptions of the fields follow the panel.)

```
+-----+
|----- Cache Subsystem Activity Summary Report -----|
| Command ==>                                           |
| Extended Options for: RMFLPN - Cache Subsystem Act. Summary Rpt |
| Specify Cache Subsystem IDs to Include in Report:      |
| SSID List      ==> ____ ____ ____ ____ ____          |
| or/and                                                |
| SSID Range(s) ==> ____ - ____ ____ - ____ ____ - ____ |
+-----+
```

Specify Cache Subsystem IDs to Include in Report:

You can specify up to seven individual subsystem ID numbers or/and four subsystem ID ranges, in hexadecimal, to include in your report.

USAGE CONSIDERATIONS:

The information recorded in the type 74 subtype 5 cache subsystem activity record, the data source for the Cache Device Activity (HARCVA), Cache Control Unit Activity (HARCCU) and RAID Rank Activity (HARRRA) files, contains total cache subsystem activity. Only one system in a shared DASD environment needs to collect this record type.

If you collect type 74 subtype 5 records with more than one system sharing a particular caching subsystem, and process these records in CA MICS, your database will contain redundant information. To avoid unnecessary processing and excessive print volume, it is recommended that you restrict your inquiry reporting to a single SYSID on the execution panel when executing this inquiry.

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done

on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

3.2.19 Post Processor Cache Subsystem Detail

The Cache Subsystem Activity Detail inquiry provides both subsystem and detailed volume level information on caching performance. The inquiry reports overall subsystem activity followed by a device overview providing a single line of information on each volume attached to the subsystem as well as a RAID Rank Activity section. A detailed report containing information about each attached volume follows.

INTENDED USE:

The report is intended to help monitor caching performance in terms of I/O rates and hit percentages for various types of I/O access. Information in the report can be used to track the effects of changes to the volume and overall caching subsystem options.

REPORT FORMAT:

See Sections 3.1.1.13 and 3.1.1.14 for examples of the output generated by the Cache Subsystem Detail report.

DATA SOURCE (file/timespan):

HARCCU, HARCVA and HARRRA at the DETAIL, DAYS, WEEKS or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFCAC8 - for all systems generating the SMF type 74 subtype 5 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLP0, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF

Reference Guide.)

- o Complete the specification panel illustrated below.
(Descriptions of the fields follow the panel.)

```

+-----+
|----- Cache Subsystem Activity Detail Report -----|
| Command ==>                                         |
| Composing Inquiry: RMFLP0 - Cache Subsystem Act. Detail Rpt |
| Database ==> _____                           |
| Cycle(s) ==> -- - - - -                            |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
| Data Selection:                                     |
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date   ==> -- - - - - - - - - - - - - - - - - - |
| Hour   ==> -- - - - -                            |
| Zone   ==> -- - - - -                            |
| Sysid   ==> -- - - - - - - - - - - - - - - - - - |
| Summarization Break Variable ==> _____        |
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE) |
| SAS Subsetting Statements ==> _____            |
| _____                                          |
| Specify Extended Options ==> N (Y/N/R)             |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

Specify Extended Options - Required. Defaults to N (No).
This parameter is used to specify extended options parameters for the inquiry function. It is displayed at the bottom of the panel. Specify Y to display the Extended Options Menu. Extended options parameters are used to perform additional selections for the report being defined. Extended options are never required;

default values are provided. A flag will appear to the right of this parameter if ANY extended option has been specified. To restore the extended options to their default values, specify R (Reset).

- o Optionally, complete the extended option panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Cache Subsystem Activity Detail Report -----|
| Command ==>                                         |
| Extended Options for: RMFLP0 - Cache Subsystem Act. Detail Rpt |
| Specify Cache Subsystem IDs to Include in Report:   |
|   SSID List    ==> ____ ____ ____ ____ ____ ____ |
|   or/and       |
|   SSID Range(s) ==> ____ - ____ - ____ - ____ - ____ |
+-----+

```

Specify Cache Subsystem IDs to Include in Report:

You can specify up to seven individual subsystem ID numbers or/and four subsystem ID ranges, in hexadecimal, to include in your report.

USAGE CONSIDERATIONS:

The information recorded in the type 74 subtype 5 cache subsystem activity record, the data source for the Cache Device Activity (HARCVA), Cache Control Unit Activity (HARCCU) and RAID Rank Activity (HARRRA) files, contains total cache subsystem activity. Only one system in a shared DASD environment needs to collect this record type.

If you collect type 74 subtype 5 records with more than one system sharing a particular caching subsystem, and process these records in CA MICS, your database will contain redundant information. To avoid unnecessary processing and excessive print volume, it is recommended that you restrict your inquiry reporting to a single SYSID on the execution panel when executing this inquiry.

This report can be voluminous. The Cache Subsystem Activity Summary report (RMFLPN) avoids printing detailed information for each attached volume and should be used as a starting point to identify subsystems where more detail is required. Once a subsystem is identified as interesting, subsetting can be used to restrict detail reporting to only that subsystem.

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

3.2.20 Post Processor USS Kernel Activity

The USS Kernel Activity inquiry provides information on Unix System Services system call and process activities, as well as inter-process communication, memory map usage, and shared library region utilization.

INTENDED USE:

The report is intended to help monitor USS performance in terms of workload as well as memory and shared library utilizations. Information about attempts to exceed site-defined maximum values in various areas is also provided. This helps in monitoring and tuning the BPXPRMxx PARMLIB parameters.

REPORT FORMAT:

See Section 3.1.1.15 for examples of the output generated by the USS Kernel Activity report.

DATA SOURCE (file/timespan):

SCPKN at the DETAIL, DAYS, WEEKS, or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFUSS1 - for all systems generating the RMF type 74 subtype 3 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPP, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below.

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

MINIMUM, AVERAGE and MAXIMUM values may differ from the standard IBM RMF OMVS Kernel Activity Report because, when normalizing values on a per-second basis (as described in the z/OS RMF Report Analysis manual) IBM does not take into consideration the RMF sampling cycle interval which, although generally set to one second, can vary from 50 milliseconds to 9.999 seconds. CA MICS calculations are normalized on a per-second basis by dividing original values (which are on a per-cycle basis) by the CYCLETM (RMF Sampling Cycle Interval) data element.

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.21 Post Processor Crypto Hardware Activity

The Crypto Hardware Activity inquiry provides information about the activities in the various cryptographic hardware features (CCA and PKCS11 coprocessors, accelerators and ICSF services).

INTENDED USE:

The report is intended to help monitor cryptographic activities executing on the various hardware features. It provides workload as well as performance information in areas such as Message Authentication Code (MAC) and Personal Identification Number (PIN) services, encryption algorithms, RSA key-generation processes, and secure public-key operations.

REPORT FORMAT:

See Section 3.1.1.16 for an example of the output generated by the Crypto Hardware Activity report.

DATA SOURCE (file/timespan):

HARCRA, HARCRA, and HARCRA at the DETAIL, DAYS, WEEKS or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE members:

- o @RMFCRY1 - for all systems generating the SMF type 70 subtype 2 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPQ, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)

- o Complete the specification panel illustrated below.
(Descriptions of the fields follow the panel.)

```
+-----+
|----- Post Processor Crypto Hardware Activity Report -----|
| Command ==> _____|
| Composing Inquiry: RMFLPQ - Post Processor Crypto Act. Report|
| Database ==> _____|
| Cycle(s) ==>  -  -  -|
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS)|
| Data Selection:|
|      dd mmm yy  dd mmm yy  dd mmm yy  dd mmm yy|
| Date   ==>  -  -  -  -  -  -  -  -  -  -  -  -  -|
| Hour   ==>  -  -  -|
| Zone   ==>  -  -  -  -  -  -  -  -  -  -  -  -  -|
| Sysid  ==>  -  -  -  -  -  -  -  -  -  -  -  -  -|
| Summarization Break Variable ==> _____|
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE)|
| SAS Subsetting Statements ==> _____|
|_____|
+-----+
```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

The data shown in the CRYPTOGRAPHIC COPROCESSOR and CRYPTOGRAPHIC ACCELERATOR sections of the report always reflect the total activity in your CPC, while the data in the ICSF SERVICES is only for the recording logical partition.

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
  IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
**  Note: This report cannot be produced if the CA MICS  **  
**                database contains essential data elements only.**  
*****
```

3.2.22 Post Processor FICON Director Activity

The FICON Director Activity inquiry provides information about the activities in the FICON directors (switches).

INTENDED USE:

The report is intended to help monitor performance of the FICON directors at the port level. With fibre channel architecture and FICON switches, link-busy conditions are not returned. Instead, the frames are queued internally and sent through when the port becomes available. This latency, called Frame Pacing Time, can grow as ports' contention increases. Reporting on this switch latency is important to help in the identification of device pending and disconnect-time contributors, as well as in understanding the contention for reconnection status.

REPORT FORMAT:

See Section 3.1.1.17 for an example of the output generated by the FICON Director Activity report.

DATA SOURCE (file/timespan):

HARFDC and HARFDP at the DETAIL, DAYS, WEEKS or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFFCD1 - for all systems generating the SMF type 74 subtype 7 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPR, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)

- o Complete the specification panel illustrated below.
(Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor FICON Director Activity Report -----|
| Command ==> _____|
|
| Composing Inquiry: RMFLPR - Post Processor FICON Director Rpt
| Database ==> _____|
| Cycle(s) ==>  __ - __|
| Timespan ==>  _____ (DETAIL/DAYS/WEEKS/MONTHS)|
|
| Data Selection:
|      dd mmm yy  dd mmm yy  dd mmm yy  dd mmm yy
| Date   ==>  __ - __ - __ - __ - __ - __ - __ - __ - __ - __
| Hour   ==>  __ - __
| Zone    ==>  _____
| Sysid   ==>  _____
|
| Summarization Break Variable ==> _____
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE)
|
| SAS Subsetting Statements ==> _____
|_____
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

USAGE CONSIDERATIONS:

The measurements provided for each port include all I/O operations directed through this port, regardless of which LPAR requested the I/O, not just the activity of the system displayed in the report header.

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.23 Post Processor Shared Device Activity

The Shared Device Activity inquiry provides an overall picture of the I/O activity for the DASD and magnetic tape devices that are shared between systems in a sysplex. For each shared device the report contains one line for each system that has access to it, and an additional summary line showing the device activity contributed by all systems in the sysplex.

INTENDED USE:

The report produces a listing of all systems that have access to a DASD or magnetic tape device, and a summary line reflecting the device activity for the entire sysplex. This summary line can assist with the investigation of bottlenecks caused by a device delay in the sysplex. The system lines show each system's share in the bottleneck.

The summary device activity rate and utilization show the total load on the device. The individual system values show the share of each system.

REPORT FORMAT:

See Section 3.1.1.18 for an example of the output generated by the Shared Device Activity report.

DATA SOURCE (file/timespan):

HARDVA at the DETAIL, DAYS, WEEKS or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFSDV1 - for all systems generating the SMF type 74 subtype 1 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.

- o Select RMFLPS, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Shared Device Activity Report -----|
| Command ==> _____|
| Composing Inquiry: RMFLPS - Post Processor Shared Device Act.|
| Database ==> _____|
| Cycle(s) ==> -- - - - -|
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS)|
| Data Selection:|
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy|
| Date   ==> -- - - - - - - - - - - - - - - - - -|
| Hour   ==> -- - - - - - - - - - - - - - - - - -|
| Zone   ==> -- - - - - - - - - - - - - - - - - -|
| Sysid  ==> -- - - - - - - - - - - - - - - - - -|
| Summarization Break Variable ==> _____|
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE)|
| SAS Subsetting Statements ==> _____|
| Specify Extended Options ==> N (Y/N/R)|
+-----+

```


Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

Specify Extended Options - Required. Defaults to N (No).
This parameter is used to specify extended options parameters for the inquiry function. It is displayed at the bottom of the panel. Specify Y to display the Extended Options Menu. Extended options parameters are used to perform additional selections for the report being defined. Extended options are never required;

default values are provided. A flag will appear to the right of this parameter if ANY extended option has been specified. To restore the extended options to their default values, specify R (Reset).

- o Optionally, complete the extended option panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Shared Device Activity Report -----|
| Command ==>                                         |
|                                                     |
| Extended Options for: RMFLPS - Post Processor Shared Device Act. |
|                                                     |
| Include the Following Device Classes in Report:      |
|   Direct Access Storage Devices (DASD) ==> Y (Y/N)  |
|   Magnetic Tape Devices (TAPE)      ==> Y (Y/N)    |
|                                                     |
| Additional Devices to Include in Report:             |
|   Device Number List ==> _____              |
|   or/and                                              |
|   Device Range(s)   ==> _____ - _____ - _____ |
|                                                     |
| Devices to Exclude from Report:                     |
|   Device Number List ==> _____              |
|   or/and                                              |
|   Device Range(s)   ==> _____ - _____ - _____ |
+-----+

```

Include the Following Device Classes in Report:

Specify N for the classes of devices you do not want to see in your report. The default report includes both DASD and TAPE device classes.

Additional Devices to Include in Report:

You can specify up to seven individual device addresses or/and four device address ranges, in hexadecimal, to include in your report, regardless of the device class they belong to. For example, you can produce a report containing all your DASD devices and only specific magnetic tape units in the range of B500 to B5FF. The extended options will look like:

```

+-----+
| Include the Following Device Classes in Report:      |
|   Direct Access Storage Devices (DASD) ==> Y (Y/N)  |
|   Magnetic Tape Devices (TAPE)      ==> N (Y/N)    |
|                                                     |
| Additional Devices to Include in Report:             |
|   Device Number List ==> _____              |
|   or/and                                              |
|   Device Range(s)   ==> B500 - B5FF _____ - _____ |
+-----+

```

Devices to Exclude from Report:

You can specify up to seven individual device addresses or/and four device address ranges, in hexadecimal, to exclude from the report. For example, you can produce a report containing all your shared DASD devices except the ones in the range of 1700 to 17FF. The extended options will look like:

```
+-----+
| Include the Following Device Classes in Report: |
| Direct Access Storage Devices (DASD) ==> Y (Y/N) |
| Magnetic Tape Devices (TAPE) ==> N (Y/N) |
| Additional Devices to Include in Report: |
| Device Number List ==> ____ - ____ - ____ - ____ |
| or/and |
| Device Range(s) ==> ____ - ____ - ____ - ____ |
| Devices to Exclude from Report: |
| Device Number List ==> ____ - ____ - ____ - ____ |
| or/and |
| Device Range(s) ==> 1700 - 17FF ____ - ____ |
+-----+
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;
  IF SYSID NE: 'T';
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****
**  Note: This report cannot be produced if the CA MICS  **
**              database contains essential data elements only.**
*****
```

3.2.24 Post Processor Enterprise Disk Systems

The Enterprise Disk Systems inquiry measures the activities of an enterprise disk system (or ESS). Depending on the data that was gathered by RMF, it can contain up to three separate sections describing system adapters' activity, extent pools' disk space capacity, and rank performance statistics.

INTENDED USE:

For each adapter of an ESS, the ESS Link Statistics section contains measurements about the occurred ECKD (for IBM TotalStorage DS family devices), SCSI, and PPRC I/O operations. For each link type, this section provides the average numbers of transferred bytes and operations per second, as well as their average response time. The I/O intensity shows how utilized the adapter was during the report interval. This section is useful for analysis of the external links' usage and for capacity planning of the peer-to-peer remote copy (PPRC) links.

The ESS Extent Pool Statistics section provides capacity and performance information about allocated disk space. For each extent pool, it shows the real capacity and the number of real extents. This section can be used to check the available disk capacity and, if required, change the capacity.

The ESS Rank Statistics section provides statistics about read and write operations in each rank of an extent pool. It also shows the characteristics of the arrays defined in all ranks. These values reflect the current configuration. You can use this section to detect and resolve performance problems and also for disk space capacity planning.

REPORT FORMAT:

See Section 3.1.1.19 for an example of the output generated by the Enterprise Disk Systems report.

DATA SOURCE (file/timespan):

HARELS, HARERS, HARXPS at the DETAIL, DAYS, WEEKS or MONTHS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFESS1 - for all systems generating the SMF type 74 subtype 8 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPT, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Post Processor Enterprise Disk Systems Report -----|
| Command ==> |
|-----|
| Composing Inquiry: RMFLPT - Enterprise Disk Systems Report |
| Database ==> |
| Cycle(s) ==> |
| Timespan ==> | (DETAIL/DAYS/WEEKS/MONTHS) |
|-----|
| Data Selection: |
|      dd mmm yy  dd mmm yy  dd mmm yy  dd mmm yy |
| Date   ==> |
| Hour   ==> |
| Zone   ==> |
| Sysid  ==> |
|-----|
| Summarization Break Variable ==> |
| Summarization Technique      ==> | (DETAIL or COMPOSITE) |
|-----|
| SAS Subsetting Statements ==> |
|-----|
| Specify Extended Options ==> N (Y/N/R) |
|-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Defaults to DAYS.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements by report. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYPE EQ: "3390";
```

Specify Extended Options - Required. Defaults to N (No).
This parameter is used to specify extended options parameters for the inquiry function. It is displayed at the bottom of the panel. Specify Y to display the Extended Options Menu. Extended options parameters are used to perform additional selections for the report being defined. Extended options are never required;

default values are provided. A flag will appear to the right of this parameter if ANY extended option has been specified. To restore the extended options to their default values, specify R (Reset).

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.2.25 Sysplex Aggregation Compliance Report

The Sysplex Aggregation Compliance report provides, for every machine (CPC) analyzed, the average contribution of each z/OS logical partition to the Sysplexes' workload, over an expected 40 hours prime shift period. Based upon IBM's Parallel Sysplex Aggregation rules, the report also determines which Sysplex, if any, a machine belongs to.

INTENDED USE:

IBM's Parallel Sysplex Aggregation allows customers to receive software pricing benefits by adding together software licenses in a Parallel Sysplex in order to price them as a single entity. To qualify for aggregation, a Sysplex must meet all IBM's criteria in the hardware, software, and operational categories.

The Sysplex Aggregation Compliance report is intended to help you assess whether your machines meet the Parallel Sysplex Aggregation 50% operational criterion: on a given machine, the images participating in the Parallel Sysplex must account for at least 50% of the workload on the machine in order to belong to this Sysplex.

This report is designed to enable you to analyze your Sysplex environment for compliance with the LPAR usage criterion of IBM's Parallel Sysplex Aggregation rules. It assumes but does not verify your compliance with the other criteria for aggregation.

Use of the Sysplex Aggregation Compliance report is not designed to arrive at a conclusive determination of your eligibility for Parallel Sysplex Aggregation. This determination may only be made by IBM.

REPORT FORMAT:

This inquiry produces a single page table for each reported period of 40 hours from 5 consecutive business days.

SYSPLEX AGGREGATION COMPLIANCE REPORT							
Customer Name : XYZ Corp.							
Reporting Period: 19NOV07:09:00 - 23NOV07:17:00							
Machine: CPC1 Serial: p0963 MSUs Rating: 742 Model: 2094-528(712)							
Logical Partitions							
LPAR Name	Sysid	Operating System	System Name	Sysplex	Contribution Pct	MSUs	Notes (may affect reporting accuracy)
CF01							No data for this LPAR was provided.
ZOS1	ZOS1	z/OS 1.8	ZOS1	PLEXC1	31.2%	88	0h55 of data missing out of the 40h00 expected.
ZOS2							No data for this LPAR was provided.
ZOS3	ZOS3	z/OS 1.8	ZOS3	PLEXC1	51.0%	143	
VM01							No data for this LPAR was provided.
ZPR1	ZPR1	z/OS 1.8	ZPR1	PLEXC1	12.8%	36	
ZQA1	ZQA1	z/OS 1.8	ZQA1	PLEXC1	5.0%	14	
Based on the above information, the Primary Sysplex for CPC1 is: PLEXC1							
Machine: CPC2 Serial: p6193 MSUs Rating: 247 Model: 2064-1C7							
Logical Partitions							
LPAR Name	Sysid	Operating System	System Name	Sysplex	Contribution Pct	MSUs	Notes (may affect reporting accuracy)
DRP1							No data for this LPAR was provided.
XAZ1	XAZ1	z/OS 1.8	XAZ1	PLEXD1	27.2%	35	
XAZ2	XAZ2	z/OS 1.8	XAZ2	PLEXP1	61.2%	79	
XAZ3	XAZ3	z/OS 1.8	XAZ3	PLEXD1	11.6%	15	
Based on the above information, the Primary Sysplex for CPC2 is: PLEXP1							

Figure 3-25. Sysplex Aggregation Compliance report

FIELDS DESCRIPTION

The report is broken in to four sections in the following order: header, machine overview, LPAR summary, and conclusion. The general layout of the report is:

```
+-- Header (describes the reporting period)
!
!   +-- Machine 1 overview (general characteristics of CPC1)
!   !
!   !   +-- LPAR summary (list all LPARs' contribution)
!   !   !   ...
!   !   !   ...
!   !   +-- ...
!   !
!   +-- Conclusion (primary Sysplex determination for CPC1)
!
!   +-- Machine 2 overview (general characteristics of CPC2)
!   !
!   !   +-- LPAR summary
!   !   !   ...
!   !   !   ...
!   !   +-- ...
!   !
!   +-- Conclusion (primary Sysplex determination for CPC2)
+--
```

Each section is explained below:

Header section

Customer Name: The name of the customer as specified in the MICF execution panel.

Reporting Period: The starting and ending times of the prime shift. This field can be used to control if the information stored in the CA MICS database covers the expected amount of data, representing 40 hours from 5 consecutive business days. We will use the following week as a reference for all examples listed in this section:

```
Mon, November 19, 2007
Tue, November 20, 2007
Wed, November 21, 2007
Thu, November 22, 2007
Fri, November 23, 2007
Sat, November 24, 2007
Sun, November 25, 2007
```

By default, the prime shift is 9am-5pm, Monday through Friday. This would show up as the following reporting period:

19NOV07:09:00 - 23NOV07:17:00

When the Sysplex Aggregation Compliance report is executed using the DETAIL or DAYS timespans, the default reporting period can be altered in three ways:

- 1) Modify the prime shift starting day: Any day of the week can be chosen as the starting day of the period. The reporting program will automatically extend the input data selection for 5 days from the starting day. For example, if your prime shift starts on Wednesdays, the reporting period will be 9am-5pm, Wednesday through Sunday:

21NOV07:09:00 - 25NOV07:17:00

- 2) Modify the prime shift starting hour: Any hour of the day can be chosen as the starting hour of the period (this can be combined with a modified starting day as described above). The reporting program will automatically extend the input data selection for 8 hours from this time. For example, if your prime shift starts at 8am, the reporting period will be 8am-4pm, Monday through Friday:

19NOV07:08:00 - 23NOV07:16:00

- 3) Exclude lunch time hours: Up to two consecutive hours may be excluded from the input data. This can be useful if you do not want to consider lunch time utilization as being part of your prime shift pattern. The reporting program will automatically extend the input data selection for 8 hours from the starting hour and exclude the lunch time interval. For example, using the default prime shift, if you want to remove two lunch hours (12am-2pm), the reporting period will be 9am-12am and 2pm-7pm, Monday through Friday, and the excluded hours will be displayed:

19NOV07:09:00 - 23NOV07:19:00
(Lunch Time Excluded: 12:00-13:59)

When the Sysplex Aggregation Compliance report is executed using the WEEKS timespan, you must supply the CA MICS zones

that represent your prime shift. You can also use zone selection with the DETAIL or DAYS timespans, but this is mutually exclusive with the prime shift specifications described above. Therefore, you should carefully review your CA MICS parameters in order to supply the correct zones to the program. Although no verification is performed against the zone setup, an additional note will be displayed next to the reporting period field:

19NOV07:09:00 - 23NOV07:17:00 (CA MICS zone selected: 1)

Machine overview section

Machine: An arbitrary designation of the machine in the form CPCn where n is incremented by one each time a different machine is found within the reporting period.

Serial: The unique serial number of the machine in the form "pnnnn" where nnnn are the last four digits of the processor serial number.

MSUs Rating: The software MSU rating for the machine being analyzed.

If a master LPAR (for example PRD1) has been specified for this machine on the MICF execution panel, a note will immediately follow the machine specifications:

NOTE: All LPAR timestamps have been adjusted to the specified master LPAR, PRD1.

LPAR summary section

This section provides a table containing the information for all the active logical partitions in the machine that are using general purpose processors. The Sysplex calculations can only be performed for LPARs that produced SMF type 70 subtype 1 records.

If the program detects that no SMF records exist for an LPAR, all columns will be empty, and a note will be displayed. Otherwise the following information is provided for each LPAR:

LPAR Name: The name of the logical partition.

Sysid: The SYSID name for the instance of z/OS running in

the logical partition.

Operating System: The O/S and level of the logical partition.

System Name: The system name for the instance of z/OS running in the logical partition.

Sysplex: The Parallel Sysplex name for the logical partition.

Contribution Pct: The average utilization contribution (in %) of the LPAR's workload, as a percentage of workload on the machine over the reporting period. zAAP/zIIP special processors are included in the calculations.

Contribution MSUs: The average utilization contribution (in MSUs) of the LPAR's workload, over the reporting period. zAAP/zIIP special processors are included in the calculations.

Notes: For each logical partition, various notes may appear in this column. This is an indication that the report accuracy may be affected. These notes can be one of the following:

"No data for this LPAR was provided": The data covered by the reporting period does not contain any information for this logical partition (originally no SMF type 70 subtype 1 record). This is not necessarily a problem if this LPAR is not a z/OS system (for example VM, coupling facility). But, if it is a z/OS system, its potential contribution to a Sysplex activity cannot be assessed.

"HHhMM of data missing out of the 40h00 expected": The data for the logical partition is incomplete. If the same amount of data is missing for all LPARs, one reason may be that the reporting period does not cover a full prime shift.

Conclusion section

This section provides the primary Sysplex determination. Based on the logical partitions' contributions to the various sysplexes, the program displays the name of the sysplex the machine belongs to. It is either the name of the Sysplex that generates at least 50% of the workload of the machine, or *NONE* if no Sysplex reaches the 50% limit.

A sysplex name means aggregation with other machines is possible, *NONE* means the machine cannot aggregate.

DATA SOURCE (file/timespan):

HARCPU and HARLPC at the DETAIL, DAYS, or WEEKS timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE(@RMFSPX1).

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MWF).
- o Choose option 2, CA MICS Information Center Facility (MICF).
- o Choose option 2, Database Inquiries.
- o Select RMFLPU, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|----- Sysplex Aggregation Compliance Report -----|
| Command ==>                                         |
|-----|
| Composing Inquiry: RMFLPU - Sysplex Aggregation Compliance Report |
| Database ==> _____|
| Cycle(s) ==>  _ - _ _|
| Timespan ==> _____ (DETAIL/DAYS/WEEKS)|
|-----|
| Customer Name ==> _____|
|-----|
| Prime Shift Selections:|
| Starting Day ==>  _ - Hour ==>  _   Lunch Hours ==>  _ - _|
| or|
| CA MICS Zone ==>  _ - _ _|
|-----|
| Master LPARs (CPC serial number last 4 digits followed by LPAR name):|
| ==>  _____ - _____ - _____ - _____|
| ==>  _____ - _____ - _____ - _____|
| ==>  _____ - _____ - _____ - _____|
| ==>  _____ - _____ - _____ - _____|
| ==>  _____ - _____ - _____ - _____|
|-----|
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

Specify 00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution. It is important, for the accuracy of the report, that enough cycles be specified to cover IBM's view of the prime shift (40 hours from 5 consecutive business days).

Customer Name - Required. No default.

Specify the customer name that will be displayed in the header of the report.

The default reporting period is 9am to 5pm, Monday through Friday (40 hours). If necessary, you can specify a different range of days and/or hours to match your own prime shift patterns. You can also exclude up to 2 consecutive hours per day if you do not want to consider lunch time utilization. This facility is only available with the DETAIL and DAYS timespans, when no CA MICS zone is specified. If the WEEKS timespan is used or if CA MICS zones are selected, these zones are expected to represent your complete prime shift.

Starting Day - Optional. Defaults to MON. MON-SUN.

Specify the starting day of your prime shift. Valid with DETAIL and DAYS only.

Starting Hour - Optional. Defaults to 09. 00-23.

Specify the starting hour of your prime shift. Valid with DETAIL and DAYS only.

Lunch Hours - Optional. No default. 00-23.

Specify up to two consecutive hours to exclude from the report. Valid with DETAIL and DAYS only.

CA MICS Zone - Required with WEEKS, otherwise optional. No default. 1-9.

You can specify up to four zone values. An input

observation is selected if its zone value is equal to any of the specified values. Because this parameter is mutually exclusive with the other prime shift specifications, it is expected that the selected period represents your entire prime time (40 hours from 5 consecutive business days). Otherwise, the report may draw incorrect conclusions.

Master LPARs - Optional. No default. CPC serial number last 4 digits followed by LPAR name.

You can specify which LPAR (for up to 20 machines) represents local time in the event that different LPARs are running in different time zones. All other LPARs' timestamps will be adjusted to match the master. If no LPAR is explicitly specified, the most contributing one will be considered as the master.

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

** Note: This report cannot be produced if the CA MICS **
** database contains essential data elements only.**

3.2.26 Serialization Delay Report

The Serialization Delay report provides contention information at the system and address space levels for different types of suspend locks, GRS enqueues, and GRS latches: CMS locks, CMS enqueue/dequeue locks, CMS latch locks, CMS SMF locks, local locks, and CML locks.

The first part of the report, the Serialization Delay Summary, contains system-wide summary data for all address spaces. The second part, the Serialization Delay Details, contains detailed data about address spaces' locks, latches, and enqueues. Only the top twenty address spaces with the longest contention times are reported for each lock type.

INTENDED USE:

The Serialization Delay report helps in analyzing serialization-related performance problems, using global resource serialization (GRS) enqueue and latch performance statistics, as well as system suspend lock contention information. It may be useful to detect and debug performance problems due to resource contention when system dumps or traditional performance reports fail to identify the address space that is causing a contention.

REPORT FORMAT:

See Section 3.1.1.20 for an example of the output generated by the Serialization Delay report.

DATA SOURCE (file/timespan):

SCPSRD, SCPSRS at the DETAIL timespan.

DATA ELEMENTS USED AND CALCULATIONS:

Consult the SAS source code used to generate this report in sharedprefix.MICS.SOURCE member:

- o @RMFSDR1 - for all systems generating the SMF type 72 subtype 5 record.

HOW TO PRODUCE THE REPORT:

- o Enter the CA MICS Workstation Facility (MMF).
- o Choose option 2, CA MICS Information Center Facility (MICF).

- o Choose option 2, Database Inquiries.
- o Select RMFLPV, whose Catalog Group is PERFORM.
- o Complete the MICF Execution panel. (If you are not familiar with MICF, see the MICF User Guide and the MICF Reference Guide.)
- o Complete the specification panel illustrated below. (Descriptions of the fields follow the panel.)

```

+-----+
|-----+   Serialization Delay Report   +-----+
| Command ==>                               |
| Composing Inquiry: RMFLPV - Serialization Delay Report |
| Database ==> _____ |
| Cycle(s) ==> __ - __ |
| Timespan ==> DETAIL (Detailed Report Only) |
|
| Data Selection: |
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date  ==>  __ - __ - __ - __ - __ - __ - __ - __ - __ |
| Hour  ==>  __ - __ |
| Zone  ==>  _____ |
| Sysid ==>  _____ |
|
| Summarization Break Variable ==> _____ |
| Summarization Technique      ==> _____ (DETAIL or COMPOSITE) |
|
| SAS Subsetting Statements ==> _____ |
| _____ |
+-----+

```

Database - Required. No default.

Specify up to six database unit IDs (the IDs of the CA MICS database units from which the files are read). If CA MICS files exist in only one database unit, this parameter is set automatically. To display a selection list of valid database unit IDs, specify ? (question mark).

Cycle(s) - Required. Defaults to 01.

00-99 in either data entry field; leading zeros are inserted automatically. The CA MICS files cycle (specify first field) or cycle range (specify both fields) for the inquiry execution.

Timespan - Required. Forced to DETAIL.

The timespan of the CA MICS database from which the primary input files are selected. See Chapter 3 for a listing of file requirements. The CA MICS required input files must be available at the specified timespan.

Date - Optional. No default.

Up to two date ranges in DD MMM YY format. The first value in each date range is the starting date and the last value is the ending date. The ending date must be higher than the starting date. The date ranges should not overlap, but you can specify the higher range before the lower range. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of any specified date range.

Hour - Optional. No default.

An hour range from 0 to 23. The first value is the starting hour and the last value is the ending hour. The ending hour must be higher than the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified hour range.

Zone - Optional. No default.

One-character zone value from 1 to 9. You can specify up to nine zone values. An input observation is selected if its zone value is equal to any of the specified values.

SYSID - Optional. No default.

1-4 character SYSID value. You can specify up to ten SYSIDs. An input observation is selected if its SYSID value is equal to any of the specified values.

Summarization Break Variable - Optional. No default.
Data element name to be used as control-break variable. Valid entries are STARTTS, HOUR, ZONE, DAY, WEEK, MONTH, YEAR, and SYSID. CA MICS summarization facilities are used to preprocess the files used by the report programs. These facilities allow that a data element be defined as a control-break variable, and that the summarized file(s) are sorted so the break variable is last in the sort key list. A single summarized observation is then written from multiple observations, with the same break variable value, whenever the break variable value changes.

Summarization Technique - Required. Defaults to DETAIL.
Specify DETAIL to cause the input files to be processed and reported in date/time order, or COMPOSITE to force ALL occurrences of the same value of the summarization break variable to be summarized and reported together. See section 3.1.2.1.4 for a more detailed explanation of the summarization control techniques.

SAS Subsetting Statements - Optional. No default.
Free-form user-supplied SAS code. During the creation of the work files used to generate the reports, user-defined SAS code may be included to modify or subset the data.

IMPORTANT: No validity checking is done on the user-defined code. If it contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

Examples of valid statements:

```
IF SYSID EQ "SYS1";  
  
IF DEVTYP EQ: "3390";
```

USAGE CONSIDERATIONS:

This inquiry provides a user exit that you can use to perform additional data selection from the CA MICS database. To invoke this exit, you must first copy the shared inquiry into your private MICF catalog, then select it for modification. Finally code SAS statements in the SELECT macro, bracketed by

the %MACRO and %MEND statements.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS file(s). You can use it to delete observations from the data as it is selected. For example, in a system activity study, you might want to exclude test systems starting with a T from the analysis. You would then code the following:

```
%MACRO SELECT;  
IF SYSID NE: 'T';  
%MEND SELECT;
```

Note that you do not have to code the %MACRO and %MEND statements, as they are already provided for you.

IMPORTANT: You must code each specified SAS statement in accordance with the syntax of the SAS Macro Language, as described in the SAS manuals. No validity checking is done on the defined code. If the user code contains syntax or logic errors, the inquiry will either terminate abnormally or will produce unpredictable results.

```
*****  
** Note: This report cannot be produced if the CA MICS **  
** database contains essential data elements only.**  
*****
```

3.3 Management Objective Reports

The Management Objective Reports for the WLM information area are produced on a daily, weekly, and monthly basis and are described in that order within this section. No reports are available for the Hardware or SCP information areas.

The SAS source code for the WLM Management Objective Reports is contained in three members in `sharedprefix.MICS.SOURCE`:

DYRMFMBO - Daily WLM Management Objective Reports
WKRMFMBO - Weekly WLM Management Objective Reports
MNRMFMB0 - Monthly WLM Management Objective Reports

User-defined options are provided to specify data selection (time, zones, etc.), define the applicable management values, and specify the scales of the graphic report representations.

These options are specified as SAS macro variables and are contained in the member `#RMFM0BJ` in the `sharedprefix.MICS.SOURCE` library. The options are briefly described in the report sections to which they pertain. Section 3.3.4, WLM Report Options, fully explains the options.

The user-defined options are the following:

- o Hourly Selection Range for Daily Reports: The start and end hours of the day to be included in the daily WLM reports. It is suggested that the hours be set to include the entire day (00 to 23).
- o Daily Percentage Limit: The percent of total resource consumption, that is the high-water limit for all service classes.
- o Weekly Percentage Limit: The percent of total resource consumption, that is the high-water limit for all service classes.
- o Monthly Percentage Limit: The percent of total resource consumption, that is the high-water limit for all service classes.

Individual reports are described in the following sections:

- 1 - Daily WLM Reports
- 2 - Weekly WLM Report

- 3 - Monthly WLM Report
- 4 - WLM Report Options

3.3.1 Daily WLM Reports

The daily reports provide management a way to determine if their primary WLM processing objectives are being attained.

An hour of the day selection facility is provided, so that these daily reports may reflect the entire 24 hours or a user specified range.

The following user options are provided to define the daily reports:

Hourly Selection Range for Daily Reports: The start and end hours of the day to be included in the daily WLM reports. It is suggested that the hours be set to include the entire day (00 to 23).

RMFDLHR and RMFDHHR macro variables define the low and high hours of the day for selection of the WLM activity to be reported in the daily reports:

```
%LET RMFDLHR = 00;  
%LET RMFDHHR = 23;
```

A full description of the user options is provided in section 3.3.4, WLM Report Options.

The following sections display and explain the daily WLM Management Objective Reports:

- 1 - Report Format Description
- 2 - Top Service Classes Service Units Consumers Report
- 3 - Detail Service Unit Consumption Report
- 4 - Resource Consumption Report

3.3.1.1 Report Format Description

The daily reports are produced as a standard process in the CA MICS daily job stream. The reports are produced from the most recent cycle (01) of the Service Class Resource Consumption (WLMSEC) file, maintained in the database's DAYS timespan. The SAS CHART procedure is used to produce the desired reports.

The heading lines contain the installation name (for example, XYZ Manufacturing, Inc.), the frequency identification (that is, Daily WLM Management Objectives), the objective being reported and the computing system (that is, the SYSID) on which the WLM activity was measured.

The bar chart illustrates the day and hour, and the measurement being reported (service units).

A horizontal axis is used to chart the measure being reported and it is with this axis that the management objective for this category is defined. The horizontal axis is first established through the SAS CHART AXIS option which identifies the highest value represented on the horizontal axis. The SAS CHART REF option formats a dashed line down the page to illustrate the management objective.

Consider the chart of resource consumption by service class (see Figure 3-22). The title describes the management objective as utilizing within 30% of the total service units for the hour. The measure that would be charted is the percentage of resource consumed (service units), for each service class, by hour. The horizontal axis therefore, would be set up for a maximum value of 100 (for 100%) and the horizontal reference line would be printed at the 30% level. This reference line then clearly depicts how the maximum usage for any service class was satisfied or missed for each hour of the day.

Note especially that the location of the reference line may be rounded for purposes of scaling the axis. Each horizontal line may have a unit value of 2.5%, and therefore a reference line specification of 32% would not fall directly on a vertical axis coordinate. In this case, the 32% line would be shown as a line at 30%.

The member DYRMFB0 in the sharedprefix.MICS.SOURCE library contains the SAS statements for producing the chart report. For information on defining your installation objectives, see section 3.3.4, WLM Report Options.

3.3.1.2 Top Service Classes Service Units Consumers Report

This report identifies and quantifies the top 6 total service consumers by the identified hour, day, and computing system.

Figure 3-22 illustrates the top 6 service classes consumers based on total service units and provides a graphic display of each class's CPU, I/O, STORAGE, and SRB service consumption.

Additionally, the service consumption consumed by all other service classes above the top 6 is reported as one class entitled *OTHER*.

The report displays the CPU, I/O, STORAGE, SRB, and total service unit categories up the left side of the block report and service class names along the bottom. Each cell within the block quantifies that service class's percent of service unit consumption for the designated category. The horizontal bar provides a quick graphic reference of the percentage.

CA		16:55 Tuesday, mmm dd						
CA MICS IS Management Support System								
Top Service Class Total Service Consumers								
----- System Identifier=S1 Time Zone=1 -----								
Sum of PCT_SU by WLMCLASS grouped by TYPE								

Figure 3-22. Top Service Classes Service Units Consumers Report

3.3.1.3 Detail Service Unit Consumption Report

This report identifies and quantifies the detail service consumption by service class. The report is formatted by zone and system.

Figure 3-23 illustrates each service class's percentage contribution to consumption, listing CPU, I/O, STORAGE, SRB, and total service units.

The report displays all service class names and their associated percentages of CPU, I/O, STORAGE, SRB, and total service unit consumption. Each of the four columns adds up to one hundred percent.

CA						09:43 Thursday, December 6, yyyy
CA MICS IS Management Support System						
Detail Service Units Consumption						
----- System Identifier=ST0 Time Zone=1 -----						
WLMCLASS	CPU_SU	STOR_SU	IO_SU	SRB_SU	TOTAL_SU	
BATA1V90	10.0309	1.6143	27.1687	63.6662	10.0748	
BATA2V30	0.0190	0.0029	0.0000	0.0024	0.0058	
BATA2V50	0.1531	0.0266	0.1927	0.2491	0.0797	
BATA4V10	1.1046	0.0350	0.3821	0.1023	0.2684	
CA2V60	38.1904	42.0144	21.4857	13.4638	37.6697	
DISCR	2.7501	0.4999	0.7794	0.3497	0.9415	
ICA2V50	0.7337	0.0000	0.0000	0.0000	0.1435	
ICA4V50	0.1531	0.0000	0.0000	0.0000	0.0299	
STCA1V40	0.0002	0.0000	0.0000	0.0001	0.0001	
STCA1V90	0.0659	0.0129	0.0000	0.0020	0.0216	
STCA2V30	2.4915	2.6278	2.8918	0.1327	2.3951	
STCA2V40	0.8317	3.2578	0.0072	0.3085	2.3522	
STCA2V50	0.4196	4.5367	18.1654	7.1641	4.6799	
STCA5V05	2.7660	0.0709	0.0000	0.1206	0.5987	
STCA5V10	0.9692	0.5537	0.0000	0.1279	0.5683	
STCOMVS	22.8154	1.9911	16.9945	0.0258	6.6805	
SYSSTC	4.1622	8.9502	0.3162	9.3143	7.5915	
SYSTEM	12.3117	33.8005	11.6160	4.9697	25.8887	
TS0	0.0316	0.0055	0.0002	0.0008	0.0099	

Figure 3-23. Detail Service Unit Consumption Report

3.3.1.4 Resource Consumption Report

This report quantifies the resources consumed on an hourly basis for the identified day and computing system.

To evaluate resources used by service classes, management sets an objective that is a percentage measure of total service units used each hour. Figure 3-24 illustrates the Daily Resource Consumption Report based on a management objective of utilizing less than 30% of the service units within each hour.

The following user options apply to this report:

Percentage Limit: The percent of total resource consumption. The percentage limit is management's target for resource consumption. This value becomes a reference line on the report.

RMFDREF macro variable defines the reference line that corresponds to management's target:

```
%LET RMFDREF = 30;
```

A full description of the user options is provided in section 3.3.4, WLM Report Options.

Figure 3-24 illustrates the resources consumed, with the vertical axis representing the hours of the day and the horizontal axis charting the percentage of service units consumed within the hour.

The management objective for percentage of resources consumed is shown by the dashed vertical reference line printed down the chart. In Figure 3-24, the reference line is shown at the 30% level of the horizontal axis. Therefore, any hour for which the charted bar exceeds this reference line shows that the resource consumption objective for that service class was missed for that hour.

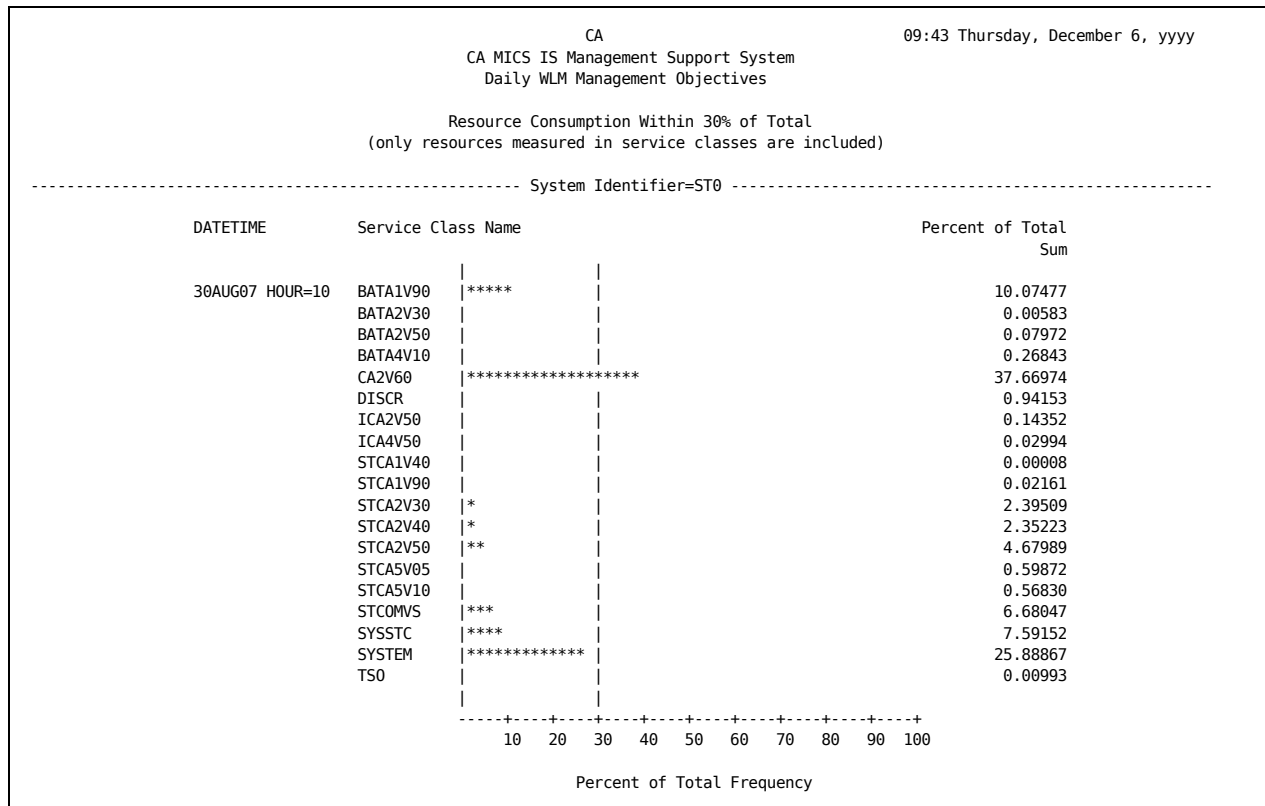


Figure 3-24. Daily Resource Consumption Report

3.3.2 Weekly WLM Report

The weekly report provides management a way to determine if their primary WLM processing objectives are being attained. The chart illustrates the week's activity, by zone, in reference to the established objectives for percentage of the total service unit consumption.

The following sections display and explain the weekly WLM management objective report:

- 1 - Report Format Description
- 2 - Weekly Resource Consumption Report

3.3.2.1 Report Format Description

The weekly report is produced as a standard process in the CA MICS weekly job stream. The report is produced from the most recent cycle (01) of the Service Class Resource Consumption (WLMSEC) file, maintained in the database's WEEKS timespan. The SAS CHART procedure is used to produce the desired bar-chart reports.

The heading lines contain the installation name (for example, XYZ Manufacturing, Inc.), the frequency identification (that is, Weekly WLM Management Objectives), the objective being reported, the computing system (that is, SYSID) on which the WLM activity was measured, the week, and the zone number and name.

The bar chart illustrates the day and zone, and the measurement being reported (service units).

A horizontal axis is used to chart the measure being reported and it is with this axis that the management objective for this category is defined. The horizontal axis is first established through the SAS CHART AXIS option which identifies the highest value to be represented on the horizontal axis. The SAS CHART REF option formats a dashed line down the page to illustrate the management objective.

Consider the chart of resource consumption by service class (see Figure 3-25). The title describes the management objective as utilizing within 30% of the total service units for the hour. The measure that would be charted is the percentage of resource consumed (service units) for each service class by hour. The horizontal axis therefore would be set up for a maximum value of 100 (for 100%) and the horizontal reference line would be printed at the 30% level. This reference line then clearly depicts how the objective was satisfied or missed for each hour of the day.

Note especially that the location of the reference line may be rounded for purposes of scaling the axis. Each horizontal line may have a unit value of 2.5%, and therefore a reference line specification of 32% would not fall directly on a vertical axis coordinate. In this case, the 32% line would be shown as a line at 30%.

The member WKRMFMB0 in the sharedprefix.MICS.SOURCE library contains the SAS statements for producing the chart report. For information on defining your installation objectives, see section 3.3.4, WLM Report Options.

3.3.2.2 Weekly Resource Consumption Report

This report quantifies the service units consumed on a zone basis for the identified week and computing system.

The management objective to be tracked, to evaluate resources used by each service class, is a percentage measure of the total service units used for each zone. Figure 3-25 illustrates the Weekly Resource Consumption Report based on a maximum usage level of utilizing less than 30% of the service units within each zone.

The following user options apply to this report:

Weekly Percentage Limit: The percentage of total resource consumption. This is high-level limit for all service classes.

RMFWREF macro variable defines the reference line for identifying a high percentage concentration of service unit consumption by a given service class in the weekly reports:

```
%LET RMFWREF = 30;
```

A full description of the user options is provided in section 3.3.4.1, Report Options.

Figure 3-25 quantifies the resources consumed. The vertical axis represents the service classes and the horizontal axis charts the percentage of service units consumed within the zone.

The management objective for percentage of resources consumed is shown by the dashed vertical reference line printed down the chart. In Figure 3-25, the reference line is shown at the 30% level. Any zone that exceeds this reference line exceeded the Resource Consumption limit for that zone.

3.3.3.1 Report Format Descriptions

The monthly report is produced as a standard process in the CA MICS monthly job stream. The report is produced from the 12 most recent cycles (01-12) of the Service Class Resource Consumption (WLMSEC) file, maintained in the database's MONTHS. The SAS CHART procedure is used to produce the desired reports.

The heading lines contain the installation name (for example, XYZ Manufacturing, Inc.), the frequency identification (that is, Monthly WLM Management Objectives), the objective being reported, the computing system (that is, SYSID) on which the WLM activity was measured, and the zone number and name.

The bar chart illustrates the service class, the month, and the measurement being reported (service units).

A horizontal axis is used to chart the measurement being reported, and it is with this axis that the management objective for this category is defined. The horizontal axis is first established through the SAS CHART AXIS option, which identifies the highest value represented on the horizontal axis. The SAS CHART REF option formats a dashed line down the page to illustrate the management objective.

Consider the chart of the resource consumption by service class (see Figure 3-26). The title describes the management objective as within 30% of the total service units for the month. The measurement that would be charted is the percentage of resource consumed (service units) for each service class by month. The horizontal axis, therefore, would be set up for a maximum value of 100 (for 100%) and the horizontal reference line would be printed at the 30% level. This reference line then clearly depicts how the objective was satisfied or missed for each month.

Note especially that the location of the reference line may be rounded for purposes of scaling the axis. Each horizontal line may have a unit value of 2.5%, so a reference line specification of 32% would not fall directly on a vertical axis coordinate. In this case, the 32% line would be shown as a line at 30%.

The member MNRMFMB0 in the sharedprefix.MICS.SOURCE library contains the SAS statements for producing the chart report. To define your data center objectives, see section 3.3.4, WLM Report Options.

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3.3.3.2 Monthly Resource Consumption Report

This report quantifies the service units consumed on a monthly basis for the identified day and computing system.

The management objective to be tracked to evaluate the resources used by each service class is a percentage measure of the total service units used for each month. Figure 3-26 illustrates the Monthly Resource Consumption Report based on a management objective of utilizing less than 30% of the service units within each month.

The following user options apply to this report:

Monthly Percentage Limit: The percentage of total resource consumption. This is the high-level limit for all service classes.

RMFMREF macro variable defines the reference line for identifying a high percentage concentration of service unit consumption by a given service class in the monthly reports.

```
%LET RMFMREF = 30;
```

A full description of the user options is provided in section 3.3.4.1, Report Options.

Figure 3-26 quantifies the resources consumed. The vertical axis represents the months, and the horizontal axis charts the percentage of service units consumed within the month.

The management objective for percentage of resources consumed is shown by the dashed vertical reference line printed down the chart. In Figure 3-26, the reference line is shown at the 30% level. Therefore, in any month that the bar exceeds this reference line, the resource consumption objective was missed.

3.3.4 WLM Report Options

The Management Objective Reports assume that a set of objectives related to the operation of the Workload Manager (WLM) have been determined. Often, this may not be the case. This section describes how the management objectives may be specified to the reporting process once they have been defined by management.

Numbers which will be used as management objectives should not be defined without some analysis of the installation's historical WLM performance.

The CA MICS database provides a useful information base for analyzing historical performance. It is suggested that one or more of the following analyses be used to study past performance.

Statistical Analysis: The CA MICS database may be used to analyze in-depth the measures around which the management objectives are to be determined. Specifically, the SAS procedures UNIVARIATE and FREQ may be used to provide a reasonable statistical analysis of an individual measure, providing the analyst with mean, standard deviation, and percentile values. It is our opinion that the percentile values may be the most applicable to the process of determining the management objectives target values.

The following CA MICS database files should be used to analyze WLM activity for purposes of establishing WLM Report Options. They are listed according to the reports to which they apply:

- Daily - DAYS.WLMSEC01
- Weekly - WEEKS.WLMSEC01
- Monthly - MONTHS.WLMSEC01-12

In each case, the data source is the Service Class Resource Consumption File.

The last input essential in defining management objectives for WLM, is the minimum level of service, availability, and throughput required by WLM users.

The integration of this information with data processing management's own priorities and requirements establishes the base for defining the management objectives for WLM.

The following sections describe specifically how an

installation is able to specify the numerical values used in these reports.

- 1 - Report Options
- 2 - Report Options Macro Variables Example

3.3.4.1 Report Options

The following options are provided for defining the WLM Management Objective Reports along with the names of the SAS macro variables used for option definition.

Hourly Selection Range for Daily Reports: The start and end hours of the day that are to be included in the daily WLM reports. It is suggested that the hours be set to include the entire day (00-23).

RMFDLHR and RMFDHHR macro variables define the low and high hours of the day for selection of the WLM activity to be reported in the daily reports.

Percentage Limit: The percentage of total resource consumption. The percentage limit is management's target for resource consumption. This value becomes a reference line on the report.

RMFDREF macro variable defines the reference line that corresponds to management's target in the daily reports.

RMFWREF macro variable defines the reference line that corresponds to management's target in the weekly reports.

RMFMREF macro variable defines the reference line that corresponds to management's target in the monthly reports.

3.3.4.2 Report Options Macro Variables Example

Once the management objectives for WLM have been established they can easily be incorporated into the WLM Reports.

The specification of the management objectives to be used in the reporting process are defined in the #RMFMOBJ member contained in the sharedprefix.MICS.SOURCE library. This member consists of a series of SAS macro variables which define values for the required objectives. This member, however, should not be changed. Changes should instead be made to #RMFMOBJ in prefix.MICS.USER.SOURCE.

The #RMFMOBJ member is distributed with a set of default values and it is the responsibility of the CA MICS System Administrator to initially tailor the values and maintain them for subsequent installation changes and, of course, CA MICS system maintenance itself.

All values input by the user for defining objectives are specified as SAS macro variables for ease of incorporation into the reporting process. A brief explanation of SAS macro variables is provided. For instance, the threshold for the percentage of total service consumed by any given service class per hour is defined as:

```
%LET RMFDREF = 30;
```

A SAS macro variable is defined by the statement %LET followed in order by the name used to reference the macro variable, the value that is to be substituted any time the macro variable is used in a SAS program, and the ; sign which signifies the end of the macro variable definition. For example, the name of the macro variable in the above statement is RMFDREF and any time that &RMFDREF is referenced in the CA MICS code, the value 30 is substituted.

In changing the objectives used in the reports, the user is changing the appropriate macro variable's value to reflect what should be used in your installation's reports.

The user must ensure that the statement %LET, the CA MICS macro variable name, and the ending ; character ARE NOT ALTERED IN ANY WAY, and the only item changed is the value within the macro variable.

The #RMFMOBJ member is organized to enable the user to quickly identify the values that require changing and is laid-out as shown below in Figure 3-27.

```
***** ;
* The following section defines the objectives, * ;
* selection fields, and charting options to be used * ;
* for daily, weekly, and monthly Hardware and SCP * ;
* Analyzer objective reporting. * ;
***** ;

%LET RMFDREF = percentage-limit;
%LET RMFWREF = percentage-limit;
%LET RMFMREF = percentage-limit;
/* Time selection specification - daily */
%LET RMFDLHR = starting-hour;
%LET RMFDHHR = ending-hour;
```

Figure 3-27. WLM Report Options in #RMFMOBJ

Figure 3-28 shows how the WLM options have been defined in #RMFMOBJ in the distributed version of the member.

```
***** ;
* The following section defines the objectives, * ;
* selection fields, and charting options to be used * ;
* for daily, weekly, and monthly Hardware and SCP * ;
* Analyzer objective reporting. * ;
***** ;

%LET RMFDREF = 30;
%LET RMFWREF = 30;
%LET RMFMREF = 30;
/* Time selection specification - daily */
%LET RMFDLHR = 8;
%LET RMFDHHR = 17;
```

Figure 3-28. Completed #RMFMOBJ Member

The installation needs only define the management objectives in the #RMFMOBJ member and the reporting process will be tailored to your system's definitions.

3.4 CSV Extracts

The Hardware and SCP Analyzer provides the following inquiries that produce CSV data extracts:

Category	Inquiry	Inquiry Name	CSV File Description
Perform	RMFED1	CPU and ASID Activity	Daily - Percent CPU Busy by System Daily - ASID Activity by System
	RMFED3	Paging Activity	Daily - Real Storage Use by System
	RMFED4	Top N Active DASD Activity	Daily - DASD Usage by System & Volume Daily - DASD Percent Busy by Hour
	RMFED5	Top-4 CPU Busy Comparison	Daily - Percent CPU Busy by System

Figure 3-29. RMF Distributed CSV Inquiries

The CSV extracts created by these inquiries can be downloaded to the Q&R Workstation and used to plot charts using the CA MICS reporting application. See the Q&R Workstation Getting Started guide and Query Library Guide for details.

If you want to produce the CSV extracts, access the inquiries listed above through the MICF Inquiries panel of the CA MICS Workstation Facility (MWF).

The following sections describe the individual inquiries:

- 1 - CPU and ASID Activity (RMFED1)
- 2 - Paging Activity (RMFED3)
- 3 - Top N Active DASD Activity (RMFED4)
- 4 - Top-4 CPU Comparison (RMFED5)

3.4.1 CPU and ASID Activity (RMFED1)

INQUIRY ID:

RMFED1

DATA SOURCE (file/timespan):

HARCPU at the DAYS timespan

OUTPUT CONTROL PARAMETER:

- 1) Daily - Percent CPU Busy by System
-- K3D1 (Three key columns, one three-dimensional area chart per system/date)
- 2) Daily - ASID Activity by System
-- K3D9 (Three key columns, nine three-dimensional area charts per system/date)

DATA ELEMENTS USED:

SYSID - SYSID
DATE - Date
HOUR - Hour
CPUPCBSY - Pct CPs Busy
CPUPCBZP - Pct zAAPs Busy
CPUPCBSU - Pct zIIPs Busy
CPUTOBTM - Total Time CPs Busy
CPUZPBTM - Total Time zAAPs Busy
CPUSUBTM - Total Time zIIPs Busy
CPUTOOTM - Total CPs Online Time
CPUZPOTM - Total zAAPs Online Time
CPUSUOTM - Total zIIPs Online Time
CPUAVONL - Avg Online CPs
CPUAVOZP - Avg Online zAAPs
CPUAVOSU - Avg Online zIIPs
CPUTOONL - Total Online CPs
CPUTOOZP - Total Online zAAPs
CPUTOOSU - Total Online zIIPs
INTERVLS - Number of Recording Intervals
CPUAVB - Avg Batch Users
CPUAVT - Avg Tso Users
CPUAVE - Avg OMVS Users
CPUAVI - Avg In Users
CPUAVP - Avg APPC Users
CPUAVS - Avg Started Users
CPUAVA - Avg Logical Wait Users
CPUAVL - Avg Logical Ready Users
CPUAVO - Avg Out and Ready Users

CPUAVR - Avg In and Ready
CPUAVW - Avg Out and Wait Users
CPURSMP - Number of RMF Samples
CPUATT - Total Logical Out Wait Users
CPUBTT - Total Batch Users
CPUETT - Total OMVS Users
CPUITT - Total In Users
CPUTTT - Total Logical Out Ready Users
CPUOTT - Total Out and Ready Users
CPUPTT - Total APPC Users
CPUTTT - Total In and Ready Count
CPUTTT - Total Started Users
CPUTTT - Total Tso Users
CPUWTT - Total Out and Wait Users

CALCULATIONS:

DATE = MDY(MONTH,DAY,%YEAR4);

USAGE CONSIDERATIONS:

Not applicable

EXECUTION-TIME PARAMETERS:

Execution-time parameters enable you to produce a CSV file containing just the information you want. This reduces the:

- o Amount of data extracted
- o Network traffic during download

as well as makes the presentation more effective.

```
+-----+
|----- Execution-Time Parameters -----|
| Command ==>                               Scroll ==> CSR |
| Executing CA MICS Inquiry: RMFED1 - CPU and ASID Activity (.CSV) |
|-----|
| Enter one or more Data Base IDs for the Data Base(s) you want to process. |
|-----|
| Enter range of CA MICS online file cycles or enter ARCHIVE for archive files. |
|-----|
| Enter the range of dates (DDMMYY) to be reported or leave blank for all |
|-----|
| Enter the range of hours to be reported or leave blank to report all |
|-----|
| Enter the SYSID(s) to be reported or leave blank to report all systems |
|-----|
+-----+
```


Enter one or more Data Base IDs for the Data Base(s) you want to process.

-- Required. Specify database unit IDs (the IDs of the CA MICS database units from which files are read). To display a selection list of valid database unit IDs, specify ? (question mark).

Enter range of CA MICS online file cycles or enter ARCHIVE for archive files.

-- Required. These are the cycles of the specified timespan for the CA MICS files that are used as input to the analysis. You can specify a range of cycles in either ascending or descending order (for example, 01-03 or 03-01). The fields can contain any numeric value between 0 and 99, or "ARCHIVE" for archive files.

Enter the range of dates (DDMMYY) to be reported or leave blank for all.

-- Optional. Specify the date range in DDMMYY format (for example, 01OCT10). The first date range is the starting date and the last value in each date range is the ending date. The ending date must be higher than, or equal to the starting date. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of the specified date range. If only one value is specified, an observation is selected if its date value is equal to the specified value.

Enter the range of hours to be reported or leave blank to report all.

-- Optional. The first value is the starting hour and the last is the ending hour. The ending hour must be higher than, or equal to the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified date range. If only one value is specified, an observation is selected if its hour value is equal to the specified value.

Enter the SYSID(s) to be reported or leave blank to report all systems.

-- Optional. Specify one or more 1-4 character SYSID

value(s). Observations whose SYSID value is equal to any of the specified values are selected. If not specified, all are selected.

3.4.2 Paging Activity (RMFED3)

The Paging Activity inquiry produces a CSV file that can be used to plot stacked bar charts using CA MICS reporting.

CSV FILES:

Daily - Real Storage Use by System

==> One bar chart will be generated for each system/date combination with the following metrics stacked on each bar by hour:

- 1) Avg Private Pageable Frames
- 2) Avg LSQA Fix Frames
- 3) Avg CSA+LPA Pageable Frames
- 4) Avg LPA Pagable Frames
- 5) Avg SQA Fixed Frames

Note: Because this inquiry does not produce a chart, no sample is provided.

INQUIRY ID:

RMFED3

DATA SOURCE (file/timespan):

SCPPAG at the DAYS timespan

OUTPUT CONTROL PARAMETER:

K3D1B5 (three key columns, one bar chart per system/date with 5 metrics on each bar)

DATA ELEMENTS USED:

SYSID	- System Identifier
HOURL	- Hour
PAGAVS	- Avg Private Pageable Frames
PAGAVLS	- Avg LSQA Fix Frames
PAGAVP	- Avg CSA+LPA Pageable Frames
PAGAVLP	- Avg LPA Pagable Frames
PAGAVQ	- Avg SQA Fixed Frames
PAGAVF	- Avg Unused Page Frames
PAGFIN	- Frames in Nucleus
PAGAVTFC	- Avg Page Frames in Real Storage
PAGRSMP	- Number of RMF Samples
PAGS	- Private Space Pageable Frames

PAGLS - LSQA Fixed Frames
PAGP - CSA+LPA Pageable Frames
PAGLP - LPA Pagable Frames
PAGQ - Sqa Fixed Frames
PAGTFC - Page Frames in Real Storage
PAGF - Unused Page Frames

CALCULATIONS:

DATE = MDY(MONTH,DAY,%YEAR4);

USAGE CONSIDERATIONS:

Not applicable

EXECUTION-TIME PARAMETERS:

Execution-time parameters enable you to produce a CSV file containing just the information you want. This reduces the:

- o Amount of data extracted
- o Network traffic during download

as well as makes the presentation more effective.

```
+-----+
|----- Execution-Time Parameters -----|
| Command ==>                               Scroll ==> CSR |
| Executing CA MICS Inquiry: RMFED3 - Paging Activity (.CSV) |
|-----|
| Enter one or more Data Base IDs for the Data Base(s) you want to process. |
|-----|
| Enter range of CA MICS online file cycles or enter ARCHIVE for archive files. |
|-----|
| Enter the range of dates (DDMMYY) to be reported or leave blank for all |
|-----|
| Enter the range of hours to be reported or leave blank to report all |
|-----|
| Enter the SYSID(s) to be reported or leave blank to report all systems |
|-----|
+-----+
```

Enter one or more Data Base IDs for the Data Base(s) you want to process.

-- Required. Specify database unit IDs (the IDs of the CA MICS database units from which files are read). To display a selection list of valid database unit IDs, specify ? (question mark).

Enter range of CA MICS online file cycles or enter ARCHIVE for archive files.

-- Required. These are the cycles of the specified timespan for the CA MICS files that are used as input to the analysis. You can specify a range of cycles in either ascending or descending order (for example, 01-03 or 03-01). The fields can contain any numeric value between 0 and 99, or "ARCHIVE" for archive files.

Enter the range of dates (DDMMYY) to be reported or leave blank for all.

-- Optional. Specify the date range in DDMMYY format (for example, 01OCT10). The first date range is the starting date and the last value in each date range is the ending date. The ending date must be higher than, or equal to the starting date. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of the specified date range. If only one value is specified, an observation is selected if its date value is equal to the specified value.

Enter the range of hours to be reported or leave blank to report all.

-- Optional. The first value is the starting hour and the last is the ending hour. The ending hour must be higher than, or equal to the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified date range. If only one value is specified, an observation is selected if its hour value is equal to the specified value.

Enter the SYSID(s) to be reported or leave blank to report all systems.

-- Optional. Specify one or more 1-4 character SYSID

value(s). Observations whose SYSID value is equal to any of the specified values are selected. If not specified, all are selected.

3.4.3 Top N Active DASD Activity (RMFED4)

The Top N Active DASD Activity inquiry produces two CSV files that can be used to plot bar charts and time-series charts using CA MICS reporting. You may select one to ten busiest devices to be included in the CSV file.

CSV FILES:

1. Daily - DASD Usage by System & Volume
 ==> Four bar charts will be generated for each system/date/volser combination. These charts provides you the following graphics:
 - 1) Pct Device Utilized by Hour
 - 2) Avg Dev Response Time by Hour
 - 3) Avg IO Service Time by Hour
 - 4) Avg Dev Activity Rates by Hour
2. Daily - DASD Percent Busy by Hour
 ==> One time-series chart will be generated for each system/date combination with one line per volser. The chart compares how busy these selected DASDs are.

Note: Because this inquiry does not produce a chart, no sample is provided.

INQUIRY ID:

RMFED4

DATA SOURCE (file/timespan):

HARDVA at the DAYS timespan

OUTPUT CONTROL PARAMETER:

1. K4D4B (Four key columns, four bar charts per system/date)
2. K3D1T24 (Three key columns, one time-series chart per system/date)

DATA ELEMENTS USED:

SYSID - System Identifier
 DATE - Date
 VOLSER - Volser
 HOUR - Hour
 DVAPCUTL - Pct Device Utilized

DVAAVRES - Avg Dev Response Time
DVAAVSER - Avg IO Service Time
DVAACRTT - Avg Dev Activity Rate
DVAAVCNN - Avg Dev Connect Time
DVAAVDIS - Avg Dev Disconnect Time
DVAPCCNN - Pct Dev Connected
DVAAVDVB - Avg Dev Busy Pending Time
DVAAVIOS - Avg Dev IOSQ Time
DVAAVPEN - Avg Dev Pending Time
DEVNUM - Device Number
DEVNAME - Device Name
CTLUNAME - Control Unit Name
RANK - Rank

CALCULATIONS:

DATE = MDY(MONTH,DAY,%YEAR4);

USAGE CONSIDERATIONS:

Not applicable

EXECUTION-TIME PARAMETERS:

Execution-time parameters enable you to produce a CSV file containing just the information you want. This reduces the:

- o Amount of data extracted
- o Network traffic during download

as well as makes the presentation more effective.


```
+-----+
|----- Execution-Time Parameters -----|
| Command ==>                               Scroll ==> CSR |
| Executing CA MICS Inquiry: RMFED4 - Top N Active DASD Activity (.CSV) |
|-----|
| Enter one or more Data Base IDs for the Data Base(s) you want to process. |
|-----|
| Enter range of CA MICS online file cycles or enter ARCHIVE for archive files. |
|-----|
| Enter the range of dates (DDMMYY) to be reported or leave blank for all |
|-----|
| Enter the range of hours to be reported or leave blank to report all |
|-----|
| Enter the SYSID(s) to be reported or leave blank to report all systems |
|-----|
| Enter the number of most active DASD(s) to be reported (1-10) |
|-----|
+-----+
```

Enter one or more Data Base IDs for the Data Base(s) you want to process.

-- Required. Specify database unit IDs (the IDs of the CA MICS database units from which files are read). To display a selection list of valid database unit IDs, specify ? (question mark).

Enter range of CA MICS online file cycles or enter ARCHIVE for archive files.

-- Required. These are the cycles of the specified timespan for the CA MICS files that are used as input to the analysis. You can specify a range of cycles in either ascending or descending order (for example, 01-03 or 03-01). The fields can contain any numeric value between 0 and 99, or "ARCHIVE" for archive files.

Enter the range of dates (DDMMYY) to be reported or leave blank for all.

-- Optional. Specify the date range in DDMMYY format (for example, 01OCT10). The first date range is the starting date and the last value in each date range is the ending date. The ending date must be higher than, or equal to the starting date. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of the specified date range. If only one value is specified, an observation is selected if its date value is equal to the specified value.

Enter the range of hours to be reported or leave blank to report all.

-- Optional. The first value is the starting hour and the last is the ending hour. The ending hour must be higher than, or equal to the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified date range. If only one value is specified, an observation is selected if its hour value is equal to the specified value.

Enter the SYSID(s) to be reported or leave blank to report all systems.

-- Optional. Specify one or more 1-4 character SYSID

value(s). Observations whose SYSID value is equal to any of the specified values are selected. If not specified, all are selected.

Enter the number of most active DASD(s) to be reported (1-10).

-- Required. Specify the number of busiest DASD(s) you want. Default is 5. The field must contain a number between 1 and 10.

3.4.4 Top-4 CPU Comparison (RMFED5)

The Top-4 CPU Comparison inquiry produces a CSV file that can be used to plot multi-line charts using CA MICS reporting.

CSV FILES:

Daily - Percent CPU Busy by System
==> One multi-line chart will be generated per date with
top 4 busiest systems plotted on separate lines.
The metric reported is Percent CPU Busy (CPUPCBSY).

Note: Because this inquiry does not produce a chart, no sample is provided.

INQUIRY ID:

RMFED5

DATA SOURCE (file/timespan):

HARCPU at the DAYS timespan

OUTPUT CONTROL PARAMETER:

K2D1M4 (Two key columns, one four-line charts per date)

DATA ELEMENTS USED:

DATE - Date
HOUR - Hour
CPUPCBSY - Percent CPU Busy
SYSID - System Identifier

CALCULATIONS:

DATE = MDY(MONTH,DAY,%YEAR4);

USAGE CONSIDERATIONS:

The selection of top four busiest systems is done after the execution-time parameters have been applied to the input.

EXECUTION-TIME PARAMETERS:

Execution-time parameters enable you to produce a CSV file containing just the information you want. This reduces the:

- o Amount of data extracted
- o Network traffic during download

as well as makes the presentation more effective.

```
+-----+
|----- Execution-Time Parameters -----|
| Command ==>                               Scroll ==> CSR |
| Executing CA MICS Inquiry: RMFED5 - Top-4 CPU Comparison (.CSV) |
|-----|
| Enter one or more Data Base IDs for the Data Base(s) you want to process. |
|-----|
| Enter range of CA MICS online file cycles or enter ARCHIVE for archive files. |
|-----|
| Enter the range of dates (DDMMYY) to be reported or leave blank for all |
|-----|
| Enter the range of hours to be reported or leave blank to report all |
|-----|
| Enter the SYSID(s) to be reported or leave blank to report all systems |
|-----|
+-----+
```

Enter one or more Data Base IDs for the Data Base(s) you want to process.

-- Required. Specify database unit IDs (the IDs of the CA MICS database units from which files are read). To display a selection list of valid database unit IDs, specify ? (question mark).

Enter range of CA MICS online file cycles or enter ARCHIVE for archive files.

-- Required. These are the cycles of the specified timespan for the CA MICS files that are used as input to the analysis. You can specify a range of cycles in either ascending or descending order (for example, 01-03 or 03-01). The fields can contain any numeric value between 0 and 99, or "ARCHIVE" for archive files.

Enter the range of dates (DDMMYY) to be reported or leave blank for all.

-- Optional. Specify the date range in DDMMYY format (for example, 01OCT10). The first date range is the starting date and the last value in each date range is the ending date. The ending date must be higher than, or equal to the starting date. An input observation is selected if its date value is greater than or equal to the starting date and is less than or equal to the ending date of the specified date range. If only one value is specified, an observation is selected if its date value is equal to the specified value.

Enter the range of hours to be reported or leave blank to report all.

-- Optional. The first value is the starting hour and the last is the ending hour. The ending hour must be higher than, or equal to the starting hour. An input observation is selected if its hour value is greater than or equal to the starting hour and is less than or equal to the ending hour of the specified date range. If only one value is specified, an observation is selected if its hour value is equal to the specified value.

Enter the SYSID(s) to be reported or leave blank to report all systems.

-- Optional. Specify one or more 1-4 character SYSID

value(s). Observations whose SYSID value is equal to any of the specified values are selected. If not specified, all are selected.

3.5 NSM Performance Trend Data Extracts

The Hardware and SCP Analyzer provides the following inquiries, producing a group of special formatted CSV files that can be read by the NSM Performance Trend component:

Category	Inquiry	Inquiry Name
TNGPERF	RMFTD1	Performance Trend Data Extract
	RMFTD2	LPAR Performance Trend Data Extract

Figure 3-30. RMF Distributed NSM Performance Trend Inquiries

Performance Trend data extracts can be transferred to NSM desktop and analyzed by the NSM Performance Trend component. See the NSM Performance Trend documentation for more details about the product.

If you want to produce the CSV extracts, access the inquiries listed above through the MICF Inquiries panel of the CA MICS Workstation Facility (MWF).

The following sections describe the individual inquiries:

- 1 - Performance Trend Data Extract (RMFTD1)
- 2 - LPAR Performance Trend Data Extract (RMFTD2)

3.5.1 Performance Trend Data Extract (RMFTD1)

The Performance Trend Data Extract inquiry produces a set of files that can be downloaded to the NSM Performance Trend component for trend analysis.

Note: Because this inquiry does not produce a chart, no sample is provided.

DATA SOURCE (FILE/TIMESPAN) AND DATA ELEMENTS REPORTED:

o HARCPU at the DAYS timespan

SYSID - System Identifier
CPUPCBSY - Pct CP Processors Busy
CPUAVB - Avg Batch Users
CPUAVT - Avg TSO Users
CPUAVS - Avg Started Tasks
CPUSLIH - Total # of Entries to the I/O SLIH
CPUTPI - Total # of TPI I/O Events

o SCPPAG at the DAYS timespan

SYSID - System Identifier
PAGAVPSI - Avg Pages per Swap-In from Aux
PAGAVPSO - Avg Pages per Swap-Out to Aux
PAGPSDPG - Demand Page-In Rate
PAGPSSPG - Demand Page Rate
PAGPSSWP - Swaps per Second
PAGPSTPF - Total Page Fault Rate
PAGAVPES - Avg Pages Moved to Expanded Storage
PAGAVPEA - Avg Pages Migrated from ES to Aux
PAGPSVRE - VIO Pages/Sec Read from Exp Stor
PAGPSVME - VIO Pages/Sec Written to Exp Stor
PAGPSVMG - VIO Pages/Sec Migrated from Exp Stor
PAGPSRES - Pages/Sec Read from Exp Stor
PAGPSHIN - Hiperspace Page-Ins per Second
PAGPSHOT - Hiperspace Page-Outs per Second
PAGPSHME - Hiperspace Pgs/Sec Written to Exp Stor
PAGPSHMG - Hiperspace Pgs/Sec Migr from Exp Stor
PAGPSHRE - Hiperspace Pgs/Sec Read from Exp Stor

o HARDTA at the DAYS timespan

SYSID - System Identifier
DTAAVRES - Avg Device Response Time
DTAACTRT - Avg Device Activity Rate
DEVCLASS - Device Class

o SCPPSD at the DAYS timespan

SYSID - System Identifier
 PSDAVU - Avg Used Slots or Swap Sets
 PSDAVA - Avg Allocated Slots
 PSDPGX - Pages Transferred
 PSDAVSTM - Avg Service Time
 PSDPST - Page Space Type

The parameter file at sharedprefix.MICS.PARMS(RMFTD1) defines the data to be extracted for the inquiry.

Note: When the RMFTD1 inquiry runs for the first time, SAS code is generated and stored within member RMFTD1 in sharedprefix.MICS.SOURCE based on the contents of the member RMFTD1 in sharedprefix.MICS.PARMS. The code in the SOURCE member will be invoked in the subsequent runs if it has been built. The CA MICS data extract program will not parse the parameter file again. For the parameter file change to take effect, you must delete the corresponding member in sharedprefix.MICS.SOURCE.

EXECUTION-TIME PARAMETERS:

```

+-----+
| ----- Execution-Time Parameters ----- |
| Command ==>                               Scroll ==> CSR |
| Executing CA MICS Inquiry: RMFTD1 - Performance Trend Data Extract |
| ----- |
| Enter one or more database IDs for the databases you want to process. |
| ----- |
| Enter range of CA MICS online file cycles or enter ARCHIVE for archive files. |
| ----- |
+-----+
  
```

Enter one or more database IDs for the databases you want to process.

-- Required. Specify database unit IDs (the IDs of the CA MICS database units from which files are read). To display a selection list of valid database unit IDs, specify ? (question mark).

Enter range of CA MICS online file cycles or enter ARCHIVE for archive files.

-- Required. These are the cycles of the specified timespan of the CA MICS files that are used as input to the analysis. You can specify a range of cycles in either ascending or descending order (for example, 01-03 or 03-01). The fields can contain any numeric value between 0 and 99, or ARCHIVE for archive files.

3.5.2 LPAR Performance Trend Data Extract (RMFTD2)

The LPAR Performance Trend Data Extract inquiry produces a set of files that can be downloaded to the NSM Performance Trend component for trend analysis. These files describe usage of the PR/SM logical partitions in your enterprise.

Note: Because this inquiry does not produce a chart, no sample is provided.

DATA SOURCE (FILE/TIMESPAN) AND DATA ELEMENTS REPORTED:

- o HARLPC at the DAYS timespan

SYSID - System Identifier
 PRSMLPNM - Logical Partition Name
 LPCPCVPU - LPAR CP Processors Utilization
 LPCPCSSU - LPAR Shared CP Processors Utilization
 LPCPCTSU - LPAR Total CP Processors Utilization

The parameter file at sharedprefix.MICS.PARMS(RMFTD2) provides the data definitions for the inquiry.

Note: When the RMFTD2 inquiry runs for the first time, SAS code is generated and stored within the member RMFTD2 in sharedprefix.MICS.SOURCE based on the contents of the member RMFTD2 in sharedprefix.MICS.PARMS. The code in the SOURCE member will be invoked in the subsequent runs if it has been built. The CA MICS data extract program will not parse the parameter file again. In order for parameter file change to take effect, you must delete the corresponding member in sharedprefix.MICS.SOURCE.

EXECUTION-TIME PARAMETERS:

```

+-----+
| ----- Execution-Time Parameters ----- |
| Command ==>                               Scroll ==> CSR |
| Executing CA MICS Inquiry: RMFTD2 - LPAR Performance Trend Data Extract |
| ----- |
| Enter one or more database IDs for the databases you want to process. |
| ----- - ----- |
| Enter range of CA MICS online file cycles or enter ARCHIVE for archive files. |
| ----- - ----- |
+-----+
  
```

Enter one or more database IDs for the databases you want to process.

-- Required. Specify database unit IDs (the IDs of the CA MICS database units from which files are read). To display a selection list of valid database unit IDs, specify ? (question mark).

Enter range of CA MICS online file cycles or enter ARCHIVE for archive files.

-- Required. These are the cycles of the specified timespan for the CA MICS files that are used as input to the analysis. You can specify a range of cycles in either ascending or descending order (for example, 01-03 or 03-01). The fields can contain any numeric value between 0 and 99, or ARCHIVE for archive files.

Chapter 4: EXCEPTIONS

The CA MICS Hardware and SCP Analyzer supports the standard CA MICS exception process. CA MICS exception processing enables the IT organization to focus on problems affecting its effectiveness in terms of availability, service, workload, standards, security, and performance for the different areas of responsibility (such as batch, TS0/E, or IMS).

The standard exceptions for this product are shown in Figures 4-1 and 4-2. Each standard exception test is shipped with default values. However, to make effective use of the exception process, you must evaluate your needs and modify these sample values accordingly.

This chapter contains information on the following topics:

- 1 - Exception Process Overview
- 2 - Setting Exception Values
- 3 - Detailed Exception Descriptions

Number	Severity	Management Area	Exception Description
01002	Warning	Performance	CPU Underutilized
01003	Impacting	Performance	CPU Overutilized
01004	Warning	Standards	Number of Active Batch Jobs Exceeds Max
01101	Impacting	Performance	Block Multiplexor Channel Overloaded
01103	Warning	Performance	Block Multiplexor Channel Underutilized
01200	Warning	Performance	Device Avg Queue Length Exceeds Max
01206	Warning	Performance	Pct of Time Device Mount Pending Exceeds Max
01207	Warning	Performance	Pct of Time Device Not Ready Exceeds Max
01209	Warning	Performance	Pct of Time Device Reserved Exceeds Max
01211	Impacting	Performance	Device I/O Queue Time Exceeds Max
01212	Impacting	Performance	Device I/O Service Time Exceeds Max
01213	Impacting	Performance	Device I/O (Queue + Service) Time Exceeds Max
01214	Warning	Performance	Critical Device I/O Rate Below Min
01500	Warning	Performance	IPU Processor Unit Underutilized
01501	Impacting	Performance	IPU Processor Unit Overutilized
01600	Warning	Performance	PR/SM LPAR Underutilized. ID=xx
01601	Impacting	Performance	PR/SM LPAR Overutilized. ID=xx
01602	Critical	Performance	PR/SM LPAR Using Excessive Resources. ID=xx
01700	Warning	Performance	PR/SM Logical Processor Underutilized. ID=xx
01701	Impacting	Performance	PR/SM Logical Processor Overutilized. ID=xx

Figure 4-1. Hardware Utilization Exception List

Number	Severity	Management Area	Exception Description
02000	Impacting	Performance	System Swap Paging Rate Exceeds Max
02001	Impacting	Performance	Total Paging Rate Exceeds Max
02002	Impacting	Performance	Physical VIO Paging Rate Exceeds Max
02003	Impacting	Performance	Page Fault Rate Exceeds Max
02004	Warning	Performance	Long Wait Swap Rate Exceeds Max
02005	Critical	Performance	Detected Wait Swap Rate Exceeds Max
02006	Critical	Performance	Unilateral Swap Rate Exceeds Max
02007	Critical	Performance	Request Swap Rate Exceeds Max
02008	Critical	Performance	Auxiliary Storage Shortage Swap Occurred
02009	Critical	Performance	Real Storage Shortage Swap Occurred
02010	Impacting	Performance	Exchange Swap Rate Exceeds Max
02011	Impacting	Performance	Enqueue Swap Rate Exceeds Max
02012	Warning	Performance	Transition Swap Occurred
02013	Impacting	Performance	Average Pages per Swap Exceeds Max
02014	Impacting	Performance	Total Swap Rate Exceeds Max
02015	Critical	Performance	Insufficient Pageable Frames
02016	Critical	Performance	SQA Fixed Frames Exceeds Max
02017	Critical	Performance	CSA Fixed Frames Exceeds Max
02018	Critical	Performance	LPA Fixed Frames Exceeds Max
02019	Critical	Performance	LSQA Fixed Frames Exceeds Max
02020	Critical	Performance	Private Fixed Frames Exceeds Max
02021	Critical	Performance	Total Fixed Frames Exceeds Max
02023	Impacting	Performance	System Paging Rate Exceeds Max
02024	Impacting	Performance	Demand Paging Rate Exceeds Max
02025	Impacting	Performance	Extended Storage Total Migration Rate Exceeds Max
02026	Impacting	Performance	Extended Storage Swap Migration Rate Exceeds Max
02050	Impacting	Performance	Percentage of Failed Logical Swaps Exceeds Max
02103	Impacting	Performance	LCU Delayed I/O (Ctl Unit Bsy) Exceeds Max
02150	Impacting	Performance	Average Queue Length Exceeds Max
02151	Impacting	Performance	Average Device IOS Queue Time Exceeds Max
02153	Impacting	Performance	Percent Control Unit Busy Exceeds Max
02154	Impacting	Performance	Percent LCU Requests Deferred Exceeds Max
02500	Critical	Performance	Unusable Page Slot Detected
02501	Impacting	Performance	Pct Page Data Set Busy Exceeds Max
02502	Impacting	Performance	Avg Page Service Time Exceeds Max
02503	Impacting	Performance	Pages Transferred per Physical I/O Below Min
02600	Impacting	Performance	Resource Enqueue Delay Occurred
02700	Impacting	Performance	IOC Channel Measurement Failure
02701	Impacting	Performance	IOP Channel Measurement Failure
02703	Impacting	Performance	Control Unit Busy Exceeds Max

Figure 4-2. SCP Exception List (Part 1 of 2)

Number	Severity	Management Area	Exception Description
02750	Impacting	Performance	IOP Initiative Queue Length Exceeds Max
02751	Impacting	Performance	IOP Request Rate Exceeds Max
02900	Impacting	Performance	Size of Dup. PLPA Modules in MLPA/FLPA Exceeds Max
02901	Impacting	Performance	PLPA Packing Loss Exceeds Max
02902	Impacting	Performance	SQA Overflow Into CSA
02903	Impacting	Performance	CSA Assigned to Nonstandard Protect Key
02904	Impacting	Performance	Allocated SQA Pages Exceeds Max
02905	Impacting	Performance	Allocated CSA Pages Exceeds Max
02906	Impacting	Performance	Largest Free Block of SQA Less than Min
02907	Impacting	Performance	Largest Free Block of CSA Less than Min
02908	Impacting	Performance	Percent SQA Allocated Exceeds Max
02909	Impacting	Performance	Percent CSA Allocated Exceeds Max

Figure 4-2. SCP Exception List (Part 2 of 2)

This section contains the following topics:

[4.1 Exception Process Overview](#) (see page 288)

[4.2 Setting Exception Values](#) (see page 291)

[4.3 Detailed Exception Descriptions](#) (see page 292)

4.1 Exception Process Overview

The CA MICS exception process consists of the exceptions themselves, a set of standard reports, CA MICS Information Center Facility (MICF) inquiries, an exception test routine, and an exception value analysis routine. Each of these is described below.

If you intend to make use of the exception reports, it is important that you evaluate the exceptions which are shipped with the product and adjust them to the requirements of your unique environment.

EXCEPTIONS

An exception is the occurrence of an event that merits visibility and attention. It may be an occurrence that is a distinct problem (for example, CICS abended at 2:00 pm), one that may be a problem and requires further research (for example, a TSO user overloaded the system from 1:00 to 1:30 pm), or it may represent a standards, security, or audit violation (for example, user XYZ is not authorized to use PDZAP and was detected using it seven times yesterday).

Because the volume of exception occurrences can be quite large, CA MICS provides means to categorize, aggregate, consolidate, and prioritize them to meet your needs. Each exception has:

- o An Exception Number for unique definition
- o A Severity Level to signify degree of importance
- o A Management Area to identify area of responsibility

STANDARD EXCEPTION REPORTS

The standard exception reports provide a concise, integrated method for problem reporting. The following reports can be produced as part of the CA MICS DAILY job:

- o Exception Management Overview Report
- o Severity Level Exception Summary Report
- o Management Area Exception Summary Report

You control which reports are produced via the REPORT

EXCEPTIONS statement in prefix.MICS.PARMS(EXECDEF). See Section 2.3.5 of the PIOM for more information.

Two additional standard reports can be produced as required to provide the necessary background detail to effectively analyze reported exceptions. The two reports are

- o Full Exception Detail Report
- o Short Exception Detail Report

MICF INQUIRIES

The catalog group EXCEPT that is shipped with CA MICS contains a number of standard MICF inquiries that can be used to report exception conditions. In the following inquiry list, graphic reports with a value of x equals C, produce color graphic reports using SAS/GRAPH. If the value of x is P, printer graphic reports are produced without using SAS/GRAPH.

- o BASxM1 - Monthly Exception Summary Report
- o BASxM2 - Monthly Mgmt. Area Exception Summary Report
- o BASxM3 - Monthly Info. Area Exception Summary Report
- o BASxM4 - Monthly Exception Management Overview Report
- o BASxM5 - Monthly Info. Area Exception Overview Report
- o BASxW1 - Weekly Exception Summary Report
- o BASxW2 - Weekly Mgmt. Area Exception Summary Report
- o BASxW3 - Weekly Info. Area Exception Summary Report

The following inquiries that produce printed reports are also available:

- o BASLD2 - Daily Severity Level Exception Summary Report
- o BASLD3 - Daily Management Area Exception Summary Report
- o BASLD4 - Daily Short Exception Detail Report
- o BASLD5 - Daily Full Exception Detail Report
- o BASLD6 - Daily Exception Ranking Report
- o BASLM6 - Monthly Exception Ranking Report

These standard inquiries have an execution-time parameter selection that permits you to report on a subset of the exceptions. For example, inquiry BASLD5 allows selection on SYSID, Information Area, Management Area, Severity Level, and other criteria.

EXCEPTION TEST ROUTINE

Each CA MICS product has an exception test routine that is invoked in the DAY200 step of the CA MICS DAILY job. You control which routines are invoked using the CREATE EXCEPTIONFILES statement in prefix.MICS.PARMS(EXECDEF). See the PIOM, Section 2.3.5, for more information on EXECDEF.

An exception test routine, written in the SAS language, defines the exception and tests to determine whether or not the exception condition is present in the data being processed. The distributed exception test routine for each product is contained in sharedprefix.MICS.SOURCE(DYcccEXC) where ccc is the product identifier. When the DAY200 step invokes the test routines, it does so by %INCLUDEing the DYcccEXC member from prefix.MICS.USER.SOURCE. As distributed, that member then %INCLUDEs the member from sharedprefix.MICS.SOURCE. See Section 4.2 of this guide, Setting Exception Values, for more information on DYcccEXC.

EXCEPTION VALUE ANALYSIS ROUTINE

Each product has an exception value analysis (EVA) routine that can be used to help determine values for the exception conditions. The EVA routine extracts information from the CA MICS Database. Descriptive statistics for the values of variables used in exception tests are printed in the Exception Value Analysis Report. The EVA routine for each product is stored in sharedprefix.MICS.SOURCE(cccEVA). The job control to execute the EVA process is contained in prefix.MICS.CNTL(cccEVA).

ADJUSTING EXCEPTION VALUES

It is important that sharedprefix.MICS.SOURCE(DYcccEXC) not be modified directly. See the CA MICS Standard Reports Guide, Section 2.4 for procedures on how to make modifications to exception values. Also it is recommended that IEBUPDTE be used for any changes. This will allow modifications to be easily re-applied after maintenance is applied to DYcccEXC.

4.2 Setting Exception Values

Exception test routines contain tests that determine the conditions and definitions that classify the exception for reporting and analysis. The following is a sample exception test:

```
*
** 01003 CPU OVERUTILIZED;
*;
IF CPUMXPBS GT 98
  THEN DO;
    EXCCODE='01003'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDESC1='CPU OVERUTILIZED';
    EXCDESC2='CPU BUSY=' || PUT(CPUMXPBS,5.1) || '%';
    LINK HIT;
  END;
```

This exception test is processed for each observation in the latest cycle of the DETAIL CPU Activity File (HARCPU). The test is positive when the value of any CPUMXPBS element is greater than the specified percentage.

When the test is positive, the exception is categorized by providing the appropriate values for EXCCODE, SEVERITY, and MGMTAREA. EXCDESC1 provides a consistent label for the exception. EXCDESC2 provides variable information for the conditions that caused the test to be positive. The LINK HIT statement invokes a routine that causes the exception condition eventually to be written to the Exception Activity File (ADMEXC) for later processing by the standard reports or MICF inquiries.

For most organizations, the exception limits used here would either cause too many exceptions or too few exceptions to be reported, which defeats one of the purposes of exception processing: to report on "out of the ordinary" conditions that warrant attention. Therefore, each organization must determine and set its own exception values.

Furthermore, the values for some exception conditions should be determined uniquely for different environments within a single organization. For example, a system paging rate that would be excessive during the nightly batch processing may be normal during the daytime hours, which have heavy interactive usage. Also, different processors can support different paging rates. Numbers used as exception values should not be defined without some analysis of installation history,

performance, and user requirements.

The CA MICS database provides a useful information base for analyzing historical performance. The exception value analysis routine uses the CA MICS database to produce a statistical analysis of the values used in the standard exception tests distributed with the products.

Using the results of this analysis, along with your installation's internal political, security, or standards policies; industry publications; and your own analysis of data element behavior, you can determine how to modify each exception test for your environment. You can also modify the exception test routine to add your own tests for additional exception conditions not detected by the standard tests delivered with the product.

4.3 Detailed Exception Descriptions

This section describes each of the standard exceptions for the CA MICS Hardware and SCP Analyzer. The exceptions are organized numerically and appear sequentially starting with exception 01000.

The format provides the title, number, and a statement on the purpose, rationale, and definition for each exception to give you some insight into the meaning and use of the information. Finally, the description contains the SAS code for the exception, with an explanation on modifying the exception threshold values.

01000: System ID Incorrect for Hardware Serial Number

FILE: CPU Processor Activity File
 SAS FILE NAME: DAYS.HARCPU01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
 MANAGEMENT AREA: Standards (MGMTAREA='STANDARDS')

PURPOSE: Detects the use of an MVS system executing on the wrong CPU based on SMF SYSID.

RATIONALE: The SMF System ID is set in the SMF parameters and may be used for the analysis of SMF data for a specific CPU (for example, drive accounting/billing systems). This exception identifies the occurrence of a system being IPL'ed on the wrong CPU.

DEFINITION: The SMF System ID (ORGSYSID) is compared with the expected System ID and the associated CPU Serial Number(s) on which it should run.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01000 SYSTEM ID INCORRECT FOR HARDWARE SERIAL NUMBER;
*;
IF E01000 AND
  ORGSYSID='SYSID'
  AND NOT(CPU0SER='020037' AND CPU1SER='120037'))
  THEN DO;
  RETAIN E01000 1;
  E01000=0; * SET FLAG TO PREVENT REPETITION OF EXCEPTION;
  EXCCODE='01000'; SEVERITY='C'; MGMTAREA='STANDARDS';
  EXCDISC1='SYSTEM ID INCORRECT FOR HARDWARE SERIAL NUMBER';
  EXCDISC2='SYSTEM ID WAS ' || ORGSYSID ||
           ' WITH SERIAL NUMBER(S) ' || CPU0SER ||
           ', ' || CPU1SER;

  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the values used for sysid and serial-number according to the following conventions:

sysid - The system ID is specified as a four character literal. An ID of UDU2 would appear as:

ORGSYSID='UDU2'

serial-number - The CPU serial number(s) is specified:

CPU0SER='123078' for a uniprocessor system

CPU0SER='098765' OR CPU2SER='298765'
for a multiprocessor system

01001: CPU Usage Imbalance Between Multiprocessors

FILE: CPU Processor Activity File
 SAS FILE NAME: DAYS.HARCPU01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects imbalanced CPU utilization between processors in a multiprocessor central electronic complex.

RATIONALE: All CPUs in multiprocessor central complex should reasonably share the load (that is, 75% busy on CPU 0 and 65% busy on CPU 1). A significant imbalance can result from unexpected CPU affinity or ineffective configuration symmetry. The problems that may be related to symmetrical or asymmetrical configurations are installation dependent and each installation should evaluate their unique configuration and workload characteristics to determine what is the reasonable processing difference to be used for this exception.

DEFINITION: This exception is detected when the difference between the most and least busy CPUs exceeds an installation defined limit. There should not be greater than a ten percentage point differential in the two busy percentages.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01001 CPU USAGE IMBALANCE BETWEEN MULTIPROCESSORS;
*;
IF CPUNOCPU>1 THEN DO;
  IF CPUPC0BS=0 THEN CPUPC0BS=.;
  IF CPUPC1BS=0 THEN CPUPC1BS=.;
  IF CPUPC2BS=0 THEN CPUPC2BS=.;
  IF CPUPC3BS=0 THEN CPUPC3BS=.;
  IF CPUPC4BS=0 THEN CPUPC4BS=.;
  IF CPUPC5BS=0 THEN CPUPC5BS=.;
  IF CPUPC6BS=0 THEN CPUPC6BS=.;
  IF CPUPC7BS=0 THEN CPUPC7BS=.;
  IF CPUPC8BS=0 THEN CPUPC8BS=.;
  IF CPUPC9BS=0 THEN CPUPC9BS=.;
  IF CPUPCABS=0 THEN CPUPCABS=.;
  IF CPUPCBBS=0 THEN CPUPCBBS=.;
```

```
IF CPUPCCBS=0 THEN CPUPCCBS=. ;
IF CPUPCDBS=0 THEN CPUPCDBS=. ;
IF CPUPCEBS=0 THEN CPUPCEBS=. ;
IF CPUPCFBS=0 THEN CPUPCFBS=. ;
CPUMIN=MIN(CPUPC0BS,CPUPC1BS,CPUPC2BS,CPUPC3BS,
            CPUPC4BS,CPUPB5BS,CPUPC6BS,CPUPC7BS,
            CPUPC8BS,CPUPC9BS,CPUPCABS,CPUPCBBS,
            CPUPCCBS,CPUPCDBS,CPUPCEBS,CPUPCFBS);
CPUMAX=MAX(CPUPC0BS,CPUPC1BS,CPUPC2BS,CPUPC3BS,
            CPUPC4BS,CPUPB5BS,CPUPC6BS,CPUPC7BS,
            CPUPC8BS,CPUPC9BS,CPUPCABS,CPUPCBBS,
            CPUPCCBS,CPUPCDBS,CPUPCEBS,CPUPCFBS);
CPUDIFF=CPUMAX-CPUMIN;
IF CPUDIFF > percent
THEN DO;
    EXCCODE='01001'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDISC1='CPU USAGE IMBALANCE BETWEEN MULTIPROCESSORS';
    EXCDISC2='DIFFERENCE=' || PUT(CPUDIFF,5.1) || '%';
    LINK HIT;
END;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following conventions:

percent - The percent imbalance between processors is specified. A 10 percent threshold would appear as:

```
CPUDIFF > 10
```


01002: CPU Underutilized

FILE: CPU Activity File
 SAS FILE NAME: DAYS.HARCPU01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an underutilized CPU.

RATIONALE: An underutilized CPU may result from lack of workload or may serve as an indication of poor performance. When the operating system is overcommitted (page faulting, I/O delays, and so on), processor utilization may decrease because the supervisor and workload are waiting unnecessarily. Detection of low processor utilization may identify periods of poor performance, permitting further investigation of the critical resources.

DEFINITION: This exception is detected when the CPU wait percentage is above the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01002 CPU UNDERUTILIZED;
*;
IF (CPUMXPWT GT percent) AND
   (HOUR GE hh1 AND HOUR LE hh2) AND
   (DAYNAME EQ 'MON' OR DAYNAME EQ 'TUE' OR DAYNAME EQ 'WED'
    OR DAYNAME EQ 'THU' OR DAYNAME EQ 'FRI')
THEN DO;
  EXCCODE='01002'; SEVERITY='W'; MGMTAREA='PERFORMANCE';
  EXCDISC1='CPU UNDERUTILIZED';
  EXCDISC2='CPU WAIT=' !! PUT(CPUMXPWT,5.1) !! '%';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value and prime time according to the following conventions:

percent - The maximum CPU wait percent is specified. A 10 percent threshold would appear as:

```
CPUMXPWT GT 10
```

prime time - The hour range and days of the week to be included in the exception are specified. The hour of the day must be within the hh1 through hh2 range. Prime time specified as 8:00 am through 6:59 pm (18:59) would appear as:

```
(HOUR GE 8 AND HOUR LE 18)
```

The days of the week are represented by the first three characters of their names. They must be enclosed in quotes, separated with ORs. Prime time specified as MONDAY through FRIDAY would appear as:

```
(DAYNAME EQ 'MON' OR DAYNAME EQ 'TUE' OR DAYNAME EQ 'WED'  
OR DAYNAME EQ 'THU' OR DAYNAME EQ 'FRI')
```

The time period to be included may already be defined by means of the ZONE definition, which would provide a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it would appear as:

```
ZONE='1'
```

01003: CPU Overutilized

FILE: CPU Activity File
 SAS FILE NAME: DAYS.HARCPU01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an overutilized CPU.

RATIONALE: An overcommitted CPU may cause performance degradation. One school of thought suggests that a CPU operating at greater than a 98% busy rate may indicate a performance problem. It should be pointed out, however, that a well tuned system with a good I/O configuration (that is, separation of channels, devices, control units, and so on), and sufficiently fast DASD to handle paging and other I/O demands, may well run at 95-100% for prolonged periods.

DEFINITION: This exception is detected when the CPU utilization percentage is above the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01003 CPU OVERUTILIZED;
*;
IF CPUMXPBS GT percent
  THEN DO;
  EXCCODE='01003'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='CPU OVERUTILIZED';
  EXCDISC2='CPU BUSY=' !! PUT(CPUMXPBS,5.1) !! '%';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The CPU percent busy is specified. A 98 percent threshold would appear as:

CPUMXPBS GT 98

01004: Number of Active Batch Jobs Exceeds Max

FILE: CPU Activity File
SAS FILE NAME: DAYS.HARCPU01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Standards (MGMTAREA='STANDARDS')

PURPOSE: Identifies when more batch jobs are active than is allowed by installation standards.

RATIONALE: An excessive number of batch jobs can lower throughput, unnecessarily elongate the elapsed time for batch jobs, and raise response times in interactive systems running in the same complex with the batch workload. This usually occurs when system operators vary the number of batch initiators.

DEFINITION: This exception is detected when the maximum number of batch address spaces active at any one time exceeds the installation-defined maximum number of batch initiators.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01004 NUMBER OF ACTIVE BATCH JOBS EXCEEDS MAX;  
*;  
IF CPUMXB GT batch-address-spaces THEN DO;  
  EXCCODE='01004'; SEVERITY='W'; MGMTAREA='STANDARDS';  
  EXCDISC1='NUMBER OF ACTIVE BATCH JOBS EXCEEDS MAX';  
  EXCDISC2=PUT(CPUMXB,4.) !!  
    ' BATCH JOBS WERE ACTIVE';  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the value used for the number of batch address spaces according to the following convention:

batch-address-spaces - The maximum number of batch address spaces is specified. A threshold of 15 batch address spaces would appear as:

```
CPUMXB GT 15
```

01100: Selector Channel Overloaded

FILE: Physical Channel Activity File
 SAS FILE NAME: DAYS.HARPCA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overloaded selector channels which may be a symptom of I/O problems and performance degradation.

RATIONALE: As physical channel busy increases, the probability of I/O delay increases exponentially. It can be inferred that I/O delay due to channel busy is occurring from a high channel busy situation. This problem may be particularly impacting if a critical data set such as the IMS log tape is on a device which must be accessed through this channel.

DEFINITION: This exception is detected when the channel busy percentage exceeds the installation defined maximum. A selector channel is overloaded when its channel busy percent exceeds 60-70%, assuming few, if any, DASD devices.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01100 SELECTOR CHANNEL OVERLOADED;
IF CHANTYPE='SELECTOR'
AND PCAPCBSY > percent
THEN DO;
  EXCCODE='01100'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='SELECTOR CHANNEL OVERLOADED';
  EXCDISC2='BUSY=' || PUT(PCAPCBSY,5.1) ||
    '%, CHAN=' || CHANNEL;
  IF RMFVER<='08 '
  THEN EXCDISC2=TRIM(EXCDISC2) || ', SET=' || CPUID;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent channel busy is specified.
 A 60 percent threshold would appear as:

PCAPCBSY > 60

01101: Block Multiplexor Channel Overloaded

FILE: Physical Channel Activity File
 SAS FILE NAME: DAYS.HARPCA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overloaded block multiplexor channels that may be a symptom of I/O problems and performance degradation.

RATIONALE: As physical channel-busy increases, the probability of I/O delay increases exponentially. It can be inferred that I/O delay due to channel-busy is occurring from a high channel-busy situation. This can be a real problem if this channel is the path to the page data sets.

DEFINITION: This exception is detected when the channel-busy percentage exceeds the installation-defined maximum. A block multiplexor channel is overloaded when its channel-busy percent exceeds 35%.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01101 BLOCK MULTIPLEXOR CHANNEL OVERLOADED;
*;
IF CHANTYPE EQ 'BLOCK MPX'
AND PCAPCBSY GT percent
THEN DO;
  EXCCODE='01101'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='BLOCK MULTIPLEXOR CHANNEL OVERLOADED';
  EXCDISC2='BUSY=' !! PUT(PCAPCBSY,5.1) !!
           '%, CHAN=' !! CHANNEL;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent channel-busy is specified. A 35 percent threshold would appear as:

PCAPCBSY GT 35

01102: Selector Channel Underutilized

FILE: Physical Channel Activity File
SAS FILE NAME: DAYS.HARPCA01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify underutilized selector channels which identify wasted resources or indicate a potential channel bottleneck.

RATIONALE: During periods when work is expected in the system, low channel utilization suggests that external effects (that is, RESERVES) may be preventing proper utilization. If low channel utilization occurs on one channel concurrent with high utilization on the other channels, some external impact (that is, high paging) may be the cause. Low utilization can also be due to an imbalance caused by an improperly specified channel selection algorithm.

DEFINITION: This exception is detected when the channel busy percentage is below the installation defined minimum. A selector channel is underutilized when its channel busy percent is below 10% during expected heavy load hours.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01102 SELECTOR CHANNEL UNDERUTILIZED;  
*;  
IF CHANTYPE='SELECTOR'  
AND PCAPBSY < percent  
AND (DAYNAME='MON' OR DAYNAME='TUE' OR DAYNAME='WED'  
OR DAYNAME='THU' OR DAYNAME='FRI')  
AND (HOUR >= hh1 AND HOUR <= hh2)  
THEN DO;  
EXCCODE='01102'; SEVERITY='W'; MGMTAREA='PERFORMANCE';  
EXCDESC1='SELECTOR CHANNEL UNDERUTILIZED';  
EXCDESC2='BUSY=' || PUT(PCAPBSY,5.1) ||  
'%', CHAN=' || CHANNEL;  
IF RMFVER<='08 '  
THEN EXCDESC2=TRIM(EXCDESC2) || ', SET=' || CPUID;  
LINK HIT;  
END;
```


THRESHOLD MODIFICATION: The user should modify the percent value and prime time according to the following conventions:

percent - The channel busy percent is specified. A 10 percent threshold would appear as:

```
PCAPCBSY < 10
```

prime time - The hour range and days of the week to be included in the exception are specified. The hour of the day must be within the hh1 through hh2 range. Prime time specified as 8am through 6:59 pm (18:59) would appear as:

```
AND ( 8 <=HOUR AND HOUR<= 18 )
```

The days of the week are represented by the first three characters of their names. They must be enclosed in quotes, separated with OR's. Prime time specified as MONDAY through FRIDAY would appear as:

```
AND (DAYNAME='MON' OR DAYNAME='TUE' OR DAYNAME='WED'  
      OR DAYNAME='THU' OR DAYNAME='FRI' )
```

The time period to be included may already be defined by means of the ZONE definition, which would provide a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it would appear as:

```
AND ZONE='1'
```

01103: Block Multiplexor Channel Underutilized

FILE: Physical Channel Activity File

SAS FILE NAME: DAYS.HARPCA01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify underutilized selector channels that identify wasted resources or indicate a potential channel bottleneck.

RATIONALE: During periods when work is expected in the system, low channel utilization suggests that external effects may be preventing proper utilization. If low channel utilization occurs on one channel concurrent with high utilization on the other channels, some external impact (that is, high paging) may be the cause. Low utilization can also be due to an imbalance caused by an improperly specified channel selection algorithm.

DEFINITION: This exception is detected when the channel-busy percentage is below the installation-defined minimum. A selector channel is underutilized when its channel-busy percent is below 10% during expected heavy load hours.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01102 BLOCK MULTIPLEXOR CHANNEL UNDERUTILIZED;
*;
IF CHANTYPE EQ 'BLOCK MPX' AND
PCAPCBSY LT percent AND
(DAYNAME EQ 'MON' OR DAYNAME EQ 'TUE' OR DAYNAME EQ 'WED'
OR DAYNAME EQ 'THU' OR DAYNAME EQ 'FRI') AND
(HOUR GE hh1 AND HOUR LE hh2)
THEN DO;
EXCCODE='01102'; SEVERITY='W'; MGMTAREA='PERFORMANCE';
EXCDESC1='BLOCK MULTIPLEXOR CHANNEL UNDERUTILIZED';
EXCDESC2='BUSY=' !! PUT(PCAPCBSY,5.1) !!
        '%, CHAN=' !! CHANNEL;
LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value and prime time according to the following conventions:

percent - The channel-busy percent is specified. A 10 percent threshold would appear as:

PCAPCBSY LT 10

prime time - The hour range and days of the week to be included in the exception are specified. The hour of the day must be within the hh1 through hh2 range. Prime time specified as 8:00 am through 6:59 pm (18:59) would appear as:

(HOUR GE 8 AND HOUR LE 18)

The days of the week are represented by the first three characters of their names. They must be enclosed in quotes, separated with ORs. Prime time specified as MONDAY through FRIDAY would appear as:

(DAYNAME EQ 'MON' OR DAYNAME EQ 'TUE' OR DAYNAME EQ 'WED'
OR DAYNAME EQ 'THU' OR DAYNAME EQ 'FRI')

The time period to be included may already be defined by means of the ZONE definition, which would provide a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it would appear as:

ZONE='1'

01200: Device Avg Queue Length Exceeds Max

FILE: Device Activity File
SAS FILE NAME: DAYS.HARDVA01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: A high average queue length for a device may indicate devices that are I/O bottlenecks.

RATIONALE: The average size of the queue for an individual device reflects the number of times I/O was queued for that device. This may identify devices that cause I/O delay. If the I/O to the device is all from one subsystem, which schedules its own I/O, this indicator will show no queue length, and thus is useful primarily on devices used by multiple address spaces.

DEFINITION: This exception is detected when the average queue length for a device exceeds the installation-defined maximum. Different thresholds should be established for different device classes and types.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01200 DEVICE AVG QUEUE LENGTH EXCEEDS MAX;  
*;  
IF DVAAVQUE GT queue  
THEN DO;  
  EXCCODE='01200'; SEVERITY='W'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='DEVICE AVG QUEUE LENGTH EXCEEDS MAX';  
  EXCDISC2='AVG Q=' !! PUT(DVAAVQUE,5.2) !!  
    ', VOL=' !! VOLSER !!  
    ', ADDR=' !! PUT(DEVNUM,HEX4.) !!  
    ', TYPE=' !! DEVTYPE;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the average queue length value according to the following convention:

queue - The average queue length is specified. A threshold queue length of 0.1 appear as:

DVAAVQUE GT .1

01206: Pct of Time Device Mount Pending Exceeds Max

FILE: Device Activity File
SAS FILE NAME: DAYS.HARDVA01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: The percent of time a device was in pending mount status may be used to identify the time spent mounting devices.

RATIONALE: Performance in replying to mounts may be measured by the amount of time the device was found with a mount pending. However, the number of mounts during the measurement interval is not available, so a high value for percent mount pending is not necessarily a sign of inefficiency.

DEFINITION: This exception is detected when the percent of time a mount was pending exceeds the installation-defined maximum. Different values should be established for different device classes and types. Note that the time measured is for all mount pending events that occurred during the RMF record interval.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01206 PCT OF TIME DEVICE MOUNT PENDING EXCEEDS MAX;  
*;  
IF (DEVCLASS EQ 'TAPE' AND DVAPCMTP GT percent) OR  
   (DEVCLASS EQ 'DASD' AND DVAPCMTP GT percent)  
THEN DO;  
  EXCCODE='01206'; SEVERITY='W'; MGMTAREA='PERFORMANCE';  
  EXCDDESC1='PCT OF TIME DEVICE MOUNT PENDING EXCEEDS MAX';  
  EXCDDESC2='PCT=' !! PUT(DVAPCMTP,5.1) !!  
             ', VOL=' !! VOLSER           !!  
             ', ADDR=' !! PUT(DEVNUM,HEX4.) !!  
             ', TYPE=' !! DEVTYPE;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent of time a mount is pending. A 5 percent threshold would appear as:

DVAPCMTP GT 5

01207: Pct of Time Device Not Ready Exceeds Max

FILE: Device Activity File
SAS FILE NAME: DAYS.HARDVA01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: The percent of time a device was not ready may be used to identify when the device was not ready due to mounts or problems on the device.

RATIONALE: The percent of time that a mountable device is not ready is a measure of the mount service time (as separate from the mount queue time, the time required to recognize the mount request and locate the volume), and thus provides productivity measures. For a non-mountable device, "device-not-ready" indicates a problem with the device.

DEFINITION: This exception is detected when the percent of time device-not-ready exceeds the installation-defined maximum. Different values should be established for different device classes and types.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01207 PCT OF TIME DEVICE NOT READY EXCEEDS MAX;  
IF (DEVCLASS EQ 'TAPE' AND DVAPCNRD GT percent) OR  
   (DEVCLASS EQ 'DASD' AND DVAPCNRD GT percent)  
THEN DO;  
  EXCCODE='01207'; SEVERITY='W'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='PCT OF TIME DEVICE NOT READY EXCEEDS MAX';  
  EXCDISC2='PCT=' !! PUT(DVAPCNRD,5.1) !!  
            ', VOL=' !! VOLSER           !!  
            ', ADDR=' !! PUT(DEVNUM,HEX4.) !!  
            ', TYPE=' !! DEVTYPE;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent of time a device is not ready is specified. A 25 percent threshold would appear as:

DVAPCNRD GT 25

01209: Pct of Time Device Reserved Exceeds Max

FILE: Device Activity File
SAS FILE NAME: DAYS.HARDVA01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify the system causing the reserve delay.

RATIONALE: This measure reflects the actual time that a reserve was in effect by one system, rather than the delay that may have been incurred by another system that shares the device measured by exception 1208. However, if exception 1208 is reported in a complex of two or more systems, this exception may identify the system causing the delay.

DEFINITION: This exception is detected when the percent of time a device was reserved exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01209 PCT OF TIME DEVICE Reserved EXCEEDS MAX;  
*;  
IF DVAPCRSV GT percent  
THEN DO;  
  EXCCODE='01209'; SEVERITY='W'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='PCT OF TIME DEVICE RESERVED EXCEEDS MAX';  
  EXCDISC2='PCT=' !! PUT(DVAPCRSV,5.1) !!  
           ', VOL=' !! VOLSER           !!  
           ', ADDR=' !! PUT(DEVNUM,HEX4.) !!  
           ', TYPE=' !! DEVTYPE;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent of time a device is reserved is specified. A 5 percent threshold would appear as:

DVAPCRSV GT 5

01211: Device I/O Queue Time Exceeds Max

FILE: Device Activity File
 SAS FILE NAME: DAYS.HARDVA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify potential I/O bottlenecks resulting from excessive device I/O queue time.

RATIONALE: An estimate of the average delay time, per successful I/O, identifies devices for which both the number of delayed I/Os is high and the duration of each delay is significant. Because it is an estimate rather than a time measure, it is susceptible to statistical bias and should not be calculated when the number of successful I/Os is too low.

DEFINITION: The exception is detected when the average delay time per I/O exceeds the installation-defined maximum and the number of I/Os per hour also exceeds an installation-defined minimum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01211 DEVICE I/O QUEUE TIME EXCEEDS MAX;
IF DVASSC GT 1000 THEN Q_TIME=DVAAVIOS;
ELSE IF DVASIO GT 1000
  THEN Q_TIME=(DVAAVQUE*DURATION)/DVASIO;
IF Q_TIME GT queue-time THEN DO;
  EXCCODE='01211'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='DEVICE I/O QUEUE TIME EXCEEDS MAX';
  EXCDISC2='Q TIME (SS.TTT)=' !! PUT(Q_TIME,6.3) !!
           ', VOL=' !! VOLSER           !!
           ', ADDR=' !! PUT(DEVNUM,HEX4.) !!
           ', TYPE=' !! DEVTYPE;

  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the queue time value according to the following convention:

queue-time - The maximum I/O time in seconds is specified. A .030 second threshold would appear as:

```
Q_TIME GT .030
```


01212: Device I/O Service Time Exceeds Max

FILE: Device Activity File
 SAS FILE NAME: DAYS.HARDVA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify potential device I/O bottlenecks resulting from excessive I/O service time.

RATIONALE: An estimate of the average service time per I/O is useful in identifying devices that spend significant time transferring data or significant seek-and-search times. The identified devices may then be analyzed for data set placement, appropriate blocking, and so on. This condition can also result from heavy use of a device by an access method (or user written EXCP technique) that does not use or support RPS.

DEFINITION: This exception is detected when the average I/O service time to a device exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01212 DEVICE I/O SERVICE TIME EXCEEDS MAX;
*;
IF DVASSC GT io-rate THEN S_TIME=DVAASER;
IF S_TIME GT service-time
THEN DO;
  EXCCODE='01212'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='DEVICE I/O SERVICE TIME EXCEEDS MAX';
  EXCDISC2='SERV TIME (SS.TTT)=' !! PUT(S_TIME,6.3) !!
           ', VOL=' !! VOLSER !!
           ', ADDR=' !! PUT(DEVNUM,HEX4.)!!
           ', TYPE=' !! DEVTYPE;

  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the io-rate and service-time values according to the following conventions:

io-rate - The minimum number of I/O operations is specified.
 A threshold of 1000 I/Os would appear as:

DVASSC GT 1000

service-time - The maximum I/O time in seconds is specified.

A .030 second threshold would appear as:

S_TIME GT .030

01213: Device I/O (Queue + Service) Time Exceeds Max

FILE: Device Activity File
 SAS FILE NAME: DAYS.HARDVA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify potential device I/O bottlenecks resulting from excessive I/O (queue wait and service) time.

RATIONALE: The average I/O time is the sum of the estimated I/O queue wait time and I/O service time, and thus it estimates the total time spent per I/O to each device. The identified devices should be examined further to determine the cause.

DEFINITION: This exception is detected when the average I/O time exceeds the installation-defined maximum and the number of I/Os per hour also exceeds an installation-defined minimum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01213 DEVICE I/O (QUEUE + SERVICE) TIME EXCEEDS MAX;
*;
IOTIME=SUM(Q_TIME,S_TIME);
IF IOTIME GT iotime
  THEN DO;
    EXCCODE='01213'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDISC1='DEVICE I/O (QUEUE + SERVICE) TIME EXCEEDS MAX';
    EXCDISC2='I/O TIME (SS.TTT)=' !! PUT(IOTIME,6.3) !!
              ', VOL=' !! VOLSER !!
              ', ADDR=' !! PUT(DEVNUM,HEX4.)!!
              ', TYPE=' !! DEVTYPE;
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the I/O time value according to the following convention:

iotime - The maximum I/O time in seconds is specified. A .030 second threshold would appear as:

```
IOTIME GT .030
```


01214: Critical Device I/O Rate Below Min

FILE: Device Activity File
 SAS FILE NAME: DAYS.HARDVA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify devices with low I/O rates that may detect devices with I/O bottlenecks or subsystem failures.

RATIONALE: A low device I/O rate may reflect I/O bottlenecks causing degraded performance, during periods when significant work is expected. Low I/O rates to specific devices (such as TSO, IMS, CICS, and other database devices) may also indicate a subsystem failure or degradation within the subsystem.

DEFINITION: This exception is detected when the device I/O rate per hour is less than an installation-defined minimum for installation-defined time periods. Different limits may be specified for different device class and types and even device addresses or volume serial numbers.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01214 CRITICAL DEVICE I/O RATE BELOW MIN;
*;
IF (DEVADDR EQ 'device-address' AND DVAACRT LT io-rate)
OR (DEVADDR EQ 'device-address' AND DVAACRT LT io-rate)
OR (VOLSER EQ 'volume-serial' AND DVAACRT LT io-rate)
AND (DAYNAME EQ 'day' OR DAYNAME EQ 'day'
      OR DAYNAME EQ 'day' OR DAYNAME EQ 'day')
AND (HOUR GE hh1 AND HOUR LE hh2)
AND ZONE EQ 'n'
THEN DO;
  EXCCODE='01214'; SEVERITY='W'; MGMTAREA='PERFORMANCE';
  EXCDISC1='CRITICAL DEVICE I/O RATE BELOW MIN';
  EXCDISC2='I/O RATE=' !! PUT(DVAACRT,5.1) !!
           '/SEC, VOL=' !! VOLSER           !!
           ', ADDR=' !! PUT(DEVNUM,HEX4.) !!
           ', TYPE=' !! DEVTYPE;
  LINK HIT;
END;
THRESHOLD MODIFICATION: Modify the values of the following:
```

- o device-address: the hexadecimal device address is specified as a three character SAS literal. For example, device address 1A8 is expressed as:

```
DEVADDR EQ '1A8'
```

- o volume-serial: the volume serial number is specified as a one to six character SAS literal. For example, volume serial number PAG1C0 is expressed as:

```
VOLSER EQ 'PAG1C0'
```

- o io-rate: the minimum number of start I/Os to a critical device in an hour is specified. For example, a threshold of 1000 for device address 2B3 is expressed as:

```
(DEVADDR EQ '2B3' AND DVAACRT LT 1000)
```

- o day: the days of the week to be included in the exception. Specify the first three characters of each day's name, enclosed in quotes and separated with OR's. For example, prime time specified as MONDAY through FRIDAY is expressed as:

```
(DAYNAME EQ 'MON' OR DAYNAME EQ 'TUE' OR DAYNAME EQ 'WED'  
OR DAYNAME EQ 'THU' OR DAYNAME EQ 'FRI' )
```

- o hh1 and hh2 (time period): the hour range to be included in the exception, where hh1 and hh2 are hours of the day. Prime time specified as 8:00 am through 6:59 pm (18:59) is expressed as:

```
(HOUR GE 8 AND HOUR LE 18)
```

- o n (ZONE value): the time period to be included. The ZONE definition includes the hours and days, so the ZONE definition is a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to Monday through Friday from 8:00 am until 6:59 pm, it is expressed as:

```
ZONE EQ '1'
```

01300: Control Unit I/O Rate Below Min

FILE: Control Unit Activity File
 SAS FILE NAME: DAYS.HARCUA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify low control unit I/O rates which may indicate I/O conflicts.

RATIONALE: During periods when work is expected in the system, a low I/O rate may result from I/O conflicts.

DEFINITION: This exception is detected when the control unit I/O rate is below the installation defined minimum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01300 CONTROL UNIT I/O RATE BELOW MIN;
*;
IF RMFVER > '08 ' THEN CUAPSSIO=CUACTRT;
IF CUAPSSIO ^= . THEN IF CUAPSSIO < rate
  AND (DAYNAME='MON' OR DAYNAME='TUE' OR DAYNAME='WED' OR
        DAYNAME='THU' OR DAYNAME='FRI')
  AND (HOUR >= hh1 AND HOUR <= hh2)
THEN DO;
  EXCCODE='01300'; SEVERITY='W'; MGMTAREA='PERFORMANCE';
  EXCDDESC1='CONTROL UNIT I/O RATE BELOW MIN';
  EXCDDESC2= 'I/O RATE=' || PUT(CUAPSSIO,6.1) ||
    '/SEC, CONTROL UNIT=' || CUADDR;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The minimum rate of SIO's per second is specified.
 A threshold rate of 2 would appear as:

CUAPSSIO < 2

prime time - The hour range and days of the week to be included in the exception are specified. The hour of the day must be within the hh1 through hh2 range. Prime time

specified as 8am through 6:59 pm (18:59) would appear as:

```
AND ( 8 <=HOUR AND HOUR<= 18 )
```

The days of the week are represented by the first three characters of their names. They must be enclosed in quotes, separated with OR's. Prime time specified as MONDAY through FRIDAY would appear as:

```
AND (DAYNAME='MON' OR DAYNAME='TUE' OR DAYNAME='WED'  
      OR DAYNAME='THU' OR DAYNAME='FRI' )
```

NOTE: The time period to be included may already be defined by means of the ZONE definition, which would provide a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it would appear as:

```
AND ZONE='1'
```

01303: Control Unit Busy Pending Time Exceeds Max

FILE: Control Unit Activity File
 SAS FILE NAME: DAYS.HARCUA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies the average time of I/O delays resulting from control unit busy.

RATIONALE: The solution may be to add control units, or to relocate devices on different control units, when the I/O delays result from control unit busy. This exception may identify when the control unit (or string switch) is an I/O bottleneck.

DEFINITION: This exception is detected when the average delay time of I/O requests due to control unit busy exceeds the installation defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 01303 CONTROL UNIT BUSY PENDING TIME EXCEEDS MAX;
*;
IF RMFVER=>'330' AND CUAAVCUB > time
THEN DO;
  EXCCODE='01303'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='CONTROL UNIT BUSY PENDING TIME EXCEEDS MAX';
  EXCDISC2= 'TIME=' || PUT(CUAAVCUB,5.3) ||
    ', CONTROL UNIT=' || CUADDR;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the time value according to the following convention:

time - The maximum average time an I/O is delayed is specified. A .10 second threshold would appear as:

```
CUAAVCUB > .10
```

01500: IPU Underutilized

FILE: Individual Processor Activity File
SAS FILE NAME: DAYS.HARIPU01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an underutilized processor.

RATIONALE: An underutilized processor may result from lack of workload or may indicate poor performance. When the operating system is overcommitted (page faulting, I/O delays, and so on), processor utilization may decrease because the supervisor and workload are waiting unnecessarily. Detection of low processor utilization may identify periods of poor performance, permitting further investigation of the critical resources.

DEFINITION: This exception is detected when a processor wait percentage is above the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below.

```
*****;  
*** 01500 *** IPU UNDERUTILIZED ***;  
*****;  
IF ((SYSID EQ 'sysid1' AND IPUPCWT GT percent1) OR  
    (SYSID EQ 'sysid2' AND IPUPCWT GT percent2))  
  THEN IF ((HOUR GE hh1 AND HOUR LE hh2) AND  
           (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))  
    THEN DO;  
      EXCCODE='01500'; SEVERITY='W'; MGMTAREA='PERFORMANCE';  
      EXCDISC1='PROCESSOR UNIT UNDERUTILIZED';  
      EXCDISC2='IPU ADDRESS=' !! PUT(IPUADDR,HEX2.) !!  
               ', IPU WAIT=' !! PUT(IPUPCWT,5.1) !! '%';  
      LINK HIT;  
    END;
```

THRESHOLD MODIFICATION: Modify the sysid, percent and prime time values according to the following conventions:

sysid - Specifies a four-character CA MICS system ID.

percent - Specifies the maximum processor wait percent.

A 10 percent threshold for system GFL1 and a 20 percent threshold for system GFL2 appears as:

```
IF ((SYSID EQ 'GFL1' AND IPUPCWT GT 10) OR  
    (SYSID EQ 'GFL2' AND IPUPCWT GT 20))
```

prime time - Specifies the hour range and days of the week to be included in the exception. The hour of the day must be within the hh1 through hh2 range. The days of the week are represented by the first three characters of their names. Prime time specified as 8:00 am through 6:59 pm (18:59) on weekdays only appears as:

```
IF ((HOUR GE 8 AND HOUR LE 18) AND  
    (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
```

The time period to be included may already be defined by means of the ZONE definition, which provides a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it appears as:

```
IF ZONE EQ '1'
```

01501: IPU Overutilized

FILE: Individual Processor Activity File
SAS FILE NAME: DAYS.HARIPU01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an overutilized processor.

RATIONALE: An overcommitted processor may cause performance degradation. One school of thought suggests that a processor operating at greater than a 98% busy rate may be indicative of a performance problem. It should be pointed out, however, that a well-tuned system with a good I/O configuration (that is, separation of channels, devices, control units, and so on) and sufficiently fast DASD to handle paging and other I/O demands, may well run at 95-100% for prolonged periods.

DEFINITION: This exception is detected when a processor utilization percentage is above the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
*****;  
*** 01501 *** IPU OVERUTILIZED ***;  
*****;  
IF ((SYSID EQ 'sysid1' AND IPUCBS GT percent1) OR  
    (SYSID EQ 'sysid2' AND IPUCBS GT percent2))  
  THEN IF ((HOUR GE hh1 AND HOUR LE hh2) AND  
           (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))  
    THEN DO;  
      EXCCODE='01501'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
      EXCDISC1='PROCESSOR UNIT OVERUTILIZED';  
      EXCDISC2='IPU ADDRESS=' !! PUT(IPUADDR,HEX2.) !!  
              ', IPU BUSY=' !! PUT(IPUCBS,5.1) !! '%';  
      LINK HIT;  
    END;
```

THRESHOLD MODIFICATION: Modify the sysid, percent and prime time values according to the following conventions:

sysid - Specifies a four-character CA MICS system ID.

percent - Specifies the maximum processor busy percent.

A 90 percent threshold for system ID GFL1 and a 95 percent threshold for system ID GFL2 appears as:

```
IF ((SYSID EQ 'GFL1' AND IPUPCBS GT 90) OR  
    (SYSID EQ 'GFL2' AND IPUPCBS GT 95))
```

prime time - Specifies the hour range and days of the week to be included in the exception. The hour of the day must be within the hh1 through hh2 range. The days of the week are represented by the first three characters of their names. Prime time specified as 8:00 am through 6:59 pm (18:59) on weekdays only appears as:

```
IF ((HOUR GE 8 AND HOUR LE 18) AND  
    (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
```

The time period to be included may already be defined by means of the ZONE definition, which provides a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it appears as:

```
IF ZONE EQ '1'
```

01600: LPAR Partition Underutilized

FILE: PR/SM LPAR Config/Activity File
SAS FILE NAME: DAYS.HARLPC01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an underutilized logical partition.

RATIONALE: An underutilized logical partition may result from lack of workload or may serve as an indication of improper LPAR definition criteria, such as poorly defined partition weights. If such a partition is used for production workloads, then service objectives may not be met. Detection of low logical partition utilization may identify periods of poor performance, permitting further investigation of the critical resources.

For additional information concerning interpretation and usage of these values, refer to Section 6.8 of this guide.

DEFINITION: This exception is detected when the logical partition processor utilization percentage is below the site-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below.

```
*****;  
*** 01600 *** PR/SM LPAR UNDERUTILIZED ***;  
*****;  
IF (SYSID EQ 'rsys')  
  THEN IF ((HEXLPID EQ 'id1' AND LPCPCVPU LT percent1) OR  
            (HEXLPID EQ 'id2' AND LPCPCVPU LT percent2) OR  
            (HEXLPID EQ 'id3' AND LPCPCVPU LT percent3))  
  THEN IF ((HOUR GE hh1 AND HOUR LE hh2) AND  
            (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))  
  THEN DO;  
    EXCCODE='01600'; SEVERITY='W'; MGMTAREA='PERFORMANCE';  
    EXCDESC1='PR/SM LPAR UNDERUTILIZED. ID=' !! HEXLPID;  
    EXCDESC2='LPAR ID=' !! HEXLPID !! ' WAS' !!  
              PUT(LPCPCVPU,5.1) !! '% BUSY';  
    LINK HIT;  
  END;  
THRESHOLD MODIFICATION: Modify the recording SYSID, the LPAR
```

IDs, the percent values, and prime time according to the following conventions:

rsys - The SYSID of the system whose measurements are to be used to evaluate the exception condition. If the evaluation is to be made based on the information recorded by RMF running in a system ID of SYS1, the statement would appear as:

```
IF (SYSID EQ 'SYS1')
```

id - Specifies the logical partition ID, a two-character hexadecimal number, with lead zero, if applicable, in quotes.

percent - Specifies the minimum logical processor utilization for a particular LPAR.

A 30 percent threshold for LPAR ID 1, a 40 percent threshold for LPAR ID 2, and a 50 percent threshold for LPAR ID C appear as:

```
IF ((HEXLPID EQ '01' AND LPCPCVPU LT 30) OR  
    (HEXLPID EQ '02' AND LPCPCVPU LT 40) OR  
    (HEXLPID EQ '0C' AND LPCPCVPU LT 50))
```

prime time - Specifies the hour range and days of the week to be included in the exception. The hour of the day must be within the hh1 through hh2 range. The days of the week are represented by the first three characters of their names. Prime time specified as 8:00 am through 6:59 pm (18:59) on weekdays only appears as:

```
IF ((HOUR GE 8 AND HOUR LE 18) AND  
    (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
```

The time period to be included may already be defined by means of the ZONE definition, which provides a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it appears as:

```
IF ZONE EQ '1'
```

01601: LPAR Partition Overutilized

FILE: PR/SM LPAR Config/Activity File

SAS FILE NAME: DAYS.HARLPC01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an overutilized logical partition.

RATIONALE: An overutilized logical partition may result from an excessive workload or may serve as an indication of improper LPAR definition criteria, such as poorly defined partition weights. Such a partition may dominate the central processor complex (CPC) and cause the service objectives of other logical partitions not to be met. Detection of high logical partition utilization may identify periods of poor performance for other logical partitions, permitting further investigation of the critical resources.

For additional information concerning interpretation and usage of these values, refer to Section 6.8 of this guide.

DEFINITION: This exception is detected when the logical partition processor utilization percentage is above the site defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below.

```
*****;
*** 01601 *** PR/SM LPAR OVERUTILIZED ***;
*****;
IF (SYSID EQ 'rsys')
  THEN IF ((HEXLPID EQ 'id1' AND LPCPCVPU GT percent1) OR
            (HEXLPID EQ 'id2' AND LPCPCVPU GT percent2) OR
            (HEXLPID EQ 'id3' AND LPCPCVPU GT percent3))
  THEN IF ((HOUR GE hh1 AND HOUR LE hh2) AND
            (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
  THEN DO;
    EXCCODE='01601'; SEVERITY='W'; MGMTAREA='PERFORMANCE';
    EXCDESC1='PR/SM LPAR OVERUTILIZED. ID= ' !! HEXLPID;
    EXCDESC2='LPAR ID=' !! HEXLPID !! ' WAS ' !!
              PUT(LPCPCVPU,5.1) !! '% BUSY';
    LINK HIT;
```

END;

THRESHOLD MODIFICATION: Modify the recording SYSID, the LPAR IDs, the percent values, and prime time according to the following conventions:

rsys - The SYSID of the system whose measurements are to be used to evaluate the exception condition. If the evaluation is to be made based on the information recorded by RMF running in a system ID of SYS1, the statement would appear as:

```
IF (SYSID EQ 'SYS1')
```

id - Specifies the logical partition ID, a two-character hexadecimal number, with lead zero if applicable, in quotes.

percent - Specifies the maximum logical processor utilization for a particular LPAR.

A 70 percent threshold for LPAR ID 1, a 80 percent threshold for LPAR ID 2, and a 90 percent threshold for LPAR ID C appear as:

```
IF ((HEXLPID EQ '01' AND LPCPCVPU GT 70) OR
    (HEXLPID EQ '02' AND LPCPCVPU GT 80) OR
    (HEXLPID EQ '0C' AND LPCPCVPU GT 90))
```

prime time - Specifies the hour range and days of the week to be included in the exception. The hour of the day must be within the hh1 through hh2 range. The days of the week are represented by the first three characters of their names. Prime time specified as 8:00 am through 6:59 pm (18:59) on weekdays only appears as:

```
IF ((HOUR GE 8 AND HOUR LE 18) AND
    (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
```

The time period to be included may already be defined by means of the ZONE definition, which provides a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it appears as:

```
IF ZONE EQ '1'
```

01602: PR/SM LPAR Using Excessive Resources

FILE: PR/SM LPAR Config/Activity File

SAS FILE NAME: DAYS.HARLPC01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects a logical partition that uses an excessive portion of the shared processor resources of the central processor complex (CPC).

RATIONALE: A single logical partition that dominates the shared processor resources of the central processor complex (CPC) may indicate a resource shortage that can result in service objectives of other logical partitions to be missed. Detection of excessive logical partition resource utilization may identify a capacity constraint in the CPC, requiring further investigation of the critical resources.

For additional information concerning interpretation and usage of these values, refer to Section 6.8 of this guide.

DEFINITION: This exception is detected when the logical partition shared system utilization percentage is above the site-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below.

```
*****;
*** 01602 *** PR/SM LPAR USING EXCESSIVE RESOURCES ***;
*****;
IF (SYSID EQ 'rsys')
  THEN IF ((HEXLPID EQ 'id1' AND LPCPCSSU GT percent1) OR
           (HEXLPID EQ 'id2' AND LPCPCSSU GT percent2) OR
           (HEXLPID EQ 'id3' AND LPCPCSSU GT percent3))
  THEN IF ((HOUR GE hh1 AND HOUR LE hh2) AND
           (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
  THEN DO;
    EXCCODE='01602'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
    EXCDESC1='PR/SM LPAR USING EXCESSIVE RESOURCES. ID='
              '!! HEXLPID;
    EXCDESC2='LPAR ID=' !! HEXLPID !! ' WAS USING' !!
              PUT(LPCPCSSU,5.1) !! '% OF COMPLEX RESOURCES';
    LINK HIT;
```

END;

THRESHOLD MODIFICATION: Modify the recording SYSID, the LPAR IDs, the percent values, and prime time according to the following conventions:

rsys - The SYSID of the system whose measurements are to be used to evaluate the exception condition. If the evaluation is to be made based on the information recorded by RMF running in a system ID of SYS1, the statement would appear as:

IF (SYSID EQ 'SYS1')

id - Specifies the logical partition ID, a two-character hexadecimal number, with lead zero if applicable, in quotes.

percent - Specifies the maximum shared system utilization for a particular LPAR.

A 30 percent threshold for LPAR ID 1, a 40 percent threshold for LPAR ID 2, and a 50 percent threshold for LPAR ID C appear as:

IF ((HEXLPID EQ '01' AND LPCPCSSU GT 30) OR
(HEXLPID EQ '02' AND LPCPCSSU GT 40) OR
(HEXLPID EQ '0C' AND LPCPCSSU GT 50))

prime time - Specifies the hour range and days of the week to be included in the exception. The hour of the day must be within the hh1 through hh2 range. The days of the week are represented by the first three characters of their names. Prime time specified as 8:00 am through 6:59 pm (18:59) on weekdays only appears as:

IF ((HOUR GE 8 AND HOUR LE 18) AND
(DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))

The time period to be included may already be defined by means of the ZONE definition, which provides a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it appears as:

IF ZONE EQ '1'

01700: Logical Processor Underutilized

FILE: PR/SM Logical Proc Activity File

SAS FILE NAME: DAYS.HARVPA01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an underutilized logical processor.

RATIONALE: An underutilized logical processor may result from lack of workload or may serve as an indication of improper LPAR definition criteria, such as poorly defined processor weights. If such a processor is used in a partition used for production workloads, service objectives may not be met. Detection of low logical processor utilization may identify periods of poor performance, permitting further investigation of the critical resources.

For additional information concerning interpretation and usage of these values, refer to Section 6.8 of this guide.

DEFINITION: This exception is detected when the logical processor utilization percentage is below the site-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below.

```
*****;
*** 01700 *** PR/SM LOGICAL PROCESSOR UNDERUTILIZED ***;
*****;
IF (SYSID EQ 'rsys')
  THEN IF ((HEXLPID EQ 'id1' AND VPAPCVPU LT pct1) OR
            (HEXLPID EQ 'id2' AND VPAPCVPU LT pct2))
  THEN IF ((HOUR LE hh1 AND HOUR GE hh2) AND
            (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
  THEN DO;
    EXCCODE='01700'; SEVERITY='W'; MGMTAREA='PERFORMANCE';
    EXCDISC1='PR/SM LOGICAL PROCESSOR UNDERUTILIZED. ID='
              !! HEXLPID;
    EXCDISC2='LPAR ID=' !! HEXLPID !!
              ' LOG PROC=' !! PUT(VPAADDR,HEX2.) !!
              ' WAS' !! PUT(VPAPCVPU,5.1) !! '% BUSY';
    LINK HIT;
  END;
```


THRESHOLD MODIFICATION: Modify the recording SYSID, the LPAR IDs, the percent values and prime time according to the following conventions:

rsys - The SYSID of the system whose measurements are to be used to evaluate the exception condition. If the evaluation is to be made based on the information recorded by RMF running in a system ID of SYS1, the statement would appear as:

```
IF (SYSID EQ 'SYS1')
```

id - Specifies the logical partition ID, a two-character hexadecimal number, with lead zero if applicable, in quotes.

percent - Specifies the minimum logical processor utilization for a particular LPAR.

A 10 percent threshold for LPAR ID 1 and a 50 percent threshold for LPAR ID C appear as:

```
IF ((HEXLPID EQ '01' AND VPAPCVPU LT 30) OR  
    (HEXLPID EQ '0C' AND VPAPCVPU LT 50))
```

prime time - Specifies the hour range and days of the week to be included in the exception. The hour of the day must be within the hh1 through hh2 range. The days of the week are represented by the first three characters of their names. Prime time specified as 8:00 am through 6:59 pm (18:59) on weekdays only appears as:

```
IF ((HOUR GE 8 AND HOUR LE 18) AND  
    (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
```

The time period to be included may already be defined by means of the ZONE definition, which provides a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it appears as:

```
IF ZONE EQ '1'
```

01701: Logical Processor Overutilized

FILE: PR/SM Logical Proc Activity File

SAS FILE NAME: DAYS.HARVPA01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detects an overutilized logical processor.

RATIONALE: An overutilized logical processor may result from an excessive workload or may serve as an indication of improper LPAR definition criteria, such as poorly defined processor weights. If such a processor is used in a partition used for production workloads, service objectives may not be met. Detection of high logical processor utilization may identify periods of poor performance, permitting further investigation of the critical resources.

For additional information concerning interpretation and usage of these values, refer to Section 6.8 of this guide.

DEFINITION: This exception is detected when the logical processor utilization percentage is above the site-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below.

```
*****;
*** 01701 *** PR/SM LOGICAL PROCESSOR OVERUTILIZED ***;
*****;
IF (SYSID EQ 'rsys')
  THEN IF ((HEXLPID EQ 'id1' AND VPAPCVPU GT pct1) OR
            (HEXLPID EQ 'id2' AND VPAPCVPU GT pct2))
  THEN IF ((HOUR GE hh1 AND HOUR LE hh2) AND
            (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
  THEN DO;
    EXCCODE='01701'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDESC1='PR/SM LOGICAL PROCESSOR OVERUTILIZED. ID='
              !! HEXLPID;
    EXCDESC2='LPAR ID=' !! HEXLPID !!
              ' LOG PROC=' !! PUT(VPAADDR,HEX2.) !!
              ' WAS' !! PUT(VPAPCVPU,5.1) !! '% BUSY';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: Modify the recording SYSID, the LPAR IDs, the percent values and prime time according to the following conventions:

rsys - The SYSID of the system whose measurements are to be used to evaluate the exception condition. If the evaluation is to be made based on the information recorded by RMF running in a system ID of SYS1, the statement would appear as:

```
IF (SYSID EQ 'SYS1')
```

id - Specifies the logical partition ID, a two-character hexadecimal number, with lead zero if applicable, in quotes.

percent - Specifies the maximum logical processor utilization for a particular LPAR.

A 80 percent threshold for LPAR ID 1 and a 90 percent threshold for LPAR ID C appear as:

```
IF ((HEXLPID EQ '01' AND VPAPCVPU GT 80) OR  
    (HEXLPID EQ '0C' AND VPAPCVPU GT 90))
```

prime time - Specifies the hour range and days of the week to be included in the exception. The hour of the day must be within the hh1 through hh2 range. The days of the week are represented by the first three characters of their names. Prime time specified as 8:00 am through 6:59 pm (18:59) on weekdays only appears as:

```
IF ((HOUR GE 8 AND HOUR LE 18) AND  
    (DAYNAME NE 'SAT' AND DAYNAME NE 'SUN'))
```

The time period to be included may already be defined by means of the ZONE definition, which provides a simpler method of selecting hours and days for processing. If ZONE 1 corresponds to the desired time period, it appears as:

```
IF ZONE EQ '1'
```

02000: System Swap Paging Rate Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Excessive swap paging rate can identify periods of overcommitment, incorrect SRM constants, or increasing use of real storage (that is, large working sets).

RATIONALE: A high swap paging rate can result from a high swapping rate (exception 02014) but can also indicate that the number of pages per swap is excessive.

DEFINITION: This exception is detected when the swap paging rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02000 SYSTEM SWAP PAGING RATE EXCEEDS MAX
*
RATE=SUM(PAGSIN,PAGSOT)/DURATION;
IF RATE GT rate
THEN DO;
  EXCCODE='02000';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='SYSTEM SWAP PAGING RATE EXCEEDS MAX';
  EXCDISC2='PAGE RATE=' !! PUT(RATE,5.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum system swap paging rate per second is specified. A threshold rate of 5 would appear as:

```
RATE GT 5
```

02001: Total Paging Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Excessive paging indicates overcommitment of memory.

RATIONALE: The total paging rate (non-swap, non-VIO page-ins and page-outs, swap pages in and out, and VIO pages in and out) reflects the sum of all actual page transfers between real memory and auxiliary storage. When real memory is overcommitted, excessive paging results and this exception can identify such periods.

DEFINITION: This exception is detected when the sum of non-swap non-VIO paging, swap paging, and VIO paging rates exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02001 TOTAL PAGING RATE EXCEEDS MAX
*;
RATE=
  SUM(PAGPIN,PAGPOUT,PAGVIN,PAGVOT,PAGSIN,PAGSOT)/DURATION;
IF RATE GT rate THEN DO;
  EXCCODE='02001';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='TOTAL PAGING RATE EXCEEDS MAX';
  EXCDISC2='PAGE RATE=' !! PUT(RATE,5.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of paging per second is specified. A rate threshold of 500 would appear as:

RATE GT 500

02002: Physical VIO Paging Rate Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Excessive VIO paging indicates that real memory is overcommitted or that the VIO facility is being misused.

RATIONALE: The total VIO paging rate reflects the actual transferring of pages between real memory and auxiliary storage for VIO pages. When real memory is overcommitted, excessive paging results. However, this exception can also result from misuse of VIO.

DEFINITION: This exception is detected when the VIO paging rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02002 PHYSICAL VIO PAGING RATE EXCEEDS MAX
*
RATE=SUM(PAGVIN,PAGVOT)/DURATION;
IF RATE GT rate
THEN DO;
  EXCCODE='02002';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='PHYSICAL VIO PAGING RATE EXCEEDS MAX';
  EXCDISC2='PAGE RATE=' !! PUT(RATE,5.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of VIO paging per second is specified. A rate threshold of 5 would appear as:

RATE GT 5

02003: Page Fault Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Excessive page fault rate indicates an overcommitment of real memory and resulting delays to tasks in execution.

RATIONALE: A page fault causes a task that is already in real memory to be delayed, as well as usually causing a physical page I/O.

DEFINITION: This exception is detected when the page fault rate (the rate of non-swap non-VIO page-ins, VIO page-ins, and PLPA/CSA page-ins) exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02003 PAGE FAULT RATE EXCEEDS MAX
*;
RATE=SUM(PAGPIN,PAGVIN,PAGSNI)/DURATION;
IF RATE GT rate THEN DO;
  EXCCODE='02003';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='PAGE FAULT RATE EXCEEDS MAX';
  EXCDISC2='PAGE RATE=' !! PUT(RATE,5.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of page faults per second is specified. A rate threshold of 60 would appear as:

```
RATE GT 60
```

02004: Long Wait Swap Rate Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: A high long wait swap rate can identify poorly written software.

RATIONALE: Normally, a long wait swap is a good event, since it is issued intentionally by software that expects a significant wait for a response (often from a console operator or some form of human involvement). Excessive use of long wait could result from software that should be examined to see if the response (and hence if the long wait) is truly required.

DEFINITION: This exception is detected when the long wait swap rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02004 LONG WAIT SWAP RATE EXCEEDS MAX
*
RATE=PAGLWS / DURATION;
IF RATE GT rate
  THEN DO;
    EXCCODE='02004'; SEVERITY='W'; MGMTAREA='PERFORMANCE';
    EXCDISC1='LONG WAIT SWAP RATE EXCEEDS MAX';
    EXCDISC2='SWAP RATE=' !! PUT(RATE,5.1) !! '/SEC';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of long wait swaps per second is specified. A rate of 2 threshold would appear as:

RATE GT 2

02005: Detected Wait Swap Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: A high detected wait swap rate results from unexpected delays and thus identifies performance degradation periods.

RATIONALE: A detected wait occurs when the System Resource Manager (SRM) finds that a task that is already in memory has been in wait state for several seconds. The SRM usually does not know why the task is waiting so it swaps out the task rather than clearing the wait. Thus, detected wait swaps are undesired and should be investigated. Some common causes of detected wait swaps are reserves, locks, and enqueues.

DEFINITION: This exception is detected when the detected wait swap rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02005 DETECTED WAIT SWAP RATE EXCEEDS MAX
*;
RATE=PAGDWS / DURATION;
IF RATE GT rate
  THEN DO;
    EXCCODE='02005'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
    EXCDISC1='DETECTED WAIT SWAP RATE EXCEEDS MAX';
    EXCDISC2='SWAP RATE=' !! PUT(RATE,5.1) !! '/SEC';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of detected wait swaps per second is specified. A rate threshold of 2 would appear as:

```
RATE GT 2
```


02006: Unilateral Swap Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: High unilateral swap rate results from resource overcommitment or from ineffective SRM constants.

RATIONALE: The SRM controls resource usage through swapping. When the SRM thinks its resources are overcommitted, it will remove active tasks from memory via unilateral swaps, delaying the execution of the task and reducing the multiprogramming level (which it presumes will reduce overcommitment). A high unilateral swap rate is undesirable since it is additional overhead at a time of system overcommitment.

DEFINITION: This exception is detected when the unilateral swap rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02006 UNILATERAL SWAP RATE EXCEEDS MAX
*;
RATE=PAGULS / DURATION;
IF RATE GT rate
  THEN DO;
    EXCCODE='02006'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
    EXCDISC1='UNILATERAL SWAP RATE EXCEEDS MAX';
    EXCDISC2='SWAP RATE=' !! PUT(RATE,5.1) !! '/SEC';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of unilateral swaps per second is specified. A rate threshold of 1 would appear as:

```
RATE GT 1
```

New Topic (313)

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies job steps requiring real memory for execution or jobs affected by storage reconfiguration.

RATIONALE: This exception reports on the occurrence of job steps that run as V=R and/or the occurrence of storage reconfiguration by the system operator.

DEFINITION: This exception is detected whenever the rate of requested swaps exceeds an installation-specified maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02007 REQUEST SWAP RATE EXCEEDS MAX
* ;
RATE=PAGNRS / DURATION;
IF RATE GT rate
  THEN DO;
    EXCCODE='02007'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
    EXCDISC1='REQUEST SWAP RATE EXCEEDS MAX ';
    EXCDISC2='SWAP RATE=' !! PUT(RATE,5.1) !! '/SEC';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of request swaps per second is specified. A rate threshold of 1 would appear as:

RATE GT 1

02008: Auxiliary Storage Shortage Swap Occurred

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Auxiliary storage shortage swapping results from insufficient page data space and should not occur.

RATIONALE: Auxiliary storage shortage swapping results when the defined page space is insufficient to hold either the started address spaces or the defined VIO data sets. This condition can result from excessive VIO use or from incorrect space allocations and should be corrected as soon as possible.

DEFINITION: This exception is detected when an auxiliary storage shortage swap occurs.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02008 AUXILIARY STORAGE SHORTAGE SWAP OCCURRED
*
IF PAGASS GT 0
THEN DO;
  EXCCODE='02008'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDISC1='AUXILIARY STORAGE SHORTAGE SWAP OCCURRED';
  EXCDISC2='SWAP COUNT=' !! PUT(PAGASS,5.);
  LINK HIT;
END;
```

02009: Real Storage Shortage Swap Occurred

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Real storage shortage swapping results from a shortage of pageable real storage frames.

RATIONALE: Real storage shortage swapping results when the percentage of pageable online storage falls below an installation-defined minimum. This condition should be investigated as soon as possible to determine whether the shortage is real or the result of incorrectly setting the system threshold.

DEFINITION: This exception is detected when a real storage shortage swap occurs.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02009 REAL STORAGE SHORTAGE SWAP OCCURRED
*
IF PAGRSS GT 0
THEN DO;
  EXCCODE='02009'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDISC1='REAL STORAGE SHORTAGE SWAP OCCURRED';
  EXCDISC2='SWAP COUNT=' !! PUT(PAGRSS,5.);
  LINK HIT;
END;
```

02010: Exchange Swap Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: High exchange swap rate results from resource overcommitment or from ineffective SRM constants.

RATIONALE: Exchange swaps occur when the SRM detects tasks falling behind their objectives.

DEFINITION: This exception is detected when the exchange swap rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02010 EXCHANGE SWAP RATE EXCEEDS MAX
*;
RATE=PAGEXS / DURATION;
IF RATE GT rate
  THEN DO;
  EXCCODE='02010';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='EXCHANGE SWAP RATE EXCEEDS MAX';
  EXCDISC2='SWAP RATE=' !! PUT(RATE,5.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of exchange swaps per second is specified. A rate threshold of 1 would appear as:

RATE GT 1

02011: Enqueue Swap Rate Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Enqueue swapping results from enqueue conflicts that should be eliminated whenever possible.

RATIONALE: An enqueue swap occurs when an enqueue conflict has been raised for a resource and the task owning the needed resource is currently swapped out. The System Resource Manager (SRM) swaps in the owning task and keeps the owning task in for an amount of service set by the ERV parameter. In order to make room for the owning task, another task is selected to be swapped out. Thus, this exception reports that a conflict for resources is occurring. Exception 2600 can identify the resource involved and elimination can possibly be addressed there. It is possible that a low ERV value can cause excessive (and unnecessary) enqueue swapping.

DEFINITION: This exception is detected when the enqueue swap rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02011 ENQUEUE SWAP RATE EXCEEDS MAX
*;  
RATE=PAGEES / DURATION;  
IF RATE GT rate  
THEN DO;  
  EXCCODE='02011';SEVERITY='I';MGMTAREA='PERFORMANCE';  
  EXCDISC1='ENQUEUE SWAP RATE EXCEEDS MAX '  
  EXCDISC2='SWAP RATE=' !! PUT(RATE,5.1) !! '/SEC';  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of enqueue swaps per second is specified. A rate threshold of 1 would appear as:

RATE GT 1

02012: Transition Swap Occurred

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Warning (SEVERITY='W')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Indicates tasks are running non-swappable.

RATIONALE: When a request for an address space to be marked non-swappable is processed, the address space is first swapped out for the transition and actually becomes non-swappable when swapped back in to real memory. Since the presence of non-swappable address spaces reduces the ability of the System Resource Manager (SRM) to balance resource utilization, this is generally not a desired occurrence with the exception of system address spaces or address spaces used to service online facilities. This exception can be used to detect the existence of other non-swappable address spaces.

DEFINITION: This exception is detected whenever the count of transition swaps is greater than zero.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02012 TRANSITION SWAP OCCURRED
*
IF PAGTXS GT 0
  THEN DO;
    EXCCODE='02012';SEVERITY='W';MGMTAREA='PERFORMANCE';
    EXCDESC1='TRANSITION SWAP OCCURRED';
    EXCDESC2='SWAP COUNT=' !! PUT(PAGTXS,5.);
    LINK HIT;
  END;
```

02013: Average Pages Per Swap Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify excessive swap overhead.

RATIONALE: An important characteristic to track is the average number of pages per swap, measured when the swap rate is within normal bounds. This may indicate an increased LSQA amount due to a new or changed system function.

DEFINITION: This exception is raised when the average number of pages per swap exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02013 AVERAGE PAGES PER SWAP EXCEEDS MAX
* ;
PAGES=SUM(PAGAVPS0,PAGAVPSI);
IF PAGES GT pages
THEN DO;
  EXCCODE='02013';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='AVERAGE PAGES PER SWAP EXCEEDS MAX';
  EXCDISC2='AVG PAGES OUT=' !! PUT(PAGAVPS0,5.1) !!
           ', AVG PAGES IN=' !! PUT(PAGAVPSI,5.1);
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the pages value according to the following convention:

pages - The maximum number of pages per swap is specified. A threshold frame count of 40 would appear as:

PAGES GT 40

02014: Total Swap Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: The total swap rate can identify periods of resource overcommitment.

RATIONALE: The total swap rate is the sum of the different swapping rates. While swapping is expected in a TSO system, in a batch system excess swapping occurs when the resources are overcommitted. This exception identifies the total swaps and thus can be used to trigger investigation of the actual type of swap occurring.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02014 TOTAL SWAP RATE EXCEEDS MAX
*;
RATE=(PAGTOSWP/DURATION)*3600; /* CONVERT TO HOURLY RATE */
IF RATE GT rate THEN DO;
  EXCCODE='02014';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDESC1='TOTAL SWAP RATE EXCEEDS MAX';
  EXCDESC2='SWAP RATE=' !! PUT(RATE,5.1) !! '/HOUR';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of swaps per hour is specified. A threshold rate of 13000 swaps per hour would appear as:

```
RATE GT 13000
```

02015: Insufficient Pageable Frames

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Indicates a real memory shortage.

RATIONALE: Virtual address spaces must share the pageable frames of real memory. When insufficient real memory exists, increased paging occurs. The memory shortage can result from too many active address spaces or too much fixed memory. If this exception is not occurring while high paging is occurring, the cause of high paging may be I/O conflicts rather than memory shortage. This exception can also occur when an incorrect amount of real memory is specified at IPL or when memory has been varied offline.

DEFINITION: This exception is detected when the number of pageable frames is less than the installation-defined minimum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02015 INSUFFICIENT PAGEABLE FRAMES
*
IF PAGAVTFC GT 0
THEN PCT=(PAGAVF*100) / PAGAVTFC; ELSE PCT=.;
IF PCT NE . AND PCT LT percent
THEN DO;
  EXCCODE='02015'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDDESC1='INSUFFICIENT PAGEABLE FRAMES';
  EXCDDESC2='UNUSED FRAMES=' !! PUT(PAGAVF,6.) !!
    ', ' !! PUT(PCT,2.) !! '%';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The percent of available storage that is pageable is specified. A threshold value of 5 percent would appear

as:

PCT LT 5

02016: SQA Fixed Frames Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies type of excess fixed frames.

RATIONALE: When real memory shortages occur, they often result from excess fixed frames. This exception identifies when the number of fixed frames in SQA is the cause of real memory shortages.

DEFINITION: This exception is raised when the number of frames of real memory fixed in SQA exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02016 SQA FIXED FRAMES EXCEEDS MAX
*;
IF PAGMXQ GT fixed-frames
THEN DO;
  EXCCODE='02016'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDESC1='SQA FIXED FRAMES EXCEEDS MAX';
  EXCDESC2='FIXED FRAMES=' !! PUT(PAGMXQ,6.);
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the fixed-frames value according to the following convention:

fixed-frames - The maximum number of fixed frames is specified. A threshold frame count of 250 would appear as:

PAGMXQ GT 250

02017: CSA Fixed Frames Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies type of excess fixed frames.

RATIONALE: When real memory shortages occur, they often result from excess fixed frames. This exception identifies when the number of fixed frames in CSA is the cause of real memory shortages.

DEFINITION: This exception is raised when the number of frames of real memory fixed in CSA exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02017 CSA FIXED FRAMES EXCEEDS MAX
*
IF PAGMXC GT fixed-frames
THEN DO;
  EXCCODE='02017'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDISC1='CSA FIXED FRAMES EXCEEDS MAX';
  EXCDISC2='FIXED FRAMES=' !! PUT(PAGMXC,6.);
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the fixed-frames value according to the following convention:

fixed-frames - The maximum number of fixed frames is specified. A threshold frame count of 100 would appear as:

```
PAGMXC GT 100
```

02018: LPA Fixed Frames Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies type of excess fixed frames.

RATIONALE: When real memory shortages occur, they often result from excess fixed frames. This exception identifies when the number of fixed frames in LPA is the cause of real memory shortages.

DEFINITION: This exception is raised when the number of frames of real memory fixed in LPA exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02018 LPA FIXED FRAMES EXCEEDS MAX
*;
IF PAGMXLF GT fixed-frames
  THEN DO;
  EXCCODE='02018'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDISC1='LPA FIXED FRAMES EXCEEDS MAX';
  EXCDISC2='FIXED FRAMES=' !! PUT(PAGMXLF,6.);
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the fixed-frames value according to the following conventions:

fixed-frames - The maximum number of fixed frames is specified. A frame count of 15 threshold would appear as:

```
PAGMXLF GT 15
```

02019: LSQA Fixed Frames Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies type of excess fixed frames.

RATIONALE: When real memory shortages occur, they often result from excess fixed frames. This exception identifies when the number of fixed frames in LSQA is the cause of real memory shortages.

DEFINITION: This exception is raised when the number of frames of real memory fixed in LSQA exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02019 LSQA FIXED FRAMES EXCEEDS MAX
*
IF PAGMXLS GT fixed-frames
THEN DO;
  EXCCODE='02019'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDISC1='LSQA FIXED FRAMES EXCEEDS MAX ';
  EXCDISC2='FIXED FRAMES=' !! PUT(PAGMXLS,6.);
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the fixed-frames value according to the following conventions:

fixed-frames - The maximum number of fixed frames is specified. A threshold frame count of 275 would appear as:

PAGMXLS GT 275

02020: Private Fixed Frames Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies type of excess fixed frames.

RATIONALE: When real memory shortages occur, they often result from excess fixed frames. This exception identifies when the number of private fixed frames is the cause of real memory shortages.

DEFINITION: This exception is raised when the number of private frames of real memory fixed exceeds the installation-defined threshold.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02020 PRIVATE FIXED FRAMES EXCEEDS MAX
*
IF PAGMXR GT fixed-frames
THEN DO;
  EXCCODE='02020'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDISC1='PRIVATE FIXED FRAMES EXCEEDS MAX';
  EXCDISC2='FIXED FRAMES=' !! PUT(PAGMXR,6.);
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the fixed-frames value according to the following convention:

fixed-frames - The maximum number of fixed frames is specified. A threshold frame count of 300 would appear as:

PAGMXR GT 300

02021: Total Fixed Frames Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies fixed frames as the cause of real memory shortage.

RATIONALE: When real memory shortages occur, they often result from excess fixed frames. This exception identifies when the total number of fixed frames is the cause of real memory shortages. Exceptions 2016 thru 2020 should identify in which area the excess page fixing is occurring.

DEFINITION: This exception is detected when the total number of fixed frames of real memory exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02021 TOTAL FIXED FRAMES EXCEEDS MAX
*
IF PAGMXX GT fixed-frames
THEN DO;
  EXCCODE='02021'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDESC1='TOTAL FIXED FRAMES EXCEEDS MAX';
  EXCDESC2='FIXED FRAMES=' !! PUT(PAGMXX,6.);
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the fixed-frames value according to the following convention:

fixed-frames - The maximum number of fixed frames is specified. A threshold frame count of 500 would appear as:

```
PAGMXX GT 500
```

02023: System Paging Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies when the system paging rate is causing the System Resource Manager (SRM) to swap tasks.

RATIONALE: The system paging rate is used by the SRM in determining under/overcommitment. When the rate is above the limit, multiprogramming will be decreased by unilateral swaps. Thus, this exception identifies the cause of unilateral swapping when it occurs.

DEFINITION: This exception is detected when the system paging rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02023 SYSTEM PAGING RATE EXCEEDS MAX
*;
IF PAGPSSPG GT rate
THEN DO;
  EXCCODE='02023';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDESC1='SYSTEM PAGING RATE EXCEEDS MAX ';
  EXCDESC2='PAGE RATE=' !! PUT(PAGPSSPG,8.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate per second of system paging is specified. A threshold rate of 100 would appear as:

```
PAGPSSPG GT 100
```

02024: Demand Paging Rate Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identifies when the demand paging rate is causing the System Resource Manager (SRM) to swap tasks.

RATIONALE: The demand paging rate is used by the SRM in determining under/overcommitment. When the rate is above the limit, multiprogramming will be decreased by unilateral swaps. Thus, this exception may identify the cause of unilateral swapping when it occurs.

DEFINITION: This exception is detected when the demand paging rate exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02024 DEMAND PAGING RATE EXCEEDS MAX
*
IF PAGPSDPG GT rate
THEN DO;
  EXCCODE='02024';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='DEMAND PAGING RATE EXCEEDS MAX ';
  EXCDISC2='PAGE RATE=' !! PUT(PAGPSDPG,8.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The maximum rate of demand paging per second is specified. A threshold rate of 100 would appear as:

PAGPSDPG GT 100

02025: Extended Storage Total Migration Rate Exceeds Max

FILE: Paging Activity File
 SAS FILE NAME: DAYS.SCPPAG01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify improper use of expanded storage.

RATIONALE: A page originally sent to expanded storage and later migrated to auxiliary storage represents unnecessary system overhead. The migration is accomplished by moving the page first to main memory and then to a pagespace data set. These operations could have been avoided if the page had been sent to auxiliary storage in the first place.

DEFINITION: This exception is detected when the total migration rate from expanded storage to auxiliary storage exceeds an installation-specified maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02025 EXTENDED STORAGE TOTAL MIGRATION RATE EXCEEDS MAX
*;
IF EXTSTOR='Y' THEN IF PAGAVPEA GT rate
  THEN DO;
  EXCCODE='02025'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='EXTENDED STG TOTAL MIGRATION RATE EXCEEDS MAX';
  EXCDISC2='MIGRATION RATE=' !! PUT(PAGAVPEA,8.1) !! '/SEC';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The total migration rate from expanded to auxiliary storage is specified. A threshold rate of 4 pages per second would appear as:

PAGAVPEA GT 4

02026: Extended Storage Swap Migration Rate Exceeds Max

FILE: Paging Activity File
SAS FILE NAME: DAYS.SCPPAG01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify improper use of expanded storage.

RATIONALE: A page originally sent to expanded storage and later migrated to auxiliary storage represents unnecessary system overhead. The migration is accomplished by moving the page first to main memory and then to a pagespace data set. These operations could have been avoided if the page had been sent to auxiliary storage in the first place.

DEFINITION: This exception is detected when the swap migration rate from expanded storage to auxiliary storage exceeds an installation-specified maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02026 EXTENDED STORAGE SWAP MIGRATION RATE EXCEEDS MAX
*;  
IF EXTSTOR='Y' THEN DO;  
  RATE=PAGMIG/DURATION;  
  IF RATE GT rate THEN DO;  
    EXCCODE='02026'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
    EXCDISC1='EXTENDED STG SWAP MIGRATION RATE EXCEEDS MAX';  
    EXCDISC2='MIGRATION RATE=' !! PUT(RATE,8.1) !! '/SEC';;  
    LINK HIT;  
  END;  
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The swap migration rate from expanded to auxiliary storage is specified. A threshold rate of 4 pages per second would appear as:

RATE GT 4

02050: Percentage of Failed Logical Swaps Exceeds Max

FILE: Swapping Activity File
 SAS FILE NAME: DAYS.SCPSWP01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify improper use of the logical swap facility.

RATIONALE: An address space originally swapped logically that later becomes physically swapped represents unnecessary system overhead and an improper use of real storage. While logically swapped, an address space still occupies main memory and the pages are not available for page stealing. In large TSO systems especially, this can represent megabytes of real memory made unavailable by logically swapped users. This situation could have been avoided if the address space had been sent to physical swaps in the first place.

DEFINITION: This exception is detected when the percentage of all swaps, for this swap reason, that were originally swapped logically and later were physically swapped to auxiliary storage, exceeds an installation-specified maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02050 PERCENTAGE OF FAILED LOGICAL SWAPS EXCEEDS MAX **
***** */
PCT=((SWPLSWPS-SWPLSWPE)*100)/SWPTOSWP;
IF PCT GT percent
THEN DO;
  EXCCODE='02050';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='PERCENTAGE OF FAILED LOGICAL SWAPS EXCEEDS MAX';
  EXCDISC2='FAILED LOG. SWAPS=' !! PUT(PCT,5.1) !!
           '%, REASON=' !! SWAPNAME;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The percent of all swaps that were originally swapped logically that eventually became physical swaps is

specified. A threshold of 10 percent would appear as:

PCT GT 10

02103: Log Chan / LCU Delayed I/O (CU Busy) Exceeds Max

FILE: Logical Channel/CU Activity File
 SAS FILE NAME: DAYS.SCPLCA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify why logical channel or logical control unit queuing exists.

RATIONALE: Queuing can be caused by a control unit, channel path busy, or device busy condition. One of these reasons, control unit busy, can indicate incorrect configuration of control units in the I/O subsystem.

DEFINITION: This exception is detected when the percent of I/O operations deferred because of control unit busy exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02103 LCU DELAYED I/O (CU BUSY) EXCEEDS MAX
*;
IF LCAPCCUB GT percent
THEN DO;
  EXCCODE='02103';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDESC1=
    'LCU DELAYED I/O (CONTROL UNIT BUSY) EXCEEDS MAX';
  EXCDESC2='DELAYED=' !! PUT(LCAPCCUB,5.1) !!
    '%, LCUID=' !! LCUID;
END;
LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent of delayed I/O operations is specified. A threshold of 75 percent would appear as:

```
LCAPCCUB GT 75
```

02104: Log Chan / LCU Delayed I/O (Device Busy) Exceeds Max

FILE: Logical Channel Activity File
SAS FILE NAME: DAYS.SCPLCA01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify why logical channel or logical control unit queue exists.

RATIONALE: There are four reasons why a queue will form for the logical channel in an MVS/370 environment: the device, control unit, logical channel, or physical channel can be busy. In MVS/XA on a 3090 processor, queueing can be caused by either control unit or a channel path busy condition, and on other CPUs by either control unit or device busy conditions. One of these reasons, device busy, can indicate incorrect configuration of control units in the I/O subsystem.

DEFINITION: This exception is detected when the percent of I/O operations deferred because of device busy exceeds the installation defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02104 LOG CHAN / LCU DELAYED I/O (DEV BUSY) EXCEEDS MAX
*;
IF LCAPCDVB > percent
THEN DO;
  EXCCODE='02104';SEVERITY='I';MGMTAREA='PERFORMANCE';
  IF RMFVER<='08 ' THEN DO;
    EXCDDESC1='LOGCHAN DELAYED I/O (DEVICE BUSY) EXCEEDS MAX';
    EXCDDESC2='DELAYED=' || PUT(LCAPCDVB,5.1) ||
              '%, LOG. CHAN=' || PUT(LOGCHAN,3.);
  END;
ELSE DO;
  EXCDDESC1='LCU DELAYED I/O (DEVICE BUSY) EXCEEDS MAX';
  EXCDDESC2='DELAYED=' || PUT(LCAPCDVB,5.1) ||
              '%, LCUID=' || LCUID;
END;
LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent of time an I/O is delayed is specified. A 75 percent threshold would appear as:

LCAPCDVB > 75

02105: Log Chan / LCU Delayed I/O (All Reasons) Exceeds Max

FILE: Logical Channel Activity File
SAS FILE NAME: DAYS.SCPLCA01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify excessive I/O queuing.

RATIONALE: There are four reasons why a queue will form for the logical channel or control unit. This exception identifies when the percent of I/O delayed by queuing is excessive. The four reasons, identified in the indicated exceptions, used to calculate this percentage are listed below:

- o Physical channel busy (Exception 02101)
- o Logical busy (" 02102)
- o Control unit busy (" 02103)
- o Device busy (" 02104)

DEFINITION: This exception is detected when the percent of I/O operations deferred exceeds the installation defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02105 LOG CHAN /LCU DELAYED I/O (ALL REASONS) EXCEEDS MAX
*;
DELAYED=SUM(OF LCAPCPBC, LCAPCLBC, LCAPCCUB, LCAPCDVB);
IF DELAYED > percent
THEN DO;
  EXCCODE='02105'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  IF RMFVER<='08 ' THEN DO;
    EXCDISC1='LOGCHAN DELAYED I/O (ALL REASONS) EXCEEDS MAX';
    EXCDISC2='DELAYED=' || PUT(DELAYED,5.1) ||
              '%, LOG. CHAN=' || PUT(LOGCHAN,3.);
  END;
ELSE DO;
  EXCDISC1='LCU DELAYED I/O (ALL REASONS) EXCEEDS MAX';
  EXCDISC2='DELAYED=' || PUT(DELAYED,5.1) ||
              '%, LCUID=' || LCUID;
END;
LINK HIT;
```

END;

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent of time an I/O is delayed is specified. A threshold of 75 percent would appear as:

DELAYED > 75

02150: Average Queue Length Exceeds Max

FILE: Logical Control Unit Activity File
SAS FILE NAME: DAYS.SCPLCU01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify logical control units with excessive I/O queuing.

RATIONALE: I/O operations queued at the logical control unit level indicate a possible I/O bottleneck, resulting in lower throughput or elongated response times in I/O-sensitive online systems.

DEFINITION: This exception is detected when the average queue of waiting I/O operations exceeds the installation defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02150 AVERAGE QUEUE LENGTH EXCEEDS MAX **  
***** */  
IF LCUAVQL GT queue-length  
THEN DO;  
  EXCCODE='02150'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='AVERAGE QUEUE LENGTH EXCEEDS MAX';  
  EXCDISC2='Q TIME=' !! PUT(LCUAVQL,5.3) !!  
           ', LCUID=' !! LCUID;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the value of queue-length according to the following convention:

queue-length - The maximum I/O queue length is specified. A queue length threshold of 5 would appear as:

LCUAVQL GT 5

02151: Average Device IOS Queue Time Exceeds Max

FILE: Logical Control Unit Activity File
 SAS FILE NAME: DAYS.SCPLCU01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify logical control units with excessive I/O delays due to IOS queuing.

RATIONALE: I/O operations delayed by IOS queuing indicate a possible I/O bottleneck, resulting in lower throughput or elongated response times in I/O-sensitive online systems.

DEFINITION: This exception is detected when the average queue time of waiting I/O operations exceeds the installation defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02151 AVERAGE DEVICE IOS QUEUE TIME EXCEEDS MAX **
***** */
IF LCUAVIOS GT queue-time
THEN DO;
  EXCCODE='02151'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDESC1='AVERAGE DEVICE IOS QUEUE TIME EXCEEDS MAX';
  EXCDESC2='Q TIME=' !! PUT(LCUAVIOS,5.1) !!
           ', LCUID=' !! LCUID;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the value of queue-time according to the following convention:

queue-time - The maximum IOS queue time in seconds is specified. A threshold of 15 milliseconds would appear as:

LCUAVIOS GT .015

02152: Percent All Channel Paths Busy Exceeds Max

FILE: Logical Control Unit Activity File
SAS FILE NAME: DAYS.SCPLCU01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overcommitment of channel paths.

RATIONALE: If all possible channel paths attached to a logical control unit are busy, the LCU is unable to start any new I/O operations. A high percentage of observations with this condition indicates a possible I/O bottleneck, resulting in lower throughput or elongated response times in I/O-sensitive online systems.

DEFINITION: This exception is detected when the percent of observations when all channel paths attached to the LCU are busy exceeds the installation defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02152 PERCENT ALL CHANNEL PATHS BUSY EXCEEDS MAX **  
***** */  
IF LCUPCABY > percent  
THEN DO;  
  EXCCODE='02152'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDDESC1='PERCENT ALL CHANNEL PATHS BUSY EXCEEDS MAX';  
  EXCDDESC2='BUSY=' || PUT(LCUPCABY,5.1) ||  
    '%, LCUID=' || LCUID;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the value of percent according to the following convention:

percent - The maximum percent of observations when all channels paths attached to the LCU are busy is specified. A threshold of 15 percent would appear as:

```
LCUPCABY > 15
```


02153: Percent Control Unit Busy Exceeds Max

FILE: Logical Control Unit Activity File
 SAS FILE NAME: DAYS.SCPLCU01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overcommitted physical control units.

RATIONALE: A high percentage I/O operations deferred for any reason indicates a possible I/O bottleneck, resulting in lower throughput or elongated response times in I/O-sensitive online systems. This exception identifies LCUs with excessive numbers of I/Os deferred due to physical control unit busy conditions.

DEFINITION: This exception is detected when the percent of I/O operations deferred due to physical control unit busy exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02153 PERCENT CONTROL UNIT BUSY EXCEEDS MAX **
***** */
IF LCUPCCUB GT percent
THEN DO;
  EXCCODE='02153'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='PERCENT CONTROL UNIT BUSY EXCEEDS MAX';
  EXCDISC2='BUSY=' !! PUT(LCUPCCUB,5.1) !!
    '%, LCUID=' !! LCUID;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the value of percent according to the following convention:

percent - The maximum percent of I/O requests deferred due to physical control unit busy is specified. A threshold of 15 percent would appear as:

LCUPCCUB GT 15

02154: Percent LCU Requests Deferred Exceeds Max

FILE: Logical Control Unit Activity File
SAS FILE NAME: DAYS.SCPLCU01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overcommitted logical control units.

RATIONALE: A high percentage I/O operations deferred for any reason indicates a possible I/O bottleneck, resulting in lower throughput or elongated response times in I/O-sensitive online systems.

DEFINITION: This exception is detected when the percent of I/O operations deferred for any reason exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02154 PERCENT LCU REQUESTS DEFERRED EXCEEDS MAX **  
***** */  
IF LCUPCRQD GT percent  
THEN DO;  
  EXCCODE='02154'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='PERCENT LCU REQUESTS DEFERRED EXCEEDS MAX';  
  EXCDISC2='REQ. DEFERRED=' !! PUT(LCUPCRQD,5.1) !!  
           '%, LCUID=' !! LCUID;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the value of percent according to the following convention:

percent - The maximum percent of I/O requests deferred for any reason is specified. A threshold of 15 percent would appear as:

LCUPCRQD GT 15

02500: Unusable Page Slot or Swap Set Detected.

FILE: Page/Swap Data Set Activity File
 SAS FILE NAME: DAYS.SCPPSD01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Critical (SEVERITY='C')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify page/swap data sets with unusable space.

RATIONALE: Hardware errors will cause the Auxiliary Storage Manager (ASM) to stop using all or portions of page or swap data sets. When an unusable condition occurs, old pages still owned and readable will be used, but no new pages/swap sets will be written to that device. Thus, the paging load is spread across a smaller number of devices, which can cause excessive paging delays. If this exception occurs, either schedule an IPL to bring up a different device, or use PAGADD to add new page/swap data sets.

DEFINITION: This exception is detected when any swap or page data set is marked with unusable space.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02500 UNUSABLE PAGE SLOT OR SWAP SET DETECTED
*;
IF PSDBDS GT 0
AND E02500
THEN DO;
  RETAIN E02500 1;
  E02500=0; * SET FLAG TO PREVENT REPETITION OF EXCEPTION;
  EXCCODE='02500'; SEVERITY='C'; MGMTAREA='PERFORMANCE';
  EXCDISC1='UNUSABLE PAGE SLOT OR SWAP SET DETECTED ';
  EXCDISC2='COUNT=' !! PUT(PSDBDS,3.) !!
    ', VOLSER=' !! VOLSER !!
    ', ADDR=' !! PUT(DEVNUM,HEX4.)!!
    '!' !! ', DSN=' !! PSDDSN;
  LINK HIT;
END;
```

02501: Pct Page/Swap Data Set Busy Exceeds Max

FILE: Page/Swap Data Set Activity File

SAS FILE NAME: DAYS.SCPPSD01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overutilized page/swap data sets

RATIONALE: As the utilization of each page/swap data set increases, the delay to paging increases exponentially. This exception identifies those page/swap data sets with high utilization. Consider moving the data sets to different devices/control units/channels as appropriate. Note that this utilization is as seen by the Auxiliary Storage Manager (ASM) and thus reflects data set busy time. The ASM is unaware, and does not consider, the device busy time or know about any other data sets on the device.

DEFINITION: This exception is detected when the percent page/swap data set busy exceeds the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02501 PCT PAGE/SWAP DATA SET BUSY EXCEEDS MAX
*;
IF PSDPCUSE GT percent
THEN DO;
  EXCCODE='02501';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='PCT PAGE/SWAP DATA SET BUSY EXCEEDS MAX ';
  EXCDISC2='BUSY=' !! PUT(PSDPCUSE,5.1) !!
           '%, VOL=' !! VOLSER !! '(' !! PUT(DEVNUM,HEX4.)!!
           '), DSN=' !! PSDDSN;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following conventions:

percent - The maximum percent busy is specified. A 75 percent threshold would appear as:

PSDPCUSE GT 75

02502: Avg Page/Swap Service Time Exceeds Max

FILE: Page/Swap Data Set Activity File
SAS FILE NAME: DAYS.SCPPSD01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify page/swap data set overutilization.

RATIONALE: The average service time to complete each page/swap I/O is estimated by dividing the data set busy time by the number of successful I/Os. This then is an estimate of the rate at which the Auxiliary Storage Manager (ASM) is able to page/swap. A large service time will cause I/O bottlenecks, which, because they are paging I/O, will cause reduction in service delivered.

DEFINITION: This exception is detected when the average service time per page/swap I/O exceeds the installation defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02502 AVG PAGE/SWAP SERVICE TIME EXCEEDS MAX
*
IF PSDAVSTM GT service-time
THEN DO;
  EXCCODE='02502';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='AVG PAGE/SWAP SERVICE TIME EXCEEDS MAX';
  EXCDISC2='TIME=' !! PUT(PSDAVSTM,6.3) !!
    ', VOL=' !! VOLSER !!
    '(' !! PUT(DEVNUM,HEX4.)!!
    '), DSN=' !! PSDDSN;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the service time value according to the following convention:

service-time - The maximum service time in seconds is specified. A threshold of 50 milliseconds would appear as:

PSDAVSTM GT .050

02503: Pages Transferred Per Physical I/O Below Min

FILE: Page/Swap Data Set Activity File
SAS FILE NAME: DAYS.SCPPSD01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify page/swap data set delays.

RATIONALE: The Auxiliary Storage Manager (ASM) dynamically changes the number of pages transferred per I/O based on the average service time previously received by the ASM for earlier page I/O. This exception identifies those times when the number of pages is too low, which usually results from overcommitted paging (insufficient memory or I/O bottlenecks on the paging device/control unit/channels).

DEFINITION: This exception is detected when the number of pages transferred for each paging I/O is less than the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02503 PAGES TRANSFERRED PER PHYSICAL I/O BELOW MIN
*
IF PSDPST NE 'SWAP' AND PSDSI0 GT 0 THEN DO;
RATE=PSDPGX / PSDSI0;
IF RATE LT rate
THEN DO;
  EXCCODE='02503';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='PAGES TRANSFERRED PER PHYSICAL I/O BELOW MIN ';
  EXCDISC2='RATE=' !! PUT(RATE,5.1) !!
           ', VOL=' !! VOLSER !! '(' !! PUT(DEVNUM,HEX4.)!!
           '), DSN=' !! PSDDSN;
  LINK HIT;
END;
END;
```

THRESHOLD MODIFICATION: The user should modify the rate value according to the following convention:

rate - The minimum number of pages transferred by I/O is specified. A threshold rate of 2 would appear as:

RATE LT 2

02600: Resource Enqueue Delay Occurred

FILE: Resource Enqueue Activity File

SAS FILE NAME: DAYS.SCPENQ01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify resources involved in enqueue delays.

RATIONALE: When a system task or system function is delayed because a resource it tried to obtain via enqueue was held by another task or job, both the task names and the resource names involved are recorded. By counting the number of such delay events, this exception will alert the user to further investigate what resources are creating conflicts and which tasks are holding/delaying others. With this knowledge, the conflicts can be minimized or eliminated. Some enqueue conflicts will always exist and they should be identified and removed from this exception.

DEFINITION: This exception is detected whenever a resource enqueue has occurred more times than the installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
** 02600 RESOURCE ENQUEUE DELAY OCCURRED
*;
IF ENQVGT GT events
THEN DO;
  EXCCODE='02600';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDESC1='RESOURCE ENQUEUE DELAY OCCURRED';
  EXCDESC2=PUT(ENQDWR,4.) !! ' JOBS WAITING. Q=' !!
    TRIM(ENQQNM) !! ' / ' !! TRIM(ENQRNM);
  IF ENQRHEX NE: ' '
    THEN EXCDESC2=TRIM(EXCDESC2) !! ' HEX=' !! ENQRHEX;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the value of events according to the following convention:

events - The number of times a enqueue delay occurred. A

threshold of 100 enqueue delay events would appear as:

ENQEVN GT 100

02700: IOC Channel Measurement Failure

FILE: I/O Queuing Configuration File
SAS FILE NAME: DAYS.SCPIOC01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify failure of the channel measurement facility.

RATIONALE: A failure of the channel measurement facility results in some of the statistics describing channel activity being unavailable. Control unit busy, channel path taken, and channel path busy values are affected.

DEFINITION: This exception is detected whenever the channel measurement facility has failed to record accurate statistics.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02700 IOC CHANNEL MEASUREMENT FAILURE **  
***** */  
IF IOCINVCT THEN DO;  
  EXCCODE='02700'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='IOC CHANNEL MEASUREMENT FAILURE';  
  EXCDISC2='LCUID=' !! TRIM(LCUID) !!  
           ', CHAN=' !! CHANNEL;  
  LINK HIT;  
END;
```

02701: IOP Channel Measurement Failure

FILE: I/O Queuing Configuration File

SAS FILE NAME: DAYS.SCPIOC01

SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')

MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify failure of the channel measurement facility

RATIONALE: A failure of the channel measurement facility results in some of the statistics describing channel activity being unavailable. IOP activity and queuing information is affected.

DEFINITION: This exception is detected whenever the channel measurement facility has failed to record accurate statistics.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02701 IOP CHANNEL MEASUREMENT FAILURE **  
***** */  
IF IOCCMFCT THEN DO;  
  EXCCODE='02701'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='IOP CHANNEL MEASUREMENT FAILURE';  
  EXCDISC2='LCUID=' !! TRIM(LCUID) !!  
    ', CHAN=' !! CHANNEL;  
  LINK HIT;  
END;
```

02702: Channel Path Busy Exceeds Max

FILE: I/O Queuing Configuration File
 SAS FILE NAME: DAYS.SCPIOC01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overloaded channel paths which may be symptomatic of I/O problems and performance degradation.

RATIONALE: As the probability of finding a channel path busy increases, the probability of I/O operations being delayed also increases. This will be particularly impacting if all of the channel paths within the logical control unit are excessively busy.

DEFINITION: This exception is detected when the channel path busy percentage exceeds the installation defined maximum. The actual percent that indicates a possible problem varies with the I/O configuration and nature of the resource(s) being accessed.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02702 CHANNEL PATH BUSY EXCEEDS MAX **
***** */
IF IOCIOTYP =: 'IOP'
THEN IF IOPCBSY > percent
THEN DO;
  EXCCODE='02702'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='CHANNEL PATH BUSY EXCEEDS MAX';
  EXCDISC2='BUSY=' || PUT(IOPCBSY,5.1) ||
    '%, LCUID=' || TRIM(LCUID) ||
    ', CHAN=' || CHANNEL;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent channel path busy is specified. A 30 percent threshold would appear as:

I0PCBSY > 30

02703: Control Unit Busy Exceeds Max

FILE: I/O Queuing Configuration File
 SAS FILE NAME: DAYS.SCPIOC01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify overloaded control units that may be symptomatic of I/O problems and performance degradation.

RATIONALE: As the probability of finding a control unit busy increases, the probability of I/O operations being delayed also increases. This can be a real problem if all of the physical control units within the logical control unit are excessively busy.

DEFINITION: This exception is detected when the control unit busy percentage exceeds the installation-defined maximum. The actual percent that indicates a possible problem varies with the I/O configuration and nature of the resources being accessed.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02703 CONTROL UNIT BUSY EXCEEDS MAX **
***** */
IF IOCPCCUB GT percent THEN DO;
  EXCCODE='02703'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='CONTROL UNIT BUSY EXCEEDS MAX';
  EXCDISC2='BUSY=' !! PUT(IOCPCCUB,5.1) !!
    '%, LCUID=' !! TRIM(LCUID) !!
    ', CHAN=' !! CHANNEL;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent control unit busy is specified.
 A 25 percent threshold would appear as:

```
IOCPCCUB GT 25
```


02750: IOP Initiative Queue Length Exceeds Max

FILE: I/O Processor Queueing File
 SAS FILE NAME: DAYS.SCPIOP01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify excessive activity by the I/O processor (IOP).

RATIONALE: The size of the IOP initiative queue is a measure of the number of I/O operations that are waiting for service by the IOP. An excessively high value could indicate that there is a problem in the I/O subsystem or that the workload of the CPC is not well balanced.

DEFINITION: This exception is detected when the average IOP queue length exceeds the installation-defined maximum. The threshold will vary greatly with the I/O configuration and workload being executed by the CPC.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02750 IOP INITIATIVE QUEUE LENGTH EXCEEDS MAX **
***** */
IF IOPAVQUE GT queue-length
THEN DO;
  EXCCODE='02750'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='IOP INITIATIVE QUEUE LENGTH EXCEEDS MAX';
  EXCDISC2='QUEUE LENGTH=' !! PUT(IOPAVQUE,6.1) !!
           ', IOPID=' !! IOPID ;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the queue-length value according to the following convention:

queue-length - The maximum length of the IOP initiative queue is specified. A queue length of 100 would appear as:

```
IOPAVQUE GT 100
```

02751: IOP Request Rate Exceeds Max

FILE: I/O Processor Queueing File
SAS FILE NAME: DAYS.SCPiop01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify excessive activity by the I/O processor (IOP).

RATIONALE: The rate at which the IOP processes I/O requests is one of the basic measurements of the activity of a CPC. An unusually high rate of I/O requests could indicate that there is a problem in the I/O subsystem or that the workload of the CPC is not well balanced.

DEFINITION: This exception is detected when the average IOP request rate exceeds the installation-defined maximum. The threshold will vary greatly with the I/O configuration and workload being executed by the CPC.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02751 IOP REQUEST RATE EXCEEDS MAX **  
***** */  
IF IOPAVRQS GT request-rate  
THEN DO;  
  EXCCODE='02751'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='IOP REQUEST RATE EXCEEDS MAX';  
  EXCDISC2='REQUEST RATE=' !! PUT(IOPAVRQS,6.1) !!  
           '/SEC, IOPID=' !! IOPID ;  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the request-rate value according to the following convention:

request-rate - The maximum I/O request rate of the IOP is specified. A threshold of 500 operations per second would appear as:

IOPAVRQS GT 500

02800: Performance Group Page-In Rate Exceeds Max

FILE: Performance Group Activity File
 SAS FILE NAME: DAYS.SCPPGA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify workloads experiencing high paging.

RATIONALE: For online systems, a high page-in rate can cause response time degradation. For batch systems, it can mean overinitiation and unnecessarily elongated run times.

DEFINITION: This exception is detected when the page-in rate per second for selected performance groups exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02800 PERFORMANCE GROUP PAGE-IN RATE EXCEEDS MAX **
***** */
IF (PERFGRP=perfgrp1 AND PGAPSPIN > rate1) OR
   (PERFGRP=perfgrp2 AND PGAPSPIN > rate2)
THEN DO;
  EXCCODE='02800'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='PERFORMANCE GROUP PAGE-IN RATE EXCEEDS MAX';
  EXCDISC2='RATE=' || PUT(PGAPSPIN,6.1) ||
    '/SEC, GROUP=' || PUT(PERFGRP,3.) ||
    ', NAME=' || PERFGRPN;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the perfgrp and rate values according to the following conventions:

perfgrp - The performance group number of the workload to be examined.

rate - The maximum page-in rate for the performance group

A test for a page-in rate in excess of 5 pages per second for performance group 6 would appear as:

(PERFGRP=6 AND PGAPSPIN > 5)

02801: Swaps per Ended Transaction Exceeds Max

FILE: Performance Group Activity File
 SAS FILE NAME: DAYS.SCPPGA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify workloads with high swap activity.

RATIONALE: For online systems, a high swap rate can cause response time degradation. For batch systems, it can mean overinitiation and unnecessarily elongated run times.

DEFINITION: This exception is detected when the average number of swaps per ended transaction for selected performance groups exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02801 SWAPS PER ENDED TRANSACTION EXCEEDS MAX **
***** */
IF (PERFGRP=perfgrp1 AND PGASPT > count1) OR
   (PERFGRP=perfgrp2 AND PGASPT > count2)
THEN DO;
  EXCCODE='02801'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='SWAPS PER ENDED TRANSACTION EXCEEDS MAX';
  EXCDISC2='SWAPS/TRANSACTION=' || PUT(PGASPT,6.1) ||
           ', GROUP=' || PUT(PERFGRP,3.) ||
           ', NAME=' || PERFGRPN;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the perfgrp and count values according to the following conventions:

perfgrp - The performance group number to be examined.

count - The maximum swap count per transaction for the performance group.

A test for a swaps-per-transaction count in excess of 5 for performance group 6 would appear as:

(PERFGRP=6 AND PGASPT > 5)

02802: Multiprogramming Level Exceeds Max

FILE: Performance Group Activity File
 SAS FILE NAME: DAYS.SCPPGA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify situations where the multiprogramming level (MPL) for a workload exceeds standards.

RATIONALE: The setting of maximum and minimum MPLs is a primary means of controlling system activity in order to meet service objectives. An MPL in excess of the expected maximum can mean that the wrong SYS1.PARMLIB member is being used to set system resource management values or that an operator command has been issued at the system console to override the values normally used.

DEFINITION: This exception is detected when the MPL for selected performance groups exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02802 MULTIPROGRAMMING LEVEL EXCEEDS MAX **
***** */
IF (PERFGRP=perfgrp1 AND PGAMPL > count1) OR
   (PERFGRP=perfgrp2 AND PGAMPL > count2)
THEN DO;
  EXCCODE='02802'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='MULTIPROGRAMMING LEVEL EXCEEDS MAX';
  EXCDISC2='MPL=' || PUT(PGAMPL,5.1) ||
    ', GROUP=' || PUT(PERFGRP,3.) ||
    ', NAME=' || PERFGRPN;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the perfgrp and count values according to the following conventions:

perfgrp - The performance group to be examined.

count - The maximum MPL for the performance group.

A test for an MPL greater than 15 for performance group 1 would appear as:

(PERFGRP=1 AND PGAMPL > 15)

02803: Multiprogramming Level Less than Min

FILE: Performance Group Activity File
 SAS FILE NAME: DAYS.SCPPGA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify situations where the multiprogramming level (MPL) for a workload is less than expected.

RATIONALE: The setting of maximum and minimum MPLs is a primary means of controlling system activity in order to meet service objectives. An MPL below the anticipated minimum can mean that the wrong SYS1.PARMLIB member is being used to set system resource management values, or that an operator command has been issued at the system console to override the values normally used.

DEFINITION: This exception is detected when the MPL for selected performance groups is less than an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02803 MULTIPROGRAMMING LEVEL LESS THAN MIN **
***** */
IF PGAMPL ^=. THEN
IF (PERFGRP=perfgrp1 AND PGAMPL < count1) OR
(PERFGRP=perfgrp2 AND PGAMPL < count2)
THEN DO;
EXCCODE='02803'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
EXCDESC1='MULTIPROGRAMMING LEVEL LESS THAN MIN';
EXCDESC2='MPL=' || PUT(PGAMPL,5.1) ||
', GROUP=' || PUT(PERFGRP,3.) ||
', NAME=' || PERFGRPN;
LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the perfgrp and count values according to the following conventions:

perfgrp - The performance group number to be examined.

count - The minimum MPL for the performance group

A test for an MPL less than 7 for performance group 112 would appear as:

(PERFGRP=112 AND PGAMPL < 7)

02804: Transaction Service Time Exceeds Max

FILE: Performance Group Activity File
 SAS FILE NAME: DAYS.SCPPGA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect elongated transaction service time.

RATIONALE: The internal response time for a transaction is the sum of the time spent waiting for service and the time spent being serviced. The failure to meet response time objectives may be caused by spending an excessive amount of time in either state. Exception 02805 reports excessive wait-for-service times.

DEFINITION: This exception is detected when the average service time per transaction for selected performance groups exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02804 TRANSACTION SERVICE TIME EXCEEDS MAX **
***** */
IF (PERFGRP=perfgrp1 AND PGAAVSTM > time1) OR
   (PERFGRP=perfgrp2 AND PGAAVSTM > time2)
THEN DO;
  EXCCODE='02804';SEVERITY='I';MGMTAREA='PERFORMANCE';
  EXCDISC1='TRANSACTION SERVICE TIME EXCEEDS MAX';
  EXCDISC2='SERV TIME=' || PUT(PGAAVSTM,7.1) ||
           ', GROUP=' || PUT(PERFGRP,3.) ||
           ', NAME=' || PERFGRPN;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the perfgrp and time values according to the following conventions:

perfgrp - The performance group number to be examined.

time - Maximum performance group wait for service time.

A test for a service time in excess of 1 second for performance group 6 would appear as:

(PERFGRP=6 AND PGAAVSTM > 1)

A test for a service time in excess of 1 day for performance group 9 would appear as:

(PERFGRP=9 AND PGAAVSTM > 86400)

02805: Transaction Wait for Service Time Exceeds Max

FILE: Performance Group Activity File
 SAS FILE NAME: DAYS.SCPPGA01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect workloads with excessive amounts of time spent waiting for service.

RATIONALE: The internal response time for a transaction is the sum of the time spent waiting for service and the time spent being serviced. The failure to meet response time objectives may be caused by spending an excessive amount of time in either state. Exception 02804 reports excessive service times.

DEFINITION: This exception is detected when the average wait for service time per transaction for selected performance groups exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02805 TRANSACTION WAIT FOR SERVICE TIME EXCEEDS MAX **
***** */
IF (PERFGRP=perfgrp1 AND PGAAVTM > time1) OR
   (PERFGRP=perfgrp2 AND PGAAVTM > time2)
THEN DO;
  EXCCODE='02805'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='TRANSACTION WAIT FOR SERVICE TIME EXCEEDS MAX';
  EXCDISC2='TIME=' || PUT(PGAAVTM,7.1) ||
           ', GROUP=' || PUT(PERFGRP,3.) ||
           ', NAME=' || PERFGRPN;
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the perfgrp and time values according to the following conventions:

perfgrp - The performance group number to be examined.

time - Maximum performance group wait for service time.

A test for a wait-for-service time in excess of 1 second
for performance group 6 would appear as:

(PERFGRP=6 AND PGAAWTM > 1)

02900: Size of Dup. PLPA Modules in MLPA/FLPA Exc Max

FILE: Virtual Storage System Usage File
 SAS FILE NAME: DAYS.SCPVSM01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify excessive virtual storage use within the Pageable Link Pack Area (PLPA) caused by modules of the same name being included in Modified Link Pack Area (MLPA) or Fixed Link Pack Area (FLPA).

RATIONALE: A common testing technique for modifications to, or new versions of, modules residing in the LPA is to include them in a secondary library and include them in the MLPA. Since the MLPA is searched first, the new module is always used, and the version in PLPA is never executed. Similarly, an LPA module may be placed in page-fixed rather than pageable storage for performance reasons. If the same module, or a module with the same name, is in PLPA, it also is never executed. Both these situations can be interpreted as a waste of virtual storage if the amount of memory occupied by these modules is large.

DEFINITION: This exception is detected when the amount of space occupied by duplicated LPA modules exceeds an installation-specified maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02900 SIZE OF DUP. PLPA MODULES IN MLPA/FLPA EXC MAX **
***** */
IF VSMADUPL GT kbyte
  THEN DO;
    EXCCODE='02900'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDISC1='SIZE OF DUP. PLPA MODULES IN MLPA/FLPA EXC MAX';
    EXCDISC2='SIZE=' !! PUT(VSMADUPL,4.) !! ' KBYTES';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the kbyte value according to the following convention:

kbyte - The maximum amount of space occupied by duplicate modules. A test for a value in excess of 100 KB would appear as:

VSMADUPL GT 100

02901: PLPA Packing Loss Exceeds Max

FILE: Virtual Storage System Usage File
 SAS FILE NAME: DAYS.SCPVSM01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify excessive virtual storage use within the Pageable Link Pack Area (PLPA) caused by the use of the pack list option.

RATIONALE: PLPA paging can be reduced by forcing modules that tend to be used together to be loaded into the same page, or group of pages, in PLPA storage, thus reducing the probability of additional pages being read from auxiliary storage after the initial module is accessed. When a group of modules in the pack list is loaded into memory, any unused space in the last page is never used. This is in contrast to normal PLPA loading, where an effort is made to make best use of all space. An excessive amount of space being wasted, as a result of incomplete pages built during pack list processing, may be cause for concern in virtual storage constrained systems, especially if the amount is sufficient to cause the LPA to exceed a one-megabyte segment boundary, thereby making the private area one megabyte smaller than necessary.

DEFINITION: This exception is detected when the amount of empty space caused by pack list processing exceeds an installation-specified maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02901 PLPA PACKING LOSS EXCEEDS MAX **
***** */
IF VSMAPAKL GT kbyte
  THEN DO;
    EXCCODE='02901'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDISC1='PLPA PACKING LOSS EXCEEDS MAX';
    EXCDISC2='LOSS=' !! PUT(VSMAPAKL,4.) !! ' KBYTES';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the kbyte value according to the following convention:

kbyte - The maximum amount of unused space caused by pack list processing. A threshold 100 KB would appear as:

VSMAPAKL GT 100

02902: SQA Overflow into CSA

FILE: Virtual Storage System Usage File
 SAS FILE NAME: DAYS.SCPVSM01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Identify situations where either the size for the System Queue Area (SQA) is insufficient or SQA storage is not properly managed, resulting in the use of the Common Storage Area (CSA) for SQA allocations.

RATIONALE: An SQA expansion into CSA may be the result of SQA storage fragmentation, the failure of one or more facilities to free SQA storage allocations properly, or of setting the SQA size to too small a value. When this happens, the effective size of CSA is reduced. Unlike SQA, when CSA is filled, the operating system crashes.

DEFINITION: This exception is detected whenever there is any use of CSA by SQA expansion.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02902 SQA OVERFLOW INTO CSA **
***** */
IF VSMACSQL
  THEN DO;
    EXCCODE='02902'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDDESC1='SQA OVERFLOW INTO CSA';
    EXCDDESC2='OVERFLOW=' !! PUT(VSMACSQL,4.) !! ' KBYTES';
    LINK HIT;
  END;
```

02903: CSA Assigned to Non-Standard Protect Key

FILE: Virtual Storage System Usage File
SAS FILE NAME: DAYS.SCPVSM01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect Common Storage Area (CSA) usage by programs running in a storage protect key not usually used.

RATIONALE: Most problem programs run in protect key 8 (except for V=R jobs that run in unique keys from 9 to F), and system-related address spaces run in protect keys 0 through 7. The following table shows the normal protect key assignments in an unmodified MVS environment:

Key	Use
---	-----
0	System Control Program
1	Job Scheduler, JES2, JES3
2	VSPC
3	not used
4	not used
5	Data Management, Access Methods
6	Communications
7	IMS
8	V=V Problem Programs
9-F	V=R Problem Programs

Normally, some protect keys are not used. For example, key 3 is not used by any of the standard IBM address spaces. Storage protect keys below 8 can only be assigned by programs running in the authorized state, or whose program name is identified in the Program Properties Table (PPT). The PPT should be a highly secured facility in any installation since it can be used to give system-wide authority to otherwise unauthorized programs. Unexplained storage key allocations in CSA, therefore, can be an indication of a possible security exposure, or of defective code in a properly authorized program.

DEFINITION: This exception is detected whenever any CSA allocations are made for an installation-defined protect key.
EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are

described below:

```
/* *****  
** 02903 CSA ASSIGNED TO NONSTANDARD PROTECT KEY **  
***** */  
IF VSMaKCSL  
  THEN DO;  
    EXCCODE='02903'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
    EXCDDESC1='CSA ASSIGNED TO NONSTANDARD PROTECT KEY';  
    EXCDDESC2='KEY k CSA=' !! PUT(VSMaKCSL,4.) !! ' KBYTES';  
    LINK HIT;  
  END;
```

THRESHOLD MODIFICATION: The user should modify the three "k" values in the above code to the desired protect key. A test for CSA allocations in key 3 would appear as:

```
IF VSMA3CSL  
  THEN DO;  
    EXCCODE='02903'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
    EXCDDESC1='CSA ASSIGNED TO NONSTANDARD PROTECT KEY';  
    EXCDDESC2='KEY 3 CSA=' !! PUT(VSMA3CSL,4.) !! ' KBYTES';  
    LINK HIT;  
  END;
```

02904: Allocated SQA Pages Exceeds Max

FILE: Virtual Storage System Usage File
SAS FILE NAME: DAYS.SCPVSM01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect excessive System Queue Area (SQA) use. This exception is defined in terms of absolute size. Exception 02908 may also be used to detect this condition in terms of the percent of SQA allocated.

RATIONALE: When sufficient SQA storage is not available, SQA allocations are made in the Common Storage Area (CSA), thereby effectively making the CSA smaller. Excessive SQA usage can occur either through normal workload growth or as a result of improper SQA storage management.

DEFINITION: This exception is detected when the amount of storage allocated in SQA exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02904 ALLOCATED SQA PAGES EXCEEDS MAX **  
***** */  
IF VSMAUSQL GT kbytes  
THEN DO;  
  EXCCODE='02904'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='ALLOCATED SQA PAGES EXCEEDS MAX';  
  EXCDISC2='SIZE=' !! PUT(VSMAUSQL,4.) !! ' KBYTES';  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the kbyte value according to the following convention:

kbyte - The maximum amount in kilobytes of space allocated in SQA. A test for a value in excess of 600 KB would appear as:

```
VSMAUSQL GT 600
```

02905: Allocated CSA Pages Exceeds Max

FILE: Virtual Storage System Usage File
 SAS FILE NAME: DAYS.SCPVSM01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect excessive Common Storage Area (CSA) use.
 This exception is defined in terms of absolute size.
 Exception 02909 may also be used to detect this condition in terms of the percent of CSA allocated.

RATIONALE: When sufficient CSA storage is not available, the operating system usually crashes. Excessive CSA usage can occur either through normal workload growth or as a result of improper CSA storage management.

DEFINITION: This exception is detected when the amount of storage allocated in CSA exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02905 ALLOCATED CSA PAGES EXCEEDS MAX **
***** */
IF VSMAUCSL GT kbyte
  THEN DO;
    EXCCODE='02905'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDISC1='ALLOCATED CSA PAGES EXCEEDS MAX';
    EXCDISC2='SIZE=' !! PUT(VSMAUCSL,4.) !! ' KBYTES';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the kbyte value according to the following convention:

kbyte - The maximum amount in kilobytes of space allocated in CSA. A test for a value in excess of 4000 KB would appear as:

```
VSMAUCSL GT 4000
```

02906: Largest Free Block of SQA Less Than Minimum

FILE: Virtual Storage System Usage File
SAS FILE NAME: DAYS.SCPVSM01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect fragmented or overcommitted System Queue Area (SQA).

RATIONALE: When storage allocations in the SQA are made and released over a long period of time, it is possible for the free space to be so fragmented that there is no single contiguous area large enough to satisfy an allocation request even though the sum of the fragments is more than the request. In this case, an unconditional allocation request will fail.

DEFINITION: This exception is detected when the largest free block of SQA is less than an installation-defined minimum size.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02906 LARGEST FREE BLOCK OF SQA LESS THAN MINIMUM **  
***** */  
IF VSMABSQL NE . THEN IF VSMABSQL LT kbytes  
THEN DO;  
  EXCCODE='02906'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='LARGEST FREE BLOCK OF SQA LESS THAN MINIMUM';  
  EXCDISC2='SIZE=' !! PUT(VSMABSQL,4.) !! ' KBYTES';  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the kbyte value according to the following convention:

kbyte - The minimum size of the largest free block of SQA. A test for a value less than 16 KB would appear as:

VSMABSQL LT 16

02907: Largest Free Block of CSA Less Than Minimum

FILE: Virtual Storage System Usage File
 SAS FILE NAME: DAYS.SCPVSM01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect fragmented or overcommitted System Queue Area (CSA).

RATIONALE: When storage allocations in the CSA are made and released over a long period of time, it is possible for the free space to be so fragmented that there is no single contiguous area large enough to satisfy an allocation request even though the sum of the fragments is more than the request. In this case, an unconditional allocation request will fail.

DEFINITION: This exception is detected when the largest free block of CSA is less than an installation-defined minimum size.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****
** 02907 LARGEST FREE BLOCK OF CSA LESS THAN MINIMUM **
***** */
IF VSMABCSL NE . THEN IF VSMABCSL LT kbytes
  THEN DO;
    EXCCODE='02907'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
    EXCDISC1='LARGEST FREE BLOCK OF CSA LESS THAN MINIMUM';
    EXCDISC2='SIZE=' !! PUT(VSMABCSL,4.) !! ' KBYTES';
    LINK HIT;
  END;
```

THRESHOLD MODIFICATION: The user should modify the kbyte value according to the following convention:

kbyte - The minimum size of the largest free block of CSA. A test for a value less than 96 KB would appear as:

```
VSMABCSL LT 96
```

02908: Percent SQA Allocated Exceeds Max

FILE: Virtual Storage System Usage File
SAS FILE NAME: DAYS.SCPVSM01
SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect excessive System Queue Area (SQA) use. This exception is defined in terms of percent. Exception 02904 may also be used to detect this condition in terms of the absolute size of SQA allocated.

RATIONALE: When sufficient SQA storage is not available, SQA allocations are made in the Common Storage Area (CSA), thereby effectively making the CSA smaller. Excessive SQA usage can occur either through normal workload growth or as a result of improper SQA storage management.

DEFINITION: This exception is detected when the percent of SQA storage allocated exceeds an installation-defined maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the exception situation and describing the condition are stored in the source member named in SOURCE LOCATION and are described below:

```
/* *****  
** 02908 PERCENT SQA ALLOCATED EXCEEDS MAX **  
***** */  
IF VSMASQLP NE . THEN IF VSMASQLP GT percent  
THEN DO;  
  EXCCODE='02908'; SEVERITY='I'; MGMTAREA='PERFORMANCE';  
  EXCDISC1='PERCENT SQA ALLOCATED EXCEEDS MAX';  
  EXCDISC2='ALLOCATED=' !! PUT(VSMASQLP,4.) !! '%';  
  LINK HIT;  
END;
```

THRESHOLD MODIFICATION: The user should modify the percent value according to the following convention:

percent - The maximum percent of SQA allocated is specified.
An 85 percent threshold would appear as:

```
VSMASQLP GT 85
```

02909: Percent CSA Allocated Exceeds Max

FILE: Virtual Storage System Usage File
 SAS FILE NAME: DAYS.SCPVSM01
 SOURCE LOCATION: prefix.MICS.USER.SOURCE(DYRMFEXC)

SEVERITY: Impacting (SEVERITY='I')
 MANAGEMENT AREA: Performance (MGMTAREA='PERFORMANCE')

PURPOSE: Detect excessive Common Storage Area (CSA) use.
 This exception is defined in terms of percent. Exception
 02905 may also be used to detect this condition in terms of
 the absolute size of CSA allocated.

RATIONALE: When sufficient CSA storage is not available, the
 operating system usually crashes. Excessive CSA usage can
 occur either through normal workload growth or as a result of
 improper CSA storage management.

DEFINITION: This exception is detected when the percent of
 CSA storage allocated exceeds an installation-defined
 maximum.

EXCEPTION STATEMENTS: The SAS statements identifying the
 exception situation and describing the condition are stored
 in the source member named in SOURCE LOCATION and are
 described below:

```
/* *****
** 02909 PERCENT CSA ALLOCATED EXCEEDS MAX **
***** */
IF VSMACSLP NE . THEN IF VSMACSLP GT percent
  THEN DO;
  EXCCODE='02909'; SEVERITY='I'; MGMTAREA='PERFORMANCE';
  EXCDISC1='PERCENT CSA ALLOCATED EXCEEDS MAX';
  EXCDISC2='ALLOCATED=' !! PUT(VSMACSLP,4.) !! '%';
  LINK HIT;
END;
```

THRESHOLD MODIFICATION: The user should modify the percent
 value according to the following convention:

percent - The maximum percent of CSA allocated is specified.
 An 85 percent threshold would appear as:

```
VSMACSLP GT 85
```


Chapter 5: FILES

The CA MICS Hardware and SCP Analyzer divides its data logically into the following information areas:

- o Hardware Information Area (HAR) - These files contain CPU, LPAR, cryptographic hardware, coupling facility, channel path, physical control unit, device, and caching information.
- o SCP Information Area (SCP) - These files contain workload, paging, page data set, enqueue, RMF trace, virtual storage, logical control unit, I/O queuing, and USS data.
- o Workload Management Information Area (WLM) - These files contain information that describes WLM control definitions, associations between clients and servers, resource group definitions, service class goals, measurements of service received, transaction response times and response time percentile distributions, sampled execution delay states, and Workload Manager states that were sampled as transactions passed through server address spaces.

Figure 5-1 lists the product's files and the timespans that are activated for each file. Figures 5-2 through 5-4 describe the files supported by the HAR, SCP, and WLM information areas, and their data sources.

Figure 5-1 identifies the individual database files and categorizes them by the information area to which they belong. For each file in an information area, the following data is provided:

XDWMYT - This entry defines the timespans in which the file is supported.

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

File - The identifier used to access this file.

File Name - The description of the file.

Note: The timespans in which a file is supported are defined by each data center when CA MICS is installed. Therefore,

this table has been generated as part of the installation process to accurately reflect the CA MICS system at your data center.

+-----+-----+		
Hardware Utilization	Date Generated:	
Information Area	Fri, Sep 6, 2013	
+-----+-----+		
XDWMYT File File Name		
XDWM.. HARCCU CACHE CONTROL UNIT ACTIVITY FILE		
XDWM.. HARCFA CF CHANNEL PATH FILE		
XDWM.. HARCFC CF CONNECTIVITY FILE		
XDWM.. HARCFD CF DUPLEXING ACTIVITY FILE		
XDWM.. HARCFA CF CACHE STRUCTURE ACTIVITY FILE		
XDWM.. HARCFC CF CONFIGURATION AND ACTIVITY FILE		
XDWM.. HARCFR CF REQUEST FILE		
XDWM.. HARCFS CF STRUCTURE FILE		
XDWMY. HARCME CPU MEASUREMENT FACILITY ENGINE FILE		
XDWMY. HARCML CPU MEASUREMENT FACILITY LPAR FILE		
XDWMY. HARCMT CPU MEASUREMENT FACILITY ENGTYPE FILE		
X..... HRCMX CPU MEASUREMENT FACILITY SUSPEND FILE		
XDWM.. HARCPU CPU ACTIVITY FILE		
XDWM.. HARCRA CRYPTO ACCELERATOR ACTIVITY FILE		
XDWM.. HARCRA CRYPTO SERVICES ACTIVITY FILE		
XDWM.. HARCRA CRYPTO PKCS11 COPROCESSOR ACTIVITY		
XDWM.. HARCRA CRYPTO CCA COPROCESSOR ACTIVITY		
.DWM.. HARCVA CACHE VOLUME ACTIVITY FILE		
XDWM.. HARDDA DEVICE ACTIVITY FILE		
XDWM.. HARELS ESS LINK STATISTICS FILE		
XDWM.. HARERS ESS RANK STATISTICS FILE		
XDWM.. HARFDC FICON DIRECTOR CONNECTOR FILE		
XDWM.. HARFDP FICON DIRECTOR PORT ACTIVITY FILE		
XDWM.. HARIPU INDIVIDUAL PROCESSOR ACTIVITY FILE		
XDWM.. HARLPC PR/SM LPAR CONFIG/ACTIVITY FILE		
XDWM.. HARPCA PHYSICAL CHANNEL ACTIVITY FILE		
XDWM.. HARRRA RAID RANK ACTIVITY FILE		
X..... HARRSV HARDWARE RESERVE ACTIVITY FILE		
XDWM.. HARVPA PR/SM LOGICAL PROC ACTIVITY FILE		
XDWM.. HARXPS ESS EXTENT POOL STATISTICS FILE		
.DWM.. HARDDA DEVICE TYPE ACTIVITY FILE		
.DWM.. HARPHY PHYSICAL HARDWARE FILE		
.DWM.. HARSGA STORAGE GROUP ACTIVITY FILE		
+-----+-----+		
System Control Program	Date Generated:	
Information Area	Fri, Sep 6, 2013	

+-----+-----+		
XDWMYT	File	File Name
X.....	SCPARD	ADDRESS SPACE ACTIVITY FILE
XDW...	SCPENQ	RESOURCE ENQUEUE ACTIVITY FILE
XDWM..	SCPIOC	I/O QUEUING CONFIGURATION FILE
XDWM..	SCPIOP	I/O PROCESSOR ACTIVITY FILE
XDWM..	SCPKRN	USS KERNEL ACTIVITY FILE
XDWM..	SCPLCA	LOGICAL CHANNEL/CU ACTIVITY FILE
XDWM..	SCPPAG	PAGING ACTIVITY FILE
XDW...	SCPPSD	PAGE DATA SET ACTIVITY FILE
X.....	SCPSRC	REAL STORAGE/CPU/SRM ACTIVITY FILE
X.....	SCPSRD	SERIALIZATION DELAY DETAILS FILE
XDWM..	SCPSRS	SERIALIZATION DELAY SYSTEM FILE
XDWM..	SCPSWP	SWAP ACTIVITY FILE
X.....	SCPTRC	RMF TRACE ACTIVITY FILE
XDWM..	SCPVSM	VIRTUAL STORAGE SYSTEM USAGE FILE
XDWM..	SCPVSU	VIRTUAL STORAGE PRIVATE USAGE FILE
XDWM..	SCPXCA	XCF PATH ACTIVITY
XDWM..	SCPXCM	XCF MEMBER ACTIVITY
XDWM..	SCPXCY	XCF SYSTEM ACTIVITY
.DWM..	SCPLCU	LOGICAL CONTROL UNIT ACTIVITY FILE
+-----+-----+		
Workload Management		Date Generated:
Information Area		Fri, Sep 6, 2013
+-----+-----+		
XDWMYT	File	File Name
XDWM..	WLM_EA	REPORT CLASS
XDWM..	WLM_EC	REPORT CLASS RESOURCE CONSUMPTION
XDWM..	WLM_ED	REPORT CLASS GENERAL EXEC DELAY
XDWM..	WLM_EM	REPORT CLASS RESPONSE TIME
XDWM..	WLM_EW	REPORT CLASS SUBSYSTEM DELAY STATES
XDWM..	WLMRGP	RESOURCE GROUP
XDWM..	WLMSDE	SERVICE DEFINITION
XDWM..	WLMSDS	SERVICE CLASS SUBSYSTEM DELAY STATES
XDWM..	WLMSEA	SERVICE CLASS
XDWM..	WLMSEC	SERVICE CLASS RESOURCE CONSUMPTION
XDWM..	WLMSED	SERVICE CLASS GENERAL EXEC DELAY
XDWM..	WLMSEM	SERVICE CLASS RESPONSE TIME
XDWM..	WLMSVC	SERVICE CLIENT
+-----+-----+		

Figure 5-1. HAR, SCP, and WLM Files

File	File Name	Description	Derivation
HARCCU	Cache Control Unit Activity	Quantifies caching activity for caching capable DASD subsystems on a subsystem (control unit) level.	Cache Subsystem Device Activity (type 74, subtype 5)
HARCFA	CF Channel Path	Stores the characteristics of the channel paths of type CIB or CFP associated to local or remote coupling facilities on a zEC12. Also contains limited identification information (channel path id, channel path type) for channel paths other than CIB or CFP.	Coupling Facility Activity (type 74, subtype 4)
HARCFC	CF Connectivity	Stores the names of other systems in the sysplex that are also connected to the CF.	Coupling Facility Activity (type 74, subtype 4)
HARCFD	CF Duplexing Activity	Stores configuration and performance information about the remote coupling facilities connected to a local CF.	Coupling Facility Activity (type 74, subtype 4)
HARCFH	CF Cache Structure Activity	Stores performance information about CF cache structures. The information is well suited for analysis directed towards tuning cache structures. This file can be merged with the HARCFR and HARCFS files for complete info on CF cache structures. There is one HARCFH file observation for each CF cache structure per RMF recording interval.	Coupling Facility Activity (type 74, subtype 4)

File	File Name	Description	Derivation
HARCFP	CF Configuration and Activity	Stores information about the coupling facility (CF), including name, the amount of storage installed and used, and the number and utilization of processors. This file also contains information describing the hardware paths between the z/OS system and the CF, and data identifying the Cross-System Extended Services (XES) request activity through the CF.	Coupling Facility Activity (type 74, subtype 4)
HARCFR	CF Request	Stores information about all the CF/XES structures connected to the system. This information includes the name, type, and status of each structure, as well as detailed information about the number, type, and service times of all requests to and from each connected structure. There is one HARCFR file per system. Each file contains data from the perspective of its system.	Coupling Facility Activity (type 74, subtype 4)
HARCF5	CF Structure	Stores the name and storage resources of all structures allocated in the CF.	Coupling Facility Activity (type 74, subtype 4)
HARCME	CPU Measurement Facility Engine	Quantifies instruction, cycle, cache usage, other statistics for each active logical processor for z/OS LPARs.	Hardware capacity, reporting, and statistics (type 113, subtype 2)
HARCMT	CPU Measurement Facility EngType	Quantifies instruction, cycle, cache usage, other statistics for each online logical processor type (for example CP, zIIP) for z/OS LPARs.	Hardware capacity, reporting, and statistics (type 113, subtype 2)
HARCML	CPU Measurement Facility LPAR	Quantifies instruction, cycle, cache usage, other statistics for all active logical processors for each z/OS LPAR.	Hardware capacity, reporting, and statistics (type 113, subtype 2)

Figure 5-2. Hardware File Descriptions (Part 2 of 5)

File	File Name	Description	Derivation
HARCPU	CPU Activity	Quantifies CPU utilization for all processor types. Also identifies and quantifies address space usage.	CPU, PR/SM, and ICF Activity (type 70, subtype 1)
HARCRA	Crypto Accelerator Activity	Provides performance and throughput information for operations executing on cryptographic accelerators.	Cryptographic Hardware Activity (type 70, subtype 2)
HARCRF	ICSF Services Activity	Quantifies activity of cryptographic services used to encipher and decipher secure data.	Cryptographic Hardware Activity (type 70, subtype 2)
HARCRK	Crypto PKCS11 Coprocessor Activity	Provides performance and throughput information for operations executing on Cryptographic Express4S cards configured in PKCS11 coprocessor mode.	Cryptographic Hardware Activity (type 70, subtype 2)
HARCRP	Crypto CCA Coprocessor Activity	Provides performance and throughput information for operations executing on CCA cryptographic coprocessors.	Cryptographic Hardware Activity (type 70, subtype 2)
HARCVA	Cache Volume Activity	Quantifies caching activity for caching capable DASD subsystems on a device level.	Cache Subsystem Device Activity (type 74, subtype 5)
HARDTA	Device Type Activity	Quantifies the utilization of device types in terms of I/O and average performance factors for each type category. Contains one record for each device type.	Device Activity File (HARDVA)
HARDVA	Device Activity	Quantifies the utilization of individual device addresses in terms of I/O, percent busy, average queue to the device, and so on. Contains one record for each unique device address.	Device Activity (type 74, subtype 1)

Figure 5-2. Hardware File Descriptions (Part 3 of 5)

File	File Name	Description	Derivation
HARELS	ESS Link Statistics	Provides I/O performance and throughput information for Enterprise Disk Systems on a system adapter level.	Enterprise Disk System Statistics (type 74, subtype 8)
HARERS	ESS Rank Statistics	Quantifies read and write activity in each rank of an extent pool within an Enterprise Disk System.	Enterprise Disk System Statistics (type 74, subtype 8)
HARFDC	FICON Director Connector	Stores the name and status of all control units connected to multiple-CU FICON director ports.	FICON Director Statistics (type 74, subtype 7)
HARFDP	FICON Director Port Activity	Provides statistics about I/O workload, throughput, and contention for FICON director ports.	FICON Director Statistics (type 74, subtype 7)
HARIPU	Individual Processor Activity	Describes the CPU utilization for each central processor or each PR/SM logical processor defined in the processor complex.	CPU, PR/SM, and ICF Activity (type 70, subtype 1)
HARLPC	PR/SM LPAR Config/Activity	Describes the activity for each defined PR/SM logical partition in a processor complex. Data is also carried that tracks changes made to the logical partition definition that might alter performance analysis of the complex.	CPU, PR/SM, and ICF Activity (type 70, subtype 1)
HARPCA	Physical Channel Activity	Quantifies the utilization of channel paths. There is a single record per channel path on a processor complex.	Channel Path Activity (type 73)
HARPHY	Physical Hardware	Stores the physical hardware, both CPC and devices present in the HARIPU and HARDVA files. For devices that cannot be identified, logical device class/type groups are stored.	HARIPU and HARDVA files

Figure 5-2. Hardware File Descriptions (Part 4 of 5)

File	File Name	Description	Derivation
HARRRA	RAID Rank Activity	Quantifies caching activity for caching capable DASD subsystems on an array (RAID rank) level.	Cache Subsystem Device Activity (type 74, subtype 5)
HARRSV	Hardware Reserve Activity	Quantifies the reserve requests for resources made by the supervisor services RESERVE macro.	RMF Monitor II Reserve Data (type 79, subtype 6)
HARSGA	Storage Group Activity	Quantifies the utilization of defined DFSMS storage groups in terms of I/O rate, average performance factors for all devices in the group, and so on. There is one record for each storage group.	Device Activity File (HARDVA)
HARVPA	PR/SM Processor Activity	Describes the activity for each active PR/SM logical processor in a processor complex. Data is also carried that tracks changes made to the logical processor definition that might affect performance analysis of the complex.	CPU, PR/SM, and ICF Activity (type 70, subtype 1)
HARXPS	ESS Extent Pool Statistics	Provides capacity and performance information about allocated disk space on an Enterprise Disk System.	Enterprise Disk System Statistics (type 74, subtype 8)

Figure 5-2. Hardware File Descriptions (Part 5 of 5)

File	File Name	Description	Derivation
SCPARD	Address Space Activity	Quantifies the resource consumption, service, and status of each address space. There is a record for each address that exists when the record is written at the end of the recording interval.	RMF Monitor II Address Space Resource Data (type 79, subtype 2)
SCPENQ	Resource Enqueue Activity	Identifies the resources for which enqueue contention occurred.	Enqueue Activity (type 73)
SCPIOC	I/O Queuing Configuration	Contains data identifying the configuration of the system's logical control units based on the IOCDs created by the IOCP generation process. For each logical control unit, the channel paths and control units attached to the channel paths are defined.	I/O Queuing Activity (type 78, subtype 3)
SCPIOP	I/O Processor Activity	Quantifies the utilization of the I/O Processor. The I/O Processor manages and schedules I/O requests for the CPC. There is one record for each interval.	I/O Queuing Activity (type 78, subtype 3)
SCPKRN	USS Kernel Activity	Stores information about Unix System Services kernel load in terms of system activity, process workload, memory map and shared library utilizations.	OMVS Kernel Activity (type 74, subtype 3)
SCPLCA	Logical Channel/Control Unit Activity	This file quantifies the utilization of each logical control unit. There is a single record per logical control unit.	I/O Queuing Activity (type 78, subtype 3)

Figure 5-3. SCP File Descriptions (Part 1 of 4)

File	File Name	Description	Derivation
SCPLCU	Logical Control Unit Activity	Summarizes the I/O measurement data for systems to the logical control unit level. This file provides information on logical and physical control unit activity, channel path activity and other I/O configuration-dependent queuing delays. There is one record for each logical control unit defined to the system.	Device Activity File (HARDVA), Logical Channel/CU Activity File (SCPLCA), and I/O Configuration File (SCPIOC)
SCPPAG	Paging Activity	Quantifies the demands of the system paging facilities and the utilization of central storage, expanded storage, and auxiliary storage.	Paging Activity (type 71)
SCPPSD	Page Data Set Activity	Quantifies the utilization of auxiliary page slots and the use of the page data sets. There is a single record per page data set.	Page Data Set Activity (type 75)
SCPSRC	Real Storage/CPU/SRM Activity	These values, used in the SRM control algorithms, quantify the use of real storage, processor utilization, and the length of the ASM and SRM queues. There is a record for each Monitor II interval.	RMF Monitor II Storage/Processor Data (type 79, subtype 3)
SCPSRD	Serialization Delay Details	Provides contention information at the address space level for different types of suspend locks, GRS enqueues, and GRS latches.	Serialization Delay (type 72, subtype 5)
SCPSRS	Serialization Delay System	Provides system-wide summary contention information for all address spaces, for different types of suspend locks, GRS enqueues, and GRS latches.	Serialization Delay (type 72, subtype 5)

Figure 5-3. SCP File Descriptions (Part 2 of 4)

File	File Name	Description	Derivation
SCPSWP	Swapping Activity	Quantifies logical and physical swapping activity, broken down by swap reason. This file is also used to monitor swap placement activity in main memory, extended memory and auxiliary storage. There is one record for each of eleven swap reasons.	Paging Activity (type 71)
SCPTRC	Trace Activity	Identifies the field names traced, including their minimum, maximum, sum, sum of squares, standard deviation, and average values.	Trace Activity (type 76)
SCPVSM	Virtual Storage System Usage	Contains data quantifying the utilization of virtual storage broken down by system areas such as the nucleus, PSA, CSA, SQA, MLPA, FLPA, PLPA, LSQA, SWA, and so on, both above and below the 16 MB line. Usage is expressed in terms of averages, totals, maximums, minimums, and percentages of kilobytes, and starting addresses and allocation times.	Virtual Storage Activity (type 78, subtype 2)
SCPVSU	Virtual Storage Private Usage	Contains data quantifying the utilization of virtual storage broken down by private areas such as regions, subpools, LSQA, SWA, free areas, and so on, both above and below the 16 MB line. Usage is expressed in terms of averages, totals, maximums and minimums in kilobytes, and starting addresses, allocation times, getmain limits, and flags.	Virtual Storage Activity (type 78, subtype 2)

Figure 5-3. SCP File Descriptions (Part 3 of 4)

File	File Name	Description	Derivation
SCPXCA	XCF Path Activity	Stores information about each signaling path connecting the local system to all remote systems.	XCF Activity (type 74, subtype 2)
SCPXCM	XCF Member Activity	Stores information about signals sent to and from each remote system, further broken down by remote group and member.	XCF Activity (type 74, subtype 2)
SCPXCY	XCF System Activity	Stores information about Cross-System Coupling Facility (XCF) traffic to, from, and within its particular system. There is one SCPXCY file per system.	XCF Activity (type 74, subtype 2)

Figure 5-3. SCP File Descriptions (Part 4 of 4)

File	File Name	Description	Derivation
WLM_EA	Report Class	Contains information about report classes, including goal types, target values, and indicators showing the presence or absence of resource consumption, response time, and general execution delay measurement.	Workload Activity (type 72, subtype 3)
WLM_EC	Report Class Resource Consumption	Quantifies resource consumption by report class period. Measurements include service units consumed, storage occupied, paging and swapping activity, and hyperspace usage.	Workload Activity (type 72, subtype 3)
WLM_ED	Report Class General Execution Delay	Quantifies sampled execution state information by report class period. Measurements include how often work was using or waiting for CPU, waiting for auxiliary storage access, idle, or in some other condition.	Workload Activity (type 72, subtype 3)
WLM_EM	Report Class Response Time	Quantifies transaction response time by report class period. Measurements include transaction counts and processing rates, average elapsed times and standard deviations, and numbers of transactions completed within fixed percentages of specified goals.	Workload Activity (type 72, subtype 3)
WLM_EW	Report Class Subsystem Delay States	Contains information characterizing the effect of subsystem server address space status on report classes requests and transactions.	Workload Activity (type 72, subtype 3)

Figure 5-4. WLM File Descriptions (Part 1 of 3)

File	File Name	Description	Derivation
WLMRGP	Resource Group	Contains information about the resource groups assigned to service classes, including the minimum and maximum processor capacity defined for the resource group.	Workload Activity (type 72, subtype 3)
WLMSEDE	Service Definition	Contains information about the Workload Manager service definition installed at the time measurements were taken.	Workload Activity (type 72, subtype 3)
WLMSEDS	Service Class Subsystem Delay States	Contains information characterizing the effect of subsystem server address space status on service classes requests and transactions.	Workload Activity (type 72, subtype 3)
WLMSEA	Service Class	Contains information about service classes, including goal types, target values, and indicators showing the presence or absence of resource consumption, response time, and general execution delay measurement.	Workload Activity (type 72, subtype 3)
WLMSECR	Service Class Resource Consumption	Quantifies resource consumption by service class period. Measurements include service units consumed, storage occupied, paging and swapping activity, and hiperspace usage.	Workload Activity (type 72, subtype 3)
WLMSEDE	Service Class General Execution Delay	Quantifies sampled execution state information by service class period. Measurements include how often work was using or waiting for CPU, waiting for auxiliary storage access, idle, or in some other condition.	Workload Activity (type 72, subtype 3)

Figure 5-4. WLM File Descriptions (Part 2 of 3)

File	File Name	Description	Derivation
WLMSEM	Service Class Response Time	Quantifies transaction response time by service class period. Measurements include transaction counts and processing rates, average elapsed times and standard deviations, and numbers of transactions completed within fixed percentages of specified goals.	Workload Activity (type 72, subtype 3)
WLMSCV	Service Client	Contains the names of all client service classes served by transaction servers, and the number of work requests or transactions served.	Workload Activity (type 72, subtype 3)

Figure 5-4. WLM File Descriptions (Part 3 of 3)

This chapter presents the Hardware and SCP Analyzer data files as they are seen in the online database structure. These files might also be located offline in either audit or history archive files. The PIOM and the Database Structure and Content Guide discuss these other structures.

This chapter is divided into the following sections:

- 1 - Data Element Naming Conventions
- 2 - HAR Information Area Files
- 3 - SCP Information Area Files
- 4 - WLM Information Area Files

This section contains the following topics:

- [5.1 Data Element Naming Conventions](#) (see page 437)
- [5.2 HAR Information Area Files](#) (see page 440)
- [5.3 SCP Information Area Files](#) (see page 680)
- [5.4 WLM Information Area Files](#) (see page 830)

5.1 Data Element Naming Conventions

CA MICS data elements follow naming conventions that depend on whether they are standard or common data elements. Standard data elements use the first three characters of their name to identify the file in which they are defined. The following charts list the three-character prefixes with which the standard data element names begin and the files in which they are contained.

Hardware Information Area

File Name	File	Names Begin With
Cache Control Unit Activity	HARCCU	CCU
CF Channel Path	HARCFA	CFA
CF Connectivity	HARCFC	CFC
CF Duplexing Activity	HARCFD	CFD
CF Cache Structure Activity	HARCFH	CFH
CF Configuration and Activity	HARCFP	CFP
CF Request	HARCFR	CFR
CF Structure	HARCFs	CFS
CPU Measurement Facility	HARCMF	CME
Engine		
CPU Measurement Facility	HARCML	CML
LPAR		
CPU Measurement Facility	HARCMT	CMT
EngType		
CPU Activity	HARCPU	CPU
Crypto Accelerator Activity	HARCRA	CRA
ICSF Services Activity	HARCRF	CRF
Crypto PKCS11 Coprocessor	HARCRK	CRK
Activity		
Crypto CCA Coprocessor	HARCRP	CRP
Activity		
Cache Volume Activity	HARCVA	CVA
Device Type Activity	HARDTA	DTA
Device Activity	HARDVA	DVA
ESS Link Statistics	HARELS	ELS
ESS Rank Statistics	HARERS	ERS
FICON Director Connector	HARFDC	FDC
FICON Director Port Activity	HARFDP	FDP
Individual Processor	HARIPU	IPU
PR/SM LPAR Config. Activity	HARLPC	LPC
Physical Channel Activity	HARPCA	PCA
Physical Hardware File	HARPHY	PHY
RAID Rank Activity	HARRRA	RRA
Hardware Reserve Activity	HARRSV	RSV
Storage Group Activity	HARSGA	SGA
PR/SM Logical Proc. Activity	HARVPA	VPA
ESS Extent Pool Statistics	HARXPS	XPS

SCP Information Area

File Name	File	Names Begin With
Address Space Activity	SCPARD	ARD
Resource Enqueue Activity	SCPENQ	ENQ
I/O Queuing Activity	SCPIOC	IOC
I/O Processor Activity	SCPIOP	IOP
USS Kernel Activity	SCPKRN	KRN
Logical Channel Activity	SCPLCA	LCA
Logical Control Unit Activity	SCPLCU	LCU
Paging Activity	SCPPAG	PAG
Page Data Set Activity	SCPPSD	PSD
Real Storage/CPU/SRM Activity	SCPSRC	SRC
Serialization Delay Details	SCPSRD	SRD
Serialization Delay System	SCPSRS	SRS
Swapping Activity	SCPSWP	SWP
Trace Activity	SCPTRC	TRC
Virtual Stor. System Activity	SCPVSM	VSM
Virtual Stor. Private Activity	SCPVSU	VSU
XCF Path Activity	SCPXCA	XCA
XCF Member Activity	SCPXCM	XCM
XCF System Activity	SCPXCY	XCY

WLM Information Area

File Name	File	Names Begin With
Report Class	WLM_EA	SEA (See Note)
Report Class Resource Consumption	WLM_EC	SEC (See Note)
Report Class General Execution Delay	WLM_ED	SED (See Note)
Report Class Response Time	WLM_EM	SEM (See Note)
Report Class Subsystem Delay States	WLM_EW	SDS (See Note)
Resource Group	WLMRGP	RGP
Service Definition	WLMSEDE	SDE
Service Class Subsystem Delay States	WLMSDS	SDS
Service Class	WLMSEA	SEA
Service Class Resource Consumption	WLMSEC	SEC
Service Class Response Time	WLMSEM	SEM
Service Class General Execution Delay	WLMSED	SED
Service Client	WLM SVC	SVC

Note: The files containing an underscore (_) are called parallel files because they contain the same elements as another file. For these files, the first three characters of the data element names identify the file in which the data elements are defined.

Common data elements do not use a data element prefix. They have a common definition across database information areas or across files within an information area. You can find common data elements listed under Sequence/Summary Data Elements and Common Data Elements in the Data Elements List sections that follow.

5.2 HAR Information Area Files

This section identifies each file in the Hardware Information Area and defines its levels of summarization and data sequencing. Also, it presents the list of available data elements for each file.

The files maintained in the Hardware Information Area include:

- 1 - CPU Activity File (HARCPU)
- 2 - Physical Channel Activity File (HARPCA)
- 3 - Device Type Activity File (HARDTA)
- 4 - Device Activity File (HARDVA)
- 5 - CF Duplexing Activity File (HARCFD)
- 6 - Hardware Reserve Activity File (HARRSV)
- 7 - Individual Processor Activity File (HARIPU)
- 8 - PR/SM Logical Partition Activity File (HARLPC)
- 9 - PR/SM Logical Processor Activity File (HARVPA)
- 10 - Storage Group Activity File (HARSGA)
- 11 - CF Connectivity File (HARCFC)
- 12 - CF Cache Structure Activity File (HARCFH)
- 13 - CF Configuration and Activity File (HARCFP)
- 14 - CF Request File (HARCFR)
- 15 - CF Structure File (HARCFS)
- 16 - Cache Volume Activity File (HARCVA)
- 17 - Cache Control Unit Activity File (HARCCU)
- 18 - RAID Rank Activity File (HARRRA)
- 19 - Crypto Accelerator Activity File (HARCRA)
- 20 - ICSF Services Activity File (HARCRF)
- 21 - Crypto CCA Coprocessor Activity File (HARCRP)
- 22 - FICON Director Connector File (HARFDC)
- 23 - FICON Director Port Activity File (HARFDP)
- 24 - ESS Link Statistics File (HARELS)
- 25 - ESS Extent Pool Statistics File (HARXPS)
- 26 - ESS Rank Statistics File (HARERS)
- 27 - Physical Hardware File (HARPHY)
- 28 - CPU Measurement Facility Engine File (HARCME)
- 29 - CPU Measurement Facility EngType File (HARCMT)
- 30 - CPU Measurement Facility LPAR File (HARCML)
- 31 - CF Channel Path File (HARCFA)
- 32 - Crypto PKCS11 Coprocessor Activity File (HARCRK)

5.2.1 CPU Processor Activity File (HARCPU)

The CPU Activity File quantifies the CPU utilization for all processor types. Additionally, the address space (ASID) usage is identified and quantified (that is, number of in users, out users, users in wait, etc.) This file is typically used when reporting on CPU usage and address space activity.

The information in the HARCPU file is obtained from the RMF type 70 subtype 1 CPU, PR/SM, and ICF Activity record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.1.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS					
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
MONTHS	SYSID	YEAR	MONTH	ZONE		
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 12, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-5. HARCPU Sort Sequence and Data Granularity

5.2.1.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD....E	DAY	- Day of Month
XDW...E	HOUR	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year

XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CCCCCP - Current Highest CPU ID Installed
XDWM..E CPCCHGRS - Capacity Change Reason
XDWM..E CPCCHWMID - CPC Physical Model Identifier
XDWM..E CPCICP - Highest CPU ID Installed at IPL
XDWM..E CPCMCP - Max Available CPU ID Number at IPL
XDWM..E CPCMODID - CPC Model Identifier
XDWM..E CPCMODNR - Nominal Model Capacity Rating
XDWM..E CPCMODRT - Effec. Model Capacity Rating
XDWM..E CPCMPCID - CPC Permanent Model Capacity Identifier
XDWM..E CPCMPCNR - Nominal Permanent Model Capacity Rating
XDWM..E CPCMPCRT - Effec. Permanent Model Capacity Rating
XDWM..E CPCMTCID - CPC Temporary Model Capacity Identifier
XDWM..E CPCMTCNR - Nominal Temporary Model Capacity Rating
XDWM..E CPCMTCRT - Effec. Temporary Model Capacity Rating
XDWM..E CPCPLANT - CPC Manufacturer Plant
XDWM..E CPCSEQNB - CPC Sequence Number
XDWM..E CPUMODEL - CPU Model
XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E EXTSTOR - Expanded Storage Flag
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMACDP - Avg CP Dedicated Processors
XDWM..E PRSMACP - Avg CP Processors in Complex
XDWM..E PRSMACSP - Avg CP Shareable Processors
XDWM..E PRSMACVP - Avg CP Shared Logical Processors
XDWM..E PRSMADP - Avg Dedicated Processors
XDWM..E PRSMADP - Avg ICF Dedicated Processors
XDWM..E PRSMAIP - Avg ICF Processors in Complex
XDWM..E PRSMAISP - Avg ICF Shareable Processors
XDWM..E PRSMAIVP - Avg ICF Shared Logical Processors
XDWM..E PRSMALPA - Avg Active Logical Partitions
XDWM..E PRSMALPS - Avg Defined Logical Partitions
XDWM..E PRSMANDP - Avg IFL Dedicated Processors
XDWM..E PRSMANP - Avg IFL Processors in Complex
XDWM..E PRSMANSP - Avg IFL Shareable Processors
XDWM..E PRSMANVP - Avg IFL Shared Logical Processors
XDWM..E PRSMAPP - Avg Processors in Complex
XDWM..E PRSMASDP - Avg zIIP Dedicated Processors
XDWM..E PRSMASP - Avg zIIP Processors in Complex
XDWM..E PRSMASSP - Avg zIIP Shareable Processors

XDWM..E PRSMASVP - Avg zIIP Shared Logical Processors
XDWM..E PRSMAVP - Avg Shared Logical Processors
XDWM..E PRSMAZDP - Avg zAAP Dedicated Processors
XDWM..E PRSMAZP - Avg zAAP Processors in Complex
XDWM..E PRSMAZSP - Avg zAAP Shareable Processors
XDWM..E PRSMAZVP - Avg zAAP Shared Logical Processors
XDWM..E PRSMCEC - PR/SM LPAR Central Complex
XDWM..E PRSMCGLI - Capacity Group Limit
XDWM..E PRSMCGNM - Capacity Group Name
XDWM..E PRSMCGUI - Capacity Group Uses Initial Weights
XDWM..E PRSMENV - PR/SM LPAR Environment ID
XDWM..E PRSMHIPA - Intvls with Hiperdispatch Active
XDWM..E PRSMHIPC - Intvls with Hiperdispatch Status Changed
XDWM..E PRSMHIPD - Hiperdispatch Indicator
XDWM..E PRSMHIPS - Hiperdispatch Support Indicator
XDWM..E PRSMIWGT - Total Shr ICF Processor Resources Weight
XDWM..E PRSMLMCT - Intvls with LPAR Mgt Time Reporting
XDWM..E PRSMLPID - Logical Partition ID of Recording SYSID
XDWM..E PRSMLPNM - Logical Partition Name
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMLPTP - Logical Partition Type
XDWM.. PRSMMCDP - Max CP Dedicated Processors
XDWM.. PRSMMCP - Max CP Processors in Complex
XDWM.. PRSMMCSP - Max CP Shareable Processors
XDWM.. PRSMMCVP - Max CP Shared Logical Processors
XDWM.. PRSMMDP - Max Dedicated Processors
XDWM.. PRSMMIDP - Max ICF Dedicated Processors
XDWM.. PRSMMIP - Max ICF Processors in Complex
XDWM.. PRSMMISP - Max ICF Shareable Processors
XDWM.. PRSMMIVP - Max ICF Shared Logical Processors
XDWM.. PRSMMMLPA - Max Active Logical Partitions
XDWM.. PRSMMMLPS - Max Defined Logical Partitions
XDWM.. PRSMMNDP - Max IFL Dedicated Processors
XDWM.. PRSMMNP - Max IFL Processors in Complex
XDWM.. PRSMMNSP - Max IFL Shareable Processors
XDWM.. PRSMMNVP - Max IFL Shared Logical Processors
XDWM.. PRSMMPP - Max Processors in Complex
XDWM.. PRSMMSDP - Max zIIP Dedicated Processors
XDWM.. PRSMMSP - Max zIIP Processors in Complex
XDWM.. PRSMMSSP - Max zIIP Shareable Processors
XDWM.. PRSMMSVP - Max zIIP Shared Logical Processors
XDWM.. PRSMMVP - Max Shared Logical Processors
XDWM.. PRSMMZDP - Max zAAP Dedicated Processors
XDWM.. PRSMMZP - Max zAAP Processors in Complex
XDWM.. PRSMMZSP - Max zAAP Shareable Processors
XDWM.. PRSMMZVP - Max zAAP Shared Logical Processors
XDWM.. PRSMNCDP - Min CP Dedicated Processors
XDWM.. PRSMNCP - Min CP Processors in Complex
XDWM.. PRSMNCSP - Min CP Shareable Processors

XDWM..	PRSMNCVP	- Min CP Shared Logical Processors
XDWM..	PRSMNDP	- Min Dedicated Processors
XDWM..	PRSMNIDP	- Min ICF Dedicated Processors
XDWM..	PRSMNIP	- Min ICF Processors in Complex
XDWM..	PRSMNISP	- Min ICF Shareable Processors
XDWM..	PRSMNIVP	- Min ICF Shared Logical Processors
XDWM..	PRSMNLPA	- Min Active Logical Partitions
XDWM..	PRSMNLPS	- Min Defined Logical Partitions
XDWM..	PRSMNNDP	- Min IFL Dedicated Processors
XDWM..	PRSMNNP	- Min IFL Processors in Complex
XDWM..	PRSMNNSP	- Min IFL Shareable Processors
XDWM..	PRSMNNVP	- Min IFL Shared Logical Processors
XDWM..E	PRSMNOPP	- Number of Physical Processors
XDWM..	PRSMNPP	- Min Processors in Complex
XDWM..	PRSMNSDP	- Min zIIP Dedicated Processors
XDWM..	PRSMNSP	- Min zIIP Processors in Complex
XDWM..	PRSMNSSP	- Min zIIP Shareable Processors
XDWM..	PRSMNSVP	- Min zIIP Shared Logical Processors
XDWM..	PRSMNVP	- Min Shared Logical Processors
XDWM..E	PRSMNWGT	- Total Shr IFL Processor Resources Weight
XDWM..	PRSMNZDP	- Min zAAP Dedicated Processors
XDWM..	PRSMNZP	- Min zAAP Processors in Complex
XDWM..	PRSMNZSP	- Min zAAP Shareable Processors
XDWM..	PRSMNZVP	- Min zAAP Shared Logical Processors
XDWM..E	PRSMPRTP	- Logical Processor Type
XDWM..E	PRSMSWG	- Total Shr zIIP Proc. Resources Weight
XDWM..E	PRSMTAMT	- Total LPAR Mgt Time - Attributable
XDWM..E	PRSMTBPS	- All Partitions Processor Weights
XDWM..E	PRSMTCAT	- Total CP LPAR Mgt Time - Attributable
XDWM..E	PRSMTCDP	- Total CP Dedicated Processors
XDWM..E	PRSMTCDT	- Total CP Dispatch Time
XDWM..E	PRSMTCET	- Total CP Dispatch Time - Effective
XDWM..E	PRSMTCMT	- Total CP LPAR Mgt Time
XDWM..E	PRSMTCP	- Total CP Processors in Complex
XDWM..E	PRSMTCSP	- Total CP Shareable Processors
XDWM..E	PRSMTCST	- Total CP Dispatch Time - Shared
XDWM..E	PRSMTCUT	- Total CP LPAR Mgt Time - Unattributable
XDWM..E	PRSMTCVP	- Total CP Shared Logical Processors
XDWM..E	PRSMTDP	- Total Dedicated Processors
XDWM..E	PRSMTDTM	- Total Dispatch Time - Shared
XDWM..E	PRSMTEDT	- Total Dispatch Time - Effective
XDWM..E	PRSMTIAT	- Total ICF LPAR Mgt Time - Attributable
XDWM..E	PRSMTIDP	- Total ICF Dedicated Processors
XDWM..E	PRSMTIDT	- Total ICF Dispatch Time
XDWM..E	PRSMTIET	- Total ICF Dispatch Time - Effective
XDWM..E	PRSMTIMT	- Total ICF LPAR Mgt Time
XDWM..E	PRSMTIP	- Total ICF Processors in Complex
XDWM..E	PRSMTISP	- Total ICF Shareable Processors
XDWM..E	PRSMTIST	- Total ICF Dispatch Time - Shared

XDWM..E PRSMTIUT - Total ICF LPAR Mgt Time - Unattributable
XDWM..E PRSMTIVP - Total ICF Shared Logical Processors
XDWM..E PRSMTLMT - Total LPAR Mgt Time
XDWM..E PRSMTLPA - Total Active Logical Partitions
XDWM..E PRSMTLPS - Total Defined Logical Partitions
XDWM..E PRSMTNAT - Total IFL LPAR Mgt Time - Attributable
XDWM..E PRSMTNDP - Total IFL Dedicated Processors
XDWM..E PRSMTNDT - Total IFL Dispatch Time
XDWM..E PRSMTNET - Total IFL Dispatch Time - Effective
XDWM..E PRSMTNMT - Total IFL LPAR Mgt Time
XDWM..E PRSMTNP - Total IFL Processors in Complex
XDWM..E PRSMTNSP - Total IFL Shareable Processors
XDWM..E PRSMTNST - Total IFL Dispatch Time - Shared
XDWM..E PRSMTNUT - Total IFL LPAR Mgt Time - Unattributable
XDWM..E PRSMTNVP - Total IFL Shared Logical Processors
XDWM..E PRSMTPP - Total Processors in Complex
XDWM..E PRSMTSAT - Total zIIP LPAR Mgt Time - Attributable
XDWM..E PRSMTSDP - Total zIIP Dedicated Processors
XDWM..E PRSMTSDT - Total zIIP Dispatch Time
XDWM..E PRSMTSET - Total zIIP Dispatch Time - Effective
XDWM..E PRSMTSMT - Total zIIP LPAR Mgt Time
XDWM..E PRSMTSP - Total zIIP Processors in Complex
XDWM..E PRSMTSSP - Total zIIP Shareable Processors
XDWM..E PRSMTSST - Total zIIP Dispatch Time - Shared
XDWM..E PRSMTSUT - Total zIIP LPAR Mgt Tm - Unattributable
XDWM..E PRSMTSVP - Total zIIP Shared Logical Processors
XDWM..E PRSMTTDT - Total Dispatch Time
XDWM..E PRSMTUMT - Total LPAR Mgt Time - Unattributable
XDWM..E PRSMTVP - Total Shared Logical Processors
XDWM..E PRSMTWGT - Total Shr CP Processor Resources Weight
XDWM..E PRSMTZAT - Total zAAP LPAR Mgt Time - Attributable
XDWM..E PRSMTZDP - Total zAAP Dedicated Processors
XDWM..E PRSMTZDT - Total zAAP Dispatch Time
XDWM..E PRSMTZET - Total zAAP Dispatch Time - Effective
XDWM..E PRSMTZMT - Total zAAP LPAR Mgt Time
XDWM..E PRSMTZP - Total zAAP Processors in Complex
XDWM..E PRSMTZSP - Total zAAP Shareable Processors
XDWM..E PRSMTZST - Total zAAP Dispatch Time - Shared
XDWM..E PRSMTZUT - Total zAAP LPAR Mgt Tm - Unattributable
XDWM..E PRSMTZVP - Total zAAP Shared Logical Processors
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E PRSMZWGT - Total Shr zAAP Proc. Resources Weight
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM..E RMFESCDR - Intvls with ESCON Director in Config
XDWM..E RMFESCON - Intvls where Enabled for ESCON
XDWM..E RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
X....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSUPAV - Intvls with zIIP Processors Available

XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
XDWM..E SAMPLES - RMF Sample Count
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E CPUACS - Processor Actual Weighting
X..... CPUAPMP - Multiple Processors in Complex
XDWM..E CPUBPS - Partition Processor Weight
XDWM..E CPUBWP - Pct CPU Resources Reserved for Promotion
XDWM..E CPUBWT - Wait for Promotion Threshold Interval
XDWM..E CPUCABSL - Absolute LPAR Limit for CP Proc Use
XDWM..E CPUCGAVL - Available Capacity for the Group
XDWM..E CPUCGJTS - Capacity Group Join Timestamp
XDWM..E CPUDEFML - Partition Defined Capacity Limit
XDWM..E CPUGTS - LPAR Global Time Slice for CEC
XDWM.. CPUHYPOF - Hypervisor Date/Time Offset
XDWM..E CPUMAS - Processor Maximum Weighting
XDWM..E CPUMIS - Processor Minimum Weighting
XDWM..E CPUMOD - Processor Model Family
XDWM..E CPUPCRA - CP Resource Allocation Percent
XDWM..E CPUSABSL - Absolute LPAR Limit for zIIP Proc Use
XDWM..E CPUSUAVL - Service Units Available to MVS Image
XDWM..E CPUSUBPS - Partition zIIP Processors Weight
XDWM..E CPUSUPNF - zIIP Service Time Normalization Factor
XDWM..E CPUSUSEC - Physical CPU Adjustment Factor
XDWM..E CPUVER - Processor Version
XDWM..E CPUZABSL - Absolute LPAR Limit for zAAP Proc Use
XDWM..E CPUZPBPS - Partition zAAP Processors Weight

Accumulated Data Elements

XDWM..E CPUADJCH - Intvls with CPU Adjustment Factor Chgd
XDWM.. CPUATT - Total Logical Out Wait Users
XDWM.. CPUA00 - Count Logical Out Wait Users was 0
XDWM.. CPUA01 - Count Log Out Wait Users was 1 or 2
XDWM.. CPUA02 - Count Log Out Wait Users was 3 or 4
XDWM.. CPUA03 - Count Log Out Wait Users was 5 or 6
XDWM.. CPUA04 - Count Log Out Wait Users was 7 or 8
XDWM.. CPUA05 - Count Log Out Wait Users was 9 or 10
XDWM.. CPUA06 - Count Log Out Wait Users was 11 - 15
XDWM.. CPUA07 - Count Log Out Wait Users was 16 - 20
XDWM.. CPUA08 - Count Log Out Wait Users was 21 - 25
XDWM.. CPUA09 - Count Log Out Wait Users was 26 - 30
XDWM.. CPUA10 - Count Log Out Wait Users was 31 - 35

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XDWM.. CPUA11 - Count Log Out Wait Users was 36 or More
XDWM..E CPUBSYTM - Total Time All Processors Busy
XDWM..E CPUBTT - Total Batch Users
XDWM..E CPUBWPCH - Blocked Work Units Promote Pct Changed
XDWM..E CPUBWTCH - Blocked Work Units Promote Threshold Chg
XDWM.. CPUB00 - Count Batch Users was 0
XDWM.. CPUB01 - Count Batch Users was 1 or 2
XDWM.. CPUB02 - Count Batch Users was 3 or 4
XDWM.. CPUB03 - Count Batch Users was 5 or 6
XDWM.. CPUB04 - Count Batch Users was 7 or 8
XDWM.. CPUB05 - Count Batch Users was 9 or 10
XDWM.. CPUB06 - Count Batch Users was 11 - 15
XDWM.. CPUB07 - Count Batch Users was 16 - 20
XDWM.. CPUB08 - Count Batch Users was 21 - 25
XDWM.. CPUB09 - Count Batch Users was 26 - 30
XDWM.. CPUB10 - Count Batch Users was 31 - 35
XDWM.. CPUB11 - Count Batch Users was 36 or More
XDWM..E CPUCAACT - Intvls with CP Proc Use Abs Limit
XDWM..E CPUCACCT - Intvls with CP Proc Use Abs Limit Chg
XDWM..E CPUCGCCT - Intvls with Capacity Group Capped
XDWM..E CPUCGJCT - Intvls with Capacity Group Changed
XDWM.. CPUCGJTM - Time Capacity Not Managed by Group Limit
XDWM..E CPU CPCCT - Intvls with Part Capping Status Change
XDWM..E CPU CPDCT - Intvls with Partition Capping Disabled
XDWM..E CPU CPECT - Intvls with Partition Capping Enabled
XDWM..E CPUDEDCT - Intvls with Dedicated Processors
XDWM..E CPUDIAGF - Intvls with Diagnose X'204' Failure
XDWM..E CPUDIAGS - Number of Diagnose Samples
XDWM..E CPUDIAGV - Intvls with z/VM Guest Data Available
XDWM..E CPUDIAGX - Intvls with Diagnose X'204' Ext. Data
XDWM..E CPUETT - Total USS Users
XDWM.. CPUE00 - Count USS Users was 0
XDWM.. CPUE01 - Count USS Users was 1 or 2
XDWM.. CPUE02 - Count USS Users was 3 or 4
XDWM.. CPUE03 - Count USS Users was 5 or 6
XDWM.. CPUE04 - Count USS Users was 7 or 8
XDWM.. CPUE05 - Count USS Users was 9 or 10
XDWM.. CPUE06 - Count USS Users was 11 - 15
XDWM.. CPUE07 - Count USS Users was 16 - 20
XDWM.. CPUE08 - Count USS Users was 21 - 25
XDWM.. CPUE09 - Count USS Users was 26 - 30
XDWM.. CPUE10 - Count USS Users was 31 - 35
XDWM.. CPUE11 - Count USS Users was 36 or More
XDWM..E CPUGTSCH - Intvls with Global Time Slice Change
XDWM..E CPUITT - Total In Users
XDWM.. CPUI00 - Count In Users was 0
XDWM.. CPUI01 - Count In Users was 1 or 2
XDWM.. CPUI02 - Count In Users was 3 or 4
XDWM.. CPUI03 - Count In Users was 5 or 6

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XDWM.. CPUI04 - Count In Users was 7 or 8
XDWM.. CPUI05 - Count In Users was 9 or 10
XDWM.. CPUI06 - Count In Users was 11 - 15
XDWM.. CPUI07 - Count In Users was 16 - 20
XDWM.. CPUI08 - Count In Users was 21 - 25
XDWM.. CPUI09 - Count In Users was 26 - 30
XDWM.. CPUI10 - Count In Users was 31 - 35
XDWM.. CPUI11 - Count In Users was 36 or More
XDWM..E CPULACDC - Long-Term MSUs Avg Valid for Ded. CPUs
XDWM..E CPULTT - Total Logical Out Ready Users
XDWM.. CPUL00 - Count Logical Out Ready Users was 0
XDWM.. CPUL01 - Count Log Out Ready Users was 1 or 2
XDWM.. CPUL02 - Count Log Out Ready Users was 3 or 4
XDWM.. CPUL03 - Count Log Out Ready Users was 5 or 6
XDWM.. CPUL04 - Count Log Out Ready Users was 7 or 8
XDWM.. CPUL05 - Count Log Out Ready Users was 9 or 10
XDWM.. CPUL06 - Count Log Out Ready Users was 11 - 15
XDWM.. CPUL07 - Count Log Out Ready Users was 16 - 20
XDWM.. CPUL08 - Count Log Out Ready Users was 21 - 25
XDWM.. CPUL09 - Count Log Out Ready Users was 26 - 30
XDWM.. CPUL10 - Count Log Out Ready Users was 31 - 35
XDWM.. CPUL11 - Count Log Out Ready Users was 36 or More
XDWM..E CPUMACCT - Intvls with CPC in Cycle-Steering Mode
XDWM..E CPUNOPCH - Intvls with Log Proc Count Change
XDWM..E CPU0TT - Total Out/Ready Users
XDWM.. CPU000 - Count Out/Ready Users was 0
XDWM.. CPU001 - Count Out/Ready Users was 1 or 2
XDWM.. CPU002 - Count Out/Ready Users was 3 or 4
XDWM.. CPU003 - Count Out/Ready Users was 5 or 6
XDWM.. CPU004 - Count Out/Ready Users was 7 or 8
XDWM.. CPU005 - Count Out/Ready Users was 9 or 10
XDWM.. CPU006 - Count Out/Ready Users was 11 - 15
XDWM.. CPU007 - Count Out/Ready Users was 16 - 20
XDWM.. CPU008 - Count Out/Ready Users was 21 - 25
XDWM.. CPU009 - Count Out/Ready Users was 26 - 30
XDWM.. CPU010 - Count Out/Ready Users was 31 - 35
XDWM.. CPU011 - Count Out/Ready Users was 36 or More
XDWM..E CPUPTT - Total APPC Users
XDWM..E CPUPWRCT - Intvls with CPC in Power-Save Mode
XDWM.. CPUP00 - Count APPC Users was 0
XDWM.. CPUP01 - Count APPC Users was 1 or 2
XDWM.. CPUP02 - Count APPC Users was 3 or 4
XDWM.. CPUP03 - Count APPC Users was 5 or 6
XDWM.. CPUP04 - Count APPC Users was 7 or 8
XDWM.. CPUP05 - Count APPC Users was 9 or 10
XDWM.. CPUP06 - Count APPC Users was 11 - 15
XDWM.. CPUP07 - Count APPC Users was 16 - 20
XDWM.. CPUP08 - Count APPC Users was 21 - 25
XDWM.. CPUP09 - Count APPC Users was 26 - 30

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XDWM..	CPUP10	- Count APPC Users was 31 - 35
XDWM..	CPUP11	- Count APPC Users was 36 or More
XDWM..E	CPUQ00	- Count In/Ready was <= N
XDWM..E	CPUQ01	- Count In/Ready was N+1
XDWM..E	CPUQ02	- Count In/Ready was N+2
XDWM..E	CPUQ03	- Count In/Ready was N+3
XDWM..E	CPUQ04	- Count In/Ready was N+4 or N+5
XDWM..E	CPUQ05	- Count In/Ready was N+6 to N+10
XDWM..E	CPUQ06	- Count In/Ready was N+11 to N+15
XDWM..E	CPUQ07	- Count In/Ready was N+16 to N+20
XDWM..E	CPUQ08	- Count In/Ready was N+21 to N+30
XDWM..E	CPUQ09	- Count In/Ready was N+31 to N+40
XDWM..E	CPUQ10	- Count In/Ready was N+41 to N+60
XDWM..E	CPUQ11	- Count In/Ready was N+61 to N+80
XDWM..E	CPUQ12	- Count In/Ready was > N+80
XDWM..E	CPURAETM	- Total CP Resource Alloc Earned Time
XDWM..E	CPURARTM	- Total CP Resource Alloc Redeposit Time
XDWM..E	CPURAUTM	- Total CP Resource Alloc Used Time
XDWM..E	CPURSMP	- Number of RMF Samples
XDWM..E	CPURTT	- Total In/Ready Count
XDWM..E	CPUR00	- Count In/Ready was 0
XDWM..E	CPUR01	- Count In/Ready was 1
XDWM..E	CPUR02	- Count In/Ready was 2
XDWM..E	CPUR03	- Count In/Ready was 3
XDWM..E	CPUR04	- Count In/Ready was 4
XDWM..E	CPUR05	- Count In/Ready was 5
XDWM..E	CPUR06	- Count In/Ready was 6
XDWM..E	CPUR07	- Count In/Ready was 7
XDWM..E	CPUR08	- Count In/Ready was 8
XDWM..E	CPUR09	- Count In/Ready was 9
XDWM..E	CPUR10	- Count In/Ready was 10
XDWM..E	CPUR11	- Count In/Ready was 11
XDWM..E	CPUR12	- Count In/Ready was 12
XDWM..E	CPUR13	- Count In/Ready was 13
XDWM..E	CPUR14	- Count In/Ready was 14
XDWM..E	CPUR15	- Count In/Ready was 15 or More
XDWM..E	CPUSAACT	- Intvls with zIIP Proc Use Abs Limit
XDWM..E	CPUSACCT	- Intvls with zIIP Proc Use Abs Limit Chg
XDWM..E	CPUSLIH	- Total # of Entries to the I/O SLIH
XDWM..E	CPUSSMP	- Number of SRM Samples
XDWM..E	CPUSTSIA	- Intvls with STSI Facility Available
XDWM..E	CPUSTT	- Total Started Users
XDWM..E	CPUSUACH	- Intvls with Service Units Available Chgd
XDWM..E	CPUSUBTM	- Total Time zIIP Processors Busy
XDWM..E	CPUSUCNF	- Total Reconfigured zIIP Processors
XDWM..E	CPUSUDTM	- Total zIIP Processors Dispatch Time
XDWM..E	CPUSUEDT	- Total zIIP Proc. Effective Dispatch Time
XDWM..	CPUSUHPO	- Total High Polarity zIIP Processors
XDWM..	CPUSULPO	- Total Low Polarity zIIP Processors

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XDWM.. CPUSUMPO - Total Medium Polarity zIIP Processors
XDWM.. CPUSUNIO - Total zIIP Processors I/O Connections
XDWM..E CPUSUOTM - Total zIIP Processors Online Time
XDWM..E CPUSUPTM - Total zIIP Processors Parked Time
XDWM..E CPUSUSIG - Total zIIP Processors SIGP Instructions
XDWM.. CPUSUSRB - Total zIIP Processors SRB Dispatches
XDWM.. CPUSUTCB - Total zIIP Processors TCB Dispatches
XDWM..E CPUSUUTM - Total zIIP Processors Up Time
XDWM..E CPUSUVBT - Total zIIP Proc. PR/SM MVS Busy Time
XDWM..E CPUSUVWT - Total zIIP Proc. PR/SM MVS Wait Time
XDWM..E CPUSUWST - Total zIIP Proc. PR/SM Detected Wait Tm
XDWM..E CPUSUWTD - Total zIIP Processors Wait Dispatch
XDWM..E CPUSUWTM - Total Time zIIP Processors Not Busy
XDWM..E CPUSUWTS - Total zIIP Proc. Succ. Warn-Track Int.
XDWM..E CPUSUWTU - Total zIIP Proc. Unsucc. Warn-Track Int.
XDWM..E CPUSUWU - Total Work Units for zIIP Processors
XDWM..E CPUSUYTM - Total zIIP Proc. Warn-Track PR/SM Time
XDWM.. CPUS00 - Count Started Users was 0
XDWM.. CPUS01 - Count Started Users was 1 or 2
XDWM.. CPUS02 - Count Started Users was 3 or 4
XDWM.. CPUS03 - Count Started Users was 5 or 6
XDWM.. CPUS04 - Count Started Users was 7 or 8
XDWM.. CPUS05 - Count Started Users was 9 or 10
XDWM.. CPUS06 - Count Started Users was 11 - 15
XDWM.. CPUS07 - Count Started Users was 16 - 20
XDWM.. CPUS08 - Count Started Users was 21 - 25
XDWM.. CPUS09 - Count Started Users was 26 - 30
XDWM.. CPUS10 - Count Started Users was 31 - 35
XDWM.. CPUS11 - Count Started Users was 36 or More
XDWM..E CPUTOBTM - Total Time CP Processors Busy
XDWM..E CPUTOCNF - Total Reconfigured CP Processors
XDWM..E CPUTODTM - Total CP Processors Dispatch Time
XDWM..E CPUTOEDT - Total CP Proc. Effective Dispatch Time
XDWM.. CPUTOHPO - Total High Polarity CP Processors
XDWM..E CPUTOLAC - Accum. Long-Term Average of CPU MSUs
XDWM.. CPUTOLPO - Total Low Polarity CP Processors
XDWM..E CPUTOMNR - Accum. Nominal Model Capacity Rating
XDWM.. CPUTOMPO - Total Medium Polarity CP Processors
XDWM..E CPUTOMRT - Accum. Effec. Model Capacity Rating
XDWM..E CPUTOMSU - Actual Number of Consumed MSUs
XDWM..E CPUTONCA - Samples WLM Actually Capped LPAR
XDWM.. CPUTONIO - Total CP Processors I/O Connections
XDWM..E CPUTONSA - Samples at Maximum Weighting
XDWM..E CPUTONSI - Samples at Minimum Weighting
XDWM..E CPUTONSW - Samples WLM Considered Capping LPAR
XDWM..E CPUTOONL - Total Online CP Processors
XDWM..E CPUTOOSU - Total Online zIIP Processors
XDWM..E CPUTOOTM - Total CP Processors Online Time
XDWM..E CPUTOOZP - Total Online zAAP Processors

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XDWM..E CPUTOPMI - Blocked Wklds/Sec that may get Promoted
XDWM..E CPUTOPMU - Blocked Work Units Promoted
XDWM..E CPUTOPMW - Blocked Work Units Waiting for Promotion
XDWM..E CPUTOPTM - Total CP Processors Parked Time
XDWM..E CPUTOSIG - Total CP Processors SIGP Instructions
XDWM.. CPUTOSRB - Total CP Processors SRB Dispatches
XDWM.. CPUTOTCB - Total CP Processors TCB Dispatches
XDWM..E CPUTOUTM - Total CP Processors Up Time
XDWM..E CPUTOVBT - Total CP Processors PR/SM MVS Busy Time
XDWM..E CPUTOVWT - Total CP Processors PR/SM MVS Wait Time
XDWM..E CPUTOWST - Total CP Proc. PR/SM Detected Wait Time
XDWM..E CPUTOWTD - Total CP Processors Wait Dispatch
XDWM..E CPUTOWTM - Total Time CP Processors Not Busy
XDWM..E CPUTOWTS - Total CP Proc. Succ. Warn-Track Int.
XDWM..E CPUTOWTU - Total CP Proc. Unsucc. Warn-Track Int.
XDWM..E CPUTOWU - Total Work Units for CP Processors
XDWM..E CPUTOYTM - Total CP Proc. Warn-Track PR/SM Time
XDWM..E CPUTPI - Total # of TPI I/O Events
XDWM..E CPUTTT - Total TSO Users
XDWM.. CPUT00 - Count TSO Users was 0
XDWM.. CPUT01 - Count TSO Users was 1 or 2
XDWM.. CPUT02 - Count TSO Users was 3 or 4
XDWM.. CPUT03 - Count TSO Users was 5 or 6
XDWM.. CPUT04 - Count TSO Users was 7 or 8
XDWM.. CPUT05 - Count TSO Users was 9 or 10
XDWM.. CPUT06 - Count TSO Users was 11 - 15
XDWM.. CPUT07 - Count TSO Users was 16 - 20
XDWM.. CPUT08 - Count TSO Users was 21 - 25
XDWM.. CPUT09 - Count TSO Users was 26 - 30
XDWM.. CPUT10 - Count TSO Users was 31 - 35
XDWM.. CPUT11 - Count TSO Users was 36 or More
XDWM..E CPUU00 - Count Work Units was <= N
XDWM..E CPUU01 - Count Work Units was N+1
XDWM..E CPUU02 - Count Work Units was N+2
XDWM..E CPUU03 - Count Work Units was N+3
XDWM..E CPUU04 - Count Work Units was N+4 or N+5
XDWM..E CPUU05 - Count Work Units was N+6 to N+10
XDWM..E CPUU06 - Count Work Units was N+11 to N+15
XDWM..E CPUU07 - Count Work Units was N+16 to N+20
XDWM..E CPUU08 - Count Work Units was N+21 to N+30
XDWM..E CPUU09 - Count Work Units was N+31 to N+40
XDWM..E CPUU10 - Count Work Units was N+41 to N+60
XDWM..E CPUU11 - Count Work Units was N+61 to N+80
XDWM..E CPUU12 - Count Work Units was N+81 to N+100
XDWM..E CPUU13 - Count Work Units was N+101 to N+120
XDWM..E CPUU14 - Count Work Units was N+121 to N+150
XDWM..E CPUU15 - Count Work Units was > N+150
XDWM..E CPUWSCCT - Intvls with LPAR Wait Assist Change
XDWM..E CPUWSDCT - Intvls with LPAR Wait Assist Disabled

XDWM..E CPUWSECT - Intvls with LPAR Wait Assist Enabled
XDWM.. CPUWTT - Total Out/Wait Users
XDWM.. CPUW00 - Count Out/Wait Users was 0
XDWM.. CPUW01 - Count Out/Wait Users was 1 or 2
XDWM.. CPUW02 - Count Out/Wait Users was 3 or 4
XDWM.. CPUW03 - Count Out/Wait Users was 5 or 6
XDWM.. CPUW04 - Count Out/Wait Users was 7 or 8
XDWM.. CPUW05 - Count Out/Wait Users was 9 or 10
XDWM.. CPUW06 - Count Out/Wait Users was 11 - 15
XDWM.. CPUW07 - Count Out/Wait Users was 16 - 20
XDWM.. CPUW08 - Count Out/Wait Users was 21 - 25
XDWM.. CPUW09 - Count Out/Wait Users was 26 - 30
XDWM.. CPUW10 - Count Out/Wait Users was 31 - 35
XDWM.. CPUW11 - Count Out/Wait Users was 36 or More
XDWM..E CPUZAACT - Intvls with zAAP Proc Use Abs Limit
XDWM..E CPUZACCT - Intvls with zAAP Proc Use Abs Limit Chg
XDWM..E CPUZPBTM - Total Time zAAP Processors Busy
XDWM..E CPUZPCNF - Total Reconfigured zAAP Processors
XDWM..E CPUZPDTM - Total zAAP Processors Dispatch Time
XDWM..E CPUZPEDT - Total zAAP Proc. Effective Dispatch Time
XDWM.. CPUZPHPO - Total High Polarity zAAP Processors
XDWM.. CPUZPLPO - Total Low Polarity zAAP Processors
XDWM.. CPUZPMPO - Total Medium Polarity zAAP Processors
XDWM.. CPUZPNIO - Total zAAP Processors I/O Connections
XDWM..E CPUZPOTM - Total zAAP Processors Online Time
XDWM..E CPUZPPTM - Total zAAP Processors Parked Time
XDWM..E CPUZPSIG - Total zAAP Processors SIGP Instructions
XDWM.. CPUZPSRB - Total zAAP Processors SRB Dispatches
XDWM.. CPUZPTCB - Total zAAP Processors TCB Dispatches
XDWM..E CPUZPUTM - Total zAAP Processors Up Time
XDWM..E CPUZPVBT - Total zAAP Proc. PR/SM MVS Busy Time
XDWM..E CPUZPWT - Total zAAP Proc. PR/SM MVS Wait Time
XDWM..E CPUZPWST - Total zAAP Proc. PR/SM Detected Wait Tm
XDWM..E CPUZPwTD - Total zAAP Processors Wait Dispatch
XDWM..E CPUZPwTM - Total Time zAAP Processors Not Busy
XDWM..E CPUZPwTS - Total zAAP Proc. Succ. Warn-Track Int.
XDWM..E CPUZPwTU - Total zAAP Proc. Unsucc. Warn-Track Int.
XDWM..E CPUZPWU - Total Work Units for zAAP Processors
XDWM..E CPUZPYTM - Total zAAP Proc. Warn-Track PR/SM Time

Minimum Data Elements

XDWM.. CPUMNA - Min Logical Wait Users
XDWM.. CPUMNB - Min Batch Users
XDWM..E CPUMNCPU - Min Number of Assigned CP Processors
XDWM.. CPUMNE - Min USS Users
XDWM.. CPUMNI - Min In Users
XDWM.. CPUMNL - Min Logical Ready Users
XDWM..E CPUMNLAC - Minimum Long-Term Average of CPU MSUs

XDWM..E CPUMMSU - Minimum Number of Consumed MSUs
 XDWM.. CPUMNO - Min Out/Ready Users
 XDWM..E CPUMNONL - Min Number of Online CP Processors
 XDWM..E CPUMNOSU - Min Number of Online zIIP Processors
 XDWM..E CPUMNOZP - Min Number of Online zAAP Processors
 XDWM.. CPUMNP - Min APPC Users
 XDWM.. CPUMNR - Min In/Ready
 XDWM.. CPUMNS - Min Started Users
 XDWM.. CPUMNSHP - Min High Polarity zIIP Processors
 XDWM.. CPUMNSLP - Min Low Polarity zIIP Processors
 XDWM.. CPUMNSMP - Min Medium Polarity zIIP Processors
 XDWM..E CPUMNSUA - Min Serv. Units Available to MVS Image
 XDWM.. CPUMNSWU - Min Work Units for zIIP Processors
 XDWM.. CPUMNT - Min TSO Users
 XDWM.. CPUMNTHP - Min High Polarity CP Processors
 XDWM.. CPUMNTLP - Min Low Polarity CP Processors
 XDWM.. CPUMNTMP - Min Medium Polarity CP Processors
 XDWM.. CPUMNTWU - Min Work Units for CP Processors
 XDWM.. CPUMNW - Min Out/Wait Users
 XDWM.. CPUMNZHP - Min High Polarity zAAP Processors
 XDWM.. CPUMNZLP - Min Low Polarity zAAP Processors
 XDWM.. CPUMNZMP - Min Medium Polarity zAAP Processors
 XDWM.. CPUMNZWU - Min Work Units for zAAP Processors
 XDWM..E CPUNPBS - Min Pct CP Processors Busy
 XDWM..E CPUNPWT - Min Pct CP Processors Not Busy
 XDWM..E CPUNSBUS - Min Pct zIIP Processors Busy
 XDWM..E CPUNSWT - Min Pct zIIP Processors Not Busy
 XDWM..E CPUNZBUS - Min Pct zAAP Processors Busy
 XDWM..E CPUNZWU - Min Pct zAAP Processors Not Busy

Maximum Data Elements

XDWM.. CPUMXA - Max Logical Wait Users
 XDWM..E CPUMXB - Max Batch Users
 XDWM..E CPUMXCPU - Max Number of Assigned CP Processors
 XDWM.. CPUMXE - Max USS Users
 XDWM.. CPUMXI - Max In Users
 XDWM.. CPUMXL - Max Logical Ready Users
 XDWM..E CPUMXLAC - Maximum Long-Term Average of CPU MSUs
 XDWM..E CPUMXMSU - Maximum Number of Consumed MSUs
 XDWM.. CPUMXO - Max Out/Ready Users
 XDWM..E CPUMXONL - Max Number of Online CP Processors
 XDWM..E CPUMXOSU - Max Number of Online zIIP Processors
 XDWM..E CPUMXOZP - Max Number of Online zAAP Processors
 XDWM.. CPUMXP - Max APPC Users
 XDWM..E CPUMXPBS - Max Pct CP Processors Busy
 XDWM..E CPUMXPMW - Max Blocked Work Units Waiting for Prom.
 XDWM..E CPUMXPWT - Max Pct CP Processors Not Busy
 XDWM.. CPUMXR - Max In/Ready

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XDWM.. CPUMXS - Max Started Users
XDWM..E CPUMXSBS - Max Pct zIIP Processors Busy
XDWM.. CPUMXSHP - Max High Polarity zIIP Processors
XDWM.. CPUMXSLP - Max Low Polarity zIIP Processors
XDWM.. CPUMXSMP - Max Medium Polarity zIIP Processors
XDWM..E CPUMXSUA - Max Serv. Units Available to MVS Image
XDWM..E CPUMXSWT - Max Pct zIIP Processors Not Busy
XDWM.. CPUMXSWU - Max Work Units for zIIP Processors
XDWM..E CPUMXT - Max TSO Users
XDWM.. CPUMXTHP - Max High Polarity CP Processors
XDWM.. CPUMXTLP - Max Low Polarity CP Processors
XDWM.. CPUMXTMP - Max Medium Polarity CP Processors
XDWM.. CPUMXTWU - Max Work Units for CP Processors
XDWM.. CPUMXW - Max Out/Wait Users
XDWM..E CPUMXZBS - Max Pct zAAP Processors Busy
XDWM.. CPUMXZHP - Max High Polarity zAAP Processors
XDWM.. CPUMXZLP - Max Low Polarity zAAP Processors
XDWM.. CPUMXZMP - Max Medium Polarity zAAP Processors
XDWM..E CPUMXZWT - Max Pct zAAP Processors Not Busy
XDWM.. CPUMXZWU - Max Work Units for zAAP Processors
XDWM..E CPUNOCPU - Max Number of Configured Processors

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Derived Data Elements

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XDWM.. CPUAVA - Avg Logical Wait Users
XDWM..E CPUAVB - Avg Batch Users
XDWM..E CPUAVCPU - Avg Number of Assigned CP Processors
XDWM..E CPUAVE - Avg USS Users
XDWM..E CPUAVI - Avg In Users
XDWM..E CPUAVL - Avg Logical Ready Users
XDWM..E CPUAVLAC - Long-Term Average of CPU Service (MSUs)
XDWM..E CPUAVMSU - Avg Number of Consumed MSUs
XDWM..E CPUAVO - Avg Out/Ready Users
XDWM..E CPUAVONL - Avg Number of Online CP Processors
XDWM..E CPUAVOSU - Avg Number of Online zIIP Processors
XDWM..E CPUAVOZP - Avg Number of Online zAAP Processors
XDWM..E CPUAVP - Avg APPC Users
XDWM..E CPUAVPMU - Avg Blocked Work Units Promoted
XDWM..E CPUAVPMW - Avg Blocked Work Units Waiting for Prom.
XDWM..E CPUAVR - Avg In/Ready
XDWM..E CPUAVS - Avg Started Users
XDWM.. CPUAVSHP - Avg High Polarity zIIP Processors
XDWM.. CPUAVSLP - Avg Low Polarity zIIP Processors
XDWM.. CPUAVSMP - Avg Medium Polarity zIIP Processors
XDWM..E CPUAVSWU - Avg Work Units for zIIP Processors
XDWM..E CPUAVT - Avg TSO Users
XDWM.. CPUAVTHP - Avg High Polarity CP Processors
XDWM.. CPUAVTLP - Avg Low Polarity CP Processors
XDWM.. CPUAVTMP - Avg Medium Polarity CP Processors

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XDWM..E CPUAVTWU - Avg Work Units for CP Processors
XDWM.. CPUAVW - Avg Out/Wait Users
XDWM.. CPUAVZHP - Avg High Polarity zAAP Processors
XDWM.. CPUAVZLP - Avg Low Polarity zAAP Processors
XDWM.. CPUAVZMP - Avg Medium Polarity zAAP Processors
XDWM..E CPUAVZWU - Avg Work Units for zAAP Processors
XDWM.. CPUIOSRT - zIIP Processors I/O Connections Rate
XDWM.. CPUIOTRT - CP Processors I/O Connections Rate
XDWM.. CPUIOZRT - zAAP Processors I/O Connections Rate
XDWM..E CPUMWSTM - zIIP Processors Mean Time to Wait
XDWM..E CPUMWTTM - CP Processors Mean Time to Wait
XDWM..E CPUMWZTM - zAAP Processors Mean Time to Wait
XDWM.. CPUPCA00 - Cumulative Pct Logical Wait Users was 0
XDWM.. CPUPCA01 - Cumulative Pct Log Wait Users was 2 or Less
XDWM.. CPUPCA02 - Cumulative Pct Log Wait Users was 4 or Less
XDWM.. CPUPCA03 - Cumulative Pct Log Wait Users was 6 or Less
XDWM.. CPUPCA04 - Cumulative Pct Log Wait Users was 8 or Less
XDWM.. CPUPCA05 - Cumulative Pct Log Wait Users was 10 or Less
XDWM.. CPUPCA06 - Cumulative Pct Log Wait Users was 15 or Less
XDWM.. CPUPCA07 - Cumulative Pct Log Wait Users was 20 or Less
XDWM.. CPUPCA08 - Cumulative Pct Log Wait Users was 25 or Less
XDWM.. CPUPCA09 - Cumulative Pct Log Wait Users was 30 or Less
XDWM.. CPUPCA10 - Cumulative Pct Log Wait Users was 35 or Less
XDWM..E CPUPCBSU - Pct zIIP Processors Busy
XDWM..E CPUPCBSY - Pct CP Processors Busy
XDWM..E CPUPCBZP - Pct zAAP Processors Busy
XDWM.. CPUPCB00 - Cumulative Pct Batch Users was 0
XDWM.. CPUPCB01 - Cumulative Pct Batch Users was 2 or Less
XDWM.. CPUPCB02 - Cumulative Pct Batch Users was 4 or Less
XDWM.. CPUPCB03 - Cumulative Pct Batch Users was 6 or Less
XDWM.. CPUPCB04 - Cumulative Pct Batch Users was 8 or Less
XDWM.. CPUPCB05 - Cumulative Pct Batch Users was 10 or Less
XDWM.. CPUPCB06 - Cumulative Pct Batch Users was 15 or Less
XDWM.. CPUPCB07 - Cumulative Pct Batch Users was 20 or Less
XDWM.. CPUPCB08 - Cumulative Pct Batch Users was 25 or Less
XDWM.. CPUPCB09 - Cumulative Pct Batch Users was 30 or Less
XDWM.. CPUPCB10 - Cumulative Pct Batch Users was 35 or Less
XDWM..E CPUPCCAP - CPC Effective Capacity Pct
XDWM..E CPUPCDPR - Pct of Defined Promote Rate Used
XDWM..E CPUPCDTM - Pct CP Processors Dispatched
XDWM..E CPUPCDTS - Pct zIIP Processors Dispatched
XDWM..E CPUPCDTZ - Pct zAAP Processors Dispatched
XDWM.. CPUPCE00 - Cumulative Pct USS Users was 0
XDWM.. CPUPCE01 - Cumulative Pct USS Users was 2 or Less
XDWM.. CPUPCE02 - Cumulative Pct USS Users was 4 or Less
XDWM.. CPUPCE03 - Cumulative Pct USS Users was 6 or Less
XDWM.. CPUPCE04 - Cumulative Pct USS Users was 8 or Less
XDWM.. CPUPCE05 - Cumulative Pct USS Users was 10 or Less
XDWM.. CPUPCE06 - Cumulative Pct USS Users was 15 or Less

XDWM.. CPUPCE07 - Cumulative Pct USS Users was 20 or Less
XDWM.. CPUPCE08 - Cumulative Pct USS Users was 25 or Less
XDWM.. CPUPCE09 - Cumulative Pct USS Users was 30 or Less
XDWM.. CPUPCE10 - Cumulative Pct USS Users was 35 or Less
XDWM.. CPUPCI00 - Cumulative Pct In Users was 0
XDWM.. CPUPCI01 - Cumulative Pct In Users was 2 or Less
XDWM.. CPUPCI02 - Cumulative Pct In Users was 4 or Less
XDWM.. CPUPCI03 - Cumulative Pct In Users was 6 or Less
XDWM.. CPUPCI04 - Cumulative Pct In Users was 8 or Less
XDWM.. CPUPCI05 - Cumulative Pct In Users was 10 or Less
XDWM.. CPUPCI06 - Cumulative Pct In Users was 15 or Less
XDWM.. CPUPCI07 - Cumulative Pct In Users was 20 or Less
XDWM.. CPUPCI08 - Cumulative Pct In Users was 25 or Less
XDWM.. CPUPCI09 - Cumulative Pct In Users was 30 or Less
XDWM.. CPUPCI10 - Cumulative Pct In Users was 35 or Less
XDWM.. CPUPCL00 - Cumulative Pct Logical Ready Users was 0
XDWM.. CPUPCL01 - Cumulative Pct Log Ready Users was 2 or Less
XDWM.. CPUPCL02 - Cumulative Pct Log Ready Users was 4 or Less
XDWM.. CPUPCL03 - Cumulative Pct Log Ready Users was 6 or Less
XDWM.. CPUPCL04 - Cumulative Pct Log Ready Users was 8 or Less
XDWM.. CPUPCL05 - Cumulative Pct Log Ready Users was 10 or Less
XDWM.. CPUPCL06 - Cumulative Pct Log Ready Users was 15 or Less
XDWM.. CPUPCL07 - Cumulative Pct Log Ready Users was 20 or Less
XDWM.. CPUPCL08 - Cumulative Pct Log Ready Users was 25 or Less
XDWM.. CPUPCL09 - Cumulative Pct Log Ready Users was 30 or Less
XDWM.. CPUPCL10 - Cumulative Pct Log Ready Users was 35 or Less
XDWM..E CPUPCNCA - LPAR WLM Actual Capping Pct
XDWM..E CPUPCNSA - Maximum Weighting Percentage
XDWM..E CPUPCNSI - Minimum Weighting Percentage
XDWM..E CPUPCNSW - LPAR WLM Potential Capping Pct
XDWM.. CPUPC000 - Cumulative Pct Out/Ready Users was 0
XDWM.. CPUPC001 - Cumulative Pct Out/Ready Users was 2 or Less
XDWM.. CPUPC002 - Cumulative Pct Out/Ready Users was 4 or Less
XDWM.. CPUPC003 - Cumulative Pct Out/Ready Users was 6 or Less
XDWM.. CPUPC004 - Cumulative Pct Out/Ready Users was 8 or Less
XDWM.. CPUPC005 - Cumulative Pct Out/Ready Users was 10 or Less
XDWM.. CPUPC006 - Cumulative Pct Out/Ready Users was 15 or Less
XDWM.. CPUPC007 - Cumulative Pct Out/Ready Users was 20 or Less
XDWM.. CPUPC008 - Cumulative Pct Out/Ready Users was 25 or Less
XDWM.. CPUPC009 - Cumulative Pct Out/Ready Users was 30 or Less
XDWM.. CPUPC010 - Cumulative Pct Out/Ready Users was 35 or Less
XDWM.. CPUPCP00 - Cumulative Pct APPC Users was 0
XDWM.. CPUPCP01 - Cumulative Pct APPC Users was 2 or Less
XDWM.. CPUPCP02 - Cumulative Pct APPC Users was 4 or Less
XDWM.. CPUPCP03 - Cumulative Pct APPC Users was 6 or Less
XDWM.. CPUPCP04 - Cumulative Pct APPC Users was 8 or Less
XDWM.. CPUPCP05 - Cumulative Pct APPC Users was 10 or Less
XDWM.. CPUPCP06 - Cumulative Pct APPC Users was 15 or Less
XDWM.. CPUPCP07 - Cumulative Pct APPC Users was 20 or Less

XDWM.. CPUPCP08 - Cumm Pct APPC Users was 25 or Less
 XDWM.. CPUPCP09 - Cumm Pct APPC Users was 30 or Less
 XDWM.. CPUPCP10 - Cumm Pct APPC Users was 35 or Less
 XDWM.. CPUPCQ00 - Cumm Pct In/Ready was N or Less
 XDWM.. CPUPCQ01 - Cumm Pct In/Ready was N+1 or Less
 XDWM.. CPUPCQ02 - Cumm Pct In/Ready was N+2 or Less
 XDWM.. CPUPCQ03 - Cumm Pct In/Ready was N+3 or Less
 XDWM.. CPUPCQ04 - Cumm Pct In/Ready was N+5 or Less
 XDWM.. CPUPCQ05 - Cumm Pct In/Ready was N+10 or Less
 XDWM.. CPUPCQ06 - Cumm Pct In/Ready was N+15 or Less
 XDWM.. CPUPCQ07 - Cumm Pct In/Ready was N+20 or Less
 XDWM.. CPUPCQ08 - Cumm Pct In/Ready was N+30 or Less
 XDWM.. CPUPCQ09 - Cumm Pct In/Ready was N+40 or Less
 XDWM.. CPUPCQ10 - Cumm Pct In/Ready was N+60 or Less
 XDWM.. CPUPCQ11 - Cumm Pct In/Ready was N+80 or Less
 XDWM..E CPUPCRAE - Pct CP Resource Alloc Earned
 XDWM..E CPUPCRAU - Pct CP Resource Alloc Used
 XDWM.. CPUPCR00 - Cumm Pct In/Ready was 0
 XDWM.. CPUPCR01 - Cumm Pct In/Ready was 1 or Less
 XDWM.. CPUPCR02 - Cumm Pct In/Ready was 2 or Less
 XDWM.. CPUPCR03 - Cumm Pct In/Ready was 3 or Less
 XDWM.. CPUPCR04 - Cumm Pct In/Ready was 4 or Less
 XDWM.. CPUPCR05 - Cumm Pct In/Ready was 5 or Less
 XDWM.. CPUPCR06 - Cumm Pct In/Ready was 6 or Less
 XDWM.. CPUPCR07 - Cumm Pct In/Ready was 7 or Less
 XDWM.. CPUPCR08 - Cumm Pct In/Ready was 8 or Less
 XDWM.. CPUPCR09 - Cumm Pct In/Ready was 9 or Less
 XDWM.. CPUPCR10 - Cumm Pct In/Ready was 10 or Less
 XDWM.. CPUPCR11 - Cumm Pct In/Ready was 11 or Less
 XDWM.. CPUPCR12 - Cumm Pct In/Ready was 12 or Less
 XDWM.. CPUPCR13 - Cumm Pct In/Ready was 13 or Less
 XDWM.. CPUPCR14 - Cumm Pct In/Ready was 14 or Less
 XDWM.. CPUPCS00 - Cumm Pct Started Users was 0
 XDWM.. CPUPCS01 - Cumm Pct Started Users was 2 or Less
 XDWM.. CPUPCS02 - Cumm Pct Started Users was 4 or Less
 XDWM.. CPUPCS03 - Cumm Pct Started Users was 6 or Less
 XDWM.. CPUPCS04 - Cumm Pct Started Users was 8 or Less
 XDWM.. CPUPCS05 - Cumm Pct Started Users was 10 or Less
 XDWM.. CPUPCS06 - Cumm Pct Started Users was 15 or Less
 XDWM.. CPUPCS07 - Cumm Pct Started Users was 20 or Less
 XDWM.. CPUPCS08 - Cumm Pct Started Users was 25 or Less
 XDWM.. CPUPCS09 - Cumm Pct Started Users was 30 or Less
 XDWM.. CPUPCS10 - Cumm Pct Started Users was 35 or Less
 XDWM..E CPUPCTDS - Pct zIIP Proc. Dispatched - Effective
 XDWM..E CPUPCTDT - Pct CP Proc. Dispatched - Effective
 XDWM..E CPUPCTDZ - Pct zAAP Proc. Dispatched - Effective
 XDWM.. CPUPCTPI - Total Pct TPI I/O Events
 XDWM.. CPUPCT00 - Cumm Pct TSO Users was 0
 XDWM.. CPUPCT01 - Cumm Pct TSO Users was 2 or Less

```

XDWM.. CPUPCT02 - Cumm Pct TSO Users was 4 or Less
XDWM.. CPUPCT03 - Cumm Pct TSO Users was 6 or Less
XDWM.. CPUPCT04 - Cumm Pct TSO Users was 8 or Less
XDWM.. CPUPCT05 - Cumm Pct TSO Users was 10 or Less
XDWM.. CPUPCT06 - Cumm Pct TSO Users was 15 or Less
XDWM.. CPUPCT07 - Cumm Pct TSO Users was 20 or Less
XDWM.. CPUPCT08 - Cumm Pct TSO Users was 25 or Less
XDWM.. CPUPCT09 - Cumm Pct TSO Users was 30 or Less
XDWM.. CPUPCT10 - Cumm Pct TSO Users was 35 or Less
XDWM..E CPUPCUP - Pct Processors Up Time
XDWM.. CPUPCU00 - Cumm Pct Work Units was N or Less
XDWM.. CPUPCU01 - Cumm Pct Work Units was N+1 or Less
XDWM.. CPUPCU02 - Cumm Pct Work Units was N+2 or Less
XDWM.. CPUPCU03 - Cumm Pct Work Units was N+3 or Less
XDWM.. CPUPCU04 - Cumm Pct Work Units was N+5 or Less
XDWM.. CPUPCU05 - Cumm Pct Work Units was N+10 or Less
XDWM.. CPUPCU06 - Cumm Pct Work Units was N+15 or Less
XDWM.. CPUPCU07 - Cumm Pct Work Units was N+20 or Less
XDWM.. CPUPCU08 - Cumm Pct Work Units was N+30 or Less
XDWM.. CPUPCU09 - Cumm Pct Work Units was N+40 or Less
XDWM.. CPUPCU10 - Cumm Pct Work Units was N+60 or Less
XDWM.. CPUPCU11 - Cumm Pct Work Units was N+80 or Less
XDWM.. CPUPCU12 - Cumm Pct Work Units was N+100 or Less
XDWM.. CPUPCU13 - Cumm Pct Work Units was N+120 or Less
XDWM.. CPUPCU14 - Cumm Pct Work Units was N+150 or Less
XDWM..E CPUPCVBD - zIIP Processors PR/SM MVS Busy Pct
XDWM..E CPUPCVBS - CP Processors PR/SM MVS Busy Pct
XDWM..E CPUPCVBZ - zAAP Processors PR/SM MVS Busy Pct
XDWM..E CPUPCVWS - zIIP Processors PR/SM MVS Wait Pct
XDWM..E CPUPCVWT - CP Processors PR/SM MVS Wait Pct
XDWM..E CPUPCVWZ - zAAP Processors PR/SM MVS Wait Pct
XDWM..E CPUPCWAS - Pct zIIP Processors Not Busy
XDWM..E CPUPCWAT - Pct CP Processors Not Busy
XDWM..E CPUPCAWAZ - Pct zAAP Processors Not Busy
XDWM.. CPUPCW00 - Cumm Pct Out/Wait Users was 0
XDWM.. CPUPCW01 - Cumm Pct Out/Wait Users was 2 or Less
XDWM.. CPUPCW02 - Cumm Pct Out/Wait Users was 4 or Less
XDWM.. CPUPCW03 - Cumm Pct Out/Wait Users was 6 or Less
XDWM.. CPUPCW04 - Cumm Pct Out/Wait Users was 8 or Less
XDWM.. CPUPCW05 - Cumm Pct Out/Wait Users was 10 or Less
XDWM.. CPUPCW06 - Cumm Pct Out/Wait Users was 15 or Less
XDWM.. CPUPCW07 - Cumm Pct Out/Wait Users was 20 or Less
XDWM.. CPUPCW08 - Cumm Pct Out/Wait Users was 25 or Less
XDWM.. CPUPCW09 - Cumm Pct Out/Wait Users was 30 or Less
XDWM.. CPUPCW10 - Cumm Pct Out/Wait Users was 35 or Less
XDWM..E CPUPWTSS - Pct zIIP Proc. Succ. Warn-Track Int.
XDWM..E CPUPWTST - Pct CP Proc. Succ. Warn-Track Int.
XDWM..E CPUPWTSZ - Pct zAAP Proc. Succ. Warn-Track Int.
XDWM..E CPURTDPR - Defined Promote Rate

```

XDWM..E CPUSISRT - zIIP Processors SIGP Instructions Rate
XDWM..E CPUSITRT - CP Processors SIGP Instructions Rate
XDWM..E CPUSIZRT - zAAP Processors SIGP Instructions Rate
XDWM.. CPUSRSRT - zIIP Processors SRB Dispatches Rate
XDWM.. CPUSRTRT - CP Processors SRB Dispatches Rate
XDWM.. CPUSRZRT - zAAP Processors SRB Dispatches Rate
XDWM.. CPUTCSRT - zIIP Processors TCB Dispatches Rate
XDWM.. CPUTCTRT - CP Processors TCB Dispatches Rate
XDWM.. CPUTCZRT - zAAP Processors TCB Dispatches Rate

5.2.1.3 Usage Considerations

Special considerations or techniques related to using the HARCPU file are provided below.

1. Some data elements in the HARCPU file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the HARCPUnn file in the DETAIL timespan.
2. The following data elements are user-defined option dependent and their use should be within the frame of reference of the option's definition.

CA MICS PARMS SYSID

CPUMODEL - CPU Model Identification

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
5. The HARIPUnn file contains CPU measurements on an individual central processor basis. The HARCPUUnn file contains CPU measurements for the entire processor complex.

5.2.1.4 Retrieval Examples

This section presents typical HARCPU retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's CPU busy percentage for each RMF measurement interval:

```
DATA;  
SET &PHARX..HARCPU01;  
PROC PRINT; VAR SYSID STARTTS ENDTS CPUPCBSY;
```

2. Print yesterday's average and maximum hourly CPU busy percentage for each hour in zone 1:

```
DATA;  
SET &PHARD..HARCPU01;  
IF ZONE='1';  
PROC PRINT; VAR SYSID YEAR MONTH DAY HOUR  
              CPUPCBSY CPUMXPBS;
```

3. Display the average CPU busy percentage by SYSID for prime time (zone 1) over the last six months:

```
DATA;  
SET &PHARM..HARCPU01 &PHARM..HARCPU02  
    &PHARM..HARCPU03 &PHARM..HARCPU04  
    &PHARM..HARCPU05 &PHARM..HARCPU06;  
IF ZONE='1';  
PROC PRINT; VAR SYSID YEAR MONTH CPUPCBSY;
```

5.2.2 Physical Channel Activity File (HARPCA)

The Physical Channel Activity File quantifies the utilization of a physical channel (that is, block multiplexor channel B). There is a single record per physical channel on a CPU. This file is typically used when reporting on the percent channel busy.

This file is derived from the RMF Channel Activity record, type 73.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.2.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	CHANNEL	CSSID	YEAR	MONTH	
	DAY	HOUR	ENDTS			
DAYS	SYSID	CHANNEL	CSSID	YEAR	MONTH	
	DAY	HOUR				
WEEKS	SYSID	CHANNEL	CSSID	YEAR	WEEK	
	ZONE	HOUR				
MONTHS	SYSID	CHANNEL	CSSID	YEAR	MONTH	
	ZONE					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-6. HARPCA Sort Sequence and Data Granularity

5.2.2.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E	CHANNEL	- Physical Channel Address
XDWM..E	CSSID	- Channel Subsystem Identifier
XD....E	DAY	- Day of Month
XDW...E	HOUR	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year

XDWM..E YEAR - Year of Century
 XDWM..E ZONE - Time Zone

Common Data Elements

XDWM.. CHANDSCR - Channel Path Description
 XDWM..E CHANTYPE - Channel Type
 XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E EXTSTOR - Expanded Storage Flag
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E IODFCCCT - Intvls where I/O Config. Changed
 XDWM..E IODFCPCT - I/O Config Changed Since Power On Reset
 XDWM..E IODFCRTS - IODF Creation Time Stamp
 XDWM..E IODFPICT - Power On Reset Using IODF
 XDWM..E IODFSUFIX - Suffix of IODF Name
 XDWM..E IODFTICT - I/O Config. Token is Invalid
 XDWM..E MVSLEVEL - MVS Software Level
 X....E ONLINE - Online-Offline Status Indicator
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMLPNO - Logical Partition Number
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM..E RMFESCDR - Intvls with ESCON Director in Config
 XDWM..E RMFESCON - Intvls where Enabled for ESCON
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 X....E RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number
 XDWM..E SAMPLES - RMF Sample Count
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E PCAACRNM - Channel Path Acronym
 XDWM..E PCACHSPD - Channel Path Speed Megabits per Second
 XDWM..E PCADCMHW - DCM Supported by Hardware
 XDWM..E PCADUS - Data Unit Size
 XDWM..E PCAGEN - Channel Path Type Generation
 XDWM..E PCAMFCMG - CPMF Measurement Group
 XDWM..E PCAMFCMI - CPMF Mode
 XDWM..E PCAPDUS - HiperSockets LPAR Data Unit Size
 XDWM..E PCATDUS - HiperSockets Total Data Unit Size

Accumulated Data Elements

XDWM..E PCABSY - Channel Busy
XDWM..E PCACCHCT - Intvls with Chan Characteristics Changed
XDWM..E PCACNCCT - Intvls with ESCON Channel
XDWM..E PCACTCCT - Intvls Chan Path Used as CTC Adapter
XDWM..E PCACVCCT - Intvls with ESCON Converter Attached
XDWM..E PCADCMCF - Intvls with DCM Managed Channels
XDWM..E PCADCMCT - Intvls with Channel Managed by DCM
XDWM..E PCADELCT - Intvls with Channel Path Deleted
XDWM..E PCADOCCT - Intvls with ESCON Director Attached
XDWM..E PCAECDCT - Intvls with Extended Chan Data Supported
XDWM..E PCAECDEN - Intvls with Extended Chan Data Enabled
XDWM..E PCAINSCT - Intvls with Channel Path Inserted
XDWM..E PCAMCSCT - Intvls with Multiple LCSS Supported
XDWM..E PCAMFACT - Intvls with CPMF Available
XDWM..E PCAMFINT - LPAR Chan Path Measurement Interval
XDWM..E PCAMFRST - CPMF Restarts
XDWM..E PCAMFSMP - CPMF Samples
XDWM..E PCAMODCT - Intvls with Channel Path Modified
XDWM..E PCAONLCT - Intvls with Channel Path Online
XDWM..E PCAPBY - LPAR Chan Path Busy Time
XDWM..E PCAPUTTM - Channel Path Busy Time - LPAR
XDWM..E PCARSMP - Number of RMF Samples
XDWM..E PCASHRCT - Intvls with Chan Path Shared
XDWM..E PCATOFCA - Total FICON Operations Attempted
XDWM..E PCATOFCD - Total FICON Operations Deferred
XDWM..E PCATOFCS - Summation Count of FICON Operations
XDWM..E PCATOPDS - HiperSockets Data Units Sent - LPAR
XDWM..E PCATOPMS - HiperSockets Messages Sent - LPAR
XDWM..E PCATOPRU - Read Data Unit Count - LPAR
XDWM..E PCATOPUB - HiperSockets Receive Failures - LPAR
XDWM..E PCATOPUC - Channel Work Unit Count - LPAR
XDWM..E PCATOPUS - HiperSockets Message Failures - LPAR
XDWM..E PCATOPWU - Write Data Unit Count - LPAR
XDWM..E PCATOTBC - Total Bus Cycles Count
XDWM..E PCATOTDS - HiperSockets Data Units Sent - Total
XDWM..E PCATOTMS - HiperSockets Messages Sent - Total
XDWM..E PCATOTRU - Read Data Unit Count - Total
XDWM..E PCATOTUB - HiperSockets Receive Failures - Total
XDWM..E PCATOTUC - Channel Work Unit Count - Total
XDWM..E PCATOTWU - Write Data Unit Count - Total
XDWM..E PCATOZHA - Total zHPF Operations Attempted
XDWM..E PCATOZHD - Total zHPF Operations Deferred
XDWM..E PCATOZHS - Summation Count of zHPF Operations
XDWM..E PCATUTTM - Channel Path Busy Time - Total
XDWM..E PCAVARCT - Intvls when Channel Path was Varied

Maximum Data Elements

XDWM.. PCAMPBSY - Max Pct Channel Busy
XDWM.. PCAMPBUS - Max Pct Bus Busy
XDWM..E PCAMXNBC - Max Bus Cycles per Second
XDWM..E PCAMXMCU - Max Channel Work Units per Second
XDWM..E PCAMXMRU - Max Read Data Units per Second
XDWM..E PCAMXMMU - Max Write Data Units per Second

Derived Data Elements

XDWM..E PCAAVFCO - Avg FICON Operations Active
XDWM..E PCAAVZHO - Avg zHPF Operations Active
XDWM..E PCAHPMSZ - HiperSockets Avg Message Size - LPAR
XDWM..E PCAHTMSZ - HiperSockets Avg Message Size - Total
XDWM..E PCAPCBSY - Pct Channel Busy - Total
XDWM..E PCAPCBUS - Pct Bus Busy
XDWM..E PCAPCPBY - Pct Channel Busy - LPAR
XDWM..E PCAPSFCD - Deferred FICON Operations Rate
XDWM..E PCAPSFCO - FICON Operations Rate
XDWM..E PCAPSHPW - Write MB/Sec for HiperSockets - LPAR
XDWM..E PCAPSHTW - Write MB/Sec for HiperSockets - Total
XDWM..E PCAPSPMS - HiperSockets Message Sent Rate - LPAR
XDWM..E PCAPSPR - Read MB/Sec - LPAR
XDWM..E PCAPSPUB - HiperSockets Receive Failed Rate - LPAR
XDWM..E PCAPSPUS - HiperSockets Message Failed Rate - LPAR
XDWM..E PCAPSPW - Write MB/Sec - LPAR
XDWM..E PCAPSTMS - HiperSockets Message Sent Rate - Total
XDWM..E PCAPSTR - Read MB/Sec - Total
XDWM..E PCAPSTUB - HiperSockets Receive Failed Rate - Total
XDWM..E PCAPSTW - Write MB/Sec - Total
XDWM..E PCAPSZHD - Deferred zHPF Operations Rate
XDWM..E PCAPSZHO - zHPF Operations Rate

5.2.2.3 Usage Considerations

Special considerations or techniques related to using the HARPCA file are provided below.

1. The following data elements in the HARPCA file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the HARPCAnn file in the DETAIL timespan.

CYCLETM - Sampling Time Cycle Length
ONLINE - Online-Offline Status Indicator
2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.2.4 Retrieval Examples

This section presents typical HARPCA retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's channel busy percentage for each RMF measurement interval for channel 4:

```
DATA;
SET &PHARX..HARPCA01;
IF CHANNEL='4';
PROC PRINT; VAR SYSID STARTTS ENDTS PCAPCBSY;
```

2. Print yesterday's average and maximum hourly channel busy percentages for each hour in zone 1 for channel B:

```
DATA;
SET &PHARD..HARPCA01;
IF ZONE='1';
IF CHANNEL='B';
PROC PRINT; VAR SYSID YEAR MONTH DAY HOUR
              PCAPCBSY PCAMPBSY;
```

3. Display the average percent channel busy over the last six weeks for prime time (zone 1) hours:

```
DATA FILE1;
SET &PHARW..HARPCA01 &PHARW..HARPCA02
    &PHARW..HARPCA03 &PHARW..HARPCA04
    &PHARW..HARPCA05 &PHARW..HARPCA06;
IF ZONE='1';
%LET BY = SYSID CHANNEL CPUID YEAR WEEK ZONE;
%LET BREAK = ZONE;
PROC SORT DATA = FILE1; BY &BY;
DATA FILE1;
SET FILE1;
%PCASUM;
PROC PRINT; VAR SYSID CHANNEL CPUID YEAR WEEK
              PCAPCBSY;
```

5.2.3 Device Type Activity File (HARDTA)

The Device Type Activity File quantifies the utilization of device types, such as 3390, 3490, and so on, in terms of I/O and average performance factors for all devices in the type category. There is one record for each device type. This file is typically used when reporting detailed activity for each device type.

This file is derived from the CA MICS Device Activity File.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.3.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan		Level of Data Granularity				
DETAIL	N/A					
DAYS	SYSID DAY	DEVCLASS HOUR	DEVTYPE	YEAR	MONTH	
WEEKS	SYSID ZONE	DEVCLASS HOUR	DEVTYPE	YEAR	WEEK	
MONTHS	SYSID ZONE	DEVCLASS	DEVTYPE	YEAR	MONTH	
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 19, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-8. HARDTA Sort Sequence and Data Granularity

5.2.3.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

.D....E	DAY	- Day of Month
.DWM..E	DEVCLASS	- Device Class
.DWM..E	DEVTYPE	- Device Type
.DW...E	HOUR	- Hour of Day
.D.M..E	MONTH	- Month of Year
.DWM..E	SYSID	- System Identifier
.DW...E	WEEK	- Week of Year
.DWM..E	YEAR	- Year of Century

.DWM..E ZONE - Time Zone

Common Data Elements

.DWM..E CYCLETM - RMF Sampling Cycle Interval
.D....E DAYNAME - Name of Day of Week
.DWM..E DURATION - Recording Interval Time
.DWM..E ENDTS - End Time Stamp
.DWM..E EXTSTOR - Expanded Storage Flag
.DWM..E INTERVLS - Number of Recording Intervals
.DWM..E MVSLEVEL - MVS Software Level
.DWM..E ORGSYSID - Originating System Identification
.DWM..E PRSMLPNO - Logical Partition Number
.DWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
.DWM..E RMFESAME - z/Architecture Mode Indicator
.DWM..E RMFESCDR - Intvls with ESCON Director in Config
.DWM..E RMFESCON - Intvls where Enabled for ESCON
.DWM.. RMFGMTOF - GMT to Local Time Offset
.DWM..E RMFIML - I/O Measurement Level
.....E RMFSRL - SMF Record Level Change Number
.DWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
.DWM..E RMFVER - RMF Version Number
.DWM..E SAMPLES - RMF Sample Count
.DWM..E STARTTS - Start Time Stamp
.DWM..E SYSNAME - System Name
.DWM..E SYSPLEX - Sysplex Name

Accumulated Data Elements

.DWM.. DTAALC - Device Allocated
.DWM..E DTAATV - Device Active Time
.DWM..E DTA AVLCT - Available Device-Intervals
.DWM.. DTACMRM - Command Response Time
.DWM.. DTACNN - Device Connect Time
.DWM.. DTACNOV - Connect Time Overflow Count
.DWM..E DTACUQTM - Device Control Unit Queuing Time
.DWM..E DTADINTV - Total Device-Intervals
.DWM.. DTADIS - Device Disconnect Time
.DWM.. DTADVBMT - Device Busy Delay Time
.DWM.. DTAICT - Number of Invalid Samples
.DWM.. DTAIDTTM - Device Interrupt Delay Time
.DWM..E DTAISSCT - Intvls with RMF Samples Skipped
.DWM..E DTAMEC - Measurement Event Count
.DWM..E DTAMPTM - Total Mount Pending Time
.DWM..E DTAMTC - Number of Mounts
.DWM..E DTAMTP - Samples - Mount Pending Condition
.DWM.. DTANDA - Number of Device Allocations
.DWM.. DTANRD - Device Not Ready
.DWM.. DTANSS - Skipped Samples (too Large Delta Values)

.DWM..	DTANUX	- Number of PAV/HyperPAV Aliases
.DWM..	DTAPEN	- Device Pending Time
.DWM..E	DTAQUE	- Requests Queued
.DWM..E	DTARSMP	- Number of RMF Samples
.DWM..	DTARSV	- Device Reserved
.DWM..E	DTASSC	- Start Subchannel Count
.DWM..	DTAUTL	- Device Reserved and Idle

Maximum Data Elements

.DWM..	DTAMXNDA	- Max Number of Device Allocations
.DWM..	DTAMXQUE	- Max Requests Queued
.DWM..	DTAMXTAL	- Max Allocated Tape Drives
.DWM..E	DTANODEV	- Number of Devices in Device Type

Derived Data Elements

.DWM..	DTAACTRT	- Avg Device Activity Rate
.DWM..	DTAAVCMR	- Avg Command Response Time
.DWM..	DTAAVCNN	- Avg Device Connect Time
.DWM..	DTAAVDIS	- Avg Device Disconnect Time
.DWM..	DTAAVDVB	- Avg Device Busy Pending Time
.DWM..	DTAAVIDT	- Avg Device Interrupt Delay Time
.DWM..	DTAAVIOS	- Avg Device IOSQ Time
.DWM..E	DTAAVMTM	- Avg Mount Time
.DWM..	DTAAVNDA	- Avg Number of Device Allocations
.DWM..	DTAAVPEN	- Avg Device Pending Time
.DWM..	DTAAVQUE	- Avg Requests Queued
.DWM..E	DTAAVRES	- Avg Device Response Time
.DWM..	DTAAVSER	- Avg I/O Service Time
.DWM..	DTAPADUR	- Total Parallel Access Duration
.DWM..	DTAPCALC	- Pct Device Allocated
.DWM..	DTAPCCNN	- Pct Device Connected
.DWM..	DTAPCMTP	- Pct Mount Pending Condition
.DWM..	DTAPCNRD	- Pct Device Not Ready
.DWM..	DTAPCRSV	- Pct Device Reserved
.DWM..	DTAPCUTL	- Pct Device Utilized

5.2.3.3 Usage Considerations

Special considerations or techniques related to using the HARDTA file are provided below:

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized, with STARTTS being the lowest date and time, and ENDTS the highest date and time.

5.2.3.4 Retrieval Examples

This section presents typical HARDVA retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diiiit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Display the average I/O service time over the last six weeks, for prime time (zone 1) hours, by device type, for each hour of the week:

```
DATA FILE1;
SET &PHARW..HARDTA01 &PHARW..HARDTA02
    &PHARW..HARDTA03 &PHARW..HARDTA04
    &PHARW..HARDTA05 &PHARW..HARDTA06;
IF ZONE='1';
PROC PRINT; VAR SYSID DEVCLASS DEVTYPE YEAR WEEK
    HOUR DTAAVSTM;
```

2. Quantify the growth in I/O activity for 3390 devices over the last six months for prime time (zone 1):

```
DATA FILE1;
SET &PHARM..HARDTA01 &PHARM..HARDTA02
    &PHARM..HARDTA03 &PHARM..HARDTA04
    &PHARM..HARDTA05 &PHARM..HARDTA06;
IF ZONE='1';
PROC PRINT; VAR SYSID DEVCLASS DEVTYPE YEAR MONTH
    ZONE DTASSC;
```

5.2.4 Device Activity File (HARDVA)

The Device Activity File quantifies the utilization of individual device addresses in terms of I/O, percent busy, average queue length to the device, etc. There is one record for each unique device address on each CPU. This file is typically used when reporting detailed activity for each device.

This file is derived from the RMF Device Activity record, type 74.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.4.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	DEVCLASS	DEVTYPE	DEVNUM	YEAR	
	MONTH	DAY	HOURL	ENDTS		
DAYS	SYSID	DEVCLASS	DEVTYPE	DEVNUM	YEAR	
	MONTH	DAY	HOURL			
WEEKS	SYSID	DEVCLASS	DEVTYPE	DEVNUM	YEAR	
	WEEK	ZONE				
MONTHS	N/A					
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 19, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-9. HARDVA Sort Sequence and Data Granularity

5.2.4.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD....E	DAY	- Day of Month
XDW...E	DEVCLASS	- Device Class
XDW...E	DEVNUM	- Device Number
XDW...E	DEVTYPE	- Device Type
XD....E	HOURL	- Hour of Day

XD....E MONTH - Month of Year
 XDW...E SYSID - System Identifier
 XDW...E WEEK - Week of Year
 XDW...E YEAR - Year of Century
 XDW...E ZONE - Time Zone

Common Data Elements

XDW... CTLUMANU - Control Unit Manufacturer Code
 XDW...E CTLUNAME - Control Unit Name
 XDW... CTLUPLNT - Control Unit Manufacturer Plant
 XDW... CTLUSERN - Control Unit Serial Number
 XDW...E CUADDR - Control Unit Address/Number
 XDW...E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDW...E DEVADDR - Device Address/Number
 XDW...E DEVCNAME - Device Name
 XDW...E DEVPDMOD - Physical Device Model
 XDW...E DEVPDTYP - Physical Device Type
 XDW...E DURATION - Recording Interval Time
 XDW...E ENDTS - End Time Stamp
 XDW...E EXTSTOR - Expanded Storage Flag
 XDW...E INTERVLS - Number of Recording Intervals
 XDW...E IODFCCT - Intvls where I/O Config. Changed
 XDW...E IODFCPCT - I/O Config Changed Since Power On Reset
 XDW...E IODFCRTS - IODF Creation Time Stamp
 XDW...E IODFPICT - Power On Reset Using IODF
 XDW...E IODFSUFIX - Suffix of IODF Name
 XDW...E IODFTICT - I/O Config. Token is Invalid
 XDW...E LCUID - Logical Control Unit ID
 XDW...E MVSLEVEL - MVS Software Level
 X....E ONLINE - Online-Offline Status Indicator
 XDW...E ORGSYSID - Originating System Identification
 XDW...E PRSMLPNO - Logical Partition Number
 XDW...E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDW...E RMFESAME - z/Architecture Mode Indicator
 XDW...E RMFESCDR - Intvls with ESCON Director in Config
 XDW...E RMFESCON - Intvls where Enabled for ESCON
 XDW... RMFGMTOF - GMT to Local Time Offset
 XDW...E RMFIML - I/O Measurement Level
 X....E RMFSRL - SMF Record Level Change Number
 XDW...E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDW...E RMFVER - RMF Version Number
 XDW...E SAMPLES - RMF Sample Count
 XDW...E STARTTS - Start Time Stamp
 XDW...E STORNAME - DFSMS Storage Group Name
 XDW...E SYSNAME - System Name
 XDW...E SYSPLEX - Sysplex Name
 XDW...E VOLSER - Volume Serial Number

Retained Data Elements

X..... DVABDCMB - Bad CMB Data Indicator
X..... DVABDQL - Bad IOS Queue Length Indicator
X.....E DVACNF - Device Reconfiguration Indicator
XDW... DVAHPC - HyperPAV Aliases Configured for LSS
X..... DVAISS - RMF Samples Skipped Indicator
X..... DVAMULEX - PAV/HyperPAV Device Indicator
XDW... DVANDTAG - Node-Element Descriptor Tag
X..... DVANOLCU - No LCU Data Indicator
XDW... DVANSDDV - Non Self-Describing Device Number
X..... DVAPARTL - Partial Statistics Available Indicator
X.....E DVASCSID - Device Subchannel Set ID
X..... DVASMSRC - SMS Interface Call: Return Code
X..... DVASMSRS - SMS Interface Call: Reason Code
X..... DVASMS15 - SMS Interface Call: Reg 15 Contents
XDW...E DVAVOCAP - DASD Volume Capacity

Accumulated Data Elements

XDW... DVAALC - Device Allocated
XDW...E DVAATV - Device Active Time
XDW...E DVA AVLCT - Available Device-Intervals
XDW... DVABDCCT - Intvls with Bad CMB Data
XDW... DVABDQCT - Intvls with Bad IOS Queue Length
XDW...E DVACHGCT - Intvls Device was Dynamically Changed
XDW... DVACMRCT - Intvls with Valid Command Response Time
XDW... DVACMRCTM - Command Response Time
XDW...E DVACNFCT - Intvls with Device Reconfigured
XDW...E DVACNN - Device Connect Time
XDW... DVACNNOV - Connect Time Overflow Count
XDW...E DVACUQTM - Device Control Unit Queuing Time
XDW...E DVADELCT - Intvls with Device Deleted
XDW...E DVADINTV - Total Device-Intervals
XDW...E DVADIS - Device Disconnect Time
XDW... DVADVBTM - Device Busy Delay Time
XDW...E DVAFICCT - Intvls Device Connected to FICON
XDW... DVAGNXCT - Intvls with Storage Group Name Change
XDW... DVAHPVCT - Intvls Device was HyperPAV
XDW... DVAICT - Number of Invalid Samples
XDW... DVAIDTTM - Device Interrupt Delay Time
XDW...E DVAISSCT - Intvls with RMF Samples Skipped
XDW...E DVAMEC - Measurement Event Count
XDW...E DVAMPTM - Total Mount Pending Time
XDW...E DVAMTC - Number of Mounts
XDW...E DVAMTP - Samples - Mount Pending Condition
XDW... DVANDA - Number of Device Allocations
XDW... DVANOLCT - Intvls with No LCU Data

XDW...E DVANRD - Device Not Ready
 XDW... DVANSS - Skipped Samples (too Large Delta Values)
 XDW...E DVANUX - Number of PAV/HyperPAV Aliases
 XDW... DVAONLCT - Intvls with Device Online at End
 XDW... DVAPARCT - Intvls with Partial Statistics Available
 XDW... DVAPASCT - Successful PAV/HyperPAV Samples
 XDW... DVAPAUCT - Unsuccessful PAV/HyperPAV Samples
 XDW... DVAPAVCT - Intvls Device was PAV
 XDW... DVAPAXCT - Intvls where PAV Alias Count Changed
 XDW...E DVAPEN - Device Pending Time
 XDW...E DVAQUE - Requests Queued
 XDW...E DVARSM - Number of RMF Samples
 XDW...E DVARSV - Device Reserved
 XDW...E DVASHRCT - Intvls where Device was Shared
 XDW... DVASMCCT - Intvls with SMS Interface Return Non-0
 XDW... DVASMICT - Intvls with SMS Interface Error
 XDW... DVASMNCT - Intvls with SMS Not Available
 XDW... DVASMRCT - Intvls with SMS Interface Reason Non-0
 XDW... DVASM5CT - Intvls with SMS Interface Reg 15 Non-0
 XDW...E DVASSC - Start Subchannel Count
 XDW... DVATOALL - Total Generated Devices in All Classes
 XDW... DVATODCL - Total Recorded Devices in This Class
 XDW...E DVAUTL - Device Reserved and Idle
 X..... DVA74NEX - Accum. Number of PAV/HyperPAV Aliases

Minimum Data Elements

XDW... DVAMNALL - Min Generated Devices in All Classes
 XDW... DVAMNDCL - Min Recorded Devices in This Class

Maximum Data Elements

XDW... DVAMXALL - Max Generated Devices in All Classes
 XDW... DVAMXDCL - Max Recorded Devices in This Class
 XDW... DVAMXNDA - Max Number of Device Allocations
 XDW... DVAMXQUE - Max Requests Queued
 XDW... DVAMXTAL - Max Allocated Tape Drives

Derived Data Elements

XDW...E DVAACTRT - Avg Device Activity Rate
 XDW... DVAAVCMR - Avg Command Response Time
 XDW...E DVAAVCNN - Avg Device Connect Time
 XDW...E DVAAVDIS - Avg Device Disconnect Time
 XDW... DVAAVDVB - Avg Device Busy Pending Time
 XDW... DVAAVIDT - Avg Device Interrupt Delay Time
 XDW...E DVAAVIOS - Avg Device IOSQ Time
 XDW...E DVAAVMTM - Avg Mount Time
 XDW... DVAAVNDA - Avg Number of Device Allocations

XDW...E DVAAPEN - Avg Device Pending Time
XDW...E DVAAVQUE - Avg Requests Queued
XDW...E DVAAVRES - Avg Device Response Time
XDW...E DVAAVSER - Avg I/O Service Time
XDW... DVAPADUR - Total Parallel Access Duration
XDW... DVAPCALC - Pct Device Allocated
XDW...E DVAPCAVL - Pct Device Available
XDW... DVAPCCNN - Pct Device Connected
XDW...E DVAPCMTP - Pct Mount Pending Condition
XDW...E DVAPCNRD - Pct Device Not Ready
XDW...E DVAPCRSV - Pct Device Reserved
XDW... DVAPCUTL - Pct Device Utilized

5.2.4.3 Usage Considerations

Special considerations or techniques related to using the HARDVA file are provided below.

1. The following data elements in the HARDVA file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the HARDVAnn file in the DETAIL timespan.
 - CYCLETM - Sampling Time Cycle Length
 - VOLSER - Volume Serial
 - ONLINE - Online-Offline Status Indicator
2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o DAY and DAYNAME should not be used in WEEKS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.4.4 Retrieval Examples

This section presents typical HARTCA retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Display the average I/O service time for DASD devices yesterday:

```
DATA FILE1;
SET &PHARX..HARDVA01;
IF DEVCLASS EQ: "DASD";
PROC PRINT; VAR SYSID DEVCLASS DEVTYPE DEVADDR
              STARTTS ENDTS DVAAVSTM;
```

2. Display the average I/O service time over the last six weeks, for prime time (zone 1) hours, by device type, for each hour of the week for the DASD devices on the 4B and 5B banks:

```
DATA FILE1;
SET &PHARW..HARDVA01 &PHARW..HARDVA02
    &PHARW..HARDVA03 &PHARW..HARDVA04
    &PHARW..HARDVA05 &PHARW..HARDVA06;
IF ZONE EQ "1";
IF DEVADDR EQ: "'4B'" OR DEVADDR EQ: "5B";
PROC PRINT; VAR SYSID DEVCLASS DEVTYPE DEVADDR YEAR
              WEEK HOUR DVAAVSTM;
```

3. Display the percent of time that the volumes used for IMS have been in one of the not-ready states. The volumes are IMS001, IMS002, and IMS980.

```
DATA FILE1;
SET &PHARX..HARDVA01;
IF VOLSER EQ "IMS001" OR VOLSER EQ "IMS002" OR
    VOLSER EQ "IMS980";
PROC PRINT; VAR SYSID DEVCLASS DEVTYPE DEVADDR
              VOLSER STARTTS ENDTS DVAPCMTP DVAPCNRD;
```

5.2.5 CF Duplexing Activity File (HARCFD)

The CF Duplexing Activity File is used to store configuration information about the remote coupling facilities (CF) connected to a local CF, including name, hardware characteristics, and information describing the CF links used to transfer the requests through the remote coupling facilities. It also provides performance information about duplexing requests processed by each of the connected remote coupling facilities. You can use this information to analyze high-level duplexing coupling facility activity for performance analysis and capacity planning.

The information in the HARCFD file is obtained from the Remote Facility Data section of the SMF Type 74 subtype 4 record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.5.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS	CFYSYSNM	CFYCFNM	CFYRCFNM		
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
	CFYSYSNM	CFYCFNM	CFYRCFNM			
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
	CFYSYSNM	CFYCFNM	CFYRCFNM			
MONTHS	SYSID	YEAR	MONTH	ZONE	CFYSYSNM	
	CFYCFNM	CFYRCFNM				
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAULT option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-10. HARCFD Sort Sequence and Data Granularity

5.2.5.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

- XDWM..E CFYCFNM - CF Name
- XDWM..E CFYRCFNM - Remote CF Name
- XDWM..E CFYSYSNM - Name of System Using CF
- XD...E DAY - Day of Month
- XDW...E HOUR - Hour of Day

XD.M..E MONTH - Month of Year
XDWM..E SYSID - System Identifier
XDW...E WEEK - Week of Year
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E CFDCHPTP - Remote CF Channel Path Types
XDWM.. CFDCPCID - Central Processor Complex Identifier
XDWM.. CFDPNBR - Remote CF Partition Number
XDWM.. CFDPSTDE - Remote CF Partition Side
XDWM.. CFDRMNDE - Remote CF Hardware Node Descriptor
XDWM..E CFDRMSYS - System Name for Remote CF

Accumulated Data Elements

XDWM..E CFDTODLY - Total Delayed Signals
XDWM..E CFDTODSQ - Signal Delay Time Sum Squares
XDWM..E CFDTODTM - Total Signal Delay Time
XDWM..E CFDT0HES - Halt Execution Signals
XDWM..E CFDT0PGS - Channel Path Group Size
XDWM..E CFDT0RCS - Ready to Complete Signals
XDWM..E CFDT0REQ - Total Requests to this Remote CF
XDWM..E CFDT0RES - Ready to Execute Signals
XDWM..E CFDT0RSA - Request for Suppression Accepted Signals
XDWM..E CFDT0RSS - Request for Suppression Signals
XDWM..E CFDT0SRS - Total Redriven Signals
XDWM..E CFDT0SSQ - Signal Service Time Sum Squares
XDWM..E CFDT0STM - Total Signal Service Time

Minimum Data Elements

XDWM.. CFDMNPGS - Minimum Channel Path Group Size

Maximum Data Elements

XDWM.. CFDMXPGS - Maximum Channel Path Group Size

Derived Data Elements

XDWM..E CFDAVDTM - Avg Signal Delay Time
XDWM..E CFDAVPGS - Avg Channel Path Group Size
XDWM..E CFDAVSTM - Avg Signal Service Time
XDWM..E CFDPCRDL - Pct of Requests Delayed
XDWM..E CFDPSREQ - Reqs per Second to this Remote CF
XDWM..E CFDSDDTM - Std Dev of Signal Delay Time
XDWM..E CFSDSSTM - Std Dev of Signal Service Time

5.2.5.3 Usage Considerations

Special considerations or techniques related to using the HARCFD file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.5.4 Retrieval Examples

This section presents typical HARRSV retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at

your installation.

1. Print yesterday's average CPU/channel-busy percentages for the RMF measurement interval:

```
DATA;  
SET &PHARX..HARTCA01;  
PROC PRINT; VAR SYSID STARTTS ENDTS TCAPC0CB  
            TCAPC0WB;
```

2. Print yesterday's average and maximum hourly channel-busy and CPU wait percentage for each hour in zone 1:

```
DATA;  
SET &PHARD..HARTCA01;  
IF ZONE='1';  
PROC PRINT; VAR SYSID YEAR MONTH DAY HOUR  
            TCAPC0WB TCAMP0WB;
```

5.2.6 Hardware Reserve Activity File (HARRSV)

The Hardware Reserve Activity File contains data that quantifies the reserve requests for resources made by the supervisor services RESERVE macro. This file is typically used when reporting on RESERVE requests by job.

This file is derived from the RMF Monitor II Activity record, type 79 subtype 6.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.6.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	VOLSER	YEAR	MONTH	DAY	
	HOUR	ENDTS				
DAYS	N/A					
WEEKS	N/A					
MONTHS	N/A					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-11. HARRSV Sort Sequence and Data Granularity

5.2.6.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS

system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

X....E	DAY	- Day of Month
X....E	HOURL	- Hour of Day
X....E	MONTH	- Month of Year
X....E	SYSID	- System Identifier
X....E	VOLSER	- Volume Serial Number
X....E	WEEK	- Week of Year
X....E	YEAR	- Year of Century

X.....E ZONE - Time Zone

Common Data Elements

X..... ASID - Address Space Identification
 X.....E DAYNAME - Name of Day of Week
 X.....E DEVADDR - Device Address/Number
 X.....E DEVNUM - Device Number
 X.....E DURATION - Recording Interval Time
 X.....E ENDTS - End Time Stamp
 X.....E EXTSTOR - Expanded Storage Flag
 X.....E INTERVLS - Number of Recording Intervals
 X.....E JOB - Job Identification
 X.....E MICSVER - CA MICS Version Number
 X.....E MVSLEVEL - MVS Software Level
 X.....E ORGSYSID - Originating System Identification
 X.....E PRSMLPNO - Logical Partition Number
 X.....E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 X.....E RMFESAME - z/Architecture Mode Indicator
 X.....E RMFESCDR - Intvls with ESCON Director in Config
 X.....E RMFESCON - Intvls where Enabled for ESCON
 X..... RMFGMTOF - GMT to Local Time Offset
 X.....E RMFIML - I/O Measurement Level
 X..... RMFMFL - RMF Maintenance Level Indicator
 X..... RMFM2ID - RMF Monitor II Session ID
 X..... RMFM2RID - RMF Monitor II Measurement Name
 X..... RMFM2SST - RMF Monitor II Snapshot Time
 X.....E RMFSRL - SMF Record Level Change Number
 X.....E RMFSYNCH - Intvls with RMF Synchronized to SMF
 X.....E RMFVER - RMF Version Number
 X.....E STARTTS - Start Time Stamp
 X.....E SYSNAME - System Name
 X.....E SYSPLEX - Sysplex Name

Retained Data Elements

X..... RSVQNM - Major Name of Resource
 X..... RSVRHEX - Hex Minor Name Expanded
 X..... RSVRLN - Length of Minor Name
 X..... RSVRNM - Minor Name of Resource
 X..... RSVRNMTR - Minor Name Truncation Flag
 X..... RSVSTAT - Reserve Request Status
 X..... RSVSYSID - System ID of Reserving Job
 X..... RSVTYPE - Reserve Request Type

Accumulated Data Elements

X..... RSVRPTTM - Report Time Of The Session

5.2.6.3 Usage Considerations

Special considerations or techniques related to using the HARRSV file are provided below.

1. The following data elements in the HARRSV file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the HARRSVnn file in the DETAIL timespan.
2. The purpose of the data elements STARTTS and ENDTS in the DETAIL timespan is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.6.4 Retrieval Examples

This section presents typical HARIPU retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Display yesterday's hardware reserves for each RMF measurement interval during the prime time zone:

```
DATA;
  SET &PHARX..HARRSV01;
  IF ZONE='1';
PROC PRINT;
  VAR SYSID STARTTS ENDTS RSVSYSID
      DEVADDR RSVQNM RSVRNM RSVRHEX RSVRLN RSVRNMTR
      RSVSTAT RSVTYPE RSVRPTTM;
```

2. Display the exclusive enqueues originating from system B during the prime time zone for the past week:

```
DATA;
  SET &PHARX..HARRSV01 &PHARX..HARRSV02
      &PHARX..HARRSV03 &PHARX..HARRSV04
      &PHARX..HARRSV05;
  IF ZONE='1'; IF RSVSYSID='SYSB'; IF RSVTYPE='EXC';
PROC PRINT;
  VAR SYSID STARTTS ENDTS RSVSYSID
      DEVADDR RSVQNM RSVRNM RSVRHEX RSVRLN RSVRNMTR
      RSVSTAT RSVTYPE RSVRPTTM;
```

5.2.7 Individual Processor Activity File (HARIPU)

The Individual Processor Activity File describes the CPU utilization for each central processor or each PR/SM logical processor, defined in the central processor complex. This file is typically used when reporting CPU and I/O activity.

The information in the HARIPU file is obtained from the RMF type 70 subtype 1 CPU, PR/SM, and ICF Activity record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.7.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS	CPUTYPE	IPUADDR			
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
	CPUTYPE	IPUADDR				
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
	CPUTYPE	IPUADDR				
MONTHS	SYSID	YEAR	MONTH	ZONE	CPUTYPE	
	IPUADDR					
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 12, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-12. HARIPU Sort Sequence and Data Granularity

5.2.7.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E	CPUTYPE	- Physical Processor Type
XD....E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XDWM..E	IPUADDR	- Processor Address
XD.M..E	MONTH	- Month of Year

XDWM..E SYSID - System Identifier
 XDW...E WEEK - Week of Year
 XDWM..E YEAR - Year of Century
 XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CCCCCP - Current Highest CPU ID Installed
 XDWM..E CPCCHGRS - Capacity Change Reason
 XDWM..E CPCCHWMID - CPC Physical Model Identifier
 XDWM..E CPCICP - Highest CPU ID Installed at IPL
 XDWM..E CPCMCP - Max Available CPU ID Number at IPL
 XDWM..E CPCMODID - CPC Model Identifier
 XDWM..E CPCMODNR - Nominal Model Capacity Rating
 XDWM..E CPCMODRT - Effec. Model Capacity Rating
 XDWM..E CPCMPCID - CPC Permanent Model Capacity Identifier
 XDWM..E CPCMPCNR - Nominal Permanent Model Capacity Rating
 XDWM..E CPCMPCRT - Effec. Permanent Model Capacity Rating
 XDWM..E CPCMTCID - CPC Temporary Model Capacity Identifier
 XDWM..E CPCMTCNR - Nominal Temporary Model Capacity Rating
 XDWM..E CPCMTCRT - Effec. Temporary Model Capacity Rating
 XDWM..E CPCPLANT - CPC Manufacturer Plant
 XDWM..E CPCSEQNB - CPC Sequence Number
 XDWM..E CPUMODEL - CPU Model
 XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD...E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E EXTSTOR - Expanded Storage Flag
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMACDP - Avg CP Dedicated Processors
 XDWM..E PRSMACP - Avg CP Processors in Complex
 XDWM..E PRSMACVP - Avg CP Shared Logical Processors
 XDWM..E PRSMADP - Avg Dedicated Processors
 XDWM..E PRSMAIDP - Avg ICF Dedicated Processors
 XDWM..E PRSMAIP - Avg ICF Processors in Complex
 XDWM..E PRSMAIVP - Avg ICF Shared Logical Processors
 XDWM..E PRSMALPA - Avg Active Logical Partitions
 XDWM..E PRSMALPS - Avg Defined Logical Partitions
 XDWM..E PRSMANDP - Avg IFL Dedicated Processors
 XDWM..E PRSMANP - Avg IFL Processors in Complex
 XDWM..E PRSMANVP - Avg IFL Shared Logical Processors
 XDWM..E PRSMAPP - Avg Processors in Complex
 XDWM..E PRSMASDP - Avg zIIP Dedicated Processors
 XDWM..E PRMASP - Avg zIIP Processors in Complex
 XDWM..E PRSMASVP - Avg zIIP Shared Logical Processors
 XDWM..E PRSMAVP - Avg Shared Logical Processors

```

XDWM..E PRSMAZDP - Avg zAAP Dedicated Processors
XDWM..E PRSMAZP  - Avg zAAP Processors in Complex
XDWM..E PRSMAZVP - Avg zAAP Shared Logical Processors
XDWM..E PRSMCEC  - PR/SM LPAR Central Complex
XDWM..E PRSMCGUI - Capacity Group Uses Initial Weights
XDWM..E PRSMENV  - PR/SM LPAR Environment ID
XDWM..E PRSMHIPA - Intvls with Hiperdispatch Active
XDWM..E PRSMHIPC - Intvls with Hiperdispatch Status Changed
XDWM..E PRSMHIPD - Hiperdispatch Indicator
XDWM..E PRSMHIPS - Hiperdispatch Support Indicator
XDWM..E PRSMIWGT - Total Shr ICF Processor Resources Weight
XDWM..E PRSMLMCT - Intvls with LPAR Mgt Time Reporting
XDWM..E PRSMLPID - Logical Partition ID of Recording SYSID
XDWM..E PRSMLPNM - Logical Partition Name
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMLPTP - Logical Partition Type
XDWM.. PRSMMDCP - Max CP Dedicated Processors
XDWM.. PRSM MCP  - Max CP Processors in Complex
XDWM.. PRSM MCVP - Max CP Shared Logical Processors
XDWM.. PRSMMDP  - Max Dedicated Processors
XDWM.. PRSM MIDP - Max ICF Dedicated Processors
XDWM.. PRSM MIP  - Max ICF Processors in Complex
XDWM.. PRSM MIVP - Max ICF Shared Logical Processors
XDWM.. PRSM MLPA - Max Active Logical Partitions
XDWM.. PRSM MLPS - Max Defined Logical Partitions
XDWM.. PRSM MNDP - Max IFL Dedicated Processors
XDWM.. PRSM MNP  - Max IFL Processors in Complex
XDWM.. PRSM MNVP - Max IFL Shared Logical Processors
XDWM.. PRSM MPP  - Max Processors in Complex
XDWM.. PRSM MSDP - Max zIIP Dedicated Processors
XDWM.. PRSM MSP  - Max zIIP Processors in Complex
XDWM.. PRSM MSVP - Max zIIP Shared Logical Processors
XDWM.. PRSM MVP  - Max Shared Logical Processors
XDWM.. PRSM MZDP - Max zAAP Dedicated Processors
XDWM.. PRSM MZP  - Max zAAP Processors in Complex
XDWM.. PRSM MZVP - Max zAAP Shared Logical Processors
XDWM.. PRSM NCDP - Min CP Dedicated Processors
XDWM.. PRSM NCP  - Min CP Processors in Complex
XDWM.. PRSM NCVP - Min CP Shared Logical Processors
XDWM.. PRSM NDP  - Min Dedicated Processors
XDWM.. PRSM NIDP - Min ICF Dedicated Processors
XDWM.. PRSM NIP  - Min ICF Processors in Complex
XDWM.. PRSM NIVP - Min ICF Shared Logical Processors
XDWM.. PRSM NLPA - Min Active Logical Partitions
XDWM.. PRSM NLPS - Min Defined Logical Partitions
XDWM.. PRSM NNDP - Min IFL Dedicated Processors
XDWM.. PRSM NNP  - Min IFL Processors in Complex
XDWM.. PRSM NNVP - Min IFL Shared Logical Processors
XDWM..E PRSMNOPP - Number of Physical Processors

```


XDWM.. PRSMNPP - Min Processors in Complex
 XDWM.. PRSMNSDP - Min zIIP Dedicated Processors
 XDWM.. PRSMNSP - Min zIIP Processors in Complex
 XDWM.. PRSMNSVP - Min zIIP Shared Logical Processors
 XDWM.. PRSMNVP - Min Shared Logical Processors
 XDWM..E PRSMNWGT - Total Shr IFL Processor Resources Weight
 XDWM.. PRSMNZDP - Min zAAP Dedicated Processors
 XDWM.. PRSMNZP - Min zAAP Processors in Complex
 XDWM.. PRSMNZVP - Min zAAP Shared Logical Processors
 XDWM..E PRSMRTP - Logical Processor Type
 XDWM..E PRSMWGT - Total Shr zIIP Proc. Resources Weight
 XDWM..E PRSMTAMT - Total LPAR Mgt Time - Attributable
 XDWM..E PRSMTBPS - All Partitions Processor Weights
 XDWM..E PRSMTCAT - Total CP LPAR Mgt Time - Attributable
 XDWM..E PRSMTCDP - Total CP Dedicated Processors
 XDWM..E PRSMTCDT - Total CP Dispatch Time
 XDWM..E PRSMT CET - Total CP Dispatch Time - Effective
 XDWM..E PRSMT CMT - Total CP LPAR Mgt Time
 XDWM..E PRSMTCP - Total CP Processors in Complex
 XDWM..E PRSMT CST - Total CP Dispatch Time - Shared
 XDWM..E PRSMT CUT - Total CP LPAR Mgt Time - Unattributable
 XDWM..E PRSMT CVP - Total CP Shared Logical Processors
 XDWM..E PRSMTDP - Total Dedicated Processors
 XDWM..E PRSMTDTM - Total Dispatch Time - Shared
 XDWM..E PRSMT EDT - Total Dispatch Time - Effective
 XDWM..E PRSMTIAT - Total ICF LPAR Mgt Time - Attributable
 XDWM..E PRSMTIDP - Total ICF Dedicated Processors
 XDWM..E PRSMTIDT - Total ICF Dispatch Time
 XDWM..E PRSMTIET - Total ICF Dispatch Time - Effective
 XDWM..E PRSMTIMT - Total ICF LPAR Mgt Time
 XDWM..E PRSMTIP - Total ICF Processors in Complex
 XDWM..E PRSMTIST - Total ICF Dispatch Time - Shared
 XDWM..E PRSMTIUT - Total ICF LPAR Mgt Time - Unattributable
 XDWM..E PRSMTIVP - Total ICF Shared Logical Processors
 XDWM..E PRSMTLMT - Total LPAR Mgt Time
 XDWM..E PRSMTLPA - Total Active Logical Partitions
 XDWM..E PRSMTLPS - Total Defined Logical Partitions
 XDWM..E PRSMTNAT - Total IFL LPAR Mgt Time - Attributable
 XDWM..E PRSMTNDP - Total IFL Dedicated Processors
 XDWM..E PRSMTNDT - Total IFL Dispatch Time
 XDWM..E PRSMTNET - Total IFL Dispatch Time - Effective
 XDWM..E PRSMTNMT - Total IFL LPAR Mgt Time
 XDWM..E PRSMTNP - Total IFL Processors in Complex
 XDWM..E PRSMTNST - Total IFL Dispatch Time - Shared
 XDWM..E PRSMTNUT - Total IFL LPAR Mgt Time - Unattributable
 XDWM..E PRSMTNVP - Total IFL Shared Logical Processors
 XDWM..E PRSMTPP - Total Processors in Complex
 XDWM..E PRSMTSAT - Total zIIP LPAR Mgt Time - Attributable
 XDWM..E PRSMTSDP - Total zIIP Dedicated Processors

```

XDWM..E PRSMTSDT - Total zIIP Dispatch Time
XDWM..E PRSMTSET - Total zIIP Dispatch Time - Effective
XDWM..E PRSMTSMT - Total zIIP LPAR Mgt Time
XDWM..E PRSMTSP - Total zIIP Processors in Complex
XDWM..E PRSMTSST - Total zIIP Dispatch Time - Shared
XDWM..E PRSMTSUT - Total zIIP LPAR Mgt Tm - Unattributable
XDWM..E PRSMTSVP - Total zIIP Shared Logical Processors
XDWM..E PRSMTTDT - Total Dispatch Time
XDWM..E PRSMTUMT - Total LPAR Mgt Time - Unattributable
XDWM..E PRSMTVP - Total Shared Logical Processors
XDWM..E PRSMTWGT - Total Shr CP Processor Resources Weight
XDWM..E PRSMTZAT - Total zAAP LPAR Mgt Time - Attributable
XDWM..E PRSMTZDP - Total zAAP Dedicated Processors
XDWM..E PRSMTZDT - Total zAAP Dispatch Time
XDWM..E PRSMTZET - Total zAAP Dispatch Time - Effective
XDWM..E PRSMTZMT - Total zAAP LPAR Mgt Time
XDWM..E PRSMTZP - Total zAAP Processors in Complex
XDWM..E PRSMTZST - Total zAAP Dispatch Time - Shared
XDWM..E PRSMTZUT - Total zAAP LPAR Mgt Tm - Unattributable
XDWM..E PRSMTZVP - Total zAAP Shared Logical Processors
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E PRSMZWGT - Total Shr zAAP Proc. Resources Weight
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM..E RMFESCDR - Intvls with ESCON Director in Config
XDWM..E RMFESCON - Intvls where Enabled for ESCON
XDWM..E RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
X....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSUPAV - Intvls with zIIP Processors Available
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
XDWM..E SAMPLES - RMF Sample Count
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

```

Retained Data Elements

```

XDWM..E IPUABSLM - Absolute LPAR Limit for Processor Use
XDWM..E IPUACS - Processor Actual Weighting
XDWM..E IPUBPS - Partition Processor Weight
XDWM..E IPUGTS - LPAR Global Time Slice
XDWM..E IPUMAS - Processor Maximum Weighting
XDWM..E IPUMIS - Processor Minimum Weighting
XDWM..E IPUMOD - Processor Model Family
XDWM..E IPUPOLRT - Current Polarization
XDWM..E IPUSER - IPU Serial Number
XDWM..E IPUSUAVL - Service Units Available to MVS Image

```

XDWM..E IPUUSEC - Physical CPU Adjustment Factor
 XDWM..E IPUVER - Processor Version Number

Accumulated Data Elements

XDWM..E IPUABCCT - Intvls with Processor Use Abs Limit Chg
 XDWM..E IPUABSCT - Intvls with Processor Use Abs Limit
 XDWM..E IPUADJCH - Intvls with CPU Adjustment Factor Chgd
 XDWM..E IPUBTM - IPU Busy Time
 XDWM..E IPUCHPOL - Intvls with Polarization Changed
 XDWM..E IPUCNFCT - Intvls with IPU Reconfiguration
 XDWM..E IPU CPCCT - Intvls with Part Capping Status Change
 XDWM..E IPU CPDCT - Intvls with Partition Capping Disabled
 XDWM..E IPU CPECT - Intvls with Partition Capping Enabled
 XDWM..E IPUDEDCT - Intvls with Dedicated Processor
 XDWM..E IPU DIAGF - Intvls with Diagnose X'204' Failure
 XDWM..E IPU DIAGS - Number of Diagnose Samples
 XDWM..E IPU DIAGV - Intvls with z/VM Guest Data Available
 XDWM..E IPU DIAGX - Intvls with Diagnose X'204' Ext. Data
 XDWM..E IPU DTM - Dispatch Time
 XDWM..E IPU EDT - Dispatch Time - Effective
 XDWM..E IPU GTSCH - Intvls with Global Time Slice Change
 XDWM..E IPU HIPOL - Intvls with High Polarization
 XDWM..E IPU LACDC - Long-Term MSUs Avg Valid for Ded. CPUs
 XDWM..E IPU LOPOL - Intvls with Low Polarization
 XDWM..E IPU MPOL - Intvls with Medium Polarization
 XDWM.. IPU NIO - I/O Connections
 XDWM..E IPU NOPCH - Intvls with Phy Processor Count Change
 XDWM..E IPU NOPOL - Intvls without Polarization
 XDWM..E IPU ONLCT - Intvls with IPU Online
 XDWM..E IPU OTM - IPU Online Time
 XDWM..E IPU PTM - Parked Time
 XDWM..E IPU RSMP - Number of RMF Samples
 XDWM..E IPU SIG - SIGP Instructions
 XDWM..E IPU SLIH - IPU I/O SLIH Entries
 XDWM.. IPU SRB - SRB Dispatches
 XDWM..E IPU STSIA - Intvls with STSI Facility Available
 XDWM..E IPU SUACH - Intvls with Service Units Available Chgd
 XDWM.. IPU TCB - TCB Dispatches
 XDWM..E IPU TOLAC - Accum. Long-Term Average of CPU MSUs
 XDWM..E IPU TONCA - Samples WLM Actually Capped LPAR
 XDWM..E IPU TONSA - Samples at Maximum Weighting
 XDWM..E IPU TONSI - Samples at Minimum Weighting
 XDWM..E IPU TONSW - Samples WLM Considered Capping LPAR
 XDWM..E IPU TOPOW - Accumulated Polarization Weight
 XDWM..E IPU TPI - IPU TPI I/O Events
 XDWM..E IPU PRSH - Total Shareable Processors in Pool
 XDWM..E IPU UTM - IPU Up Time
 XDWM..E IPU VBTM - PR/SM MVS Busy Time

XDWM..E IPUVWTM - PR/SM MVS Wait Time
XDWM..E IPUWSCCT - Intvls with LPAR Wait Assist Change
XDWM..E IPUWSDCT - Intvls with LPAR Wait Assist Disabled
XDWM..E IPUWSECT - Intvls with LPAR Wait Assist Enabled
XDWM..E IPUWSTM - PR/SM Detected Wait Time
XDWM..E IPUWTD - Wait Dispatch Count
XDWM..E IPUWTM - IPU Not Busy Time
XDWM..E IPUWTSUC - Successful Warning-Track Interruptions
XDWM..E IPUWTUNS - Unsuccessful Warning-Track Interruptions
XDWM..E IPUWTYTM - Warning-Track Yielded to PR/SM Time

Minimum Data Elements

XDWM..E IPUMNLAC - Minimum Long-Term Average of CPU MSUs
XDWM..E IPUMNSUA - Min Serv. Units Available to MVS Image

Maximum Data Elements

XDWM..E IPUMPBS - Max Pct IPU Busy
XDWM..E IPUMPWT - Max Pct IPU Not Busy
XDWM..E IPUMXLAC - Maximum Long-Term Average of CPU MSUs
XDWM..E IPUMXSUA - Max Serv. Units Available to MVS Image

Derived Data Elements

XDWM..E IPUAPRSH - Avg Shareable Processors in Pool
XDWM..E IPUAVLAC - Long-Term Average of CPU Service (MSUs)
XDWM..E IPUAVPOW - Avg Polarization Weight
XDWM..E IPUMWTM - Mean time to Wait
XDWM..E IPUPCBS - Pct IPU Busy
XDWM..E IPUPCDT - Pct IPU Dispatched
XDWM..E IPUPCED - Pct IPU Dispatched - Effective
XDWM..E IPUPCNCA - LPAR WLM Actual Capping Pct
XDWM..E IPUPCNSA - Maximum Weighting Percentage
XDWM..E IPUPCNSI - Minimum Weighting Percentage
XDWM..E IPUPCNSW - LPAR WLM Potential Capping Pct
XDWM..E IPUPCONL - Pct IPU Online
XDWM..E IPUPCOTM - IPU Online Time Percentage
XDWM..E IPUPCPTM - Parked Time Percentage
XDWM..E IPUPCSWT - Pct Successful Warning-Track Int.
XDWM..E IPUPCTP - IPU Pct I/O Handled by TPI
XDWM..E IPUPCUP - Pct IPU Up Time
XDWM..E IPUPCVB - Pct PR/SM IPU in MVS Busy
XDWM..E IPUPCVW - Pct PR/SM IPU in MVS Wait
XDWM..E IPUPCWT - Pct IPU Not Busy
XDWM..E IPUSIGRT - SIGP Instructions Rate

5.2.7.3 Usage Considerations

Special considerations or techniques related to using the HARIPU file are provided below.

1. The following data elements in the HARIPU file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the HARIPU file in the DETAIL timespan.

CYCLETM - Sampling Time Cycle Length
IPUSER - Serial Number for CPU
IPUCNF - CPU Configuration Activity
IPUONL - CPU Online Status Indicator

2. The following data elements are user-defined option dependent and their use should be within the frame of reference of the option's definition.

CA MICS PARMS SYSID
CPUMODEL - CPU Model Identification

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
5. The HARIPU file contains CPU measurements on an individual central processor basis. The HARCPU file contains CPU measurements for the entire processor

complex.

5.2.7.4 Retrieval Examples

This section presents typical HARLPC retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's CPU busy percentage for each RMF measurement interval:

```
DATA;  
SET &PHARX..HARIPU01;  
PROC PRINT; VAR SYSID STARTTS ENDTS IPUADDR IPUPCBS;
```

2. Print yesterday's average and maximum hourly CPU usage percentage for each hour in zone 1:

```
DATA; SET &PHARD..HARIPU01;  
IF ZOE='1';  
PROC RINT; VAR SYSID YEAR MONTH DAY HOUR  
IPUADDR IPUPCBS IPUMPBS;
```

3. Display the average IPU busy percentage by SYSID for prime time (zone 1) over the last six months:

```
DATA;  
SET &PHARM..HARIPU01 &PHARM..HARIPU02  
&PHARM..HARIPU03 &PHARM..HARIPU04  
&PHARM..HARIPU05 &PHARM..HARIPU06;  
IF ZONE='1';  
PROC PRINT; VAR SYSID YEAR MONTH IPUADDR IPUPCBS;
```

5.2.8 PR/SM Logical Partition Activity File (HARLPC)

The Logical Partition Activity File describes the activity for each defined PR/SM logical partition in a central electronic complex. Data is also carried that tracks changes made to the logical partition definition that might affect performance analysis of the complex.

The information in the HARLPC file is obtained from the RMF type 70 subtype 1 CPU, PR/SM, and ICF Activity record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.8.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMLPTP	
	YEAR	MONTH	DAY	HOURL	ENDTS	
DAYS	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMLPTP	
	YEAR	MONTH	DAY	HOURL		
WEEKS	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMLPTP	
	YEAR	WEEK	ZONE	HOURL		
MONTHS	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMLPTP	
	YEAR	MONTH	ZONE			
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-13. HARLPC Sort Sequence and Data Granularity

5.2.8.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD....E	DAY	- Day of Month
XDW...E	HOUR	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	PRSMENV	- PR/SM LPAR Environment ID
XDWM..E	PRMLPID	- Logical Partition ID of Recording SYSID
XDWM..E	PRMLPNM	- Logical Partition Name

XDWM..E PRSMLPTP - Logical Partition Type
XDWM..E SYSID - System Identifier
XDW...E WEEK - Week of Year
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CCCCCP - Current Highest CPU ID Installed
XDWM..E CPCCHGRS - Capacity Change Reason
XDWM..E CPCCHMID - CPC Physical Model Identifier
XDWM..E CPCICP - Highest CPU ID Installed at IPL
XDWM..E CPCMCP - Max Available CPU ID Number at IPL
XDWM..E CPCMODID - CPC Model Identifier
XDWM..E CPCMODNR - Nominal Model Capacity Rating
XDWM..E CPCMODRT - Effec. Model Capacity Rating
XDWM..E CPCMPCID - CPC Permanent Model Capacity Identifier
XDWM..E CPCMPCNR - Nominal Permanent Model Capacity Rating
XDWM..E CPCMPCRT - Effec. Permanent Model Capacity Rating
XDWM..E CPCMTCID - CPC Temporary Model Capacity Identifier
XDWM..E CPCMTCNR - Nominal Temporary Model Capacity Rating
XDWM..E CPCMTCRT - Effec. Temporary Model Capacity Rating
XDWM..E CPCPLANT - CPC Manufacturer Plant
XDWM..E CPCSEQNB - CPC Sequence Number
XDWM..E CPUMODEL - CPU Model
XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E EXTSTOR - Expanded Storage Flag
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMACDP - Avg CP Dedicated Processors
XDWM..E PRSMACP - Avg CP Processors in Complex
XDWM..E PRSMACSP - Avg CP Shareable Processors
XDWM..E PRSMACVP - Avg CP Shared Logical Processors
XDWM..E PRSMADP - Avg Dedicated Processors
XDWM..E PRSMAIDP - Avg ICF Dedicated Processors
XDWM..E PRSMAIP - Avg ICF Processors in Complex
XDWM..E PRSMAISP - Avg ICF Shareable Processors
XDWM..E PRSMAIVP - Avg ICF Shared Logical Processors
XDWM..E PRSMALPA - Avg Active Logical Partitions
XDWM..E PRSMALPS - Avg Defined Logical Partitions
XDWM..E PRSMANDP - Avg IFL Dedicated Processors
XDWM..E PRSMANP - Avg IFL Processors in Complex
XDWM..E PRSMANSP - Avg IFL Shareable Processors
XDWM..E PRSMANVP - Avg IFL Shared Logical Processors
XDWM..E PRSMAPP - Avg Processors in Complex

XDWM..E PRSMASDP - Avg zIIP Dedicated Processors
XDWM..E PRSMASP - Avg zIIP Processors in Complex
XDWM..E PRSMASSP - Avg zIIP Shareable Processors
XDWM..E PRSMASVP - Avg zIIP Shared Logical Processors
XDWM..E PRSMAMP - Avg Shared Logical Processors
XDWM..E PRSMAZDP - Avg zAAP Dedicated Processors
XDWM..E PRSMAZP - Avg zAAP Processors in Complex
XDWM..E PRSMAZSP - Avg zAAP Shareable Processors
XDWM..E PRSMAZVP - Avg zAAP Shared Logical Processors
XDWM..E PRSMCEC - PR/SM LPAR Central Complex
XDWM..E PRSMCGLI - Capacity Group Limit
XDWM..E PRSMCGNM - Capacity Group Name
XDWM..E PRSMCGUI - Capacity Group Uses Initial Weights
XDWM..E PRSMHIPA - Intvls with Hiperdispatch Active
XDWM..E PRSMHIPD - Hiperdispatch Indicator
XDWM..E PRSMHIPS - Hiperdispatch Support Indicator
XDWM..E PRSMIWGT - Total Shr ICF Processor Resources Weight
XDWM..E PRSMLMCT - Intvls with LPAR Mgt Time Reporting
XDWM..E PRSMLPNO - Logical Partition Number
XDWM.. PRSMMCDP - Max CP Dedicated Processors
XDWM.. PRSMMCP - Max CP Processors in Complex
XDWM.. PRSMMCSP - Max CP Shareable Processors
XDWM.. PRSMMCVLP - Max CP Shared Logical Processors
XDWM.. PRSMMDP - Max Dedicated Processors
XDWM.. PRSMMIDP - Max ICF Dedicated Processors
XDWM.. PRSMMIP - Max ICF Processors in Complex
XDWM.. PRSMMISP - Max ICF Shareable Processors
XDWM.. PRSMMIVP - Max ICF Shared Logical Processors
XDWM.. PRSMMMLPA - Max Active Logical Partitions
XDWM.. PRSMMMLPS - Max Defined Logical Partitions
XDWM.. PRSMMNDP - Max IFL Dedicated Processors
XDWM.. PRSMMNCP - Max IFL Processors in Complex
XDWM.. PRSMMNSP - Max IFL Shareable Processors
XDWM.. PRSMMNVP - Max IFL Shared Logical Processors
XDWM.. PRSMMPP - Max Processors in Complex
XDWM.. PRSMMSDP - Max zIIP Dedicated Processors
XDWM.. PRSMMSP - Max zIIP Processors in Complex
XDWM.. PRSMMSSP - Max zIIP Shareable Processors
XDWM.. PRSMMSVP - Max zIIP Shared Logical Processors
XDWM.. PRSMMVP - Max Shared Logical Processors
XDWM.. PRSMMZDP - Max zAAP Dedicated Processors
XDWM.. PRSMMZP - Max zAAP Processors in Complex
XDWM.. PRSMMZSP - Max zAAP Shareable Processors
XDWM.. PRSMMZVP - Max zAAP Shared Logical Processors
XDWM.. PRSMNCDP - Min CP Dedicated Processors
XDWM.. PRSMNCPL - Min CP Processors in Complex
XDWM.. PRSMNCSP - Min CP Shareable Processors
XDWM.. PRSMNCVP - Min CP Shared Logical Processors
XDWM.. PRSMNDP - Min Dedicated Processors

XDWM..	PRSMNIDP	- Min ICF Dedicated Processors
XDWM..	PRSMNIP	- Min ICF Processors in Complex
XDWM..	PRSMNISP	- Min ICF Shareable Processors
XDWM..	PRSMNIVP	- Min ICF Shared Logical Processors
XDWM..	PRSMNLPA	- Min Active Logical Partitions
XDWM..	PRSMNLPS	- Min Defined Logical Partitions
XDWM..	PRSMNNDP	- Min IFL Dedicated Processors
XDWM..	PRSMNNP	- Min IFL Processors in Complex
XDWM..	PRSMNNSP	- Min IFL Shareable Processors
XDWM..	PRSMNNVP	- Min IFL Shared Logical Processors
XDWM..E	PRSMNOPP	- Number of Physical Processors
XDWM..	PRSMNPP	- Min Processors in Complex
XDWM..	PRSMNSDP	- Min zIIP Dedicated Processors
XDWM..	PRSMNSP	- Min zIIP Processors in Complex
XDWM..	PRSMNSSP	- Min zIIP Shareable Processors
XDWM..	PRSMNSVP	- Min zIIP Shared Logical Processors
XDWM..	PRSMNVP	- Min Shared Logical Processors
XDWM..E	PRSMNWGT	- Total Shr IFL Processor Resources Weight
XDWM..	PRSMNZDP	- Min zAAP Dedicated Processors
XDWM..	PRSMNZP	- Min zAAP Processors in Complex
XDWM..	PRSMNZSP	- Min zAAP Shareable Processors
XDWM..	PRSMNZVP	- Min zAAP Shared Logical Processors
XDWM..E	PRSMRTP	- Logical Processor Type
XDWM..E	PRSMSWG	- Total Shr zIIP Proc. Resources Weight
XDWM..E	PRSMTAMT	- Total LPAR Mgt Time - Attributable
XDWM..E	PRSMTBPS	- All Partitions Processor Weights
XDWM..E	PRSMTCAT	- Total CP LPAR Mgt Time - Attributable
XDWM..E	PRSMTCDP	- Total CP Dedicated Processors
XDWM..E	PRSMTCDT	- Total CP Dispatch Time
XDWM..E	PRSMTCET	- Total CP Dispatch Time - Effective
XDWM..E	PRSMTCMT	- Total CP LPAR Mgt Time
XDWM..E	PRSMTCP	- Total CP Processors in Complex
XDWM..E	PRSMTCSP	- Total CP Shareable Processors
XDWM..E	PRSMTCST	- Total CP Dispatch Time - Shared
XDWM..E	PRSMTCUT	- Total CP LPAR Mgt Time - Unattributable
XDWM..E	PRSMTCVP	- Total CP Shared Logical Processors
XDWM..E	PRSMTDP	- Total Dedicated Processors
XDWM..E	PRSMTDTM	- Total Dispatch Time - Shared
XDWM..E	PRSMTEDT	- Total Dispatch Time - Effective
XDWM..E	PRSMTIAT	- Total ICF LPAR Mgt Time - Attributable
XDWM..E	PRSMTIDP	- Total ICF Dedicated Processors
XDWM..E	PRSMTIDT	- Total ICF Dispatch Time
XDWM..E	PRSMTIET	- Total ICF Dispatch Time - Effective
XDWM..E	PRSMTIMT	- Total ICF LPAR Mgt Time
XDWM..E	PRSMTIP	- Total ICF Processors in Complex
XDWM..E	PRSMTISP	- Total ICF Shareable Processors
XDWM..E	PRSMTIST	- Total ICF Dispatch Time - Shared
XDWM..E	PRSMTIUT	- Total ICF LPAR Mgt Time - Unattributable
XDWM..E	PRSMTIVP	- Total ICF Shared Logical Processors

XDWM..E PRSMTLMT - Total LPAR Mgt Time
 XDWM..E PRSMTLPA - Total Active Logical Partitions
 XDWM..E PRSMTLPS - Total Defined Logical Partitions
 XDWM..E PRSMTNAT - Total IFL LPAR Mgt Time - Attributable
 XDWM..E PRSMTNDP - Total IFL Dedicated Processors
 XDWM..E PRSMTNDT - Total IFL Dispatch Time
 XDWM..E PRSMTNET - Total IFL Dispatch Time - Effective
 XDWM..E PRSMTNMT - Total IFL LPAR Mgt Time
 XDWM..E PRSMTNP - Total IFL Processors in Complex
 XDWM..E PRSMTNSP - Total IFL Shareable Processors
 XDWM..E PRSMTNST - Total IFL Dispatch Time - Shared
 XDWM..E PRSMTNUT - Total IFL LPAR Mgt Time - Unattributable
 XDWM..E PRSMTNVP - Total IFL Shared Logical Processors
 XDWM..E PRSMTTP - Total Processors in Complex
 XDWM..E PRSMTSAT - Total zIIP LPAR Mgt Time - Attributable
 XDWM..E PRSMTSDP - Total zIIP Dedicated Processors
 XDWM..E PRSMTSDT - Total zIIP Dispatch Time
 XDWM..E PRSMTSET - Total zIIP Dispatch Time - Effective
 XDWM..E PRSMTSMT - Total zIIP LPAR Mgt Time
 XDWM..E PRSMTSP - Total zIIP Processors in Complex
 XDWM..E PRSMTSSP - Total zIIP Shareable Processors
 XDWM..E PRSMTSST - Total zIIP Dispatch Time - Shared
 XDWM..E PRSMTSUT - Total zIIP LPAR Mgt Tm - Unattributable
 XDWM..E PRSMTSVP - Total zIIP Shared Logical Processors
 XDWM..E PRSMTTDT - Total Dispatch Time
 XDWM..E PRSMTUMT - Total LPAR Mgt Time - Unattributable
 XDWM..E PRSMTVP - Total Shared Logical Processors
 XDWM..E PRSMTWGT - Total Shr CP Processor Resources Weight
 XDWM..E PRSMTZAT - Total zAAP LPAR Mgt Time - Attributable
 XDWM..E PRSMTZDP - Total zAAP Dedicated Processors
 XDWM..E PRSMTZDT - Total zAAP Dispatch Time
 XDWM..E PRSMTZET - Total zAAP Dispatch Time - Effective
 XDWM..E PRSMTZMT - Total zAAP LPAR Mgt Time
 XDWM..E PRSMTZP - Total zAAP Processors in Complex
 XDWM..E PRSMTZSP - Total zAAP Shareable Processors
 XDWM..E PRSMTZST - Total zAAP Dispatch Time - Shared
 XDWM..E PRSMTZUT - Total zAAP LPAR Mgt Tm - Unattributable
 XDWM..E PRSMTZVP - Total zAAP Shared Logical Processors
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E PRSMZWGT - Total Shr zAAP Proc. Resources Weight
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM..E RMFESCDR - Intvls with ESCON Director in Config
 XDWM..E RMFESCON - Intvls where Enabled for ESCON
 XDWM..E RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 X....E RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSUPAV - Intvls with zIIP Processors Available
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number

XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
XDWM..E SAMPLES - RMF Sample Count
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E LPCACS - Processor Actual Weighting
XDWM..E LPCBPS - Partition Processor Weight
XDWM..E LPCCABSL - Absolute LPAR Limit for CP Proc Use
XDWM..E LPCCAP - Partition Capping Status
XDWM..E LPCCLUST - Cluster Name
XDWM..E LPCCSF - Central Storage Megabytes Assigned
XDWM..E LPCDEFLM - Partition Defined Capacity Limit
XDWM..E LPCESF - Expanded Storage Megabytes Assigned
XDWM..E LPCIABSL - Absolute LPAR Limit for ICF Proc Use
XDWM..E LPCMAS - Processor Maximum Weighting
XDWM..E LPCMIS - Processor Minimum Weighting
XDWM..E LPCMOD - Processor Model Family
XDWM..E LPCNABSL - Absolute LPAR Limit for IFL Proc Use
XDWM..E LPCSABSL - Absolute LPAR Limit for zIIP Proc Use
XDWM..E LPCSEPPU - Separate Specialized Processor Mgmt Flag
XDWM..E LPCSUBPS - Partition zIIP Processors Weight
XDWM..E LPCSYSTEM - z/OS System Name
XDWM..E LPCUPID - User Partition Identifier
XDWM..E LPCWST - Wait State Assist Status
XDWM..E LPCZABSL - Absolute LPAR Limit for zAAP Proc Use
XDWM..E LPCZPBPS - Partition zAAP Processors Weight

Accumulated Data Elements

XDWM..E LPCACCPU - Number of Active CP Processors
XDWM..E LPCACICF - Number of Active ICF Processors
XDWM..E LPCACIFL - Number of Active IFL Processors
XDWM..E LPCACSUP - Number of Active zIIP Processors
XDWM..E LPCACTCT - Intvls with Changed LPAR Active Status
XDWM..E LPCACZAP - Number of Active zAAP Processors
XDWM..E LPCCAACT - Intvls with CP Proc Use Abs Limit
XDWM..E LPCCACCT - Intvls with CP Proc Use Abs Limit Chg
XDWM..E LPCCAPCH - Intvls with Defined Capacity Limit Chgd
XDWM..E LPCCAPDF - Intvls with Defined Capacity Limit
XDWM..E LPCPCCT - Intvls with Part Capping Status Change
XDWM..E LPCCPDCT - Intvls with Partition Capping Disabled
XDWM..E LPCCPECT - Intvls with Partition Capping Enabled
XDWM..E LPCDEDCT - Intvls with Dedicated Processors
XDWM..E LPCDIAGS - Number of Diagnose Samples
XDWM..E LPCDIAGV - Intvls with z/VM Guest Data Available
XDWM..E LPCDPCCT - Intvls with Changed Ded Processor Count

XDWM..E LPCIAACT - Intvls with ICF Proc Use Abs Limit
XDWM..E LPCIACCT - Intvls with ICF Proc Use Abs Limit Chg
XDWM..E LPCLPCCT - Intvls with Changed Log Processor Count
XDWM..E LPCNAACT - Intvls with IFL Proc Use Abs Limit
XDWM..E LPCNACCT - Intvls with IFL Proc Use Abs Limit Chg
XDWM..E LPCNOCPU - Number of Logical Processors
XDWM..E LPCRSCCT - Intvls with Changed Relative Share
XDWM..E LPCSAACT - Intvls with zIIP Proc Use Abs Limit
XDWM..E LPCSACCT - Intvls with zIIP Proc Use Abs Limit Chg
XDWM..E LPCSIDTM - Total Shared ICF Proc. Dispatch Time
XDWM..E LPCSIEDT - Total Shr ICF Proc. Effec. Dispatch Time
XDWM..E LPCSNDTM - Total Shared IFL Proc. Dispatch Time
XDWM..E LPCSNEDT - Total Shr IFL Proc. Effec. Dispatch Time
XDWM..E LPCSPCCT - Intvls with Changed Shr Processor Count
XDWM..E LPCSSDTM - Total Shared zIIP Proc. Dispatch Time
XDWM..E LPCSSEDt - Total Shr zIIP Proc. Effec. Dispatch Tm
XDWM..E LPCSUHPO - Total High Polarity zIIP Processors
XDWM..E LPCSULPO - Total Low Polarity zIIP Processors
XDWM..E LPCSUMPO - Total Medium Polarity zIIP Processors
XDWM..E LPCSZDTM - Total Shared zAAP Proc. Dispatch Time
XDWM..E LPCSZEDT - Total Shr zAAP Proc. Effec. Dispatch Tm
XDWM..E LPCTIDTM - Total ICF Processors Dispatch Time
XDWM..E LPCTIEDT - Total ICF Proc. Effective Dispatch Time
XDWM..E LPCTIOTM - Total ICF Processors Online Time
XDWM..E LPCTNDTM - Total IFL Processors Dispatch Time
XDWM..E LPCTNEDT - Total IFL Proc. Effective Dispatch Time
XDWM..E LPCTNOTM - Total IFL Processors Online Time
XDWM..E LPCTOACT - Intvls when LPAR was Active
XDWM..E LPCTODTM - Total CP Processors Dispatch Time
XDWM..E LPCTOEDT - Total CP Proc. Effective Dispatch Time
XDWM..E LPCTOHPO - Total High Polarity CP Processors
XDWM..E LPCTOLPO - Total Low Polarity CP Processors
XDWM..E LPCTOMPO - Total Medium Polarity CP Processors
XDWM..E LPCTOMSU - Actual Number of Consumed MSUs
XDWM..E LPCTONCA - Samples WLM Actually Capped LPAR
XDWM..E LPCTONSA - Samples at Maximum Weighting
XDWM..E LPCTONSI - Samples at Minimum Weighting
XDWM..E LPCTONSW - Samples WLM Considered Capping LPAR
XDWM..E LPCTOOTM - Total CP Processors Online Time
XDWM..E LPCTSDTM - Total zIIP Processors Dispatch Time
XDWM..E LPCTSEDt - Total zIIP Proc. Effective Dispatch Time
XDWM..E LPCTSOTM - Total zIIP Processors Online Time
XDWM..E LPCTZDTM - Total zAAP Processors Dispatch Time
XDWM..E LPCTZEDT - Total zAAP Proc. Effective Dispatch Time
XDWM..E LPCTZOTM - Total zAAP Processors Online Time
XDWM..E LPCWLMMG - Intvls with WLM LPAR Management Active
XDWM..E LPCWSCCT - Intvls with Changed Wait State Assist
XDWM..E LPCWSDCT - Intvls with Wait State Assist Disabled
XDWM..E LPCWSECT - Intvls with Wait State Assist Enabled

XDWM..E LPCZAACT - Intvls with zAAP Proc Use Abs Limit
XDWM..E LPCZACCT - Intvls with zAAP Proc Use Abs Limit Chg
XDWM.. LPCZPHPO - Total High Polarity zAAP Processors
XDWM.. LPCZPLPO - Total Low Polarity zAAP Processors
XDWM.. LPCZPMPO - Total Medium Polarity zAAP Processors

Minimum Data Elements

XDWM..E LPCMNCPU - Minimum Active CP Processors
XDWM..E LPCMNCSF - Min Central Storage Megabytes Assigned
XDWM..E LPCMNDCL - Minimum Defined Capacity Limit
XDWM..E LPCMNESF - Min Expanded Storage Megabytes Assigned
XDWM..E LPCMNICF - Minimum Active ICF Processors
XDWM..E LPCMNIFL - Minimum Active IFL Processors
XDWM..E LPCMNMSU - Minimum Number of Consumed MSUs
XDWM.. LPCMNSHP - Min High Polarity zIIP Processors
XDWM.. LPCMNSLP - Min Low Polarity zIIP Processors
XDWM.. LPCMNSMP - Min Medium Polarity zIIP Processors
XDWM..E LPCMNSUP - Minimum Active zIIP Processors
XDWM.. LPCMNTHP - Min High Polarity CP Processors
XDWM.. LPCMNTLP - Min Low Polarity CP Processors
XDWM.. LPCMNTMP - Min Medium Polarity CP Processors
XDWM..E LPCMNZAP - Minimum Active zAAP Processors
XDWM.. LPCMNZHP - Min High Polarity zAAP Processors
XDWM.. LPCMNZLP - Min Low Polarity zAAP Processors
XDWM.. LPCMNZMP - Min Medium Polarity zAAP Processors

Maximum Data Elements

XDWM..E LPCMXCPU - Maximum Active CP Processors
XDWM..E LPCMXCSF - Max Central Storage Megabytes Assigned
XDWM..E LPCMXDCL - Maximum Defined Capacity Limit
XDWM..E LPCMXESF - Max Expanded Storage Megabytes Assigned
XDWM..E LPCMXICF - Maximum Active ICF Processors
XDWM..E LPCMXIFL - Maximum Active IFL Processors
XDWM..E LPCMXMSU - Maximum Number of Consumed MSUs
XDWM.. LPCMXSHP - Max High Polarity zIIP Processors
XDWM.. LPCMXSLP - Max Low Polarity zIIP Processors
XDWM.. LPCMXSMP - Max Medium Polarity zIIP Processors
XDWM..E LPCMXSUP - Maximum Active zIIP Processors
XDWM.. LPCMXTHP - Max High Polarity CP Processors
XDWM.. LPCMXTLP - Max Low Polarity CP Processors
XDWM.. LPCMXTMP - Max Medium Polarity CP Processors
XDWM..E LPCMXZAP - Maximum Active zAAP Processors
XDWM.. LPCMXZHP - Max High Polarity zAAP Processors
XDWM.. LPCMXZLP - Max Low Polarity zAAP Processors
XDWM.. LPCMXZMP - Max Medium Polarity zAAP Processors

Derived Data Elements

XDWM..E LPCAVCPU - Avg Number of Active CP Processors
XDWM..E LPCAVICF - Avg Number of Active ICF Processors
XDWM..E LPCAVIFL - Avg Number of Active IFL Processors
XDWM..E LPCAVMSU - Avg Number of Consumed MSUs
XDWM.. LPCAVSHP - Avg High Polarity zIIP Processors
XDWM.. LPCAVSLP - Avg Low Polarity zIIP Processors
XDWM.. LPCAVSMP - Avg Medium Polarity zIIP Processors
XDWM..E LPCAVSUP - Avg Number of Active zIIP Processors
XDWM.. LPCAVTHP - Avg High Polarity CP Processors
XDWM.. LPCAVTLP - Avg Low Polarity CP Processors
XDWM.. LPCAVTMP - Avg Medium Polarity CP Processors
XDWM..E LPCAVZAP - Avg Number of Active zAAP Processors
XDWM.. LPCAVZHP - Avg High Polarity zAAP Processors
XDWM.. LPCAVZLP - Avg Low Polarity zAAP Processors
XDWM.. LPCAVZMP - Avg Medium Polarity zAAP Processors
XDWM..E LPCPCNCA - LPAR WLM Actual Capping Pct
XDWM..E LPCPCNSA - Maximum Weighting Percentage
XDWM..E LPCPCNSI - Minimum Weighting Percentage
XDWM..E LPCPCNSW - LPAR WLM Potential Capping Pct
XDWM..E LPCPCSDU - LPAR Shared zIIP Processors Utilization
XDWM..E LPCPCSIU - LPAR Shared ICF Processors Utilization
XDWM..E LPCPCSNU - LPAR Shared IFL Processors Utilization
XDWM..E LPCPCSSU - LPAR Shared CP Processors Utilization
XDWM..E LPCPCSZU - LPAR Shared zAAP Processors Utilization
XDWM..E LPCPCTDU - LPAR Total zIIP Processors Utilization
XDWM..E LPCPCTIU - LPAR Total ICF Processors Utilization
XDWM..E LPCPCTNU - LPAR Total IFL Processors Utilization
XDWM..E LPCPCTSU - LPAR Total CP Processors Utilization
XDWM..E LPCPCTZU - LPAR Total zAAP Processors Utilization
XDWM..E LPCPCVIU - LPAR ICF Processors Utilization
XDWM..E LPCPCVNU - LPAR IFL Processors Utilization
XDWM..E LPCPCVPU - LPAR CP Processors Utilization
XDWM..E LPCPCVSU - LPAR zIIP Processors Utilization
XDWM..E LPCPCVZU - LPAR zAAP Processors Utilization

5.2.8.3 Usage Considerations

Special considerations or techniques related to using the HARLPC file are provided below.

1. The following data elements in the HARLPC file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the HARLPCnn file in the DETAIL timespan.

CYCLETM - Sampling Time Cycle Length
LPCBPS - Processor Relative Share
LPCWST - Wait State Assist Status

2. The following data elements are user-defined and option dependent. Their use should be within the frame of reference of the option's definition.

CA MICS PARMS SYSID
CPUMODEL - CPU Model Identification

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.

- o HOUR should not be used in MONTHS.
- o DAY and DAYNAME should not be used in WEEKS, MONTHS.
- o WEEK should not be used in MONTHS.

4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:

- o STARTTS represents RMF recording interval start time.
- o ENDTS represents RMF recording interval end time.

5.2.8.4 Retrieval Examples

This section presents typical HARVPA retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's LPAR processor resource consumption for each RMF measurement interval:

```
DATA;
SET &PHARX..HARLPC01; IF SYSID='PROD';
PROC PRINT;
VAR PRSMLPNM STARTTS ENDTS LPCPCVPU LPCPCSSU LPCPCTSU;
```

2. Print yesterday's hourly LPAR processor resource consumption each hour in zone 1:

```
DATA;
SET &PHARD..HARLPC01;
IF ZONE='1' AND SYSID='PROD';
PROC PRINT;
VAR PRSMLPNM YEAR MONTH DAY HOUR
    LPCPCVPU LPCPCSSU LPCPCTSU;
```

3. Display the average LPAR processor resource consumption by LPAR name for prime time (zone 1) over the last six months:

```
DATA;
SET &PHARM..HARLPC01 &PHARM..HARLPC02
    &PHARM..HARLPC03 &PHARM..HARLPC04
    &PHARM..HARLPC05 &PHARM..HARLPC06;
IF ZONE='1' AND SYSID='PROD';
PROC SORT; BY PRSMLPNM YEAR MONTH;
PROC PRINT;
VAR SYSID YEAR MONTH LPCPCVPU LPCPCSSU LPCPCTSU;
```

5.2.9 The PR/SM Logical Processor Activity File (HARVPA)

The Logical Processor Activity File describes the activity for each active PR/SM logical processor in a central processor complex. It also carries data that tracks changes made to the logical processor definition that might effect performance analysis of the complex. This file is typically used when reporting on the logical processor activity.

The information in the HARVPA file is obtained from the RMF type 70 subtype 1 CPU, PR/SM, and ICF Activity record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.9.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMRPTP	
	YEAR	MONTH	DAY	HOURL	ENDTS	
	CPUTYPE	VPAADDR				
DAYS	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMRPTP	
	YEAR	MONTH	DAY	HOURL	CPUTYPE	
	VPAADDR					
WEEKS	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMRPTP	
	YEAR	WEEK	ZONE	HOURL	CPUTYPE	
	VPAADDR					
MONTHS	SYSID	PRSMENV	PRSMLPNM	PRSMLPID	PRSMRPTP	
	YEAR	MONTH	ZONE	CPUTYPE	VPAADDR	
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not

is controlled by the complex definition of the
DERIVED option.

Figure 5-14. HARVPA Sort Sequence and Data Granularity

5.2.9.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E	CPUTYPE	- Physical Processor Type
XD....E	DAY	- Day of Month
XDW...E	HOUR	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	PRSMENV	- PR/SM LPAR Environment ID
XDWM..E	PRMLPID	- Logical Partition ID of Recording SYSID
XDWM..E	PRMLPNM	- Logical Partition Name
XDWM..E	PRMPRTP	- Logical Processor Type

XDWM..E	SYSID	- System Identifier
XDWM..E	VPAADDR	- Logical Processor Address
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century
XDWM..E	ZONE	- Time Zone

Common Data Elements

XDWM..E	CPCCCP	- Current Highest CPU ID Installed
XDWM..E	CPCCHGRS	- Capacity Change Reason
XDWM..E	CPCCHMID	- CPC Physical Model Identifier
XDWM..E	CPCICP	- Highest CPU ID Installed at IPL
XDWM..E	CPCMCP	- Max Available CPU ID Number at IPL
XDWM..E	CPCMODID	- CPC Model Identifier
XDWM..E	CPCMODNR	- Nominal Model Capacity Rating
XDWM..E	CPCMODRT	- Effec. Model Capacity Rating
XDWM..E	CPCMPCID	- CPC Permanent Model Capacity Identifier
XDWM..E	CPCMPCNR	- Nominal Permanent Model Capacity Rating
XDWM..E	CPCMPCRT	- Effec. Permanent Model Capacity Rating
XDWM..E	CPCMTCID	- CPC Temporary Model Capacity Identifier
XDWM..E	CPCMTCNR	- Nominal Temporary Model Capacity Rating
XDWM..E	CPCMTCRT	- Effec. Temporary Model Capacity Rating
XDWM..E	CPCPLANT	- CPC Manufacturer Plant
XDWM..E	CPCSEQNB	- CPC Sequence Number
XDWM..E	CPUMODEL	- CPU Model
XDWM..E	CYCLETM	- RMF Sampling Cycle Interval
XD...E	DAYNAME	- Name of Day of Week
XDWM..E	DURATION	- Recording Interval Time
XDWM..E	ENDTS	- End Time Stamp
XDWM..E	EXTSTOR	- Expanded Storage Flag
XDWM..E	INTERVLS	- Number of Recording Intervals
XDWM..E	MVSLEVEL	- MVS Software Level
XDWM..E	ORGSYSID	- Originating System Identification
XDWM..E	PRSMACDP	- Avg CP Dedicated Processors
XDWM..E	PRSMACP	- Avg CP Processors in Complex
XDWM..E	PRSMACVP	- Avg CP Shared Logical Processors
XDWM..E	PRSMADP	- Avg Dedicated Processors
XDWM..E	PRSMADP	- Avg ICF Dedicated Processors
XDWM..E	PRSMADP	- Avg ICF Processors in Complex
XDWM..E	PRSMADP	- Avg ICF Shared Logical Processors
XDWM..E	PRSMALPA	- Avg Active Logical Partitions
XDWM..E	PRSMALPS	- Avg Defined Logical Partitions
XDWM..E	PRSMANDP	- Avg IFL Dedicated Processors
XDWM..E	PRSMANP	- Avg IFL Processors in Complex
XDWM..E	PRSMANVP	- Avg IFL Shared Logical Processors
XDWM..E	PRSMAPP	- Avg Processors in Complex
XDWM..E	PRSMASDP	- Avg zIIP Dedicated Processors
XDWM..E	PRSMASP	- Avg zIIP Processors in Complex
XDWM..E	PRSMASVP	- Avg zIIP Shared Logical Processors

XDWM..E PRSMAVP - Avg Shared Logical Processors
XDWM..E PRSMAZDP - Avg zAAP Dedicated Processors
XDWM..E PRSMAZP - Avg zAAP Processors in Complex
XDWM..E PRSMAZVP - Avg zAAP Shared Logical Processors
XDWM..E PRSMCEC - PR/SM LPAR Central Complex
XDWM..E PRSMCGUI - Capacity Group Uses Initial Weights
XDWM..E PRSMHIPA - Intvls with Hiperdispatch Active
XDWM..E PRSMHIPD - Hiperdispatch Indicator
XDWM..E PRSMHIPS - Hiperdispatch Support Indicator
XDWM..E PRSMIWGT - Total Shr ICF Processor Resources Weight
XDWM..E PRSMLMCT - Intvls with LPAR Mgt Time Reporting
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMLPTP - Logical Partition Type
XDWM.. PRSMMCDP - Max CP Dedicated Processors
XDWM.. PRSMMCP - Max CP Processors in Complex
XDWM.. PRSMMCV - Max CP Shared Logical Processors
XDWM.. PRSMMDP - Max Dedicated Processors
XDWM.. PRSMMIDP - Max ICF Dedicated Processors
XDWM.. PRSMMIP - Max ICF Processors in Complex
XDWM.. PRSMMIVP - Max ICF Shared Logical Processors
XDWM.. PRSMMMLPA - Max Active Logical Partitions
XDWM.. PRSMMMLPS - Max Defined Logical Partitions
XDWM.. PRSMMNDP - Max IFL Dedicated Processors
XDWM.. PRSMMNP - Max IFL Processors in Complex
XDWM.. PRSMMNVP - Max IFL Shared Logical Processors
XDWM.. PRSMMPP - Max Processors in Complex
XDWM.. PRSMMSDP - Max zIIP Dedicated Processors
XDWM.. PRSMMSP - Max zIIP Processors in Complex
XDWM.. PRSMMSVP - Max zIIP Shared Logical Processors
XDWM.. PRSMMVP - Max Shared Logical Processors
XDWM.. PRSMMZDP - Max zAAP Dedicated Processors
XDWM.. PRSMMZP - Max zAAP Processors in Complex
XDWM.. PRSMMZVP - Max zAAP Shared Logical Processors
XDWM.. PRSMNCDP - Min CP Dedicated Processors
XDWM.. PRSMNCP - Min CP Processors in Complex
XDWM.. PRSMNCVP - Min CP Shared Logical Processors
XDWM.. PRSMNDP - Min Dedicated Processors
XDWM.. PRSMNIDP - Min ICF Dedicated Processors
XDWM.. PRSMNIP - Min ICF Processors in Complex
XDWM.. PRSMNIVP - Min ICF Shared Logical Processors
XDWM.. PRSMNLPA - Min Active Logical Partitions
XDWM.. PRSMNLPS - Min Defined Logical Partitions
XDWM.. PRSMNNDP - Min IFL Dedicated Processors
XDWM.. PRSMNNP - Min IFL Processors in Complex
XDWM.. PRSMNVP - Min IFL Shared Logical Processors
XDWM..E PRSMNOPP - Number of Physical Processors
XDWM.. PRSMNPP - Min Processors in Complex
XDWM.. PRSMNSDP - Min zIIP Dedicated Processors
XDWM.. PRSMNSP - Min zIIP Processors in Complex

```

XDWM.. PRSMNSVP - Min zIIP Shared Logical Processors
XDWM.. PRSMNVP - Min Shared Logical Processors
XDWM..E PRSMNWGT - Total Shr IFL Processor Resources Weight
XDWM.. PRSMNZDP - Min zAAP Dedicated Processors
XDWM.. PRSMNZP - Min zAAP Processors in Complex
XDWM.. PRSMNZVP - Min zAAP Shared Logical Processors
XDWM..E PRSMSWGt - Total Shr zIIP Proc. Resources Weight
XDWM..E PRSMTAMT - Total LPAR Mgt Time - Attributable
XDWM..E PRSMTBPS - All Partitions Processor Weights
XDWM..E PRSMTCAT - Total CP LPAR Mgt Time - Attributable
XDWM..E PRSMTCDP - Total CP Dedicated Processors
XDWM..E PRSMTCDT - Total CP Dispatch Time
XDWM..E PRSMTCET - Total CP Dispatch Time - Effective
XDWM..E PRSMTCMT - Total CP LPAR Mgt Time
XDWM..E PRSMTCP - Total CP Processors in Complex
XDWM..E PRSMTCST - Total CP Dispatch Time - Shared
XDWM..E PRSMTCUT - Total CP LPAR Mgt Time - Unattributable
XDWM..E PRSMTCVp - Total CP Shared Logical Processors
XDWM..E PRSMTDP - Total Dedicated Processors
XDWM..E PRSMTDTM - Total Dispatch Time - Shared
XDWM..E PRSMTEDT - Total Dispatch Time - Effective
XDWM..E PRSMTIAT - Total ICF LPAR Mgt Time - Attributable
XDWM..E PRSMTIDP - Total ICF Dedicated Processors
XDWM..E PRSMTIDT - Total ICF Dispatch Time
XDWM..E PRSMTIET - Total ICF Dispatch Time - Effective
XDWM..E PRSMTIMT - Total ICF LPAR Mgt Time
XDWM..E PRSMTIP - Total ICF Processors in Complex
XDWM..E PRSMTIST - Total ICF Dispatch Time - Shared
XDWM..E PRSMTIUT - Total ICF LPAR Mgt Time - Unattributable
XDWM..E PRSMTIVP - Total ICF Shared Logical Processors
XDWM..E PRSMTLMT - Total LPAR Mgt Time
XDWM..E PRSMTLPA - Total Active Logical Partitions
XDWM..E PRSMTLPS - Total Defined Logical Partitions
XDWM..E PRSMTNAT - Total IFL LPAR Mgt Time - Attributable
XDWM..E PRSMTNDP - Total IFL Dedicated Processors
XDWM..E PRSMTNDT - Total IFL Dispatch Time
XDWM..E PRSMTNET - Total IFL Dispatch Time - Effective
XDWM..E PRSMTNMT - Total IFL LPAR Mgt Time
XDWM..E PRSMTNP - Total IFL Processors in Complex
XDWM..E PRSMTNST - Total IFL Dispatch Time - Shared
XDWM..E PRSMTNUT - Total IFL LPAR Mgt Time - Unattributable
XDWM..E PRSMTNVP - Total IFL Shared Logical Processors
XDWM..E PRSMTPP - Total Processors in Complex
XDWM..E PRSMsAT - Total zIIP LPAR Mgt Time - Attributable
XDWM..E PRSMsDP - Total zIIP Dedicated Processors
XDWM..E PRSMsDT - Total zIIP Dispatch Time
XDWM..E PRSMsET - Total zIIP Dispatch Time - Effective
XDWM..E PRSMsMT - Total zIIP LPAR Mgt Time
XDWM..E PRSMsTP - Total zIIP Processors in Complex

```

XDWM..E PRSMTSST - Total zIIP Dispatch Time - Shared
 XDWM..E PRSMTSUT - Total zIIP LPAR Mgt Tm - Unattributable
 XDWM..E PRSMTSVP - Total zIIP Shared Logical Processors
 XDWM..E PRSMTTDT - Total Dispatch Time
 XDWM..E PRSMTUMT - Total LPAR Mgt Time - Unattributable
 XDWM..E PRSMTVP - Total Shared Logical Processors
 XDWM..E PRSMTWGT - Total Shr CP Processor Resources Weight
 XDWM..E PRSMTZAT - Total zAAP LPAR Mgt Time - Attributable
 XDWM..E PRSMTZDP - Total zAAP Dedicated Processors
 XDWM..E PRSMTZDT - Total zAAP Dispatch Time
 XDWM..E PRSMTZET - Total zAAP Dispatch Time - Effective
 XDWM..E PRSMTZMT - Total zAAP LPAR Mgt Time
 XDWM..E PRSMTZP - Total zAAP Processors in Complex
 XDWM..E PRSMTZST - Total zAAP Dispatch Time - Shared
 XDWM..E PRSMTZUT - Total zAAP LPAR Mgt Tm - Unattributable
 XDWM..E PRSMTZVP - Total zAAP Shared Logical Processors
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E PRSMZWGT - Total Shr zAAP Proc. Resources Weight
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM..E RMFESCDR - Intvls with ESCON Director in Config
 XDWM..E RMFESCON - Intvls where Enabled for ESCON
 XDWM..E RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 X....E RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSUPAV - Intvls with zIIP Processors Available
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number
 XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
 XDWM..E SAMPLES - RMF Sample Count
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E VPAABSLM - Absolute LPAR Limit for Processor Use
 XDWM..E VPAACS - Processor Actual Weighting
 XDWM..E VPABPS - Partition Processor Weight
 XDWM..E VPACAP - Partition Capping Status
 XDWM..E VPAMAS - Processor Maximum Weighting
 XDWM..E VPAMIS - Processor Minimum Weighting
 XDWM..E VPAMOD - Processor Model Family
 XDWM..E VPAPOLRT - Current Polarization
 XDWM..E VPAWST - Wait State Assist Status

Accumulated Data Elements

XDWM..E VPAABCCT - Intvls with Processor Use Abs Limit Chg
 XDWM..E VPAABSCT - Intvls with Processor Use Abs Limit

XDWM..E VPACHPOL - Intvls with Polarization Changed
XDWM..E VPACPCCT - Intvls with Part Capping Status Change
XDWM..E VPACPDCT - Intvls with Partition Capping Disabled
XDWM..E VPACPECT - Intvls with Partition Capping Enabled
XDWM..E VPADEDCT - Intvls with Dedicated Processors
XDWM..E VPADIAGS - Number of Diagnose Samples
XDWM..E VPADIAGV - Intvls with z/VM Guest Data Available
XDWM..E VPADTM - Dispatch Time
XDWM..E VPAEDT - Dispatch Time - Effective
XDWM..E VPAHIPOL - Intvls with High Polarization
XDWM..E VPALOPOL - Intvls with Low Polarization
XDWM..E VPAMDPOL - Intvls with Medium Polarization
XDWM..E VPANOPOL - Intvls without Polarization
XDWM..E VPAOTM - Online Time
XDWM..E VPARSCCT - Intvls with Changed Relative Share
XDWM..E VPATONCA - Samples WLM Actually Capped LPAR
XDWM..E VPATONSA - Samples at Maximum Weighting
XDWM..E VPATONSI - Samples at Minimum Weighting
XDWM..E VPATONSW - Samples WLM Considered Capping LPAR
XDWM..E VPATOPOW - Accumulated Polarization Weight
XDWM..E VPATPRSH - Total Shareable Processors in Pool
XDWM..E VPAWSCCT - Intvls with Changed Wait State Assist
XDWM..E VPAWSDCT - Intvls with Wait State Assist Disabled
XDWM..E VPAWSECT - Intvls with Wait State Assist Enabled

Minimum Data Elements

XDWM.. VPANPEDT - Minimum Utilization - Effective
XDWM..E VPANPVPU - Minimum Utilization

Maximum Data Elements

XDWM..E VPAMPEDT - Maximum Utilization - Effective
XDWM..E VPAMPVPU - Maximum Utilization

Derived Data Elements

XDWM..E VPAAPRSH - Avg Shareable Processors in Pool
XDWM..E VPAAVPOW - Avg Polarization Weight
XDWM..E VPAPCEDT - Average Utilization - Effective
XDWM..E VPAPCNCA - LPAR WLM Actual Capping Pct
XDWM..E VPAPCNSA - Maximum Weighting Percentage
XDWM..E VPAPCNSI - Minimum Weighting Percentage
XDWM..E VPAPCNSW - LPAR WLM Potential Capping Pct
XDWM..E VPAPCOTM - Average Online Time
XDWM..E VPAPCVPU - Average Utilization

5.2.9.3 Usage Considerations

Special considerations or techniques related to using the HARVPA file are provided below.

1. The following data elements in the HARVPA file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the HARVPAnn file in the DETAIL timespan.

CYCLETM - Sampling Time Cycle Length
VPABPS - Processor Relative Share
VPAWST - Wait State Assist Status

2. The following data elements are user-defined and option dependent, and their use should be within the frame of reference of the option's definition.

CA MICS PARMS SYSID
CPUMODEL - CPU Model Identification

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.

- o HOUR should not be used in MONTHS.
- o DAY and DAYNAME should not be used in WEEKS, MONTHS.
- o WEEK should not be used in MONTHS.

4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:

- o STARTTS represents RMF recording interval start time.
- o ENDTS represents RMF recording interval end time.

5.2.9.4 Retrieval Examples

This section presents typical HARSGA retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's logical processor utilization for LPAR ID 3 for each RMF measurement interval:

```
DATA;  
SET &PHARX..HARVPA01; IF SYSID='PROD' AND PRSMLPID=3;  
PROC PRINT; VAR STARTTS VPAADDR VPAPCVPU;
```

2. Print yesterday's hourly logical processor effective dispatch percentage for LPAR name MVSTEST for each hour in zone 1:

```
DATA;  
SET &PHARD..HARVPA01;  
IF ZONE='1' AND SYSID='PROD' AND PRSMLPNM='MVSTEST';  
PROC PRINT; VAR YEAR MONTH DAY HOUR VPAADDR VPAPCEDT;
```

3. Display the average individual logical processor utilization for all active partitions by partition name for prime time (zone 1) over the last six months:

```
DATA;  
SET &PHARM..HARVPA01 &PHARM..HARVPA02 &PHARM..HARVPA03  
    &PHARM..HARVPA04 &PHARM..HARVPA05 &PHARM..HARVPA06;  
IF ZONE='1' AND SYSID='PROD';  
PROC SORT; BY PRSMLPNM YEAR MONTH VPAADDR;  
PROC PRINT; BY PRSMLPNM;  
VAR YEAR MONTH VPAADDR VPAPCVPU;
```

5.2.10 Storage Group Activity File (HARSGA)

The Storage Group Activity File quantifies the utilization of defined DFSMS storage groups in terms of I/O and average performance factors for all devices in the group. There is one record for each storage group. This file is typically used when reporting on the performance of System Managed Storage in the installation.

This file is derived from the CA MICS Device Activity File. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.10.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	N/A					
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	STORNAME
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	STORNAME
MONTHS	SYSID	YEAR	MONTH	ZONE	STORNAME	
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 19, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-16. HARCFC Sort Sequence and Data Granularity

5.2.10.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Fri, Oct 19, 2012

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

.D...E	DAY	- Day of Month
.DW...E	HOUR	- Hour of Day
.D.M..E	MONTH	- Month of Year
.DWM..E	STORNAME	- DFSMS Storage Group Name
.DWM..E	SYSID	- System Identifier
.DW...E	WEEK	- Week of Year

.DWM..E YEAR - Year of Century
.DWM..E ZONE - Time Zone

Common Data Elements

.DWM..E CYCLETM - RMF Sampling Cycle Interval
.D....E DAYNAME - Name of Day of Week
.DWM..E DURATION - Recording Interval Time
.DWM..E ENDTS - End Time Stamp
.DWM..E EXTSTOR - Expanded Storage Flag
.DWM..E INTERVLS - Number of Recording Intervals
.DWM..E MVSLEVEL - MVS Software Level
.DWM..E ORGSYSID - Originating System Identification
.DWM..E PRSMLPNO - Logical Partition Number
.DWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
.DWM..E RMFESAME - z/Architecture Mode Indicator
.DWM..E RMFESCDR - Intvls with ESCON Director in Config
.DWM..E RMFESCON - Intvls where Enabled for ESCON
.DWM.. RMFGMTOF - GMT to Local Time Offset
.DWM..E RMFIML - I/O Measurement Level
.....E RMFSRL - SMF Record Level Change Number
.DWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
.DWM..E RMFVER - RMF Version Number
.DWM..E SAMPLES - RMF Sample Count
.DWM..E STARTTS - Start Time Stamp
.DWM..E SYSNAME - System Name
.DWM..E SYSPLEX - Sysplex Name

Accumulated Data Elements

.DWM.. SGAALC - Device Allocated Count
.DWM..E SGAATV - Device Active Time
.DWM..E SGA AVLCT - Available Device-Intervals
.DWM.. SGACMR TM - Command Response Time
.DWM..E SGACNN - Device Connect Time
.DWM.. SGACNN OV - Connect Time Overflow Count
.DWM..E SGADINTV - Total Device-Intervals
.DWM..E SGADIS - Device Disconnect Time
.DWM.. SGADVBTM - Device Busy Delay Time
.DWM.. SGAICT - Invalid Sample Count
.DWM.. SGAIDTTM - Device Interrupt Delay Time
.DWM..E SGAISSCT - Intvls with RMF Samples Skipped
.DWM..E SGAMEC - Measurement Event Count
.DWM.. SGAMPTM - Total Mount Pending Time
.DWM.. SGAMTC - Number of Mounts
.DWM..E SGAMTP - Samples - Mount Pending Condition Count
.DWM.. SGANDA - Allocation Count
.DWM..E SGANRD - Device Not Ready Count
.DWM.. SGANSS - Skipped Samples (too Large Delta Values)

.DWM..E SGANUX - Number of PAV/HyperPAV Aliases
.DWM..E SGAPEN - Device Pending Time
.DWM..E SGAQUE - Requests Queued Count
.DWM..E SGARSMP - Number of RMF Samples
.DWM..E SGARSV - Device Reserved Count
.DWM..E SGASSC - Start Subchannel Count
.DWM..E SGAUTL - Device Reserved and Idle Count

Maximum Data Elements

.DWM.. SGAMXNDA - Max Allocation Count
.DWM.. SGAMXQUE - Max Requests Queued Count
.DWM.. SGAMXTAL - Max Allocated Tape Drives
.DWM..E SGANOVOL - Number of Volumes in Storage Group

Derived Data Elements

.DWM..E SGAACRT - Avg Device Activity Rate
.DWM.. SGAAVCMR - Avg Command Response Time
.DWM..E SGAAVCNN - Avg Device Connect Time
.DWM..E SGAAVDIS - Avg Device Disconnect Time
.DWM.. SGAAVDVB - Avg Device Busy Pending Time
.DWM.. SGAVIDT - Avg Device Interrupt Delay Time
.DWM..E SGAAVIOS - Avg Device IOSQ Time
.DWM.. SGAAVMTM - Avg Mount Time
.DWM.. SGAAVNDA - Avg Number of Allocations in Effect
.DWM..E SGAAVPEN - Avg Device Pending Time
.DWM..E SGAAVQUE - Avg Requests Queued
.DWM..E SGAAVRES - Avg Device Response Time
.DWM..E SGAAVSER - Avg I/O Service Time
.DWM.. SGAPADUR - Total Parallel Access Duration
.DWM.. SGAPCALC - Pct Device Allocated
.DWM..E SGAPCCNN - Pct Device Connected
.DWM..E SGAPCMTP - Pct Mount Pending Condition
.DWM..E SGAPCNRD - Pct Device Not Ready
.DWM..E SGAPCRSV - Pct Device Reserved
.DWM..E SGAPCUTL - Pct Device Utilized

5.2.10.3 Usage Considerations

Special considerations or techniques related to using the HARCFC file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.10.4 Retrieval Examples

This section presents typical HARSGA retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Display the average number of device allocations in effect and I/O activity rate per second over the last six weeks for prime time (zone 1) hours, by SYSID for each storage group, in YEAR WEEK HOUR order:

```
DATA;
SET &PHARW..HARSGA01 &PHARW..HARSGA02
    &PHARW..HARSGA03 &PHARW..HARSGA04
    &PHARW..HARSGA05 &PHARW..HARSGA06;
IF ZONE='1';
PROC SORT; BY SYSID YEAR WEEK HOUR STORNAME;
PROC PRINT;
BY SYSID; ID STORNAME;
VAR YEAR WEEK HOUR SGA AVNDA SGA ACTRT;
```

2. Quantify the growth in I/O activity for storage group PRODDB, over the last six months, for prime time (zone 1):

```
DATA;
SET &PHARM..HARSGA01 &PHARM..HARSGA02
    &PHARM..HARSGA03 &PHARM..HARSGA04
    &PHARM..HARSGA05 &PHARM..HARSGA06;
IF ZONE='1' AND STORNAME='PRODDB';
PROC PRINT; VAR SYSID STORNAME YEAR MONTH ZONE SGA ACTRT;
```

5.2.11 CF Connectivity File (HARCFC)

The CF Connectivity File is used to store the names of the other systems in the sysplex that are also connected to the coupling facility. You can use this information to determine the topography of the parallel sysplex.

The information in the HARCFC file is obtained from the connectivity data section of the SMF type 74 subtype 4 record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.11.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS	CFYSYSNM	CFYCFNM			
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
	CFYSYSNM	CFYCFNM				
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
	CFYSYSNM	CFYCFNM				
MONTHS	SYSID	YEAR	MONTH	ZONE	CFYSYSNM	
	CFYCFNM					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-16. HARCFC Sort Sequence and Data Granularity

5.2.11.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
D - DAYS
W - WEEKS
M - MONTHS
Y - YEARS
T - TABLE AREA
. - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E CFYCFNM - CF Name
 XDWM..E CFYSYSNM - Name of System Using CF
 XD...E DAY - Day of Month
 XDW...E HOUR - Hour of Day
 XD.M..E MONTH - Month of Year
 XDWM..E SYSID - System Identifier
 XDW...E WEEK - Week of Year

XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLEM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E CFCRMSYS - Remote System Name

5.2.11.3 Usage Considerations

Special considerations or techniques related to using the HARCFC file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.12 CF Cache Structure Activity File (HARCFH)

SMEM @RMF1CFH

The CF Cache Structure File stores performance information about CF cache structures. The information is well suited for analysis directed towards tuning cache structures. This file can be merged with the CF Request (HARCFR) file to provide a complete picture of each CF cache structure. There is one HARCFH file observation for each CF cache structure per RMF recording interval.

The information in the HARCFH file is obtained from the request data section of the SMF type 74 subtype 4 record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.2.12.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSID	YEAR	MONTH	DAY	HOUR	
	ENDTS	CFYSYSNM	CFYCFNM	CFYSTRNM		
DAYS	SYSID	YEAR	MONTH	DAY	HOUR	
	CFYSYSNM	CFYCFNM	CFYSTRNM			
WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR	
	CFYSYSNM	CFYCFNM	CFYSTRNM			
MONTHS	SYSID	YEAR	MONTH	ZONE	CFYSYSNM	
	CFYCFNM	CFYSTRNM				
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-17. HARCFH Sort Sequence and Data Granularity

5.2.12.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

- XDWM..E CFYCFNM - CF Name
- XDWM..E CFYSTRNM - CF Structure Name
- XDWM..E CFYSYSNM - Name of System Using CF
- XD...E DAY - Day of Month
- XDW...E HOUR - Hour of Day
- XD.M..E MONTH - Month of Year
- XDWM..E SYSID - System Identifier

XDW...E WEEK - Week of Year
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E PRSMLPNO - Logical Partition Number
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X.....E RMFSRL - SMF Record Level Change Number
XDW..E RMFVER - RMF Version Number
XDW..E STARTTS - Start Time Stamp
XDW..E SYSNAME - System Name
XDW..E SYSPLEX - Sysplex Name

Accumulated Data Elements

XDW..E CFHAPPS - Cache Structure Application Count
XDW..E CFHTOCOC - Castout Counter
XDW..E CFHTODAC - Total Data Elements
XDW..E CFHTODEC - Total Directory Entries
XDW..E CFHTODER - Directory Entry Reclaim Counter
XDW..E CFHTODTA - Data Area Counter
XDW..E CFHTODTR - Data Entry Reclaim Counter
XDW..E CFHTOPRL - Part Completed Refer List Counter
XDW..E CFHTOR - Total Reads
XDW..E CFHTORH - Read Hit Counter
XDW..E CFHTORLC - Completed Reference List Counter
XDW..E CFHTORMA - Read Miss Assignment Suppressed Counter
XDW..E CFHTORMD - Read Miss Directory Hit Counter
XDW..E CFHTORMN - Read Miss Name Assigned Counter
XDW..E CFHTORMT - Read Miss Target Storage Class Full
XDW..E CFHTORSM - Reference Signal Miss Counter
XDW..E CFHTOTCC - Total Changed Counter
XDW..E CFHTOTCF - Target Storage Class Full Counter
XDW..E CFHTOW - Total Writes
XDW..E CFHTOWHC - Write Hits Changed Data
XDW..E CFHTOWHU - Write Hits Unchanged Data
XDW..E CFHTOWMI - Write Miss Invalid State Counter
XDW..E CFHTOWMN - Write Miss Not Registered Counter
XDW..E CFHTOWMS - Write Miss Storage Class Full Counter

XDWM..E CFHTOXCI - XI Complement Invalidation Counter
XDWM..E CFHTOXDR - XI Directory Reclaim Counter
XDWM..E CFHTOXLX - XI Local Cache Vector Index Replacement
XDWM..E CFHTOXNI - XI Name Invalidation Counter
XDWM..E CFHTOXWC - XI Write Counter
XDWM..E CFHTOXWU - XI Write Unchanged Counter

Minimum Data Elements

XDWM..E CFHMNDAC - Min Data Element Entries
XDWM..E CFHMNDEC - Min Directory Entries

Maximum Data Elements

XDWM..E CFHMXDAC - Max Data Element Entries
XDWM..E CFHMXDEC - Max Directory Entries

Derived Data Elements

XDWM..E CFHAVDAC - Avg Data Elements
XDWM..E CFHAVDEC - Avg Directory Entries
XDWM..E CFHPCRH - Pct Read Hits
XDWM..E CFHPCWHC - Pct Write Hits Changed
XDWM..E CFHPCWHU - Pct Write Hits Unchanged

5.2.12.3 Usage Considerations

Special considerations or techniques related to using the HARCFP file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.12.4 Retrieval Examples

This section presents typical HARCFH retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Merge yesterday's DETAIL timespan CF Request (HARCFR) file with the CF Cache Structure (HARCFH) file to provide additional information for CF cache structures. Print structure name, cache read hits, cache changed write hits, total reads, and total writes. Note that no sort is required as these two files have an identical sort/sequence order:

```
DATA;
MERGE &PHARX..HARCFR01(IN=R) &PHARX..HARCFH01(IN=C) ;
    BY SYSID ENDTS CFYSYSNM CFYCFNM CFYSTRNM ;
IF R AND C ;

PROC PRINT;
VAR CFYSTRNM CFHTORH CFHTOWHC CFHTOR CFHTOW ;
```

2. Print any instances of directory entry reclaims occurring in CF cache structures yesterday:

```
DATA;
SET &PHARD..HARCFH01;
IF CFHTODER GT 0 ;

PROC PRINT;
VAR SYSID CFYSTRNM CFHTODER ;
```

5.2.13 CF Configuration and Activity File (HARCFP)

The CF Configuration and Activity File is used to store information about the coupling facility (CF), including name, the amount of storage installed and used, and the number and utilization of processors. The file also contains information describing the hardware paths to and from the CF and the system that recorded the data and the Cross-System Extended Services (XES) request activity through the CF. You can use this information to analyze high-level coupling facility activity for performance analysis and capacity planning.

The information in the HARCFP file is obtained from the local CF, storage, and processor data sections of the SMF type 74 subtype 4 record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.13.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS	CFYSYSNM	CFYCFNM			
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
	CFYSYSNM	CFYCFNM				
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
	CFYSYSNM	CFYCFNM				
MONTHS	SYSID	YEAR	MONTH	ZONE	CFYSYSNM	
	CFYCFNM					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-18. HARCFP Sort Sequence and Data Granularity

5.2.13.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E CFYCFNM - CF Name
 XDWM..E CFYSYSNM - Name of System Using CF
 XD...E DAY - Day of Month
 XDW...E HOUR - Hour of Day
 XD.M..E MONTH - Month of Year
 XDWM..E SYSID - System Identifier
 XDW...E WEEK - Week of Year

XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E PRSMLPNO - Logical Partition Number
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X....E RMFSRL - SMF Record Level Change Number
XDW..E RMFVER - RMF Version Number
XDW..E STARTTS - Start Time Stamp
XDW..E SYSNAME - System Name
XDW..E SYSPLEX - Sysplex Name

Retained Data Elements

XDW..E CFPCFLVL - Coupling Facility Level
XDW..E CFPCPSK - Composite-Path Mask
XDW..E CFPMOD - Coupling Facility Model Family
XDW..E CFPMODID - Coupling Facility Model Identifier
XDW..E CFPPACRN - Channel Path Type Acronym Array
XDW..E CFPPAMSK - Path-Available Mask for CF Links
XDW..E CFPPIMSK - Path-Installed Mask for CF Links
XDW.. CFPLANT - Coupling Facility Manufacturer Plant
XDW..E CFPCSG - Subchannels Defined in IOGEN
XDW..E CFPCSCU - Subchannels Currently in Use
XDW.. CFPSEQNB - Coupling Facility Sequence Number

Accumulated Data Elements

XDW..E CFPACSL - Accum Subchannel Limit
XDW..E CFPACTCT - Intvls with CF Activation
XDW..E CFPCONCT - Intvls with CF Connected
XDW..E CFPDYDCT - Intvls with Dynamic CF Dispatching
XDW..E CFPERRCT - Intvls with Perm Cycle Gatherer Error
XDW..E CFPRSMP - Number of RMF Samples
XDW..E CFPTOBTM - Processor Busy Time
XDW..E CFPTOCPD - Total Dedicated Processors Defined
XDW..E CFPTOCPD - Total Shared Processors Defined
XDW..E CFPTOCPD - Total Processors Defined
XDW..E CFPTOCS - Tot Control Storage Defined (KB)

XDWL..E CFPT0CSF - Tot Control Storage Free (KB)
XDWL..E CFPT0CSQ - Subchannel Contention Tm Sum Squares
XDWL..E CFPT0CTM - Total Subchannel Contention Time
XDWL..E CFPT0DSA - Tot Dump Space Allocated (KB)
XDWL..E CFPT0DSF - Tot Dump Space Free (KB)
XDWL..E CFPT0DSR - Tot Dump Space Requested (KB)
XDWL..E CFPT0PBC - Tot Requests Failed: Path Busy
XDWL..E CFPT0PTH - Tot Paths Available
XDWL..E CFPT0REQ - Tot Requests from this System
XDWL..E CFPT0SCC - Tot All Subchannels Busy
XDWL..E CFPT0SCG - Tot Subchannels Defined in IOGEN
XDWL..E CFPT0SCU - Tot Subchannels Currently in Use
XDWL..E CFPT0SSQ - Unsuccessful Req Serv Tm Sum Squares
XDWL..E CFPT0TSD - Tot Storage Defined (KB)
XDWL..E CFPT0TSF - Tot Storage Free (KB)
XDWL..E CFPT0URQ - Tot Unsuccessful Requests
XDWL..E CFPT0UTM - Tot Unsuccessful Req Service Time
XDWL..E CFPT0WGT - Total Shared Processors Weight
XDWL..E CFPT0WTM - Processor Wait Time

Minimum Data Elements

XDWL..E CFPMNCSF - Min Control Storage Free (KB)
XDWL..E CFPMNDSF - Min Dump Space Free (KB)
XDWL..E CFPMNPCB - Min Defined Processors Utilization
XDWL..E CFPMNPCW - Min Defined Processors Pct Wait
XDWL..E CFPMNPEB - Min Effective Processors Utilization
XDWL..E CFPMNPEW - Min Effective Processors Pct Wait
XDWL..E CFPMNPTH - Min Paths Available
XDWL..E CFPMNSCU - Min Subchannels Currently in Use
XDWL..E CFPMNTSF - Min Storage Free (KB)

Maximum Data Elements

XDWL..E CFPMXDSA - Max Dump Space Allocated (KB)
XDWL..E CFPMXDSR - Max Dump Space Requested (KB)
XDWL..E CFPMXPBC - Max Requests Failed: Path Busy
XDWL..E CFPMXPCB - Max Defined Processors Utilization
XDWL..E CFPMXPCW - Max Defined Processors Pct Wait
XDWL..E CFPMXPEB - Max Effective Processors Utilization
XDWL..E CFPMXPEW - Max Effective Processors Pct Wait
XDWL..E CFPMXPTH - Max Paths Available
XDWL..E CFPMXREQ - Max Requests from this System
XDWL..E CFPMXSCC - Max All Subchannels Busy
XDWL..E CFPMXSCU - Max Subchannels Currently in Use
XDWL..E CFPMXURQ - Max Unsuccessful Requests

Derived Data Elements

XDWL..E CFPAVCPD - Avg Dedicated Processors Defined
XDWL..E CFPAVCPS - Avg Shared Processors Defined
XDWL..E CFPAVCPU - Avg Processors Defined
XDWL..E CFPAVCSD - Avg Control Storage Defined (KB)
XDWL..E CFPAVCSF - Avg Control Storage Free (KB)
XDWL..E CFPAVCTM - Avg Subchannel Contention Time
XDWL..E CFPAVDSA - Avg Dump Space Allocated (KB)
XDWL..E CFPAVDSF - Avg Dump Space Free (KB)
XDWL..E CFPAVDSR - Avg Dump Space Requested (KB)
XDWL..E CFPAVPTH - Avg Paths Available
XDWL..E CFPAVSCG - Avg Subchannels Defined in IOGEN
XDWL..E CFPAVSCL - Avg Subchannel Limit
XDWL..E CFPAVSCU - Avg Subchannels Currently in Use
XDWL..E CFPAVTSD - Avg Storage Defined (KB)
XDWL..E CFPAVTSF - Avg Storage Free (KB)
XDWL..E CFPAVUTM - Avg Unsuccessful Req Service Time
XDWL..E CFPAVWGT - Avg Shared Processors Weight
XDWL..E CFPEFCPU - Effective Processors
XDWL..E CFPPCBSY - Defined Processors Utilization
XDWL..E CFPPCCON - Pct CF Connected
XDWL..E CFPPCEBS - Effective Processors Utilization
XDWL..E CFPPCEWT - Effective Processors Pct Wait
XDWL..E CFPPCWAT - Defined Processors Pct Wait
XDWL..E CFPPSREQ - Reqs per Second from this System
XDWL..E CFPSDCTM - Std Dev of Subchannel Contention Tm
XDWL..E CFPSDUTM - Std Dev of Unsuccessful Req Serv Tm

5.2.13.3 Usage Considerations

Special considerations or techniques related to using the HARCFR file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.14 The CF Request File (HARCFR)

The CF Request File is used to store information about all CF/XES structures connected to the system that recorded the data. This information includes the name, type, and status of each structure, as well as detailed information about the number, type, and service times of all requests to and from each connected structure. You can use this information for detailed analyses of CF/XES performance and for capacity planning studies.

The information in the HARCFR file is obtained from the request data section of the SMF type 74 subtype 4 record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.14.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS	CFYSYSNM	CFYCFNM	CFYSTRNM		
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
	CFYSYSNM	CFYCFNM	CFYSTRNM			
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
	CFYSYSNM	CFYCFNM	CFYSTRNM			
MONTHS	SYSID	YEAR	MONTH	ZONE	CFYSYSNM	
	CFYCFNM	CFYSTRNM				
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-19. HARCFR Sort Sequence and Data Granularity

5.2.14.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E CFYCFNM - CF Name
 XDWM..E CFYSTRNM - CF Structure Name
 XDWM..E CFYSYSNM - Name of System Using CF
 XD...E DAY - Day of Month
 XDW...E HOUR - Hour of Day
 XD.M..E MONTH - Month of Year
 XDWM..E SYSID - System Identifier

XDW...E WEEK - Week of Year
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E PRSMLPNO - Logical Partition Number
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X....E RMFSRL - SMF Record Level Change Number
XDW..E RMFVER - RMF Version Number
XDW..E STARTTS - Start Time Stamp
XDW..E SYSNAME - System Name
XDW..E SYSPLEX - Sysplex Name

Retained Data Elements

XDW..E CFRLSVTS - Logical Structure Version Time Stamp
XDW..E CFRSTYPE - Structure Type
XDW..E CFRVERTS - Structure Version Time Stamp

Accumulated Data Elements

XDW.. CFRACTLEL - Accum Limit on List Entries
XDW.. CFRACTLEM - Accum List Entries Used at End of Intvl
XDW.. CFRACTLTL - Accum Limit on Lock Entries
XDW.. CFRACTLTM - Accum Lock Entries Used at End of Intvl
XDW.. CFRACTLW - Accum Lock Table Entries Width
XDW..E CFRACTCT - Intvls with Structure Activation
XDW..E CFRACTSIZ - Allocated Structure Size (KB)
XDW..E CFRCASEC - Intvls with Cache Section Present
XDW..E CFRCONCT - Intvls with Structure Connected
XDW..E CFRRSMP - Number of RMF Samples
XDW..E CFRT0ARC - Reqs - Asynch
XDW..E CFRT0ASQ - Req Time Sum Squares - Asynch
XDW..E CFRT0ATM - Req Time - Asynch
XDW..E CFRT0CSQ - Peer Completion Wait Time Sum Squares
XDW..E CFRT0CTC - Peer Completion Waits
XDW..E CFRT0CTM - Peer Completion Wait Time
XDW..E CFRT0DIR - Directory Entries - Cache Structure
XDW..E CFRT0DMP - Dump Serialization Found

XDW..E CFRTODRC - Reqs - Dump Ser
XDW..E CFRTODSQ - Req Time Sum Squares - Dump Ser
XDW..E CFRTODTM - Req Time - Dump Ser
XDW..E CFRTODUQ - Tot Queued Requests - Dump Ser Delay
XDW..E CFRTOELM - Data Elements - Cache Structure
XDW..E CFRTOETM - Total Structure Execution Time
XDW..E CFRTOFCN - Reqs Encountering False Contention
XDW..E CFRTOHPQ - Tot Queued Requests - High Priority
XDW..E CFRTOINU - Elements in Use - List Structure
XDW..E CFRTOLPQ - Tot Queued Requests - Low Priority
XDW..E CFRTONLH - List Headers - List Structure
XDW..E CFRTOPES - Execution Suppressed Conditions
XDW..E CFRTOPLN - Peer Link Not Available Conditions
XDW..E CFRTOPSQ - Peer Subchannel Wait Time Sum Squares
XDW..E CFRTOPTC - Peer Subchannel Waits
XDW..E CFRTOPTM - Peer Subchannel Wait Time
XDW..E CFRTOQRC - Reqs - Queued
XDW..E CFRTOQSQ - Req Time Sum Squares - Queued
XDW..E CFRTOQTM - Req Time - Queued
XDW..E CFRTORQC - Requests Completed - Total
XDW..E CFRTORSQ - Peer Sch Wait with Reserve Time Sum Squ.
XDW..E CFRTORTC - Peer Subchannel Waits with Reserve
XDW..E CFRTORTM - Peer Subchannel Wait with Reserve Time
XDW..E CFRTOSCN - Reqs Encountering Lock Contention
XDW..E CFRTOSRC - Reqs - Synch
XDW..E CFRTOSSQ - Req Time Sum Squares - Synch
XDW..E CFRTOSTA - Requests Changed from Synch to Asynch
XDW..E CFRTOSTM - Req Time - Synch

Minimum Data Elements

XDW..E CFRMNDUQ - Min Queue Length - Dump Ser Delay
XDW..E CFRMNHPQ - Min Queue Length - High Priority
XDW..E CFRMNLQ - Min Queue Length - Low Priority
XDW..E CFRMNSIZ - Min Size Allocated Structure (KB)
XDW..E CFRMNSMP - Min Number of RMF Samples

Maximum Data Elements

XDW..E CFRMXDUQ - Max Queue Length - Dump Ser Delay
XDW..E CFRMXELM - Max Element Count - List Structure
XDW..E CFRMXHPQ - Max Queue Length - High Priority
XDW..E CFRMXLPQ - Max Queue Length - Low Priority
XDW..E CFRMXMXU - Max List Entries Used at End of Intvl
XDW..E CFRMXSIZ - Max Size Allocated Structure (KB)
XDW..E CFRMXSMP - Max Number of RMF Samples

Derived Data Elements

XDW..E CFRAVATM - Avg Service Time - Asynch
XDW..E CFRAVCTM - Avg Peer Completion Wait Time
XDW..E CFRAVDTM - Avg Service Time - Dump Ser
XDW.. CFRAVLEL - Avg Limit on List Entries
XDW.. CFRAVLEM - Avg List Entries Used at End of Intvl
XDW.. CFRAVLTL - Avg Limit on Lock Entries
XDW.. CFRAVLTM - Avg Lock Entries Used at End of Intvl
XDW.. CFRAVLTW - Avg Lock Table Entry Width
XDW..E CFRAVPTM - Avg Peer Subchannel Wait Time
XDW..E CFRAVQTM - Avg Service Time - Queued
XDW..E CFRAVRTM - Avg Peer Sch Wait with Reserve Time
XDW..E CFRAVSIZ - Avg Structure Size (KB)
XDW..E CFRAVSTM - Avg Service Time - Synch
XDW..E CFRPCCON - Pct Structure Connected
XDW..E CFRPSARC - Reqs per Second - Asynch
XDW..E CFRPSCTC - Peer Completion Waits per Second
XDW..E CFRPSDRC - Reqs per Second - Dump Ser
XDW..E CFRPSDUQ - Dump Serialization Delay Rate
XDW..E CFRPSHPQ - High Priority Request Delay Rate
XDW..E CFRPSLPQ - Low Priority Request Delay Rate
XDW..E CFRPSPTC - Peer Subchannel Waits per Second
XDW..E CFRPSQRC - Reqs per Second - Queued
XDW..E CFRPSRQC - Reqs per Second Completed
XDW..E CFRPSRTC - Peer Sch Waits with Reserve per Second
XDW..E CFRPSSRC - Reqs per Second - Synch
XDW..E CFRSDATM - Std Dev of Service Time - Asynch
XDW..E CFRSDCTM - Std Dev of Peer Completion Wait Time
XDW..E CFRSDDTM - Std Dev of Service Time - Dump Ser
XDW..E CFRSDPTM - Std Dev of Peer Subchannel Wait Time
XDW..E CFRSDQTM - Std Dev of Service Time - Queued
XDW..E CFRSDRTM - Std Dev of Peer Sch Wait with Reserve Tm
XDW..E CFRSDSTM - Std Dev of Service Time - Synch

5.2.14.3 Usage Considerations

Special considerations or techniques related to using the HARCFS file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.15 CF Structure File (HARCFS)

The CF Structure File is used to store the name and storage resources of all structures allocated in the CF. You can use the storage utilization data to set and/or verify structure storage allocation policies specified in the function couple data set.

The information in the HARCFS file is obtained from the structure data section of the SMF type 74 subtype 4 record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.15.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSID	YEAR	MONTH	DAY	HOUR	
	ENDTS	CFYSYSNM	CFYCFNM	CFYSTRNM		
DAYS	SYSID	YEAR	MONTH	DAY	HOUR	
	CFYSYSNM	CFYCFNM	CFYSTRNM			
WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR	
	CFYSYSNM	CFYCFNM	CFYSTRNM			
MONTHS	SYSID	YEAR	MONTH	ZONE	CFYSYSNM	
	CFYCFNM	CFYSTRNM				
YEARS	N/A					
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-20. HARCFS Sort Sequence and Data Granularity

5.2.15.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E CFYCFNM - CF Name
 XDWM..E CFYSTRNM - CF Structure Name
 XDWM..E CFYSYSNM - Name of System Using CF
 XD...E DAY - Day of Month
 XDW...E HOUR - Hour of Day
 XD.M..E MONTH - Month of Year
 XDWM..E SYSID - System Identifier

XDW...E WEEK - Week of Year
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E PRSMLPNO - Logical Partition Number
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X....E RMFSRL - SMF Record Level Change Number
XDW..E RMFVER - RMF Version Number
XDW..E STARTTS - Start Time Stamp
XDW..E SYSNAME - System Name
XDW..E SYSPLEX - Sysplex Name

Retained Data Elements

X....E CFSSTAT - Structure Status
XDW..E CFSVERTS - Structure Version Time Stamp

Accumulated Data Elements

XDW..E CFSACSIK - Accum Structure Size (KB)

Minimum Data Elements

XDW.. CFSMNSIK - Min Structure Size (KB)

Maximum Data Elements

XDW.. CFSMXSIK - Max Structure Size (KB)

Derived Data Elements

XDW..E CFSAVSIK - Avg Structure Size (KB)

5.2.15.3 Usage Considerations

Special considerations or techniques related to using the HARCFS file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the amount of time during which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.16 Cache Volume Activity File (HARCVA)

The Cache Volume Activity file quantifies caching activity at the device (volume) level. It also contains information pertaining to the caching options pertaining to the individual volume.

The information in the HARCVA file is obtained from the cache subsystem device activity section of the SMF type 74 subtype 5 record written by RMF Monitor III. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.16.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	N/A					
DAYS	SYSID	CCUSUBID	CCUDEVID	CUDEVNUM	DEVCLASS	
	DEVTYPE	DEVNUM	YEAR	MONTH	DAY	
	HOUR					
WEEKS	SYSID	CCUSUBID	CCUDEVID	CUDEVNUM	DEVCLASS	
	DEVTYPE	DEVNUM	YEAR	WEEK	ZONE	
	HOUR					
MONTHS	SYSID	CCUSUBID	CCUDEVID	CUDEVNUM	DEVCLASS	
	DEVTYPE	DEVNUM	YEAR	MONTH	ZONE	
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-21. HARCVA Sort Sequence and Data Granularity

5.2.16.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

.DWM..E CCUDEVID - Cache Subsystem Device ID Number
 .DWM..E CCUSUBID - Cache Subsystem ID Number
 .DWM..E CUDEVNUM - Control Unit Device Number
 .D....E DAY - Day of Month
 .DWM..E DEVCLASS - Device Class
 .DWM..E DEVNUM - Device Number
 .DWM..E DEVTYPE - Device Type

```
.DW...E HOUR      - Hour of Day
.D.M..E MONTH     - Month of Year
.DWM..E SYSID     - System Identifier
.DW...E WEEK      - Week of Year
.DWM..E YEAR      - Year of Century
.DWM..E ZONE      - Time Zone
```

Common Data Elements

```
.DWM..E CACHEDUR - Cache Gatherer Interval Duration
.DWM..E CACHEETS - Cache Gatherer End Time Stamp
.DWM..E CACHESTS - Cache Gatherer Start Time Stamp
.DWM..E CCUEVAD  - Cache Subsystem Device ID Address
.DWM..E CCUSUBAD - Cache Subsystem ID Address
.DWM.. CTLUMANU  - Control Unit Manufacturer Code
.DWM..E CTLUNAME - Control Unit Name
.DWM.. CTLUPLNT  - Control Unit Manufacturer Plant
.DWM.. CTLUSERN  - Control Unit Serial Number
.DWM..E CUADDR   - Control Unit Address/Number
.DWM..E CUDEVAAD - Cache Subsystem Device Adapter Address
.DWM..E CUDEVAID - Cache Subsystem Device Adapter ID
.DWM..E CURANKAD - Cache Subsystem RAID Rank Address
.DWM..E CURANKID - Cache Subsystem RAID Rank ID
.DWM..E CURANKTP - RAID Rank Type
.DWM..E CUVOLSER - Cache Control Unit Volser
.DWM..E DEVADDR  - Device Address/Number
.DWM..E DURATION - Recording Interval Time
.DWM..E ENDTS    - End Time Stamp
.DWM..E INTERVLS - Number of Recording Intervals
.DWM..E MICSVER  - CA MICS Version Number
.DWM..E MVSLEVEL - MVS Software Level
.DWM..E ORGSYSID - Originating System Identification
.DWM..E PRSMLPNO - Logical Partition Number
.DWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
.DWM..E RMFESAME - z/Architecture Mode Indicator
.DWM.. RMFGMTOF  - GMT to Local Time Offset
.DWM..E RMFIML   - I/O Measurement Level
.DWM.. RMFMFL    - RMF Maintenance Level Indicator
.....E RMFSRL    - SMF Record Level Change Number
.DWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
.DWM..E RMFVER   - RMF Version Number
.DWM..E STARTTS  - Start Time Stamp
.DWM..E STORNAME - DFSMS Storage Group Name
.DWM..E SYSNAME  - System Name
.DWM..E SYSPLEX  - Sysplex Name
.DWM..E VOLSER   - Volume Serial Number
.DWM..E XPAD     - Extent Pool Address
.DWM..E XPID     - Extent Pool ID
```

Retained Data Elements

.DWM..E CVAODEV - Other Device of Duplex Pair
.DWM..E CVAXTTP - Extent Type

Accumulated Data Elements

.DWM..E CVAABR - Host Adapter - Bytes Read
.DWM..E CVAABW - Host Adapter - Bytes Written
.DWM..E CVAACDXF - Async Cache to DASD XFRs (Trks)
.DWM..E CVAACTIO - Total Cache Active I/O
.DWM..E CVAACTTM - Caching Active Time
.DWM..E CVAARCW - Intvls with Adapter Record Caching Wrts
.DWM..E CVAARTM - Host Adapter - Read Response Time
.DWM..E CVAAWTM - Host Adapter - Write Response Time
.DWM..E CVABCR - Bypass Cache Requests
.DWM..E CVABSVOL - Intvls Device Was Broken Spare Volume
.DWM..E CVACACT - Intvls with Caching Activated
.DWM..E CVACDACT - Intvls with Caching Deactivated
.DWM..E CVACFWB - Cache Fast Write (CFW) Bypass Count
.DWM..E CVACKDWH - CKD Write Hits
.DWM..E CVACKDWR - CKD Write Requests
.DWM..E CVADATAP - Intvls with Pinned Data for Device
.DWM..E CVADBDP - Intvls with Defect Bat Destage Pending
.DWM..E CVADFNVs - Intvls with Data in Failed NVS
.DWM..E CVADFwB - DASD Fast Write (DFW) Bypass Count
.DWM..E CVADFwIH - DASD Fast Write (DFW) Inhibit Count
.DWM..E CVADFwNR - DASD Fast Write (DFW) Normal Requests
.DWM..E CVADFwSR - DASD Fast Write (DFW) Seq Requests
.DWM..E CVADPEND - Intvls with Deactivate Pending
.DWM..E CVADPXA - Intvls with Duplex Pair Available
.DWM..E CVADPXF - Intvls with Device is Failed Duplex
.DWM..E CVADPXF - Intvls with Failed Duplex Primary
.DWM..E CVADPXF - Intvls with Failed Duplex Secondary
.DWM..E CVADPXP - Intvls with Duplex Pair Pending
.DWM..E CVAFARC - Intvls with Full Adapter Record Caching
.DWM..E CVAFWACT - Intvls with DFW Allowed
.DWM..E CVAFWDAC - Intvls with DFW Deactivated
.DWM..E CVAFWDPN - Intvls with DFW Deactivate Pending
.DWM..E CVAFWNOT - Intvls with DFW Not Used
.DWM..E CVAIACTM - Caching Inactive Time
.DWM..E CVAICLR - Inhibit Cache Load Requests
.DWM..E CVANDCXF - Normal DASD to Cache XFRs (Trks)
.DWM..E CVANPDFW - Intvls with no Pinned Data and DFW
.DWM..E CVANVSSP - NVS Space Allocation
.DWM..E CVAOFFIO - Total Cache Offline I/O
.DWM..E CVAOFFO - Total Cache Offline Other I/O
.DWM..E CVAOFFR - Total Cache Offline Read I/O
.DWM..E CVAOFFW - Total Cache Offline Write I/O

```
.DWM..E CVAPBR - Physical Storage - Bytes Read
.DWM..E CVAPBW - Physical Storage - Bytes Written
.DWM..E CVAPDFWA - Intvls with Pinned Data, DFW Active
.DWM..E CVAPDFWS - Intvls with Pinned Data, DFW Suspended
.DWM..E CVAPPRXF - Secondary PPRC Volume XFR (Trks)
.DWM..E CVAPRIM - Intvls with Primary of Duplex Pair
.DWM..E CVAPRO - Physical Storage - Read Operations
.DWM..E CVAPRTM - Physical Storage - Read Response Time
.DWM..E CVAPWO - Physical Storage - Write Operations
.DWM..E CVAPWTM - Physical Storage - Write Response Time
.DWM..E CVARCDE - Intvls with Record Caching on Def Ext
.DWM..E CVARCDWP - RCD Cache Write Promotions
.DWM..E CVARCRMS - Record Cache Read Misses
.DWM..E CVARMRR - Record Mode Read Requests
.DWM..E CVARNH - Read Normal Hits
.DWM..E CVARNR - Read Normal Requests
.DWM..E CVARNRH - Read Non-Retentive Hits
.DWM..E CVARNRR - Read Non-Retentive Requests
.DWM..E CVARSH - Read Sequential Hits
.DWM..E CVARSR - Read Sequential Requests
.DWM..E CVASDCXF - Sequential DASD to Cache XFRs (Trks)
.DWM..E CVASECN - Intvls with Secondary of Duplex Pair
.DWM..E CVASVOL - Intvls Device Was Spare Volume
.DWM..E CVATOCIO - Total Cache I/O
.DWM..E CVATOTFW - Total Fast Write (XFW) Requests
.DWM..E CVATOTH - Total Hits
.DWM..E CVATOTIO - Total I/O
.DWM..E CVATOTRH - Total Read Hits
.DWM..E CVATOTRR - Total Read Requests
.DWM..E CVATOTWH - Total Write Hits
.DWM..E CVATOTWR - Total Write Requests
.DWM..E CVATRKM - Intvls with Track Mode Caching
.DWM..E CVAWNH - Write Normal Hits
.DWM..E CVAWNR - Write Normal Requests
.DWM..E CVAWNRH - Write Non-Retentive Hits
.DWM..E CVAWNRR - Write Non-Retentive Requests
.DWM..E CVAWSH - Write Sequential Hits
.DWM..E CVAWSR - Write Sequential Requests
.DWM..E CVAXCWR - XRC or CC Contaminated Writes
.DWM..E CVAXSRR - XRC or CC Sidefile Read Requests
```

Derived Data Elements

```
.DWM..E CVAABRRT - Host Adapter - Bytes/Read Request
.DWM..E CVAABWRT - Host Adapter - Bytes/Write Request
.DWM..E CVAAVART - Host Adapter - Avg Read Response Time
.DWM..E CVAVAWT - Host Adapter - Avg Write Response Time
.DWM..E CVAAVPRT - Physical Storage - Avg Read Resp. Time
.DWM..E CVAAVPWT - Physical Storage - Avg Write Resp. Time
```


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.DWM..E CVAPSCW - XRC or CC Contaminated Write Rate
.DWM..E CVAPCSR - XRC or CC Sidefile Read Request Rate

5.2.16.3 Usage Considerations

Special considerations or techniques related to using the HARCVA file are provided below.

1. RMF interval data represented in CA MICS database files uses time and duration information common to all RMF records for a given SYSID to ensure timestamp consistency across different CA MICS database files.

This consistency allows CA MICS database records from different files (such as the HARCPU and HARDVA) to be merged together by ENDTS.

The HARCVA file maintains this consistency. Data element values for STARTTS, ENDTS, HOUR, DAY, INTERVAL, and so on are completely synchronized with the same element values found in other CA MICS database files generated from RMF data produced for the same time interval. This not only aids in the merging of data, but also allows for strict minute cut-offs to ensure that data from 9:00-9:59 is always summarized into hour 9.

2. The data in the HARCVA file may not actually represent activity exactly bounded by STARTTS and ENDTS. This is because the actual reporting of cache statistics can be delayed by device reserve activity. A unique set of Start Time, End Time, and Duration elements are provided with the HARCVA file. They represent the true time bounds of the data represented. These elements are listed below:

CACHESTS - Cache Gatherer Start Time Stamp
CACHEETS - Cache Gatherer End Time Stamp
CACHEDUR - Cache Gatherer Interval Duration
CVAACTTM - Caching Active Time
CVAIACTM - Caching Inactive Time

All HARCVA observations contain a value in CACHESTS, CACHEETS, and CACHEDUR. For intervals where caching was active, CVAACTTM is set equal to CACHEDUR. When inactive or pending inactive, CVAIACTM is set equal to CACHEDUR. This means that in higher timespans, such as MONTHS, the observation for VOLSER "VOL001" will contain the total cache activity duration (CACHEDUR) as well as the total time caching was active (CVAACTTM) and inactive (CVAIACTM). The sum of CVAACTTM and CVAIACTM will always equal CACHEDUR. These durations, rather than the RMF Interval Duration (DURATION) are used in all per-second

rate calculations.

3. DETAIL timespan HARCVA observations represent the caching activity for a single volume. When bit settings in the raw RMF record indicate that caching was active at the end of the RMF interval, one set of CA MICS data elements is populated. When caching was inactive or pending deactivation, another smaller set of data elements is populated. This separation of I/O activity into two sets of mutually exclusive data elements allows the summarization of observations that include both cache active and inactive intervals into a single summarized observation while preserving the validity of I/O rate and cache hit ratio analysis.

The following data elements are populated only when caching was inactive or pending deactivation at the end of the RMF interval:

CVAIACTM - Caching Inactive Time
CVAOFFIO - Total Cache Offline I/O
CVAOFFR - Total Cache Offline Read I/O
CVAOFFW - Total Cache Offline Write I/O
CVAOFFO - Total Cache Offline Other I/O

4. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
5. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

Remember that in the HARCVA file CACHESTS (Cache Gatherer Start Time Stamp) and CACHEETS (Cache Gatherer End Time

Stamp) represent the true time boundaries of the data, and may be slightly different from the boundaries of the RMF interval duration.

5.2.17 Cache Control Unit Activity File (HARCCU)

The Cache Control Unit Activity file quantifies caching activity at the subsystem level. The caching activity for all volumes attached to the control unit is summarized in this file. It also contains device independent information concerning the overall caching subsystem.

The information in the HARCCU file is obtained from the cache subsystem device activity section of the SMF type 74 subtype 5 record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.17.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	CCUSUBID	CUDEVNUM	YEAR	MONTH	
	DAY	HOUR	ENDTS			
DAYS	SYSID	CCUSUBID	CUDEVNUM	YEAR	MONTH	
	DAY	HOUR				
WEEKS	SYSID	CCUSUBID	CUDEVNUM	YEAR	WEEK	
	ZONE	HOUR				
MONTHS	SYSID	CCUSUBID	CUDEVNUM	YEAR	MONTH	
	ZONE					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-22. HARCCU Sort Sequence and Data Granularity

5.2.17.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
D - DAYS
W - WEEKS
M - MONTHS
Y - YEARS
T - TABLES AREA
. - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E CCUSUBID - Cache Subsystem ID Number
 XDWM..E CUDEVNUM - Control Unit Device Number
 XD...E DAY - Day of Month
 XDW...E HOUR - Hour of Day
 XD.M..E MONTH - Month of Year
 XDWM..E SYSID - System Identifier
 XDW...E WEEK - Week of Year

XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CACHEDUR - Cache Gatherer Interval Duration
XDWM..E CACHEETS - Cache Gatherer End Time Stamp
XDWM..E CACHESTS - Cache Gatherer Start Time Stamp
XDWM..E CCUDEVAD - Cache Subsystem Device ID Address
XDWM..E CCUSUBAD - Cache Subsystem ID Address
XDWM.. CTLUMANU - Control Unit Manufacturer Code
XDWM..E CTLUNAME - Control Unit Name
XDWM.. CTLUPLNT - Control Unit Manufacturer Plant
XDWM.. CTLUSERN - Control Unit Serial Number
XDWM..E CUADDR - Control Unit Address/Number
XDWM..E CUVOLSER - Cache Control Unit Volser
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
XDWM.. RMFMFL - RMF Maintenance Level Indicator
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E CCUDEVID - Cache Subsystem Device ID Number
XDWM..E CCUIDCRC - IDCSS01 Return Code
XDWM..E CCUIOSRC - IOS Return Code
XDWM..E CCUMODEL - Control Unit Model ID
XDWM..E CCUSUBTP - Cache Subsystem Type
XDWM..E CCUTOASS - Available Subsystem Storage (KB)
XDWM..E CCUTCNV - Configured Non-Volatile Cache (KB)
XDWM..E CCUTCSS - Configured Subsystem Storage (KB)
XDWM..E CCUTOOSS - Offline Subsystem Storage (KB)
XDWM..E CCUTOPNV - Pinned Non-Volatile Cache (KB)
XDWM..E CCUTOPSS - Pinned Subsystem Storage (KB)

Accumulated Data Elements

XDWM..E CCUABR - Host Adapter - Bytes Read
 XDWM..E CCUABW - Host Adapter - Bytes Written
 XDWM..E CCUACDXF - Async Cache to DASD XFRs (Trks)
 XDWM..E CCUACTIO - Total Cache Active I/O
 XDWM..E CCUACTTM - Caching Active Time
 XDWM..E CCUAPEND - Intvls with Caching Pending Active
 XDWM..E CCUARTM - Host Adapter - Read Response Time
 XDWM..E CCUAWTM - Host Adapter - Write Response Time
 XDWM..E CCUBCR - Bypass Cache Requests
 XDWM..E CCUCACT - Intvls with Caching Activated
 XDWM..E CCUCDACT - Intvls with Caching Deactivated
 XDWM..E CCUCFWB - CFW Bypass Count
 XDWM..E CCUCKDWH - CKD Write Hits
 XDWM..E CCUCKDWR - CKD Write Requests
 XDWM..E CCUDFAIL - Intvls with Deactivate Failure
 XDWM..E CCUDFWB - DASD Fast Write (DFW) Bypass Count
 XDWM..E CCUDFWBF - Intvls DFW Inhibited Battery Fail
 XDWM..E CCUDFWIH - DASD Fast Write (DFW) Inhibit Count
 XDWM..E CCUDFWNR - DASD Fast Write (DFW) Normal Requests
 XDWM..E CCUDFWSR - DASD Fast Write (DFW) Seq Requests
 XDWM..E CCUDHOST - Intvls with Host or Support Failure
 XDWM..E CCUDPEND - Intvls with Deactivate Pending
 XDWM..E CCUIACTM - Caching Inactive Time
 XDWM..E CCUICLR - Inhibit Cache Load Requests
 XDWM..E CCUIFAIL - Intvls with Internal Failure
 XDWM..E CCUMAINT - Intvls with Disabled for Maintenance
 XDWM..E CCUNCXF - Normal DASD to Cache XFRs (Trks)
 XDWM..E CCUNOCAD - Number of Caching Active Devices
 XDWM..E CCUNODEV - Number of Devices on Control Unit
 XDWM..E CCUNONCD - Number of Non-Caching Devices
 XDWM..E CCUNVSDM - Intvls with MVS Disabled for Maint
 XDWM..E CCUNVSHT - Intvls with MVS Host Termination
 XDWM..E CCUNVSPP - Intvls with MVS Pending for Problem
 XDWM..E CCUNVSPT - Intvls with MVS Problem Termination
 XDWM..E CCUNVSSP - MVS Space Allocation
 XDWM..E CCUOFFIO - Total Cache Offline I/O
 XDWM..E CCUOFFO - Total Cache Offline Other I/O
 XDWM..E CCUOFFR - Total Cache Offline Read I/O
 XDWM..E CCUOFFW - Total Cache Offline Write I/O
 XDWM..E CCUPBR - Physical Storage - Bytes Read
 XDWM..E CCUPBW - Physical Storage - Bytes Written
 XDWM..E CCUPPRXF - Secondary PPRC Volume XFR (Trks)
 XDWM..E CCUPRO - Physical Storage - Read Operations
 XDWM..E CCUPRTM - Physical Storage - Read Response Time
 XDWM..E CCUPWO - Physical Storage - Write Operations
 XDWM..E CCUPWTM - Physical Storage - Write Response Time
 XDWM..E CCURCDWP - RCD Cache Write Promotions

XDW..E CCURCRMS - Record Cache Read Misses
XDW..E CCURMRR - Record Mode Read Requests
XDW..E CCURNH - Read Normal Hits
XDW..E CCURNR - Read Normal Requests
XDW..E CCURNRH - Read Non-Retentive Hits
XDW..E CCURNRR - Read Non-Retentive Requests
XDW..E CCURSH - Read Sequential Hits
XDW..E CCURSR - Read Sequential Requests
XDW..E CCUSDCXF - Sequential DASD to Cache XFRs (Trks)
XDW..E CCUTOCIO - Total Cache I/O
XDW..E CCUTOTFW - Total Fast Write (XFW) Requests
XDW..E CCUTOTH - Total Hits
XDW..E CCUTOTIO - Total I/O
XDW..E CCUTOTRH - Total Read Hits
XDW..E CCUTOTRR - Total Read Requests
XDW..E CCUTOTWH - Total Write Hits
XDW..E CCUTOTWR - Total Write Requests
XDW..E CCUWNH - Write Normal Hits
XDW..E CCUWNR - Write Normal Requests
XDW..E CCUWNRH - Write Non-Retentive Hits
XDW..E CCUWNRR - Write Non-Retentive Requests
XDW..E CCUWSH - Write Sequential Hits
XDW..E CCUWSR - Write Sequential Requests
XDW..E CCUXCFW - Intvls with CFW Deactivated
XDW..E CCUXCWR - XRC or CC Contaminated Writes
XDW..E CCUXIML - Intvls with IML Device not Available
XDW..E CCUXSRR - XRC or CC Sidefile Read Requests
XDW..E CCUXFW - Intvls with DFW/CFW Suspended

Minimum Data Elements

XDW..E CCUMNCAD - Min Caching Active Devices
XDW..E CCUMNDEV - Min Devices on Control Unit
XDW..E CCUMNCD - Min Non-Caching Devices

Maximum Data Elements

XDW..E CCUMXCAD - Max Caching Active Devices
XDW..E CCUMXDEV - Max Devices on Control Unit
XDW..E CCUMXNCD - Max Non-Caching Devices

Derived Data Elements

XDW..E CCUABRRT - Host Adapter - Bytes/Read Request
XDW..E CCUABWRT - Host Adapter - Bytes/Write Request
XDW..E CCUAVART - Host Adapter - Avg Read Response Time
XDW..E CCUAVAWT - Host Adapter - Avg Write Response Time
XDW..E CCUAVPRT - Physical Storage - Avg Read Resp. Time
XDW..E CCUAVPWT - Physical Storage - Avg Write Resp. Time

XDWL..E CCUPBRRT - Physical Storage - Bytes/Read Request
XDWL..E CCUPBWRT - Physical Storage - Bytes/Write Request
XDWL..E CCUPCCIO - Pct Hits Cache I/O
XDWL..E CCUPCKD - Pct Successful CKD Write Hits
XDWL..E CCUPCRN - Pct Read Normal Cache Hits
XDWL..E CCUPCRNR - Pct Read Non-Retentive Cache Hits
XDWL..E CCUPCRS - Pct Read Sequential Cache Hits
XDWL..E CCUPCTIO - Pct Hits Total I/O
XDWL..E CCUPCTR - Pct Hits Total Read
XDWL..E CCUPCTW - Pct Hits Total Write
XDWL..E CCUPCWN - Pct Write Normal Cache Hits
XDWL..E CCUPCWNR - Pct Write Non-Retentive Cache Hits
XDWL..E CCUPCWS - Pct Write Sequential Cache Hits
XDWL..E CCUPSABR - Host Adapter - Bytes Read/Second
XDWL..E CCUPSABW - Host Adapter - Bytes Written/Second
XDWL..E CCUPSACD - Async Cache to DASD XFR (Trks) Rate
XDWL..E CCUPSACT - Cache Online I/O Rate
XDWL..E CCUPSBC - Total Bypass Cache Rate
XDWL..E CCUPSCFB - Cache Fast Write (CFW) Bypass Rate
XDWL..E CCUPSDFI - DASD Fast Write (DFW) Inhibit Rate
XDWL..E CCUPSDFN - DASD Fast Write (DFW) Norm Request Rate
XDWL..E CCUPSDFS - DASD Fast Write (DFW) Seq Request Rate
XDWL..E CCUPSFWB - DASD Fast Write (DFW) Bypass Rate
XDWL..E CCUPSICL - Total Inhibit Cache Load Rate
XDWL..E CCUPSND - Normal DASD to Cache XFR (Trks) Rate
XDWL..E CCUPSOFF - Cache Offline I/O Rate
XDWL..E CCUPSPBR - Physical Storage - Bytes Read/Second
XDWL..E CCUPSPBW - Physical Storage - Bytes Written/Second
XDWL..E CCUPSPPR - Secondary PPRC Volume XFR (Trks) Rate
XDWL..E CCUPSRMR - Record Mode Read Request Rate
XDWL..E CCUPSRN - Read Normal Request Rate
XDWL..E CCUPSRNH - Read Normal Hit Rate
XDWL..E CCUPSRNR - Read Non-Retentive Request Rate
XDWL..E CCUPSRN - Read Normal Request Rate
XDWL..E CCUPSRSH - Read Sequential Hit Rate
XDWL..E CCUPSRTH - Read Non-Retentive Hit Rate
XDWL..E CCUPSSDC - Seq DASD to Cache XFR (Trks) Rate
XDWL..E CCUPSTFW - Total Fast Write (XFW) Request Rate
XDWL..E CCUPSTIO - Total I/O Rate
XDWL..E CCUPSTR - Total Read Request Rate
XDWL..E CCUPSTRH - Total Read Hit Rate
XDWL..E CCUPSTW - Total Write Request Rate
XDWL..E CCUPSTWH - Total Write Hit Rate
XDWL..E CCUPSWN - Write Normal Request Rate
XDWL..E CCUPSWNH - Write Normal Hit Rate
XDWL..E CCUPSWNR - Write Non-Retentive Request Rate
XDWL..E CCUPSWN - Write Normal Request Rate
XDWL..E CCUPSWSH - Write Sequential Hit Rate
XDWL..E CCUPSWTH - Write Non-Retentive Hit Rate

XDWM..E CCUPSXCW - XRC or CC Contaminated Write Rate
XDWM..E CCUPSXSR - XRC or CC Sidefile Read Request Rate

5.2.17.3 Usage Considerations

Special considerations or techniques related to using the HARRRA file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.18 RAID Rank Activity File (HARRRA)

The RAID Rank Activity file quantifies caching activity at the RAID rank level within an Enterprise Storage Server. It also contains information related to the hardware configuration of each rank.

The information in the HARRRA file is obtained from the RAID Rank Data section of the SMF type 74 subtype 5 Cache Subsystem Activity record written by RMF Monitor III.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.18.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	CCUSUBID	CUDEVNUM	CURANKID	YEAR	
	MONTH	DAY	HOUR	ENDTS		
DAYS	SYSID	CCUSUBID	CUDEVNUM	CURANKID	YEAR	
	MONTH	DAY	HOUR			
WEEKS	SYSID	CCUSUBID	CUDEVNUM	CURANKID	YEAR	
	WEEK	ZONE	HOUR			
MONTHS	SYSID	CCUSUBID	CUDEVNUM	CURANKID	YEAR	
	MONTH	ZONE				
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-23. HARRRA Sort Sequence and Data Granularity

5.2.18.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

- XDWM..E CCUSUBID - Cache Subsystem ID Number
- XDWM..E CUDEVNUM - Control Unit Device Number
- XDWM..E CURANKID - Cache Subsystem RAID Rank ID
- XD...E DAY - Day of Month
- XDW...E HOUR - Hour of Day
- XD.M..E MONTH - Month of Year
- XDWM..E SYSID - System Identifier

XDW...E WEEK - Week of Year
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CACHEDUR - Cache Gatherer Interval Duration
XDW..E CACHEETS - Cache Gatherer End Time Stamp
XDW..E CACHESTS - Cache Gatherer Start Time Stamp
XDW..E CCUSUBAD - Cache Subsystem ID Address
XDW.. CTLUMANU - Control Unit Manufacturer Code
XDW..E CTLUNAME - Control Unit Name
XDW.. CTLUPLNT - Control Unit Manufacturer Plant
XDW.. CTLUSERN - Control Unit Serial Number
XDW..E CUADDR - Control Unit Address/Number
XDW..E CUDEVAAD - Cache Subsystem Device Adapter Address
XDW..E CUDEVAID - Cache Subsystem Device Adapter ID
XDW..E CURANKAD - Cache Subsystem RAID Rank Address
XDW..E CURANKTP - RAID Rank Type
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E PRSMLPNO - Logical Partition Number
XDW..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
XDW..E RMFIML - I/O Measurement Level
XDW.. RMFMFL - RMF Maintenance Level Indicator
X....E RMFSRL - SMF Record Level Change Number
XDW..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDW..E RMFVER - RMF Version Number
XDW..E STARTTS - Start Time Stamp
XDW..E SYSNAME - System Name
XDW..E SYSPLEX - Sysplex Name

Retained Data Elements

XDW..E RRAHDDSZ - Hard Disk Drive Sector Size
XDW..E RRANHDD - Number of Hard Disk Drives

Accumulated Data Elements

XDW..E RRAACTTM - Caching Active Time
XDW..E RRACACT - Intvls with Caching Activated
XDW..E RRACDACT - Intvls with Caching Deactivated
XDW..E RRAFBSR - Number of FB Sectors Read

XDWM..E RRAFBSW - Number of FB Sectors Written
XDWM..E RRAIACTM - Caching Inactive Time
XDWM..E RRARRQ - RAID Rank Read Requests
XDWM..E RRARRTM - RAID Rank Read Response Time
XDWM..E RRAWRQ - RAID Rank Write Requests
XDWM..E RRAWRTM - RAID Rank Write Response Time

Derived Data Elements

XDWM..E RRAAVRRQ - Avg RAID Rank Read Response Time
XDWM..E RRAAVWRQ - Avg RAID Rank Write Response Time
XDWM..E RRAMBRRT - Megabytes Transferred per Read Request
XDWM..E RRAMBWRT - Megabytes Transferred per Write Request
XDWM..E RRAPSRRQ - RAID Rank Read Request Rate
XDWM..E RRAPSWRQ - RAID Rank Write Request Rate

5.2.18.3 Usage Considerations

Special considerations or techniques related to using the HARRRA file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.19 Crypto Accelerator Activity File (HARCRA)

The Crypto Accelerator Activity file provides statistics on operations executed on cryptographic accelerators in Modulus-Exponent (ME) and Chinese Remainder Theorem (CRT) formats. Measurements include operations counts, execution times, and per-second rates, as well as accelerator utilization percentages.

The information in the HARCRA file is obtained from the cryptographic accelerator data section of the RMF type 70 subtype 2 Cryptographic Hardware Activity record. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.19.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	CRACAI	YEAR	MONTH	DAY
		HOUR	ENDTS			
	DAYS	SYSID	CRACAI	YEAR	MONTH	DAY
		HOUR				
	WEEKS	SYSID	CRACAI	YEAR	WEEK	ZONE
		HOUR				
	MONTHS	SYSID	CRACAI	YEAR	MONTH	ZONE
	YEARS		N/A			
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES		N/A			
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-24. HARCRA Sort Sequence and Data Granularity

5.2.19.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E	CRACAIDX	- Cryptographic Accelerator Index
XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century

XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E CRACPTYP - Cryptographic Accelerator Type
XDWM..E CRANBENG - Number of Engines

Accumulated Data Elements

XDWM..E CRAT0OPS - Total Operations
XDWM..E CRAT0XET - Total Execution time
XDWM..E CRA1CRCT - 1024-bit-CRT Format Operations
XDWM..E CRA1CRTM - 1024-bit-CRT Operations Execution Time
XDWM..E CRA1MECT - 1024-bit-ME Format Operations
XDWM..E CRA1METM - 1024-bit-ME Operations Execution Time
XDWM..E CRA2CRCT - 2048-bit-CRT Format Operations
XDWM..E CRA2CRTM - 2048-bit-CRT Operations Execution Time
XDWM..E CRA2MECT - 2048-bit-ME Format Operations
XDWM..E CRA2METM - 2048-bit-ME Operations Execution Time

Derived Data Elements

XDWM..E CRAAVXET - Avg Operations Execution Time
XDWM..E CRAAV1CT - Avg 1024-bit-CRT Operations Exec Time
XDWM..E CRAAV1MT - Avg 1024-bit-ME Operations Exec Time
XDWM..E CRAAV2CT - Avg 2048-bit-CRT Operations Exec Time
XDWM..E CRAAV2MT - Avg 2048-bit-ME Operations Exec Time
XDWM..E CRAPCUTL - Pct Utilization
XDWM..E CRAPC1CU - 1024-bit-CRT Format Operations Pct Util
XDWM..E CRAPC1MU - 1024-bit-ME Format Operations Pct Util

XDM..E CRAPC2CU - 2048-bit-CRT Format Operations Pct Util
XDM..E CRAPC2MU - 2048-bit-ME Format Operations Pct Util
XDM..E CRAPSOPS - Total Operations Rate
XDM..E CRAPS1CO - 1024-bit-CRT Format Operations Rate
XDM..E CRAPS1MO - 1024-bit-ME Format Operations Rate
XDM..E CRAPS2CO - 2048-bit-CRT Format Operations Rate
XDM..E CRAPS2MO - 2048-bit-ME Format Operations Rate

5.2.19.3 Usage Considerations

Special considerations or techniques related to using the HARCRA file are provided below.

1. Care must be taken in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. Information related to cryptographic hardware activity is found in the following four files:
 - o Crypto Accelerator Activity File (HARCRA)
 - o ICSF Services Activity File (HARCRF)
 - o Crypto PKCS11 Coprocessor Activity File (HARCRK)
 - o Crypto CCA Coprocessor Activity File (HARCRP)

While the data contained in the HARCRF file only applies to the logical partition (LPAR) that created the RMF records, the data in the HARCRA, HARCRK, and HARCRP files always reflects the total activity in your CPC.

5.2.20 ICSF Services Activity File (HARCRF)

The ICSF Services Activity file contains measurements on selected Integrated Cryptographic Service Facility (ICSF) activities executed on either the Cryptographic Coprocessor Facility (CCF) or on the PCI XCryptographic Coprocessor (PCIXCC) hardware. Measurements include statistics about services calls, hardware instructions executed, and amount of data processed.

The information in the HARCRF file is obtained from the ICSF services data section of the RMF type 70 subtype 2 Cryptographic Hardware Activity record. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.20.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	YEAR	MONTH	DAY	HOUR
		ENDTS				
	DAYS	SYSID	YEAR	MONTH	DAY	HOUR
	WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR
	MONTHS	SYSID	YEAR	MONTH	ZONE	
	YEARS	N/A				
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES	N/A				
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-25. HARCRF Sort Sequence and Data Granularity

5.2.20.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century

XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMLPNO - Logical Partition Number
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 X.....E RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Accumulated Data Elements

XDWM..E CRFHABCT - SHA-1: Bytes of Data Hashed
 XDWM..E CRFHACCT - SHA-1: Calls to Hash the Data
 XDWM..E CRFHAICT - SHA-1: PCMF Instruct. to Hash the Data
 XDWM..E CRFH2BCT - SHA-256: Bytes of Data Hashed
 XDWM..E CRFH2CCT - SHA-256: Calls to Hash the Data
 XDWM..E CRFH2ICT - SHA-256: PCMF Instruct. to Hash the Data
 XDWM..E CRFH5BCT - SHA-512: Bytes of Data Hashed
 XDWM..E CRFH5CCT - SHA-512: Calls to Hash the Data
 XDWM..E CRFH5ICT - SHA-512: PCMF Instruct. to Hash the Data
 XDWM..E CRFMGBCT - Bytes for which the MAC was Generated
 XDWM..E CRFMGCCT - Calls to Generate the MAC
 XDWM..E CRFMGICT - PCMF Instructions to Generate the MAC
 XDWM..E CRFMVBCT - Bytes for which the MAC was Verified
 XDWM..E CRFMVCCT - Calls to Verify the MAC
 XDWM..E CRFMVICT - PCMF Instructions to Verify the MAC
 XDWM..E CRFPTCCT - Calls to Translate the PIN
 XDWM..E CRFPVCCT - Calls to Verify the PIN
 XDWM..E CRFSDBCT - Single DES - Bytes of Data Deciphered
 XDWM..E CRFSDCCT - Single DES - Calls to Decipher Data
 XDWM..E CRFSDICT - Single DES - Instructions to Decipher
 XDWM..E CRFSEBCT - Single DES - Bytes of Data Enciphered
 XDWM..E CRFSECCT - Single DES - Calls to Encipher Data
 XDWM..E CRFSEICT - Single DES - Instructions to Encipher
 XDWM..E CRFTDBCT - Triple DES - Bytes of Data Deciphered
 XDWM..E CRFTDCCT - Triple DES - Calls to Decipher Data

XDWM..E CRFTDICT - Triple DES - Instructions to Decipher
XDWM..E CRFTEBCT - Triple DES - Bytes of Data Enciphered
XDWM..E CRFTECCT - Triple DES - Calls to Encipher Data
XDWM..E CRFTEICT - Triple DES - Instructions to Encipher

Derived Data Elements

XDWM..E CRFAVHAB - SHA-1: Avg Hashing Size
XDWM..E CRFAVH2B - SHA-256: Avg Hashing Size
XDWM..E CRFAVH5B - SHA-512: Avg Hashing Size
XDWM..E CRFAVMGB - Avg MAC Generation Size
XDWM..E CRFAVMVB - Avg MAC Verify Size
XDWM..E CRFAVSDB - Avg Single DES Decryption Size
XDWM..E CRFAVSEB - Avg Single DES Encryption Size
XDWM..E CRFAVTDB - Avg Triple DES Decryption Size
XDWM..E CRFAVTEB - Avg Triple DES Encryption Size
XDWM..E CRFPSHAC - SHA-1: Hashing Rate
XDWM..E CRFPSH2C - SHA-256: Hashing Rate
XDWM..E CRFPSH5C - SHA-512: Hashing Rate
XDWM..E CRFPSMGC - MAC Generation Rate
XDWM..E CRFPSMVC - MAC Verify Rate
XDWM..E CRFPSPTC - PIN Translation Rate
XDWM..E CRFPSPVC - PIN Verify Rate
XDWM..E CRFPSSDC - Single DES Decryption Rate
XDWM..E CRFPSSEC - Single DES Encryption Rate
XDWM..E CRFPSTDC - Triple DES Decryption Rate
XDWM..E CRFPSTEC - Triple DES Encryption Rate

5.2.20.3 Usage Considerations

Special considerations or techniques related to using the HARCRF file are provided below.

1. Care must be taken in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. Information related to cryptographic hardware activity is found in the following four files:
 - o Crypto Accelerator Activity File (HARCRA)
 - o ICSF Services Activity File (HARCRF)
 - o Crypto PKCS11 Coprocessor Activity File (HARCRK)
 - o Crypto CCA Coprocessor Activity File (HARCRP)

While the data contained in the HARCRF file only applies to the logical partition (LPAR) that created the RMF records, the data in the HARCRA, HARCRK, and HARCRP files always reflects the total activity in your CPC.

5.2.21 Crypto CCA Coprocessor Activity File (HARCRP)

The Crypto CCA Coprocessor Activity file provides statistics on operations executed on cryptographic CCA coprocessors. Measurements include operations counts, execution times, and per second rates, as well as utilization percentages.

The information in the HARCRP file is obtained from the cryptographic CCA coprocessor data section of the SMF type 70 subtype 2 Cryptographic Hardware Activity record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.21.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	CRPCCIDX	YEAR	MONTH	DAY
		HOUR	ENDTS			
	DAYS	SYSID	CRPCCIDX	YEAR	MONTH	DAY
		HOUR				
	WEEKS	SYSID	CRPCCIDX	YEAR	WEEK	ZONE
		HOUR				
	MONTHS	SYSID	CRPCCIDX	YEAR	MONTH	ZONE
	YEARS		N/A			
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES		N/A			
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-26. HARCRP Sort Sequence and Data Granularity

5.2.21.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Wed, Apr 2, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E	CRPCCIDX	- Cryptographic Coprocessor Index
XD....E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year

XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E CRPCPTYP - Cryptographic Processor Type

Accumulated Data Elements

XDWM..E CRPTOOPS - Total Operations
XDWM..E CRPTORSA - RSA Key-Generation Operations
XDWM..E CRPTOXET - Total Execution time

Derived Data Elements

XDWM..E CRPAVXET - Avg Operations Execution Time
XDWM..E CRPPCUTL - Pct Utilization
XDWM..E CRPPSOPS - Total Operations Rate
XDWM..E CRPPSRSA - RSA Key-Generation Operations Rate

5.2.21.3 Usage Considerations

Special considerations or techniques related to using the HARCRP file are provided below.

1. Care must be taken in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. Information related to cryptographic hardware activity is found in the following four files:
 - o Crypto Accelerator Activity File (HARCRA)
 - o ICSF Services Activity File (HARCRF)
 - o Crypto PKCS11 Coprocessor Activity File (HARCRK)
 - o Crypto CCA Coprocessor Activity File (HARCRP)

While the data contained in the HARCRF file only applies to the logical partition (LPAR) that created the RMF records, the data in the HARCRA, HARCRK, and HARCRP files always reflects the total activity in your CPC.

5.2.22 FICON Director Connector File (HARFDC)

The FICON Director Connector file stores configuration data for additional control units connected to multiple-CU type FICON director ports. There is one record for each connected control unit.

The information in the HARFDC file is obtained from the RMF FICON Director Statistics type 74, subtype 7 record. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.22.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	FCDSNUM	FCDPNUM	FDCCUIDX	YEAR
		MONTH	DAY	HOUR	ENDTS	
	DAYS	SYSID	FCDSNUM	FCDPNUM	FDCCUIDX	YEAR
		MONTH	DAY	HOUR		
	WEEKS	SYSID	FCDSNUM	FCDPNUM	FDCCUIDX	YEAR
		WEEK	ZONE	HOUR		
	MONTHS	SYSID	FCDSNUM	FCDPNUM	FDCCUIDX	YEAR
		MONTH	ZONE			
	YEARS		N/A			
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES		N/A			
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-27. HARFDC Sort Sequence and Data Granularity

5.2.22.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E DAY - Day of Month
 XDWM..E FCDPNUM - FICON Director Port Number
 XDWM..E FCDSNUM - FICON Director Switch Device Number
 XDWM..E FDCCUIDX - Connected Control Unit Index
 XDW...E HOUR - Hour of Day
 XD.M..E MONTH - Month of Year
 XDWM..E SYSID - System Identifier

XDW...E WEEK - Week of Year
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E FCDCONID - FICON Director Connector Id
XDWM..E FCDLSNUM - FICON Director Logical Switch Number
XDWM..E FCDPADR - FICON Director Port Address
XDWM..E FCDPTYPE - FICON Director Port Type
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E IODFCCCT - Intvls where I/O Config. Changed
XDWM..E IODFCPCT - I/O Config Changed Since Power On Reset
XDWM..E IODFCRTS - IODF Creation Time Stamp
XDWM..E IODFPICT - Power On Reset Using IODF
XDWM..E IODFSUFX - Suffix of IODF Name
XDWM..E IODFTICT - I/O Config. Token is Invalid
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

X..... FDCNACTI - Port Activated During Interval
XDWM..E FDCNBCCU - Number of Connecting Control Units
X..... FDCNRMVD - Port Removed During Interval

Accumulated Data Elements

XDWM..E FDCCPOCT - Intvls with Port Status Changed

5.2.22.3 Usage Considerations

Special considerations or techniques related to using the HARFDC file are provided below.

1. Care must be taken in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. Although it does not contain any performance metric, the HARFDC file is useful, when merged with the FICON Director Port Activity (HARFDP) file, to get a complete picture of the FICON directors (switches) configuration. The following common data elements are in both files' summarization keys, and can be used in a SAS MERGE statement:
 - o SYSID - System Identifier
 - o FCSDNUM - FICON Director Switch Device Number
 - o FCDPNUM - FICON Director Port Number

5.2.23 FICON Director Port Activity File (HARFDP)

The FICON Director Port Activity file provides statistics about I/O workload, throughput, and contention for FICON director ports. It also stores configuration data about IODF and FICON directors (switches). There is one record per FICON director port.

The information in the HARFDP file is obtained from the RMF
FICON Director Statistics type 74, subtype 7 record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.23.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	FCDSNUM	FCDPNUM	YEAR	MONTH	
	DAY	HOUR	ENDTS			
DAYS	SYSID	FCDSNUM	FCDPNUM	YEAR	MONTH	
	DAY	HOUR				
WEEKS	SYSID	FCDSNUM	FCDPNUM	YEAR	WEEK	
	ZONE	HOUR				
MONTHS	SYSID	FCDSNUM	FCDPNUM	YEAR	MONTH	
	ZONE					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAULT option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-28. HARFDP Sort Sequence and Data Granularity

5.2.23.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDWM..E	FCDPNUM	- FICON Director Port Number
XDWM..E	FCSDSDNUM	- FICON Director Switch Device Number
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year

XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E FCDCONID - FICON Director Connector Id
XDWM..E FCDLSNUM - FICON Director Logical Switch Number
XDWM..E FCDPADR - FICON Director Port Address
XDWM..E FCDPTYPE - FICON Director Port Type
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E IODFCCCT - Intvls where I/O Config. Changed
XDWM..E IODFCPCT - I/O Config Changed Since Power On Reset
XDWM..E IODFCRTS - IODF Creation Time Stamp
XDWM..E IODFPICT - Power On Reset Using IODF
XDWM..E IODFSUFx - Suffix of IODF Name
XDWM..E IODFTICT - I/O Config. Token is Invalid
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM.. FDPIFCDS - Number of Installed FCD Switches
X..... FDPNACTI - Port Activated During Interval
XDWM..E FDPNBCCU - Number of Connecting Control Units
XDWM..E FDPNBIPO - Number of Installed Ports
XDWM..E FDPNBSP0 - Number of Supported Ports
X..... FDPNONLI - Switch Brought Online During Interval
X..... FDPNRMVD - Port Removed During Interval
XDWM.. FDPSDNDE - Switch Device Node Descriptor

Accumulated Data Elements

XDWM..E FDPCNPCT - Intvls with Number of Ports Changed
XDWM..E FDPCPOCT - Intvls with Port Status Changed
XDWM..E FDPCSTCT - Intvls with Switch Status Changed
XDWM..E FDP0FPCT - Intvls where Port was Offline
XDWM..E FDP0FSCT - Intvls where Switch was Offline

XDWM..E FDPTOERR - Total Number of Errors
XDWM..E FDPTOFPT - Total Frame Pacing Time
XDWM..E FDPTONBR - Total Bytes Received
XDWM..E FDPTONBS - Total Bytes Sent
XDWM..E FDPTONFR - Total Number of Frames Received
XDWM..E FDPTONFS - Total Number of Frames Sent

Maximum Data Elements

XDWM.. FDPMXCCU - Max Number of Connecting Control Units

Derived Data Elements

XDWM..E FDPVAFPT - Avg Frame Pacing Time
XDWM..E FDPVAFSR - Avg Frame Size Read
XDWM..E FDPVAFSFS - Avg Frame Size Write
XDWM..E FDPPSBYR - Port Bandwidth Read (MB/Sec)
XDWM..E FDPPSBYS - Port Bandwidth Write (MB/Sec)

5.2.23.3 Usage Considerations

Special considerations or techniques related to using the HARFDP file are provided below.

1. Care must be taken in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. In order to get a complete picture of the FICON directors (switches) configuration, the HARFDP file should be merged with the FICON Director Connector (HARFDC) file. The following common data elements are in both files' summarization keys, and can be used in a SAS MERGE statement:
 - o SYSID - System Identifier
 - o FCSDNUM - FICON Director Switch Device Number
 - o FCDPNUM - FICON Director Port Number

However, the HARFDC file is not required if you are only interested in switch or port level performance monitoring.

5.2.24 ESS Link Statistics File (HARELS)

The ESS Link Statistics file provides I/O performance and throughput information for system adapters (links) of an Enterprise Disk System. There is one record per system adapter.

The information in the HARELS file is obtained from the SMF type 74 subtype 8 Enterprise Disk System Statistics record. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.24.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	ESSCUSER	ELSSAID	YEAR	MONTH	
	DAY	HOUR	ENDTS			
DAYS	SYSID	ESSCUSER	ELSSAID	YEAR	MONTH	
	DAY	HOUR				
WEEKS	SYSID	ESSCUSER	ELSSAID	YEAR	WEEK	
	ZONE	HOUR				
MONTHS	SYSID	ESSCUSER	ELSSAID	YEAR	MONTH	
	ZONE					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-29. HARELS Sort Sequence and Data Granularity

5.2.24.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

- XD...E DAY - Day of Month
- XDW..E ELSSAID - System Adapter Identifier
- XDW..E ESSCUSER - ESS Primary Control Unit Serial Number
- XDW...E HOUR - Hour of Day
- XD.M..E MONTH - Month of Year
- XDW..E SYSID - System Identifier
- XDW...E WEEK - Week of Year
- XDW..E YEAR - Year of Century

XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CACHEDUR - Cache Gatherer Interval Duration
 XDWM..E CACHEETS - Cache Gatherer End Time Stamp
 XDWM..E CACHESTS - Cache Gatherer Start Time Stamp
 XDWM..E CTLUNAME - Control Unit Name
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMLPNO - Logical Partition Number
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 XDWM.. RMFMFL - RMF Maintenance Level Indicator
 X....E RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E ELSATYPE - ESS Adapter Type
 XDWM.. ELSDEVAD - Measured Device Address/Number
 XDWM..E ELSIDCRC - IDCSS01 Return Code
 XDWM..E ELSSAAD - System Adapter Address
 XDWM.. ELSVOLSR - Measured Device Volume Serial

Accumulated Data Elements

XDWM..E ELSBTRIN - Intvls with Invalid Bytes Transferred
 XDWM..E ELSEROCT - Number of ECKD Read Operations
 XDWM..E ELSERTM - ECKD Read Activity Response Time
 XDWM..E ELSEWOCT - Number of ECKD Write Operations
 XDWM..E ELSEWTM - ECKD Write Activity Response Time
 XDWM..E ELSPROCT - Number of PPRC Receive Operations
 XDWM..E ELSPRTM - PPRC Receive Activity Response Time
 XDWM..E ELSPSOCT - Number of PPRC Send Operations
 XDWM..E ELSPSTM - PPRC Send Activity Response Time
 XDWM..E ELSRTMIN - Intvls with Invalid Response Times
 XDWM..E ELSSROCT - Number of SCSI Read Operations
 XDWM..E ELSRTM - SCSI Read Activity Response Time

XDWm..E ELSSWOCT - Number of SCSI Write Operations
XDWm..E ELSSWTM - SCSI Write Activity Response Time
XDWm..E ELSTOERB - Bytes Read for ECKD Activity
XDWm..E ELSTOEWB - Bytes Written for ECKD Activity
XDWm..E ELSTOPRB - Bytes Received for PPRC Activity
XDWm..E ELSTOPSB - Bytes Sent for PPRC Activity
XDWm..E ELSTOSRB - Bytes Read for SCSI Activity
XDWm..E ELSTOSWB - Bytes Written for SCSI Activity

Derived Data Elements

XDWm..E ELSAVERT - ECKD Activity - Avg Read Response Time
XDWm..E ELSAVEWT - ECKD Activity - Avg Write Response Time
XDWm..E ELSAVPRT - PPRC Activity - Avg Receive Response Tm
XDWm..E ELSAVPST - PPRC Activity - Avg Send Response Time
XDWm..E ELSAVSRT - SCSI Activity - Avg Read Response Time
XDWm..E ELSAVSWT - SCSI Activity - Avg Write Response Time
XDWm..E ELSEBRT - ECKD Activity - Bytes Read/Operation
XDWm..E ELSEWBRT - ECKD Activity - Bytes Written/Operation
XDWm..E ELSIOERT - ECKD Activity - Read I/O Intensity
XDWm..E ELSIOETT - ECKD Activity - Total I/O Intensity
XDWm..E ELSIOEWT - ECKD Activity - Write I/O Intensity
XDWm..E ELSIOPRT - PPRC Activity - Receive I/O Intensity
XDWm..E ELSIOPST - PPRC Activity - Send I/O Intensity
XDWm..E ELSIOPTT - PPRC Activity - Total I/O Intensity
XDWm..E ELSIOSRT - SCSI Activity - Read I/O Intensity
XDWm..E ELSIOSTT - SCSI Activity - Total I/O Intensity
XDWm..E ELSIOSWT - SCSI Activity - Write I/O Intensity
XDWm..E ELSPRBRT - PPRC Activity - Bytes Received/Operation
XDWm..E ELSPSBRT - PPRC Activity - Bytes Sent/Operation
XDWm..E ELSPSERB - ECKD Activity - Bytes Read/Second
XDWm..E ELSPSERO - ECKD Activity - Read Operations/Second
XDWm..E ELSPSEWB - ECKD Activity - Bytes Written/Second
XDWm..E ELSPSEWO - ECKD Activity - Write Operations/Second
XDWm..E ELSPSPRB - PPRC Activity - Bytes Received/Second
XDWm..E ELSPSPRO - PPRC Activity - Receive Operations/Sec.
XDWm..E ELSPSPSB - PPRC Activity - Bytes Sent/Second
XDWm..E ELSPSPSO - PPRC Activity - Send Operations/Second
XDWm..E ELSPSSRB - SCSI Activity - Bytes Read/Second
XDWm..E ELSPSSRO - SCSI Activity - Read Operations/Second
XDWm..E ELSPSSWB - SCSI Activity - Bytes Written/Second
XDWm..E ELSPSSWO - SCSI Activity - Write Operations/Second
XDWm..E ELSSRBRT - SCSI Activity - Bytes Read/Operation
XDWm..E ELSSWBRT - SCSI Activity - Bytes Written/Operation

5.2.24.3 Usage Considerations

Special considerations or techniques related to using the HARELS file are provided below.

1. RMF Interval data represented in CA MICS database files uses time and duration information common to all RMF records for a given SYSID to ensure timestamp consistency across different CA MICS database files.

This consistency allows CA MICS database records from different files (such as the HARCPU and HARDVA) to be merged together by ENDTS.

The HARELS file maintains this consistency. Data element values for STARTTS, ENDTS, HOUR, DAY, INTERVAL, and so on are completely synchronized with the same element values found in other CA MICS database files generated from RMF data produced for the same time interval. This not only aids in the merging of data, but also allows for strict minute cut-offs to ensure that data from 9:00-9:59 is always summarized into hour 9.

2. The data in the HARELS file may not actually represent activity exactly bounded by STARTTS and ENDTS. This is because the actual reporting of cache statistics can be delayed by device reserve activity. A unique set of Start Time, End Time, and Duration elements are provided with the HARELS file. They represent the true time bounds of the data represented. These elements are listed below:

CACHESTS - Cache Gatherer Start Time Stamp
CACHEETS - Cache Gatherer End Time Stamp
CACHEDUR - Cache Gatherer Interval Duration

All HARELS observations contain a value in CACHESTS, CACHEETS, and CACHEDUR. The CACHEDUR duration is used in all per-second rate calculations, rather than the RMF Interval Duration (DURATION).

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.

- o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
- 4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

Remember that in the HARELS file CACHESTS (Cache Gatherer Start Time Stamp) and CACHEETS (Cache Gatherer End Time Stamp) represent the true time boundaries of the data, and may be slightly different from the boundaries of the RMF interval duration.

5.2.25 ESS Extent Pool Statistics File (HARXPS)

The ESS Extent Pool Statistics file provides capacity and performance information about allocated disk space in the extent pools of an Enterprise Disk System. There is one record per extent pool.

The information in the HARXPS file is obtained from the SMF type 74 subtype 8 Enterprise Disk System Statistics record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.25.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	ESSCUSER	XPID	YEAR	MONTH	
	DAY	HOUR	ENDTS			
DAYS	SYSID	ESSCUSER	XPID	YEAR	MONTH	
	DAY	HOUR				
WEEKS	SYSID	ESSCUSER	XPID	YEAR	WEEK	
	ZONE	HOUR				
MONTHS	SYSID	ESSCUSER	XPID	YEAR	MONTH	
	ZONE					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-30. HARXPS Sort Sequence and Data Granularity

5.2.25.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDWM..E	ESSCUSER	- ESS Primary Control Unit Serial Number
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	XPID	- Extent Pool ID

XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CACHEDUR - Cache Gatherer Interval Duration
XDWM..E CACHEETS - Cache Gatherer End Time Stamp
XDWM..E CACHESTS - Cache Gatherer Start Time Stamp
XDWM..E CTLUNAME - Control Unit Name
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
XDWM.. RMFMFL - RMF Maintenance Level Indicator
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name
XDWM..E XPAD - Extent Pool Address

Retained Data Elements

XDWM..E XPSXTPP - Extent Pool Type

Accumulated Data Elements

XDWM..E XPSRXTCP - Accum Real Extent Pool Capacity
XDWM..E XPSRXTNA - Accum Number of Allocated Real Extents
XDWM..E XPSRXTNS - Accumulated Number of Real Extents

Derived Data Elements

XDWM..E XPSAVRXA - Avg Number of Allocated Real Extents
XDWM..E XPSAVRXC - Avg Real Extent Pool Capacity
XDWM..E XPSAVRXN - Avg Number of Real Extents

5.2.25.3 Usage Considerations

Special considerations or techniques related to using the HARXPS file are provided below.

1. RMF Interval data represented in CA MICS database files uses time and duration information common to all RMF records for a given SYSID to ensure timestamp consistency across different CA MICS database files.

This consistency allows CA MICS database records from different files (such as the HARCPU and HARDVA) to be merged together by ENDTS.

The HARXPS file maintains this consistency. Data element values for STARTTS, ENDTS, HOUR, DAY, INTERVAL, and so on are completely synchronized with the same element values found in other CA MICS database files generated from RMF data produced for the same time interval. This not only aids in the merging of data, but also allows for strict minute cut-offs to ensure that data from 9:00-9:59 is always summarized into hour 9.

2. The data in the HARXPS file may not actually represent activity exactly bounded by STARTTS and ENDTS. This is because the actual reporting of cache statistics can be delayed by device reserve activity. A unique set of Start Time, End Time, and Duration elements are provided with the HARXPS file. They represent the true time bounds of the data represented. These elements are listed below:

CACHESTS - Cache Gatherer Start Time Stamp
CACHEETS - Cache Gatherer End Time Stamp
CACHEDUR - Cache Gatherer Interval Duration

All HARXPS observations contain a value in CACHESTS, CACHEETS, and CACHEDUR.

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.

4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:

- o STARTTS represents RMF recording interval start time.
- o ENDTS represents RMF recording interval end time.

Remember that in the HARXPS file CACHESTS (Cache Gatherer Start Time Stamp) and CACHEETS (Cache Gatherer End Time Stamp) represent the true time boundaries of the data, and may be slightly different from the boundaries of the RMF interval duration.

5.2.26 ESS Rank Statistics File (HARERS)

The ESS Rank Statistics file quantifies read and write activity in each rank of an extent pool within an Enterprise Disk System. It also stores disk space capacity and configuration information for each array defined in a rank. There is one record per rank.

The information in the HARERS file is obtained from the SMF type 74 subtype 8 Enterprise Disk System Statistics record. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.26.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	ESSCUSER	XPID	ERSRNKID	YEAR	
	MONTH	DAY	HOUR	ENDTS		
DAYS	SYSID	ESSCUSER	XPID	ERSRNKID	YEAR	
	MONTH	DAY	HOUR			
WEEKS	SYSID	ESSCUSER	XPID	ERSRNKID	YEAR	
	WEEK	ZONE	HOUR			
MONTHS	SYSID	ESSCUSER	XPID	ERSRNKID	YEAR	
	MONTH	ZONE				
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-31. HARERS Sort Sequence and Data Granularity

5.2.26.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
D - DAYS
W - WEEKS
M - MONTHS
Y - YEARS
T - TABLES AREA
. - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDWM..E	ERSRNKID	- Rank Identifier
XDWM..E	ESSCUSER	- ESS Primary Control Unit Serial Number
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year

XDWM..E XPID - Extent Pool ID
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CACHEDUR - Cache Gatherer Interval Duration
XDWM..E CACHEETS - Cache Gatherer End Time Stamp
XDWM..E CACHESTS - Cache Gatherer Start Time Stamp
XDWM..E CTLUNAME - Control Unit Name
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
XDWM.. RMFMFL - RMF Maintenance Level Indicator
X....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name
XDWM..E XPAD - Extent Pool Address

Retained Data Elements

XDWM..E ERSRNKAD - Rank Address
XDWM..E ERSRNKTP - Rank Type

Accumulated Data Elements

XDWM..E ERSARRCT - Accumulated Number of Arrays in Rank
XDWM..E ERSROPCT - Number of Read Operations
XDWM..E ERSRRTM - Total Read Response Time
XDWM..E ERSRWTM - Total Write Response Time
XDWM..E ERSTOBYR - Total Bytes Read
XDWM..E ERSTOBYW - Total Bytes Written
XDWM..E ERSTORCP - Accumulated Rank Capacity
XDWM..E ERSTORWD - Accumulated Rank Arrays Width
XDWM..E ERSWOPCT - Number of Write Operations

Minimum Data Elements

XDWM..E ERSMNRS - Minimum Array Speed

Maximum Data Elements

XDWM..E ERSMXRSP - Maximum Array Speed

Derived Data Elements

XDWM..E ERSAVARR - Avg Number of Arrays in Rank

XDWM..E ERSAVRCP - Avg Rank Capacity

XDWM..E ERSAVRRT - Avg Read Response Time

XDWM..E ERSAVRWD - Avg Rank Arrays Width

XDWM..E ERSAVRWT - Avg Write Response Time

XDWM..E ERSBYRRT - Bytes Read/Operation

XDWM..E ERSBYWRT - Bytes Written/Operation

XDWM..E ERSPSBYR - Bytes Read/Second

XDWM..E ERSPSBYW - Bytes Written/Second

XDWM..E ERSPSROP - Read Operations/Second

XDWM..E ERSPSWOP - Write Operations/Second

5.2.26.3 Usage Considerations

Special considerations or techniques related to using the HARERS file are provided below.

1. RMF Interval data represented in CA MICS database files uses time and duration information common to all RMF records for a given SYSID to ensure timestamp consistency across different CA MICS database files.

This consistency allows CA MICS database records from different files (such as the HARCPU and HARDVA) to be merged together by ENDTS.

The HARERS file maintains this consistency. Data element values for STARTTS, ENDTS, HOUR, DAY, INTERVAL, and so on are completely synchronized with the same element values found in other CA MICS database files generated from RMF data produced for the same time interval. This not only aids in the merging of data, but also allows for strict minute cut-offs to ensure that data from 9:00-9:59 is always summarized into hour 9.

2. The data in the HARERS file may not actually represent activity exactly bounded by STARTTS and ENDTS. This is because the actual reporting of cache statistics can be delayed by device reserve activity. A unique set of Start Time, End Time, and Duration elements are provided with the HARERS file. They represent the true time bounds of the data represented. These elements are listed below:

CACHESTS - Cache Gatherer Start Time Stamp
CACHEETS - Cache Gatherer End Time Stamp
CACHEDUR - Cache Gatherer Interval Duration

All HARERS observations contain a value in CACHESTS, CACHEETS, and CACHEDUR. The CACHEDUR duration is used in all per-second rate calculations, rather than the RMF Interval Duration (DURATION).

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.

- o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
- o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

Remember that in the HARERS file, CACHESTS (Cache Gatherer Start Time Stamp) and CACHEETS (Cache Gatherer End Time Stamp) represent the true time boundaries of the data, and may be slightly different from the boundaries of the RMF interval duration.

5.2.27 Physical Hardware File (HARPHY)

The Physical Hardware file is used to store the physical hardware, both CPCs and devices, found. In addition, logical device groups are stored, identified by SYSID, Device Class, and Device Type, when the physical device associated with the logical device cannot be identified.

The information in the HARPHY file is obtained from the HARIPU and HARDVA files.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.27.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan		Level of Data Granularity				
DETAIL	N/A					
DAYS	PHYCKEY	YEAR	MONTH	DAY	HOUR	
WEEKS	PHYCKEY	YEAR	WEEK	ZONE		
MONTHS	PHYCKEY	YEAR	MONTH	ZONE		
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-32. HARPHY Sort Sequence and Data Granularity

5.2.27.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

.D...E	DAY	- Day of Month
.D...E	HOURL	- Hour of Day
.D.M..E	MONTH	- Month of Year
.DWM..E	PHYCKEY	- Composite Physical Hardware Key
.DW...E	WEEK	- Week of Year
.DWM..E	YEAR	- Year of Century
.DWM..E	ZONE	- Time Zone

Common Data Elements

.DWM..E ENDTS - End Time Stamp

Retained Data Elements

.DWM..E PHYCLASS - Hardware Class (CPC, DEV, LDV)
.DWM..E PHYDVACT - Total Device Address Count
.DWM..E PHYDVNCT - Total Device Name Count
.DWM..E PHYIPTCT - Total Physical Processor Type Count
.DWM..E PHYIPUCT - Total Physical Processor Count
.DWM..E PHYIPUC1 - Physical Processor Count 1
.DWM..E PHYIPUC2 - Physical Processor Count 2
.DWM..E PHYIPUC3 - Physical Processor Count 3
.DWM..E PHYIPUC4 - Physical Processor Count 4
.DWM..E PHYIPUC5 - Physical Processor Count 5
.DWM..E PHYIPUN1 - Physical Processor Type 1
.DWM..E PHYIPUN2 - Physical Processor Type 2
.DWM..E PHYIPUN3 - Physical Processor Type 3
.DWM..E PHYIPUN4 - Physical Processor Type 4
.DWM..E PHYIPUN5 - Physical Processor Type 5
.DWM..E PHYKWHRT - Power Kilowatts per Hour Rate
.DWM..E PHYKWHUS - Power Kilowatts per Hour Used
.DWM..E PHYLDCLS - Logical Device Class
.DWM..E PHYLDSID - Logical Device SYSID
.DWM..E PHYLDTYP - Logical Device Type
.DWM..E PHYLDVC1 - Logical Device Count 1
.DWM..E PHYLDVC2 - Logical Device Count 2
.DWM..E PHYLDVC3 - Logical Device Count 3
.DWM..E PHYLDVC4 - Logical Device Count 4
.DWM..E PHYLDVC5 - Logical Device Count 5
.DWM..E PHYLDVN1 - Logical Device Name 1
.DWM..E PHYLDVN2 - Logical Device Name 2
.DWM..E PHYLDVN3 - Logical Device Name 3
.DWM..E PHYLDVN4 - Logical Device Name 4
.DWM..E PHYLDVN5 - Logical Device Name 5
.DWM..E PHYMANUF - Physical Hardware Manufacturer
.DWM..E PHYMODEL - Physical Hardware Model
.DWM..E PHYNDTAG - Physical Device NED Tag
.DWM..E PHYPDTYP - Physical Hardware Device Type
.DWM..E PHYPLANT - Physical HW Plant of Manufacture
.DWM..E PHYPWOVH - Power Overhead Factor
.DWM..E PHYSERNB - Physical Hardware Serial Number
.DWM..E PHYSIDCT - Total SYSIDs Observed Count
.DWM..E PHYSIDN1 - Observed SYSID 1
.DWM..E PHYSIDN2 - Observed SYSID 2
.DWM..E PHYSIDN3 - Observed SYSID 3
.DWM..E PHYSIDN4 - Observed SYSID 4
.DWM..E PHYSIDN5 - Observed SYSID 5

Accumulated Data Elements

.DWM..E PHYPWCST - Physical Hardware Power Cost
.DWM..E PHYPKWH - Total Kilowatt-Hours (kWh)

5.2.27.3 Usage Considerations

Special considerations or techniques related to using the HARPHY file are provided below.

1. The HARPHY file is created from the DETAIL HARIPU and HARDVA files and contains one observation for each physical CPC or device for the day. Therefore, each observation contains an ENDTS value with the date set to the observed date, and the time set to 23:59:59.

After ENDTS is set, the CMNFLDS macro is invoked so associated date and time fields are reset based on the end of day value.

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
5. The HARPHY file contains an inventory of physical hardware. Additional HARPHY data elements can be added to RMFGENIN and values can be assigned via RMFPHYDE parameters. Calculations for HARPHY data element can be performed in the USRSPHY user exit.

5.2.28 CPU Measurement Facility Engine (HARCME) File

The CPU Measurement Facility Engine file provides IPU level statistics for each active logical processor (engine) assigned to a z/OS LPAR. The statistics are derived from counter information collected by the IBM Hardware Instrumentation Services (HIS) and the IBM CPU Measurement Facility (CPU MF).

Measurements include counts of instructions executed, cycles expended, level 1 cache miss sourcing information, cryptographic processor usage, and translation lookaside buffer and page table activity. Capacity related statistics such as the Relative Nest Intensity (RNI) are derived from the counter statistics.

The information in the HARCME file is obtained from the Counters section of the SMF type 113 subtype 2 Hardware capacity, reporting, and statistics record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.28.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSID	YEAR	MONTH	DAY	HOUR	
	ENDTS	HISCVER1	HISCVER2	CPUTYPE	IPUADDR	
DAYS	SYSID	YEAR	MONTH	DAY	HOUR	
	HISCVER1	HISCVER2	CPUTYPE	IPUADDR		
WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR	
	HISCVER1	HISCVER2	CPUTYPE	IPUADDR		
MONTHS	SYSID	YEAR	MONTH	ZONE	HISCVER1	
	HISCVER2	CPUTYPE	IPUADDR			
YEARS	SYSID	YEAR	ZONE	HISCVER1	HISCVER2	
	CPUTYPE	IPUADDR				
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Fri, Dec 30, 2011

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

5.2.28.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

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Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)

Sequence/Summary Data Elements

XDWMY.E	CPUTYPE	- Physical Processor Type
XD...E	DAY	- Day of Month
XDWMY.E	HISCVER1	- CPU MF HIS Basic/Problem Counter Ver
XDWMY.E	HISCVER2	- CPU MF HIS Extended/Crypto Counter Ver
XDW...E	HOURL	- Hour of Day
XDWMY.E	IPUADDR	- Processor Address
XD.M..E	MONTH	- Month of Year
XDWMY.E	SYSID	- System Identifier

XDW...E WEEK - Week of Year
 XDWMY.E YEAR - Year of Century
 XDWMY.E ZONE - Time Zone

Common Data Elements

XDWMY.E CPCCHGRS - Capacity Change Reason
 XDWMY.E CPCMMID - CPC Physical Model Identifier
 XDWMY.E CPCMODID - CPC Model Identifier
 XDWMY.E CPCMODNR - Nominal Model Capacity Rating
 XDWMY.E CPCMODRT - Effec. Model Capacity Rating
 XDWMY.E CPCMPCID - CPC Permanent Model Capacity Identifier
 XDWMY.E CPCMPCNR - Nominal Permanent Model Capacity Rating
 XDWMY.E CPCMPCRT - Effec. Permanent Model Capacity Rating
 XDWMY.E CPCMTCID - CPC Temporary Model Capacity Identifier
 XDWMY.E CPCMTCNR - Nominal Temporary Model Capacity Rating
 XDWMY.E CPCMTCRT - Effec. Temporary Model Capacity Rating
 XDWMY.E CPCPLANT - CPC Manufacturer Plant
 XDWMY.E CPCSEQNB - CPC Sequence Number
 XDWMY.E CPCUID - CPC Unique Identifier
 XDWMY.E CPUMODEL - CPU Model
 XD...E DAYNAME - Name of Day of Week
 XDWMY.E DURATION - Recording Interval Time
 XDWMY.E ENDTS - End Time Stamp
 X....E HISCSSTS - CPU MF HIS Collection Start Timestamp
 X....E HISINTYP - CPU MF HIS Interval Record Type
 X....E HISRVER - CPU MF HIS Record Version Number
 XDWMY.E INTERVLS - Number of Recording Intervals
 X....E JOB - Job Identification
 X....E MVSLEVEL - MVS Software Level
 X....E ORGSYSID - Originating System Identification
 X....E RDRTS - Reader Time Stamp
 XDWMY.E STARTTS - Start Time Stamp
 X....E STEPNAME - Program Step Name

Retained Data Elements

X....E CMEIPUD - IPU File Match Description

Accumulated Data Elements

XDWMY.E CMEB0 - B0-Total Cycles
 XDWMY.E CMEB1 - B1-Total Instructions
 XDWMY.E CMEB2 - B2-Total L1 I-Cache Writes
 XDWMY.E CMEB3 - B3-Total L1 I-Cache Penalty Cycles
 XDWMY.E CMEB4 - B4-Total L1 D-Cache Writes
 XDWMY.E CMEB5 - B5-Total L1 D-Cache Penalty Cycles
 XDWMY.E CMEC64 - C64-Crypto PRNG Functions
 XDWMY.E CMEC65 - C65-Crypto PRNG Cycles

XDWMY.E	CMEC66	- C66-Crypto PRNG Blocked Functions
XDWMY.E	CMEC67	- C67-Crypto PRNG Blocked Cycles
XDWMY.E	CMEC68	- C68-Crypto SHA Functions
XDWMY.E	CMEC69	- C69-Crypto SHA Cycles
XDWMY.E	CMEC70	- C70-Crypto SHA Blocked Functions
XDWMY.E	CMEC71	- C71-Crypto SHA Blocked Cycles
XDWMY.E	CMEC72	- C72-Crypto DEA Functions
XDWMY.E	CMEC73	- C73-Crypto DEA Cycles
XDWMY.E	CMEC74	- C74-Crypto DEA Blocked Functions
XDWMY.E	CMEC75	- C75-Crypto DEA Blocked Cycles
XDWMY.E	CMEC76	- C76-Crypto AES Functions
XDWMY.E	CMEC77	- C77-Crypto AES Cycles
XDWMY.E	CMEC78	- C78-Crypto AES Blocked Functions
XDWMY.E	CMEC79	- C79-Crypto AES Blocked Cycles
XDWMY.E	CMEIPUCT	- Processor Engine Count
XDWMY.E	CMEIPUR	- IPU File Match Result
XDWMY.E	CMEP32	- P32-ProbSt Cycles
XDWMY.E	CMEP33	- P33-ProbSt Instructions
XDWMY.E	CMEP34	- P34-ProbSt L1 I-Cache Writes
XDWMY.E	CMEP35	- P35-ProbSt L1 I-Cache Penalty Cycles
XDWMY.E	CMEP36	- P36-ProbSt L1 D-Cache Writes
XDWMY.E	CMEP37	- P37-ProbSt L1 D-Cache Penalty Cycles
XDWMY.E	CMESPEED	- Processor Speed (GigaHertz)
XDWMY.E	CMES32	- SuperV-State Cycles
XDWMY.E	CMES33	- SuperV-State Instructions
XDWMY.E	CMES34	- SuperV-State L1 I-Cache Writes
XDWMY.E	CMES35	- SuperV-State L1 I-Cache Penalty Cycles
XDWMY.E	CMES36	- SuperV-State L1 D-Cache Writes
XDWMY.E	CMES37	- SuperV-State L1 D-Cache Penalty Cycles
XDWMY.E	CMETL1P	- Total L1 Penalty Cycles
XDWMY.E	CMETL1W	- Total L1 Cache Writes
XDWMY.E	CME1DL15	- V1 L1-D from L1.5 (E129)
XDWMY.E	CME1DL2A	- V1 L1-D from L2 On-Bk (E131)
XDWMY.E	CME1DL2B	- V1 L1-D from L2 Off-Bk (E133)
XDWMY.E	CME1DL3A	- V1 L1-D from Local Memory (E134)
XDWMY.E	CME1DL3B	- V1 L1-D from Remote Memory (calc)
XDWMY.E	CME1DUE	- V1 L1 D-Cache Updt to Exclusive (E136)
XDWMY.E	CME1ICI	- V1 L1 I-Cache Line Invalidated (E137)
XDWMY.E	CME1IL15	- V1 L1-I from L1.5 (E128)
XDWMY.E	CME1IL2A	- V1 L1-I from L2 On-Bk (E130)
XDWMY.E	CME1IL2B	- V1 L1-I from L2 Off-Bk (E132)
XDWMY.E	CME1IL3A	- V1 L1-I from Local Memory (E135)
XDWMY.E	CME1IL3B	- V1 L1-I from Remote Memory (calc)
XDWMY.E	CME1L15T	- V1 L1.5 Cache Total Stores (E147)
XDWMY.E	CME1TL15	- V1 Total L1 from L1.5
XDWMY.E	CME1TL2A	- V1 Total L1 from L2 On-Bk
XDWMY.E	CME1TL2B	- V1 Total L1 from L2 Off-Bk
XDWMY.E	CME1TL3A	- V1 Total L1 from Local Memory
XDWMY.E	CME1TL3B	- V1 Total L1 from Remote Memory

XDWMY.E CME11DBE - V1 L1 D-TLB Translation Entry (E139)
 XDWMY.E CME11DBP - V1 L1 D-TLB Miss Penalty Cycles (E146)
 XDWMY.E CME11IBE - V1 L1 I-TLB Translation Entry (E138)
 XDWMY.E CME11IBP - V1 L1 I-TLB Miss Penalty Cycles (E145)
 XDWMY.E CME11TBE - V1 L1 Total TLB Translation Entries
 XDWMY.E CME11TBP - V1 L1 Total TLB Miss Penalty Cycles
 XDWMY.E CME12BCE - V1 L2 TLB CRSTE Array Entry (E141)
 XDWMY.E CME12BCL - V1 L2 TLB CRSTE Array Entry 1MB (E142)
 XDWMY.E CME12BPE - V1 L2 TLB PTE Array Entry (E140)
 XDWMY.E CME2DL2 - V2 L1-D from L2 (E128)
 XDWMY.E CME2DL3A - V2 L1-D from L3 On-Bk On-Chp (E150)
 XDWMY.E CME2DL3B - V2 L1-D from L3 On-Bk Off-Chp (E152)
 XDWMY.E CME2DL3C - V2 L1-D from L3 Off-Bk (E134)
 XDWMY.E CME2DL4A - V2 L1-D from L4 On-Bk (E135)
 XDWMY.E CME2DL4B - V2 L1-D from L4 Off-Bk (E138)
 XDWMY.E CME2DL5A - V2 L1-D from Local Memory (E141)
 XDWMY.E CME2DL5B - V2 L1-D from Remote Memory (calc)
 XDWMY.E CME2DUE - V2 L1 D-Cache Updt to Exclusive (E137)
 XDWMY.E CME2IL2 - V2 L1-I from L2 (E129)
 XDWMY.E CME2IL3A - V2 L1-I from L3 On-Bk On-Chp (E153)
 XDWMY.E CME2IL3B - V2 L1-I from L3 On-Bk Off-Chp (E155)
 XDWMY.E CME2IL3C - V2 L1-I from L3 Off-Bk (E143)
 XDWMY.E CME2IL4A - V2 L1-I from L4 On-Bk (E136)
 XDWMY.E CME2IL4B - V2 L1-I from L4 Off-Bk (E139)
 XDWMY.E CME2IL5A - V2 L1-I from Local Memory (E142)
 XDWMY.E CME2IL5B - V2 L1-I from Remote Memory (calc)
 XDWMY.E CME2L2T - V2 L2 Cache Total Stores (E133)
 XDWMY.E CME2TL2 - V2 Total L1 from L2
 XDWMY.E CME2TL3A - V2 Total L1 from L3 On-Bk On-Chp
 XDWMY.E CME2TL3B - V2 Total L1 from L3 On-Bk Off-Chp
 XDWMY.E CME2TL3C - V2 Total L1 from L3 Off-Bk
 XDWMY.E CME2TL4A - V2 Total L1 from L4 On-Bk
 XDWMY.E CME2TL4B - V2 Total L1 from L4 Off-Bk
 XDWMY.E CME2TL5A - V2 Total L1 from Local Memory
 XDWMY.E CME2TL5B - V2 Total L1 from Remote Memory
 XDWMY.E CME21DBE - V2 L1 D-TLB Translation Entry (E144)
 XDWMY.E CME21DBL - V2 L1 D-TLB Translation Entry 1MB (E140)
 XDWMY.E CME21DBP - V2 L1 D-TLB Miss Penalty Cycles (E130)
 XDWMY.E CME21IBE - V2 L1 I-TLB Translation Entry (E145)
 XDWMY.E CME21IBP - V2 L1 I-TLB Miss Penalty Cycles (E131)
 XDWMY.E CME21TBE - V2 L1 Total TLB Translation Entries
 XDWMY.E CME21TBP - V2 L1 Total TLB Miss Penalty Cycles
 XDWMY.E CME22BCE - V2 L2 TLB CRSTE Array Entry (E148)
 XDWMY.E CME22BCL - V2 L2 TLB CRSTE Array Entry 1MB (E147)
 XDWMY.E CME22BPE - V2 L2 TLB PTE Array Entry (E146)

Derived Data Elements

XDWMY.E CMEAVCBA - Avg P-Cycles Blocked Crypto AES

XDWMY.E CMEAVCBD - Avg P-Cycles Blocked Crypto DEA
XDWMY.E CMEAVCBP - Avg P-Cycles Blocked Crypto PRNG
XDWMY.E CMEAVCBS - Avg P-Cycles Blocked Crypto SHA
XDWMY.E CMEAVIPU - Average Processor Count
XDWMY.E CMEAVSPD - Average Processor Speed (GigaHertz)
XDWMY.E CMECPI - Cycles Per Instruction
XDWMY.E CMEMIPS - Actual MIPS Usage Rate
XDWMY.E CMEPCBSY - Percent Busy
XDWMY.E CMEPCCBA - Pct Blocked AES Crypto Functions
XDWMY.E CMEPCCBD - Pct Blocked DEA Crypto Functions
XDWMY.E CMEPCCBP - Pct Blocked PRNG Crypto Functions
XDWMY.E CMEPCCBS - Pct Blocked SHA Crypto Functions
XDWMY.E CMEPCL1M - Pct Level 1 Cache Miss
XDWMY.E CMEPCPST - Pct Problem State
XDWMY.E CMEPCSST - Pct Supervisor State
XDWMY.E CME1AVPD - V1 Avg Penalty Cycles per L1 D-Miss
XDWMY.E CME1AVPI - V1 Avg Penalty Cycles per L1 I-Miss
XDWMY.E CME1AVPM - V1 Avg Penalty Cycles per L1 Miss
XDWMY.E CME1AVPT - V1 Avg Penalty Cycles per TLB Miss
XDWMY.E CME1ECPI - V1 Estimated Finite CPI
XDWMY.E CME1EICC - V1 Est Instruction Complexity CPI
XDWMY.E CME1ESCM - V1 Est Sourcing Cycles per L1 Miss
XDWMY.E CME1PCMT - V1 TLB CPU Pct Miss of Total CPU
XDWMY.E CME1PCPT - V1 Pct PTE Misses of TLB1 Misses
XDWMY.E CME1PC15 - V1 Pct L1 from L1.5
XDWMY.E CME1PC2A - V1 Pct L1 from L2 On-Bk
XDWMY.E CME1PC2B - V1 Pct L1 from L2 Off-Bk
XDWMY.E CME1PC3A - V1 Pct L1 from Local Memory
XDWMY.E CME1PC3B - V1 Pct L1 from Remote Memory
XDWMY.E CME1PD15 - V1 Pct L1-D from L1.5
XDWMY.E CME1PD2A - V1 Pct L1-D from L2 On-Bk
XDWMY.E CME1PD2B - V1 Pct L1-D from L2 Off-Bk
XDWMY.E CME1PD3A - V1 Pct L1-D from Local Memory
XDWMY.E CME1PD3B - V1 Pct L1-D from Remote Memory
XDWMY.E CME1PI15 - V1 Pct L1-I from L1.5
XDWMY.E CME1PI2A - V1 Pct L1-I from L2 On-Bk
XDWMY.E CME1PI2B - V1 Pct L1-I from L2 Off-Bk
XDWMY.E CME1PI3A - V1 Pct L1-I from Local Memory
XDWMY.E CME1PI3B - V1 Pct L1-I from Remote Memory
XDWMY.E CME1RNI - V1 Relative Nest Intensity
XDWMY.E CME2AVPD - V2 Avg Penalty Cycles per L1 D-Miss
XDWMY.E CME2AVPI - V2 Avg Penalty Cycles per L1 I-Miss
XDWMY.E CME2AVPM - V2 Avg Penalty Cycles per L1 Miss
XDWMY.E CME2AVPT - V2 Avg Penalty Cycles per TLB Miss
XDWMY.E CME2ECPI - V2 Estimated Finite CPI
XDWMY.E CME2EICC - V2 Est Instruction Complexity CPI
XDWMY.E CME2ESCM - V2 Est Sourcing Cycles per L1 Miss
XDWMY.E CME2PCMT - V2 TLB CPU Pct Miss of Total CPU
XDWMY.E CME2PCPT - V2 Pct PTE Misses of TLB1 Misses

XDWMY.E CME2PC2 - V2 Pct L1 from L2
XDWMY.E CME2PC3A - V2 Pct L1 from L3 On-Bk On-Chp
XDWMY.E CME2PC3B - V2 Pct L1 from L3 On-Bk Off-Chp
XDWMY.E CME2PC3C - V2 Pct L1 from L3 Off-Bk
XDWMY.E CME2PC4A - V2 Pct L1 from L4 On-Bk
XDWMY.E CME2PC4B - V2 Pct L1 from L4 Off-Bk
XDWMY.E CME2PC5A - V2 Pct L1 from Local Memory
XDWMY.E CME2PC5B - V2 Pct L1 from Remote Memory
XDWMY.E CME2PD2 - V2 PCT L1-D from L2
XDWMY.E CME2PD3A - V2 PCT L1-D from L3 On-Bk On-Chp
XDWMY.E CME2PD3B - V2 PCT L1-D from L3 On-Bk Off-Chp
XDWMY.E CME2PD3C - V2 PCT L1-D from L3 Off-Bk
XDWMY.E CME2PD4A - V2 PCT L1-D from L4 On-Bk
XDWMY.E CME2PD4B - V2 PCT L1-D from L4 Off-Bk
XDWMY.E CME2PD5A - V2 PCT L1-D from Local Memory
XDWMY.E CME2PD5B - V2 PCT L1-D from Remote Memory
XDWMY.E CME2PI2 - V2 PCT L1-I from L2
XDWMY.E CME2PI3A - V2 PCT L1-I from L3 On-Bk On-Chp
XDWMY.E CME2PI3B - V2 PCT L1-I from L3 On-Bk Off-Chp
XDWMY.E CME2PI3C - V2 PCT L1-I from L3 Off-Bk
XDWMY.E CME2PI4A - V2 PCT L1-I from L4 On-Bk
XDWMY.E CME2PI4B - V2 PCT L1-I from L4 Off-Bk
XDWMY.E CME2PI5A - V2 PCT L1-I from Local Memory
XDWMY.E CME2PI5B - V2 PCT L1-I from Remote Memory
XDWMY.E CME2RNI - V2 Relative Nest Intensity

5.2.28.3 Usage Considerations

Special considerations or techniques related to using the HARCME file are provided below.

1. The SMF type 113 record, used to create the HARCME file, is not created by the IBM Resource Measurement Facility (RMF). As a result, the STARTTS and ENDTS values for DETAIL level records will not exactly match the other RMF component database files.

The Hardware Instrumentation Services (HIS) control statements used to activate SMF type 113 record collection include a SMFINTVAL=SYNC parameter that synchronizes SMF type 113 records interval duration and interval boundaries with those used by RMF, but the timestamps do not match exactly.

As a result, at the DETAIL timespan, HARCME file observations cannot be exactly merged with CA MICS files created from RMF data, such as the HARIPU or HARCPU files. If SMFINTVAL=SYNC is used in the HIS control statements, however, merging this file with other RMF component files at the DAYS and higher timespans will provide accurate measurement associations.

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents either the start time of an HIS collection run, or the start time boundary of an interval record.
 - o ENDTS represents the HIS interval record end time.

5.2.29 CPU Measurement Facility EngType (HARCMT) File

The CPU Measurement Facility EngType file provides statistics for each type (e.g., CP, zIIP, zAAP) of active logical processors (engines) assigned to a z/OS LPAR. The statistics are derived from counter information collected by the IBM Hardware Instrumentation Services (HIS) and the IBM CPU Measurement Facility (CPU MF).

Measurements include counts of instructions executed, cycles expended, level 1 cache miss sourcing information, cryptographic processor usage, and translation lookaside buffer and page table activity. Capacity related statistics such as the Relative Nest Intensity (RNI) are derived from the counter statistics.

The information in the HARCMT file is obtained from the Counters section of the SMF type 113 subtype 2 Hardware capacity, reporting, and statistics record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.29.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	YEAR	MONTH	DAY	HOUR
		ENDTS	HISCVER1	HISCVER2	CPUTYPE	
	DAYS	SYSID	YEAR	MONTH	DAY	HOUR
		HISCVER1	HISCVER2	CPUTYPE		
	WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR
		HISCVER1	HISCVER2	CPUTYPE		
	MONTHS	SYSID	YEAR	MONTH	ZONE	HISCVER1
		HISCVER2	CPUTYPE			
	YEARS	SYSID	YEAR	ZONE	HISCVER1	HISCVER2
		CPUTYPE				
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES	N/A				
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Fri, Dec 30, 2011

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

5.2.29.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Fri, Dec 30, 2011

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWMY.E	CPUTYPE	- Physical Processor Type
XD...E	DAY	- Day of Month
XDWMY.E	HISCVER1	- CPU MF HIS Basic/Problem Counter Ver
XDWMY.E	HISCVER2	- CPU MF HIS Extended/Crypto Counter Ver
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWMY.E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWMY.E	YEAR	- Year of Century

XDWMY.E ZONE - Time Zone

Common Data Elements

XDWMY.E CPCCHGRS - Capacity Change Reason
XDWMY.E CPCCHMID - CPC Physical Model Identifier
XDWMY.E CPCMODID - CPC Model Identifier
XDWMY.E CPCMODNR - Nominal Model Capacity Rating
XDWMY.E CPCMODRT - Effec. Model Capacity Rating
XDWMY.E CPCMPCID - CPC Permanent Model Capacity Identifier
XDWMY.E CPCMPCNR - Nominal Permanent Model Capacity Rating
XDWMY.E CPCMPCRT - Effec. Permanent Model Capacity Rating
XDWMY.E CPCMTCID - CPC Temporary Model Capacity Identifier
XDWMY.E CPCMTCNR - Nominal Temporary Model Capacity Rating
XDWMY.E CPCMTCRT - Effec. Temporary Model Capacity Rating
XDWMY.E CPCPLANT - CPC Manufacturer Plant
XDWMY.E CPCSEQNB - CPC Sequence Number
XDWMY.E CPCUID - CPC Unique Identifier
XDWMY.E CPUMODEL - CPU Model
XD...E DAYNAME - Name of Day of Week
XDWMY.E DURATION - Recording Interval Time
XDWMY.E ENDTS - End Time Stamp
X....E HISCSSTS - CPU MF HIS Collection Start Timestamp
X....E HISINTYP - CPU MF HIS Interval Record Type
X....E HISRVER - CPU MF HIS Record Version Number
XDWMY.E INTERVLS - Number of Recording Intervals
X....E JOB - Job Identification
X....E MVSLEVEL - MVS Software Level
X....E ORGSYSID - Originating System Identification
X....E RDRTS - Reader Time Stamp
XDWMY.E STARTTS - Start Time Stamp
X....E STEPNAME - Program Step Name

Accumulated Data Elements

XDWMY.E CMTB0 - B0-Total Cycles
XDWMY.E CMTB1 - B1-Total Instructions
XDWMY.E CMTB2 - B2-Total L1 I-Cache Writes
XDWMY.E CMTB3 - B3-Total L1 I-Cache Penalty Cycles
XDWMY.E CMTB4 - B4-Total L1 D-Cache Writes
XDWMY.E CMTB5 - B5-Total L1 D-Cache Penalty Cycles
XDWMY.E CMTC64 - C64-Crypto PRNG Functions
XDWMY.E CMTC65 - C65-Crypto PRNG Cycles
XDWMY.E CMTC66 - C66-Crypto PRNG Blocked Functions
XDWMY.E CMTC67 - C67-Crypto PRNG Blocked Cycles
XDWMY.E CMTC68 - C68-Crypto SHA Functions
XDWMY.E CMTC69 - C69-Crypto SHA Cycles
XDWMY.E CMTC70 - C70-Crypto SHA Blocked Functions
XDWMY.E CMTC71 - C71-Crypto SHA Blocked Cycles

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XDWMY.E CMTC72 - C72-Crypto DEA Functions
XDWMY.E CMTC73 - C73-Crypto DEA Cycles
XDWMY.E CMTC74 - C74-Crypto DEA Blocked Functions
XDWMY.E CMTC75 - C75-Crypto DEA Blocked Cycles
XDWMY.E CMTC76 - C76-Crypto AES Functions
XDWMY.E CMTC77 - C77-Crypto AES Cycles
XDWMY.E CMTC78 - C78-Crypto AES Blocked Functions
XDWMY.E CMTC79 - C79-Crypto AES Blocked Cycles
XDWMY.E CMTIPUCT - Processor Engine Count
XDWMY.E CMTIPUR - IPU File Match Result
XDWMY.E CMTTP32 - P32-ProbSt Cycles
XDWMY.E CMTTP33 - P33-ProbSt Instructions
XDWMY.E CMTTP34 - P34-ProbSt L1 I-Cache Writes
XDWMY.E CMTTP35 - P35-ProbSt L1 I-Cache Penalty Cycles
XDWMY.E CMTTP36 - P36-ProbSt L1 D-Cache Writes
XDWMY.E CMTTP37 - P37-ProbSt L1 D-Cache Penalty Cycles
XDWMY.E CMTSPEED - Processor Speed (GigaHertz)
XDWMY.E CMTS32 - SuperV-State Cycles
XDWMY.E CMTS33 - SuperV-State Instructions
XDWMY.E CMTS34 - SuperV-State L1 I-Cache Writes
XDWMY.E CMTS35 - SuperV-State L1 I-Cache Penalty Cycles
XDWMY.E CMTS36 - SuperV-State L1 D-Cache Writes
XDWMY.E CMTS37 - SuperV-State L1 D-Cache Penalty Cycles
XDWMY.E CMTTL1P - Total L1 Penalty Cycles
XDWMY.E CMTTL1W - Total L1 Cache Writes
XDWMY.E CMT1DL15 - V1 L1-D from L1.5 (E129)
XDWMY.E CMT1DL2A - V1 L1-D from L2 On-Bk (E131)
XDWMY.E CMT1DL2B - V1 L1-D from L2 Off-Bk (E133)
XDWMY.E CMT1DL3A - V1 L1-D from Local Memory (E134)
XDWMY.E CMT1DL3B - V1 L1-D from Remote Memory (calc)
XDWMY.E CMT1DUE - V1 L1 D-Cache Updt to Exclusive (E136)
XDWMY.E CMT1ICI - V1 L1 I-Cache Line Invalidated (E137)
XDWMY.E CMT1IL15 - V1 L1-I from L1.5 (E128)
XDWMY.E CMT1IL2A - V1 L1-I from L2 On-Bk (E130)
XDWMY.E CMT1IL2B - V1 L1-I from L2 Off-Bk (E132)
XDWMY.E CMT1IL3A - V1 L1-I from Local Memory (E135)
XDWMY.E CMT1IL3B - V1 L1-I from Remote Memory (calc)
XDWMY.E CMT1L15T - V1 L1.5 Cache Total Stores (E147)
XDWMY.E CMT1TL15 - V1 Total L1 from L1.5
XDWMY.E CMT1TL2A - V1 Total L1 from L2 On-Bk
XDWMY.E CMT1TL2B - V1 Total L1 from L2 Off-Bk
XDWMY.E CMT1TL3A - V1 Total L1 from Local Memory
XDWMY.E CMT1TL3B - V1 Total L1 from Remote Memory
XDWMY.E CMT11DBE - V1 L1 D-TLB Translation Entry (E139)
XDWMY.E CMT11DBP - V1 L1 D-TLB Miss Penalty Cycles (E146)
XDWMY.E CMT11IBE - V1 L1 I-TLB Translation Entry (E138)
XDWMY.E CMT11IBP - V1 L1 I-TLB Miss Penalty Cycles (E145)
XDWMY.E CMT11TBE - V1 L1 Total TLB Translation Entries
XDWMY.E CMT11TBP - V1 L1 Total TLB Miss Penalty Cycles

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XDWMY.E CMT12BCE - V1 L2 TLB CRSTE Array Entry (E141)
XDWMY.E CMT12BCL - V1 L2 TLB CRSTE Array Entry 1MB (E142)
XDWMY.E CMT12BPE - V1 L2 TLB PTE Array Entry (E140)
XDWMY.E CMT2DL2 - V2 L1-D from L2 (E128)
XDWMY.E CMT2DL3A - V2 L1-D from L3 On-Bk On-Chp (E150)
XDWMY.E CMT2DL3B - V2 L1-D from L3 On-Bk Off-Chp (E152)
XDWMY.E CMT2DL3C - V2 L1-D from L3 Off-Bk (E134)
XDWMY.E CMT2DL4A - V2 L1-D from L4 On-Bk (E135)
XDWMY.E CMT2DL4B - V2 L1-D from L4 Off-Bk (E138)
XDWMY.E CMT2DL5A - V2 L1-D from Local Memory (E141)
XDWMY.E CMT2DL5B - V2 L1-D from Remote Memory (calc)
XDWMY.E CMT2DUE - V2 L1 D-Cache Updt to Exclusive (E137)
XDWMY.E CMT2IL2 - V2 L1-I from L2 (E129)
XDWMY.E CMT2IL3A - V2 L1-I from L3 On-Bk On-Chp (E153)
XDWMY.E CMT2IL3B - V2 L1-I from L3 On-Bk Off-Chp (E155)
XDWMY.E CMT2IL3C - V2 L1-I from L3 Off-Bk (E143)
XDWMY.E CMT2IL4A - V2 L1-I from L4 On-Bk (E136)
XDWMY.E CMT2IL4B - V2 L1-I from L4 Off-Bk (E139)
XDWMY.E CMT2IL5A - V2 L1-I from Local Memory (E142)
XDWMY.E CMT2IL5B - V2 L1-I from Remote Memory (calc)
XDWMY.E CMT2L2T - V2 L2 Cache Total Stores (E133)
XDWMY.E CMT2TL2 - V2 Total L1 from L2
XDWMY.E CMT2TL3A - V2 Total L1 from L3 On-Bk On-Chp
XDWMY.E CMT2TL3B - V2 Total L1 from L3 On-Bk Off-Chp
XDWMY.E CMT2TL3C - V2 Total L1 from L3 Off-Bk
XDWMY.E CMT2TL4A - V2 Total L1 from L4 On-Bk
XDWMY.E CMT2TL4B - V2 Total L1 from L4 Off-Bk
XDWMY.E CMT2TL5A - V2 Total L1 from Local Memory
XDWMY.E CMT2TL5B - V2 Total L1 from Remote Memory
XDWMY.E CMT21DBE - V2 L1 D-TLB Translation Entry (E144)
XDWMY.E CMT21DBL - V2 L1 D-TLB Translation Entry 1MB (E140)
XDWMY.E CMT21DBP - V2 L1 D-TLB Miss Penalty Cycles (E130)
XDWMY.E CMT21IBE - V2 L1 I-TLB Translation Entry (E145)
XDWMY.E CMT21IBP - V2 L1 I-TLB Miss Penalty Cycles (E131)
XDWMY.E CMT21TBE - V2 L1 Total TLB Translation Entries
XDWMY.E CMT21TBP - V2 L1 Total TLB Miss Penalty Cycles
XDWMY.E CMT22BCE - V2 L2 TLB CRSTE Array Entry (E148)
XDWMY.E CMT22BCL - V2 L2 TLB CRSTE Array Entry 1MB (E147)
XDWMY.E CMT22BPE - V2 L2 TLB PTE Array Entry (E146)

Derived Data Elements

XDWMY.E CMTAVCBA - Avg P-Cycles Blocked Crypto AES
XDWMY.E CMTAVCBD - Avg P-Cycles Blocked Crypto DEA
XDWMY.E CMTAVCBP - Avg P-Cycles Blocked Crypto PRNG
XDWMY.E CMTAVCBS - Avg P-Cycles Blocked Crypto SHA
XDWMY.E CMTAVIPU - Average Processor Count
XDWMY.E CMTAVSPD - Average Processor Speed (GigaHertz)
XDWMY.E CMTCPI - Cycles Per Instruction

XDWMY.E CMTMIPS - Actual MIPS Usage Rate
XDWMY.E CMTPCBSY - Percent Busy
XDWMY.E CMTPCBA - Pct Blocked AES Crypto Functions
XDWMY.E CMTPCBD - Pct Blocked DEA Crypto Functions
XDWMY.E CMTPCBP - Pct Blocked PRNG Crypto Functions
XDWMY.E CMTPCBS - Pct Blocked SHA Crypto Functions
XDWMY.E CMTPL1M - Pct Level 1 Cache Miss
XDWMY.E CMTPCPST - Pct Problem State
XDWMY.E CMTPCSST - Pct Supervisor State
XDWMY.E CMT1AVPD - V1 Avg Penalty Cycles per L1 D-Miss
XDWMY.E CMT1AVPI - V1 Avg Penalty Cycles per L1 I-Miss
XDWMY.E CMT1AVPM - V1 Avg Penalty Cycles per L1 Miss
XDWMY.E CMT1AVPT - V1 Avg Penalty Cycles per TLB Miss
XDWMY.E CMT1ECPI - V1 Estimated Finite CPI
XDWMY.E CMT1EICC - V1 Est Instruction Complexity CPI
XDWMY.E CMT1ESCM - V1 Est Sourcing Cycles per L1 Miss
XDWMY.E CMT1PCMT - V1 TLB CPU Pct Miss of Total CPU
XDWMY.E CMT1PCPT - V1 Pct PTE Misses of TLB1 Misses
XDWMY.E CMT1PC15 - V1 Pct L1 from L1.5
XDWMY.E CMT1PC2A - V1 Pct L1 from L2 On-Bk
XDWMY.E CMT1PC2B - V1 Pct L1 from L2 Off-Bk
XDWMY.E CMT1PC3A - V1 Pct L1 from Local Memory
XDWMY.E CMT1PC3B - V1 Pct L1 from Remote Memory
XDWMY.E CMT1PD15 - V1 Pct L1-D from L1.5
XDWMY.E CMT1PD2A - V1 Pct L1-D from L2 On-Bk
XDWMY.E CMT1PD2B - V1 Pct L1-D from L2 Off-Bk
XDWMY.E CMT1PD3A - V1 Pct L1-D from Local Memory
XDWMY.E CMT1PD3B - V1 Pct L1-D from Remote Memory
XDWMY.E CMT1PI15 - V1 Pct L1-I from L1.5
XDWMY.E CMT1PI2A - V1 Pct L1-I from L2 On-Bk
XDWMY.E CMT1PI2B - V1 Pct L1-I from L2 Off-Bk
XDWMY.E CMT1PI3A - V1 Pct L1-I from Local Memory
XDWMY.E CMT1PI3B - V1 Pct L1-I from Remote Memory
XDWMY.E CMT1RNI - V1 Relative Nest Intensity
XDWMY.E CMT2AVPD - V2 Avg Penalty Cycles per L1 D-Miss
XDWMY.E CMT2AVPI - V2 Avg Penalty Cycles per L1 I-Miss
XDWMY.E CMT2AVPM - V2 Avg Penalty Cycles per L1 Miss
XDWMY.E CMT2AVPT - V2 Avg Penalty Cycles per TLB Miss
XDWMY.E CMT2ECPI - V2 Estimated Finite CPI
XDWMY.E CMT2EICC - V2 Est Instruction Complexity CPI
XDWMY.E CMT2ESCM - V2 Est Sourcing Cycles per L1 Miss
XDWMY.E CMT2PCMT - V2 TLB CPU Pct Miss of Total CPU
XDWMY.E CMT2PCPT - V2 Pct PTE Misses of TLB1 Misses
XDWMY.E CMT2PC2 - V2 Pct L1 from L2
XDWMY.E CMT2PC3A - V2 Pct L1 from L3 On-Bk On-Chp
XDWMY.E CMT2PC3B - V2 Pct L1 from L3 On-Bk Off-Chp
XDWMY.E CMT2PC3C - V2 Pct L1 from L3 Off-Bk
XDWMY.E CMT2PC4A - V2 Pct L1 from L4 On-Bk
XDWMY.E CMT2PC4B - V2 Pct L1 from L4 Off-Bk

XDWMY.E CMT2PC5A - V2 Pct L1 from Local Memory
XDWMY.E CMT2PC5B - V2 Pct L1 from Remote Memory
XDWMY.E CMT2PD2 - V2 PCT L1-D from L2
XDWMY.E CMT2PD3A - V2 PCT L1-D from L3 On-Bk On-Chp
XDWMY.E CMT2PD3B - V2 PCT L1-D from L3 On-Bk Off-Chp
XDWMY.E CMT2PD3C - V2 PCT L1-D from L3 Off-Bk
XDWMY.E CMT2PD4A - V2 PCT L1-D from L4 On-Bk
XDWMY.E CMT2PD4B - V2 PCT L1-D from L4 Off-Bk
XDWMY.E CMT2PD5A - V2 PCT L1-D from Local Memory
XDWMY.E CMT2PD5B - V2 PCT L1-D from Remote Memory
XDWMY.E CMT2PI2 - V2 PCT L1-I from L2
XDWMY.E CMT2PI3A - V2 PCT L1-I from L3 On-Bk On-Chp
XDWMY.E CMT2PI3B - V2 PCT L1-I from L3 On-Bk Off-Chp
XDWMY.E CMT2PI3C - V2 PCT L1-I from L3 Off-Bk
XDWMY.E CMT2PI4A - V2 PCT L1-I from L4 On-Bk
XDWMY.E CMT2PI4B - V2 PCT L1-I from L4 Off-Bk
XDWMY.E CMT2PI5A - V2 PCT L1-I from Local Memory
XDWMY.E CMT2PI5B - V2 PCT L1-I from Remote Memory
XDWMY.E CMT2RNI - V2 Relative Nest Intensity

5.2.29.3 Usage Considerations

Special considerations or techniques related to using the HARCMT file are provided below.

1. The SMF type 113 record, used to create the HARCMT file, is not created by the IBM Resource Measurement Facility (RMF). As a result, the STARTTS and ENDTS values for DETAIL level records will not exactly match the other RMF component database files.

The Hardware Instrumentation Services (HIS) control statements used to activate SMF type 113 record collection include a SMFINTVAL=SYNC parameter that synchronizes SMF type 113 records interval duration and interval boundaries with those used by RMF, but the timestamps do not match exactly.

As a result, at the DETAIL timespan, HARCME file observations cannot be exactly merged with CA MICS files created from RMF data, such as the HARIPU or HARCPU files. If SMFINTVAL=SYNC is used in the HIS control statements, however, merging this file with other RMF component files at the DAYS and higher timespans will provide accurate measurement associations.

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents either the start time of an HIS collection run, or the start time boundary of an interval record.
 - o ENDTS represents the HIS interval record end time.

5.2.30 CPU Measurement Facility LPAR (HARCML) File

The CPU Measurement Facility LPAR file provides LPAR level statistics for all active logical processors (engines) assigned to a z/OS LPAR. The statistics are derived from counter information collected by the IBM Hardware Instrumentation Services (HIS) and the IBM CPU Measurement Facility (CPU MF).

Measurements include counts of instructions executed, cycles expended, level 1 cache miss sourcing information, cryptographic processor usage, and translation lookaside buffer and page table activity. Capacity related statistics such as the Relative Nest Intensity (RNI) are derived from the counter statistics.

The information in the HARCML file is obtained from the Counters section of the SMF type 113 subtype 2 Hardware capacity, reporting, and statistics record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.30.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+							
Timespan		Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+							
DETAIL		SYSID	YEAR	MONTH	DAY	HOUR	
		ENDTS	HISCV1	HISCV2			
DAYS		SYSID	YEAR	MONTH	DAY	HOUR	
		HISCV1	HISCV2				
WEEKS		SYSID	YEAR	WEEK	ZONE	HOUR	
		HISCV1	HISCV2				
MONTHS		SYSID	YEAR	MONTH	ZONE	HISCV1	
		HISCV2					
YEARS		SYSID	YEAR	ZONE	HISCV1	HISCV2	
+-----+-----+-----+-----+-----+-----+-----+							
TABLES		N/A					
+-----+-----+-----+-----+-----+-----+-----+							

Generation Date: Fri, Dec 30, 2011

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAULT option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

5.2.30.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Fri, Dec 30, 2011

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDWMY.E	HISCV1	- CPU MF HIS Basic/Problem Counter Ver
XDWMY.E	HISCV2	- CPU MF HIS Extended/Crypto Counter Ver
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWMY.E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWMY.E	YEAR	- Year of Century
XDWMY.E	ZONE	- Time Zone

Common Data Elements

XDWMY.E CPCCHGRS - Capacity Change Reason
 XDWMY.E CPCWHMID - CPC Physical Model Identifier
 XDWMY.E CPCMODID - CPC Model Identifier
 XDWMY.E CPCMODNR - Nominal Model Capacity Rating
 XDWMY.E CPCMODRT - Effec. Model Capacity Rating
 XDWMY.E CPCMPCID - CPC Permanent Model Capacity Identifier
 XDWMY.E CPCMPCNR - Nominal Permanent Model Capacity Rating
 XDWMY.E CPCMPCRT - Effec. Permanent Model Capacity Rating
 XDWMY.E CPCMTCID - CPC Temporary Model Capacity Identifier
 XDWMY.E CPCMTCNR - Nominal Temporary Model Capacity Rating
 XDWMY.E CPCMTCRT - Effec. Temporary Model Capacity Rating
 XDWMY.E CPCPLANT - CPC Manufacturer Plant
 XDWMY.E CPCSEQNB - CPC Sequence Number
 XDWMY.E CPCUID - CPC Unique Identifier
 XDWMY.E CPUMODEL - CPU Model
 XD...E DAYNAME - Name of Day of Week
 XDWMY.E DURATION - Recording Interval Time
 XDWMY.E ENDTS - End Time Stamp
 X....E HISCSSTS - CPU MF HIS Collection Start Timestamp
 X....E HISINTYP - CPU MF HIS Interval Record Type
 X....E HISRVER - CPU MF HIS Record Version Number
 XDWMY.E INTERVLS - Number of Recording Intervals
 X....E JOB - Job Identification
 X....E MVSLEVEL - MVS Software Level
 X....E ORGSYSID - Originating System Identification
 X....E RDRTS - Reader Time Stamp
 XDWMY.E STARTTS - Start Time Stamp
 X....E STEPNAME - Program Step Name

Accumulated Data Elements

XDWMY.E CMLB0 - B0-Total Cycles
 XDWMY.E CMLB1 - B1-Total Instructions
 XDWMY.E CMLB2 - B2-Total L1 I-Cache Writes
 XDWMY.E CMLB3 - B3-Total L1 I-Cache Penalty Cycles
 XDWMY.E CMLB4 - B4-Total L1 D-Cache Writes
 XDWMY.E CMLB5 - B5-Total L1 D-Cache Penalty Cycles
 XDWMY.E CMLC64 - C64-Crypto PRNG Functions
 XDWMY.E CMLC65 - C65-Crypto PRNG Cycles
 XDWMY.E CMLC66 - C66-Crypto PRNG Blocked Functions
 XDWMY.E CMLC67 - C67-Crypto PRNG Blocked Cycles
 XDWMY.E CMLC68 - C68-Crypto SHA Functions
 XDWMY.E CMLC69 - C69-Crypto SHA Cycles
 XDWMY.E CMLC70 - C70-Crypto SHA Blocked Functions
 XDWMY.E CMLC71 - C71-Crypto SHA Blocked Cycles
 XDWMY.E CMLC72 - C72-Crypto DEA Functions

XDWMY.E	CMLC73	- C73-Crypto DEA Cycles
XDWMY.E	CMLC74	- C74-Crypto DEA Blocked Functions
XDWMY.E	CMLC75	- C75-Crypto DEA Blocked Cycles
XDWMY.E	CMLC76	- C76-Crypto AES Functions
XDWMY.E	CMLC77	- C77-Crypto AES Cycles
XDWMY.E	CMLC78	- C78-Crypto AES Blocked Functions
XDWMY.E	CMLC79	- C79-Crypto AES Blocked Cycles
XDWMY.E	CMLIPUCT	- Processor Engine Count
XDWMY.E	CMLIPUR	- IPU File Match Result
XDWMY.E	CMLP32	- P32-ProbSt Cycles
XDWMY.E	CMLP33	- P33-ProbSt Instructions
XDWMY.E	CMLP34	- P34-ProbSt L1 I-Cache Writes
XDWMY.E	CMLP35	- P35-ProbSt L1 I-Cache Penalty Cycles
XDWMY.E	CMLP36	- P36-ProbSt L1 D-Cache Writes
XDWMY.E	CMLP37	- P37-ProbSt L1 D-Cache Penalty Cycles
XDWMY.E	CMLSPEED	- Processor Speed (GigaHertz)
XDWMY.E	CMLS32	- SuperV-State Cycles
XDWMY.E	CMLS33	- SuperV-State Instructions
XDWMY.E	CMLS34	- SuperV-State L1 I-Cache Writes
XDWMY.E	CMLS35	- SuperV-State L1 I-Cache Penalty Cycles
XDWMY.E	CMLS36	- SuperV-State L1 D-Cache Writes
XDWMY.E	CMLS37	- SuperV-State L1 D-Cache Penalty Cycles
XDWMY.E	CMLTL1P	- Total L1 Penalty Cycles
XDWMY.E	CMLTL1W	- Total L1 Cache Writes
XDWMY.E	CML1DL15	- V1 L1-D from L1.5 (E129)
XDWMY.E	CML1DL2A	- V1 L1-D from L2 On-Bk (E131)
XDWMY.E	CML1DL2B	- V1 L1-D from L2 Off-Bk (E133)
XDWMY.E	CML1DL3A	- V1 L1-D from Local Memory (E134)
XDWMY.E	CML1DL3B	- V1 L1-D from Remote Memory (calc)
XDWMY.E	CML1DUE	- V1 L1 D-Cache Updt to Exclusive (E136)
XDWMY.E	CML1ICI	- V1 L1 I-Cache Line Invalidated (E137)
XDWMY.E	CML1IL15	- V1 L1-I from L1.5 (E128)
XDWMY.E	CML1IL2A	- V1 L1-I from L2 On-Bk (E130)
XDWMY.E	CML1IL2B	- V1 L1-I from L2 Off-Bk (E132)
XDWMY.E	CML1IL3A	- V1 L1-I from Local Memory (E135)
XDWMY.E	CML1IL3B	- V1 L1-I from Remote Memory (calc)
XDWMY.E	CML1L15T	- V1 L1.5 Cache Total Stores (E147)
XDWMY.E	CML1TL15	- V1 Total L1 from L1.5
XDWMY.E	CML1TL2A	- V1 Total L1 from L2 On-Bk
XDWMY.E	CML1TL2B	- V1 Total L1 from L2 Off-Bk
XDWMY.E	CML1TL3A	- V1 Total L1 from Local Memory
XDWMY.E	CML1TL3B	- V1 Total L1 from Remote Memory
XDWMY.E	CML11DBE	- V1 L1 D-TLB Translation Entry (E139)
XDWMY.E	CML11DBP	- V1 L1 D-TLB Miss Penalty Cycles (E146)
XDWMY.E	CML11IBE	- V1 L1 I-TLB Translation Entry (E138)
XDWMY.E	CML11IBP	- V1 L1 I-TLB Miss Penalty Cycles (E145)
XDWMY.E	CML11TBE	- V1 L1 Total TLB Translation Entries
XDWMY.E	CML11TBP	- V1 L1 Total TLB Miss Penalty Cycles
XDWMY.E	CML12BCE	- V1 L2 TLB CRSTE Array Entry (E141)

XDWMY.E CML12BCL - V1 L2 TLB CRSTE Array Entry 1MB (E142)
 XDWMY.E CML12BPE - V1 L2 TLB PTE Array Entry (E140)
 XDWMY.E CML2DL2 - V2 L1-D from L2 (E128)
 XDWMY.E CML2DL3A - V2 L1-D from L3 On-Bk On-Chp (E150)
 XDWMY.E CML2DL3B - V2 L1-D from L3 On-Bk Off-Chp (E152)
 XDWMY.E CML2DL3C - V2 L1-D from L3 Off-Bk (E134)
 XDWMY.E CML2DL4A - V2 L1-D from L4 On-Bk (E135)
 XDWMY.E CML2DL4B - V2 L1-D from L4 Off-Bk (E138)
 XDWMY.E CML2DL5A - V2 L1-D from Local Memory (E141)
 XDWMY.E CML2DL5B - V2 L1-D from Remote Memory (calc)
 XDWMY.E CML2DUE - V2 L1 D-Cache Updt to Exclusive (E137)
 XDWMY.E CML2IL2 - V2 L1-I from L2 (E129)
 XDWMY.E CML2IL3A - V2 L1-I from L3 On-Bk On-Chp (E153)
 XDWMY.E CML2IL3B - V2 L1-I from L3 On-Bk Off-Chp (E155)
 XDWMY.E CML2IL3C - V2 L1-I from L3 Off-Bk (E143)
 XDWMY.E CML2IL4A - V2 L1-I from L4 On-Bk (E136)
 XDWMY.E CML2IL4B - V2 L1-I from L4 Off-Bk (E139)
 XDWMY.E CML2IL5A - V2 L1-I from Local Memory (E142)
 XDWMY.E CML2IL5B - V2 L1-I from Remote Memory (calc)
 XDWMY.E CML2L2T - V2 L2 Cache Total Stores (E133)
 XDWMY.E CML2TL2 - V2 Total L1 from L2
 XDWMY.E CML2TL3A - V2 Total L1 from L3 On-Bk On-Chp
 XDWMY.E CML2TL3B - V2 Total L1 from L3 On-Bk Off-Chp
 XDWMY.E CML2TL3C - V2 Total L1 from L3 Off-Bk
 XDWMY.E CML2TL4A - V2 Total L1 from L4 On-Bk
 XDWMY.E CML2TL4B - V2 Total L1 from L4 Off-Bk
 XDWMY.E CML2TL5A - V2 Total L1 from Local Memory
 XDWMY.E CML2TL5B - V2 Total L1 from Remote Memory
 XDWMY.E CML21DBE - V2 L1 D-TLB Translation Entry (E144)
 XDWMY.E CML21DBL - V2 L1 D-TLB Translation Entry 1MB (E140)
 XDWMY.E CML21DBP - V2 L1 D-TLB Miss Penalty Cycles (E130)
 XDWMY.E CML21IBE - V2 L1 I-TLB Translation Entry (E145)
 XDWMY.E CML21IBP - V2 L1 I-TLB Miss Penalty Cycles (E131)
 XDWMY.E CML21TBE - V2 L1 Total TLB Translation Entries
 XDWMY.E CML21TBP - V2 L1 Total TLB Miss Penalty Cycles
 XDWMY.E CML22BCE - V2 L2 TLB CRSTE Array Entry (E148)
 XDWMY.E CML22BCL - V2 L2 TLB CRSTE Array Entry 1MB (E147)
 XDWMY.E CML22BPE - V2 L2 TLB PTE Array Entry (E146)

Derived Data Elements

XDWMY.E CMLAVCBA - Avg P-Cycles Blocked Crypto AES
 XDWMY.E CMLAVCBD - Avg P-Cycles Blocked Crypto DEA
 XDWMY.E CMLAVCBP - Avg P-Cycles Blocked Crypto PRNG
 XDWMY.E CMLAVCBS - Avg P-Cycles Blocked Crypto SHA
 XDWMY.E CMLAVIPU - Average Processor Count
 XDWMY.E CMLAVSPD - Average Processor Speed (GigaHertz)
 XDWMY.E CMLCPI - Cycles Per Instruction
 XDWMY.E CMLMIPS - Actual MIPS Usage Rate

XDWMY.E CMLPCBSY - Percent Busy
XDWMY.E CMLPCCBA - Pct Blocked AES Crypto Functions
XDWMY.E CMLPCCBD - Pct Blocked DEA Crypto Functions
XDWMY.E CMLPCCBP - Pct Blocked PRNG Crypto Functions
XDWMY.E CMLPCCBS - Pct Blocked SHA Crypto Functions
XDWMY.E CMLPCL1M - Pct Level 1 Cache Miss
XDWMY.E CMLPCPST - Pct Problem State
XDWMY.E CMLPCSST - Pct Supervisor State
XDWMY.E CML1AVPD - V1 Avg Penalty Cycles per L1 D-Miss
XDWMY.E CML1AVPI - V1 Avg Penalty Cycles per L1 I-Miss
XDWMY.E CML1AVPM - V1 Avg Penalty Cycles per L1 Miss
XDWMY.E CML1AVPT - V1 Avg Penalty Cycles per TLB Miss
XDWMY.E CML1ECPI - V1 Estimated Finite CPI
XDWMY.E CML1EICC - V1 Est Instruction Complexity CPI
XDWMY.E CML1ESCM - V1 Est Sourcing Cycles per L1 Miss
XDWMY.E CML1PCMT - V1 TLB CPU Pct Miss of Total CPU
XDWMY.E CML1PCPT - V1 Pct PTE Misses of TLB1 Misses
XDWMY.E CML1PC15 - V1 Pct L1 from L1.5
XDWMY.E CML1PC2A - V1 Pct L1 from L2 On-Bk
XDWMY.E CML1PC2B - V1 Pct L1 from L2 Off-Bk
XDWMY.E CML1PC3A - V1 Pct L1 from Local Memory
XDWMY.E CML1PC3B - V1 Pct L1 from Remote Memory
XDWMY.E CML1PD15 - V1 Pct L1-D from L1.5
XDWMY.E CML1PD2A - V1 Pct L1-D from L2 On-Bk
XDWMY.E CML1PD2B - V1 Pct L1-D from L2 Off-Bk
XDWMY.E CML1PD3A - V1 Pct L1-D from Local Memory
XDWMY.E CML1PD3B - V1 Pct L1-D from Remote Memory
XDWMY.E CML1PI15 - V1 Pct L1-I from L1.5
XDWMY.E CML1PI2A - V1 Pct L1-I from L2 On-Bk
XDWMY.E CML1PI2B - V1 Pct L1-I from L2 Off-Bk
XDWMY.E CML1PI3A - V1 Pct L1-I from Local Memory
XDWMY.E CML1PI3B - V1 Pct L1-I from Remote Memory
XDWMY.E CML1RNI - V1 Relative Nest Intensity
XDWMY.E CML2AVPD - V2 Avg Penalty Cycles per L1 D-Miss
XDWMY.E CML2AVPI - V2 Avg Penalty Cycles per L1 I-Miss
XDWMY.E CML2AVPM - V2 Avg Penalty Cycles per L1 Miss
XDWMY.E CML2AVPT - V2 Avg Penalty Cycles per TLB Miss
XDWMY.E CML2ECPI - V2 Estimated Finite CPI
XDWMY.E CML2EICC - V2 Est Instruction Complexity CPI
XDWMY.E CML2ESCM - V2 Est Sourcing Cycles per L1 Miss
XDWMY.E CML2PCMT - V2 TLB CPU Pct Miss of Total CPU
XDWMY.E CML2PCPT - V2 Pct PTE Misses of TLB1 Misses
XDWMY.E CML2PC2 - V2 Pct L1 from L2
XDWMY.E CML2PC3A - V2 Pct L1 from L3 On-Bk On-Chp
XDWMY.E CML2PC3B - V2 Pct L1 from L3 On-Bk Off-Chp
XDWMY.E CML2PC3C - V2 Pct L1 from L3 Off-Bk
XDWMY.E CML2PC4A - V2 Pct L1 from L4 On-Bk
XDWMY.E CML2PC4B - V2 Pct L1 from L4 Off-Bk
XDWMY.E CML2PC5A - V2 Pct L1 from Local Memory

XDWMY.E CML2PC5B - V2 Pct L1 from Remote Memory
XDWMY.E CML2PD2 - V2 PCT L1-D from L2
XDWMY.E CML2PD3A - V2 PCT L1-D from L3 On-Bk On-Chp
XDWMY.E CML2PD3B - V2 PCT L1-D from L3 On-Bk Off-Chp
XDWMY.E CML2PD3C - V2 PCT L1-D from L3 Off-Bk
XDWMY.E CML2PD4A - V2 PCT L1-D from L4 On-Bk
XDWMY.E CML2PD4B - V2 PCT L1-D from L4 Off-Bk
XDWMY.E CML2PD5A - V2 PCT L1-D from Local Memory
XDWMY.E CML2PD5B - V2 PCT L1-D from Remote Memory
XDWMY.E CML2PI2 - V2 PCT L1-I from L2
XDWMY.E CML2PI3A - V2 PCT L1-I from L3 On-Bk On-Chp
XDWMY.E CML2PI3B - V2 PCT L1-I from L3 On-Bk Off-Chp
XDWMY.E CML2PI3C - V2 PCT L1-I from L3 Off-Bk
XDWMY.E CML2PI4A - V2 PCT L1-I from L4 On-Bk
XDWMY.E CML2PI4B - V2 PCT L1-I from L4 Off-Bk
XDWMY.E CML2PI5A - V2 PCT L1-I from Local Memory
XDWMY.E CML2PI5B - V2 PCT L1-I from Remote Memory
XDWMY.E CML2RNI - V2 Relative Nest Intensity

5.2.30.3 Usage Considerations

Special considerations or techniques related to using the HARCML file are provided below.

1. The SMF type 113 record, used to create the HARCML file, is not created by the IBM Resource Measurement Facility (RMF). As a result, the STARTTS and ENDTS values for DETAIL level records will not exactly match the other RMF component database files.

The Hardware Instrumentation Services (HIS) control statements used to activate SMF type 113 record collection include a SMFINTVAL=SYNC parameter that synchronizes SMF type 113 records interval duration and interval boundaries with those used by RMF, but the timestamps do not match exactly.

As a result, at the DETAIL timespan, HARCME file observations cannot be exactly merged with CA MICS files created from RMF data, such as the HARIPU or HARCPU files. If SMFINTVAL=SYNC is used in the HIS control statements, however, merging this file with other RMF component files at the DAYS and higher timespans will provide accurate measurement associations.

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents either the start time of an HIS collection run, or the start time boundary of an interval record.
 - o ENDTS represents the HIS interval record end time.

5.2.31 CF Channel Path File (HARCFA)

The CF Channel Path file stores the characteristics of the channel paths of type CIB or CFP associated to local or remote coupling facilities on a zEC12. It also contains limited identification information (channel path id, channel path type) for channel paths other than CIB or CFP.

This file is derived from the SMF type 74 subtype 4 Coupling Facility Activity record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.31.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS	CFYSYSNM	CFYCFNM	CFYRCFNM	CHANNEL	
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
	CFYSYSNM	CFYCFNM	CFYRCFNM	CHANNEL		
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
	CFYSYSNM	CFYCFNM	CFYRCFNM	CHANNEL		
MONTHS	SYSID	YEAR	MONTH	ZONE	CFYSYSNM	
	CFYCFNM	CFYRCFNM	CHANNEL			
YEARS	N/A					
TABLES	N/A					

Generation Date: Mon, Dec 10, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-36. HARCFA Sort Sequence and Data Granularity

5.2.31.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Mon, Dec 10, 2012

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

- XDWM..E CFYCFNM - CF Name
- XDWM..E CFYRCFNM - Remote CF Name
- XDWM..E CFYSYSNM - Name of System Using CF
- XDWM..E CHANNEL - Physical Channel Address

XD....E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century
XDWM..E	ZONE	- Time Zone

Common Data Elements

XDWM..E	CFYLPID	- CF Logical Partition ID
XDWM..E	CYCLETM	- RMF Sampling Cycle Interval
XD....E	DAYNAME	- Name of Day of Week
XDWM..E	DURATION	- Recording Interval Time
XDWM..E	ENDTS	- End Time Stamp
XDWM..E	INTERVLS	- Number of Recording Intervals
XDWM..E	MVSLEVEL	- MVS Software Level
XDWM..E	ORGSYSID	- Originating System Identification
XDWM..E	PRSMPLNO	- Logical Partition Number
XDWM..E	RMFESAME	- z/Architecture Mode Indicator
XDWM..E	RMFGMTOF	- GMT to Local Time Offset
X.....E	RMFSRL	- SMF Record Level Change Number
XDWM..E	RMFVER	- RMF Version Number
XDWM..E	STARTTS	- Start Time Stamp
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLX	- Sysplex Name

Retained Data Elements

XDWM..E	CFAACRNM	- Channel Path Acronym
XDWM..E	CFADEGRA	- Degraded Mode Indicator
XDWM..E	CFAEDIST	- Channel Path Estimated Distance
XDWM..E	CFAHCAID	- Host Channel Adapter Identifier
XDWM..E	CFAHCAPN	- Host Channel Adapter Port Number
XDWM..E	CFALATTM	- Channel Path Latency Time
XDWM..E	CFAOPMOD	- Channel Path Operation Mode
XDWM..E	CFAPCHID	- Physical Channel Id (PCHID)
XDWM..E	CFASAP1	- 1st I/O Processor Identifier
XDWM..E	CFASAP2	- 2nd I/O Processor Identifier
XDWM..E	CFASAP3	- 3rd I/O Processor Identifier
XDWM..E	CFASAP4	- 4th I/O Processor Identifier

Accumulated Data Elements

XDWM..E	CFADEGCT	- Intvls with Channel Path Degraded

5.2.31.3 Usage Considerations

Special considerations or techniques related to using the HARCFA file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.2.32 Crypto PKCS11 Coprocessor Activity File (HARCRK)

The Crypto PKCS11 Coprocessor Activity file provides statistics on operations that are executed on Cryptographic Express4S cards configured in PKCS11 coprocessor mode. Measurements include operations counts, execution times, per second rates, and utilization percentages, for secure public-key operations executed by symmetric or asymmetric cryptographic functions.

The information in the HARCRK file is obtained from the cryptographic PKCS11 coprocessor data section of the SMF type 70 subtype 2 Cryptographic Hardware Activity record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.2.32.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	CRKCCIDX	YEAR	MONTH	DAY	
	HOUR	ENDTS				
DAYS	SYSID	CRKCCIDX	YEAR	MONTH	DAY	
	HOUR					
WEEKS	SYSID	CRKCCIDX	YEAR	WEEK	ZONE	
	HOUR					
MONTHS	SYSID	CRKCCIDX	YEAR	MONTH	ZONE	
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Sep 6, 2013

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-37. HARCRK Sort Sequence and Data Granularity

5.2.32.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Fri, Sep 6, 2013

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E	CRKCCIDX	- Cryptographic Coprocessor Index
XD....E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century
XDWM..E	ZONE	- Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E CRKCPTYP - Cryptographic Processor Type

Accumulated Data Elements

XDWM..E CRKAGCCT - Intvls with Asymmetric-Key Gen Data
XDWM..E CRKFACCT - Intvls with Fast Asymmetric-Key Data
XDWM..E CRKSACCT - Intvls with Slow Asymmetric-Key Data
XDWM..E CRKSCCCT - Intvls with Complete Symmetric-Key Data
XDWM..E CRKSPCCT - Intvls with Partial Symmetric-Key Data
XDWM..E CRKTOAGC - Asymmetric-Key Generation Operations
XDWM..E CRKTOAGT - Asymmetric-Key Generation Execution Time
XDWM..E CRKTOFAC - Fast Asymmetric-Key Operations
XDWM..E CRKTOFAT - Fast Asymmetric-Key Execution Time
XDWM..E CRKTOOPS - Total Operations
XDWM..E CRKTOSAC - Slow Asymmetric-Key Operations
XDWM..E CRKTOSAT - Slow Asymmetric-Key Execution Time
XDWM..E CRKTOSCC - Complete Symmetric-Key Operations
XDWM..E CRKTOSCT - Complete Symmetric-Key Execution Time
XDWM..E CRKTOSPC - Partial Symmetric-Key Operations
XDWM..E CRKTOSPT - Partial Symmetric-Key Execution Time
XDWM..E CRKTOXET - Total Execution Time

Derived Data Elements

XDWM..E CRKAVAGT - Avg Asymmetric-Key Generation Exec Time
XDWM..E CRKAVFAT - Avg Fast Asymmetric-Key Execution Time
XDWM..E CRKAVSAT - Avg Slow Asymmetric-Key Execution Time
XDWM..E CRKAVSCT - Avg Complete Symmetric-Key Exec Time
XDWM..E CRKAVSPT - Avg Partial Symmetric-Key Execution Time

XDWM..E CRKAVXET - Avg Operations Execution Time
XDWM..E CRKPCAGT - Pct Asymmetric-Key Gen Utilization
XDWM..E CRKPCFAT - Pct Fast Asymmetric-Key Utilization
XDWM..E CRKPCSAT - Pct Slow Asymmetric-Key Utilization
XDWM..E CRKPCSCT - Pct Complete Symmetric-Key Utilization
XDWM..E CRKPCSPT - Pct Partial Symmetric-Key Utilization
XDWM..E CRKPCXET - Pct Utilization
XDWM..E CRKPSAGC - Asymmetric-Key Gen Operations Rate
XDWM..E CRKPSFAC - Fast Asymmetric-Key Operations Rate
XDWM..E CRKPSOPS - Total Operations Rate
XDWM..E CRKPSSAC - Slow Asymmetric-Key Operations Rate
XDWM..E CRKPSSCC - Complete Symmetric-Key Operations Rate
XDWM..E CRKPSSPC - Partial Symmetric-Key Operations Rate

5.2.32.3 Usage Considerations

Special considerations or techniques related to using the HARCRK file are provided.

1. Care must be taken in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described here:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. Information related to cryptographic hardware activity is found in the following four files:
 - o Crypto Accelerator Activity File (HARCRA)
 - o ICSF Services Activity File (HARCRF)
 - o Crypto PKCS11 Coprocessor Activity File (HARCRK)
 - o Crypto CCA Coprocessor Activity File (HARCRP)

While the data contained in the HARCRF file only applies to the logical partition (LPAR) that created the RMF records, the data in the HARCRA, HARCRK, and HARCRP files always reflects the total activity in your CPC.

5.3 SCP Information Area Files

This section identifies each file in the SCP Information Area and defines its levels of summarization and data sequencing. Also, it presents the list of available data elements for each file.

The files maintained in the SCP Information Area include:

- 1 - Paging Activity File (SCPPAG)
- 2 - Logical Channel Activity File (SCPLCA)
- 3 - Page Data Set Activity File (SCPPSD)
- 4 - Resource Enqueue Activity File (SCPENQ)
- 5 - Trace Activity File (SCPTRC)
- 6 - Address Space Activity File (SCPARD)
- 7 - Real Storage/CPU/SRM Activity File (SCPSRC)
- 8 - I/O Queuing Configuration File (SCPIOC)
- 9 - Swapping Activity File (SCPSWP)
- 10 - I/O Processor Activity File (SCPIOP)
- 11 - Logical Control Unit Activity File (SCPLCU)
- 12 - Virtual Storage System Usage File (SCPVSM)
- 13 - Virtual Storage Private Usage File (SCPVSU)
- 14 - XCF System Activity File (SCPXY)
- 15 - XCF Member Activity File (SCPXCM)
- 16 - XCF Path Activity File (SCPXCA)
- 17 - USS Kernel Activity File (SCPKRN)
- 18 - Serialization Delay Details File (SCPSRD)
- 19 - Serialization Delay System File (SCPSRS)

5.3.1 Paging Activity File (SCPPAG)

The Paging Activity File quantifies the demands of the system paging facilities and the utilization of real storage and external page storage.

This file is derived from the RMF Paging Activity record, type 71.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.1.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOURL	
	ENDTS					
DAYS	SYSID	YEAR	MONTH	DAY	HOURL	
WEEKS	SYSID	YEAR	WEEK	ZONE	HOURL	
MONTHS	SYSID	YEAR	MONTH	ZONE		
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 12, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-40. SCPPAG Sort Sequence and Data Granularity

5.3.1.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, Mar 18, 2014

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD....E	DAY	- Day of Month
XDW...E	HOUR	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century

XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E EXTSTOR - Expanded Storage Flag
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFDATAV - Intvls with Enhanced DAT Architecture
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM..E RMFESCDR - Intvls with ESCON Director in Config
XDWM..E RMFESCON - Intvls where Enabled for ESCON
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E SAMPLES - RMF Sample Count
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E PAGCF - Installed Frames in Expanded Storage
XDWM..E PAGFIN - Frames in Nucleus
X..... PAGISS - Invalid Sample Flag
XDWM..E PAGLFASZ - Large Frame Area Size
XDWM..E PAGOLE - Online Frames in Expanded Storage
XDWM.. PAGOPT - SRM OPT Member

Accumulated Data Elements

XDWM.. PAGACF - Available Central Storage Frames
XDWM.. PAGAEF - Available Expanded Storage Frames
XDWM.. PAGAFC - Unused Page Frames
XDWM..E PAGAPC - APPC Wait Swaps
XDWM..E PAGAPF - Address Space Page Faults
XDWM..E PAGAS - Available SCM 4KB Paging Blocks
XDWM..E PAGASGI - Shared Page (>2GB) Page-Ins from Aux
XDWM..E PAGASGO - Shared Page (>2GB) Page-Outs to Aux
XDWM..E PAGASI - Shared Page Group Page-Ins from Aux
XDWM..E PAGASO - Shared Page Group Page-Outs to Aux

XDWM..E	PAGASS	- Auxiliary Storage Shortage Swaps
XDWM..E	PAGAXD	- Aux Storage Directed Physical Swaps
XDWM..	PAGB	- Unusable Local Page DS Slots
XDWM..E	PAGBLK	- Number of Blocks Paged In
XDWM..E	PAGBLP	- Blocked Pages Paged In
XDWM..E	PAGBS	- Bad SCM 4KB Paging Blocks
XDWM..E	PAGC	- CSA Fixed Frames
XDWM..E	PAGCFF	- HV Common Storage 4KB Fixed Pages
XDWM..E	PAGCO	- Memory Objects in HV Common Storage
XDWM..E	PAGCR	- HV Common Storage 4KB Pages Backed
XDWM..E	PAGCS	- Aux. Stg Slots for HV Common Pages
XDWM..E	PAGCSE	- CSA Pages in Expanded Storage
XDWM..E	PAGCUI	- Total Current System UIC
XDWM..E	PAGC1	- Total HV Common Memory 4KB Pages
XDWM..E	PAGC4	- Aux. SCM Slots for HV Common Pages
XDWM..	PAGDSC	- Local Page DS VIO Private Slots
XDWM..E	PAGDWS	- Detected Wait Swaps
XDWM..E	PAGEES	- Enqueue Exchange Swaps
XDWM..E	PAGESD	- Expanded Storage Directed Physical Swaps
XDWM..E	PAGESI	- Shared Page Group Page-Ins from ES
XDWM..E	PAGESO	- Shared Page Group Page-Outs to ES
XDWM..E	PAGEXS	- Exchange Swaps
XDWM..E	PAGEXSF	- Total Expanded Storage Frames
XDWM..E	PAGF	- Unused Page Frames
XDWM..E	PAGFBN	- Pages Backed During GETMAIN Requests
XDWM..E	PAGFFN	- Pages Requested to be Fixed (<2GB)
XDWM..E	PAGFNM	- ES Frames Freed Without Migration
XDWM..E	PAGFRN	- Fix Requests Issued for Storage (<2GB)
XDWM..E	PAGGRN	- GETMAIN Requests Issued
XDWM..	PAGHCF	- High Impact Central Storage Frames
XDWM..	PAGHEF	- High Impact Expanded Storage Frames
XDWM..E	PAGHIN	- Hiperspace Page-Ins
XDWM..E	PAGHIR	- Hiperspace Pages in Central Storage
XDWM..E	PAGHME	- Hiperspace Pages Written to Exp Stor
XDWM..E	PAGHMG	- Hiperspace Pages Migrated from Exp Stor
XDWM..E	PAGHOT	- Hiperspace Page-Outs
XDWM..E	PAGHPX	- Hiperspace Pages in Expanded Storage
XDWM..E	PAGHRE	- Hiperspace Pages Read from Exp Stor
XDWM..E	PAGHRS	- Hiperspace Pages Read from Central Stor
XDWM..E	PAGHWS	- Hiperspace Pages Written to Central Stor
XDWM..E	PAGIRS	- In-Real Swaps
XDWM..E	PAGISC	- Invalid Samples Returned from Collector
XDWM..E	PAGISP	- Improve System Paging Rate Swaps
XDWM..E	PAGISSCT	- Intvls with Invalid Samples
XDWM..E	PAGISU	- Improve Central Storage Usage Swaps
XDWM..E	PAGL	- # of Fixed Frames below 16 Meg
XDWM..E	PAGLAX	- Aux Storage Directed Logical Swaps
XDWM..E	PAGLBI	- LPA Block Page Page-Ins
XDWM..	PAGLCF	- Low Impact Central Storage Frames

XDWM..	PAGLEF	- Low Impact Expanded Storage Frames
XDWM..E	PAGLES	- Expanded Storage Directed Logical Swaps
XDWM..E	PAGLF	- LPA Fixed Frames
XDWM..E	PAGLFS	- Log and Phy Swapped-Out Address Spaces
XDWM..E	PAGLGS	- Logical Swapout Candidates
XDWM..E	PAGLNI	- LPA Page-Ins
XDWM..E	PAGLO	- 1MB Memory Objects in System
XDWM..E	PAGLP	- LPA Frames
XDWM..E	PAGLPE	- LPA Pages in Expanded Storage
XDWM..E	PAGLQE	- LSQA Pages in Expanded Storage
XDWM..E	PAGLQR	- LSQA Pages in Central Storage
XDWM..E	PAGLR	- 1MB Pages Backed in Central Storage
XDWM..E	PAGLS	- LSQA Fixed Frames
XDWM..E	PAGLWS	- Long Wait Swaps
XDWM..E	PAGL1	- Total 1MB Fixed Frames
XDWM..E	PAGL2	- Available 1MB Fixed Frames
XDWM..E	PAGL3	- Used 1MB Fixed Frames
XDWM..E	PAGL4	- Total 1MB Pageable Frames
XDWM..E	PAGL5	- Available 1MB Pageable Frames
XDWM..E	PAGL6	- Used 1MB Pageable Frames
XDWM..E	PAGL7	- 1MB Frames in LFArea Not In-Use
XDWM..E	PAGM	- Local Page DS Non-VIO Private Slots
XDWM..E	PAGMA	- Total High Migration Age
XDWM..	PAGMCF	- Medium Impact Central Storage Frames
XDWM..	PAGMEF	- Medium Impact Expanded Storage Frames
XDWM..E	PAGMIG	- Physical Swaps Migrated from ES
XDWM..E	PAGNRN	- Non-First Reference Faults
XDWM..E	PAGNRS	- Request Swaps
XDWM..	PAGNSC	- Local Page DS Slots Not Allocated
XDWM..E	PAGOPI	- USS Input Wait Swaps
XDWM..E	PAGOPO	- USS Output Wait Swaps
XDWM..E	PAGP	- CSA Frames
XDWM..E	PAGPEA	- Total Pages Migrated from ES to Aux
XDWM..E	PAGPES	- Total Pages Moved to Expanded Storage
XDWM..E	PAGPFB	- Pages Fixed Between 16M and 2G
XDWM..E	PAGPIN	- Non-VIO Non-Swap Page-Ins
XDWM..E	PAGPLPCT	- Intvls with Pageable Large Pages Enabled
XDWM..	PAGPMTTM	- Page Steal Movement Time
XDWM..E	PAGPMV	- Total # of Pages Moved
XDWM..E	PAGPOUT	- Non-VIO Non-Swap Page-Outs
XDWM..E	PAGPWS	- Primary Work Set Pages Migrated From ES
XDWM..E	PAGQ	- SQA Fixed Frames
XDWM..E	PAGR	- Private Fixed Frames
XDWM..E	PAGRES	- Pages Read from Exp Stor
XDWM..E	PAGRGS	- Region+SWA Pages in Expanded Storage
XDWM..E	PAGRLS	- Room for Long-Swapped User Swaps
XDWM..E	PAGRSMP	- Number of RMF Samples
XDWM..E	PAGRSMP2	- RMF Samples (minus samples skipped)
XDWM..E	PAGRSS	- Central Storage Shortage Swaps

XDWM..E	PAGS	- Private Space Pageable Frames
XDWM..E	PAGSBI	- System Pageable Areas Block Page-Ins
XDWM..E	PAGSCMCT	- Intvls with SCM Enabled
XDWM..E	PAGSGB	- Weighted Avg Shared Pg Grps Fixed<16MB
XDWM..E	PAGSGC	- Weighted Avg Shared Pg Grps in CS
XDWM..E	PAGSGE	- Weighted Avg Shared Pg Grps in ES
XDWM..E	PAGSGF	- Weighted Avg Shared Pg Grps Fixed
XDWM..E	PAGSGS	- Weighted Avg Shared Pg Grps in System
XDWM..E	PAGSGX	- Weighted Avg Shared Pg Grps Aux Slots
XDWM..E	PAGSHC	- HV Shared Pages in Central Storage
XDWM..E	PAGSHS	- HV Shared Pages in System
XDWM..E	PAGSHX	- Aux Slots for HV Shared Pages
XDWM..E	PAGSIN	- Pages Swapped In from Aux
XDWM..E	PAGSKCNT	- Samples Skipped Due to Count Failure
XDWM..E	PAGSKNEG	- Samples Skipped Due to Negative Calc
XDWM..E	PAGSNI	- CSA+LPA Page-Ins
XDWM..E	PAGSNO	- Common Page-Outs
XDWM..E	PAGSO	- Memory Objects in HV Shared Storage
XDWM..E	PAGSOT	- Pages Swapped Out to Aux
XDWM..E	PAGSPC	- System Page Count
XDWM..E	PAGSPG	- Demand Page Count
XDWM..E	PAGSPS	- System Page/Swap Page Count
XDWM..E	PAGSQE	- SQA Pages in Expanded Storage
XDWM..E	PAGSQR	- SQA Pages in Central Storage
XDWM..E	PAGSR	- HV Shr Stor 4KB Pages Backed Central
XDWM..E	PAGSSQ	- Address Space Swap Sequences
XDWM..E	PAGS1	- Total HV Shared Memory 4KB Pages
XDWM..E	PAGS5	- Aux. DASD Slots for HV Shared Pages
XDWM..E	PAGS6	- Aux. SCM Slots for HV Shared Pages
XDWM..E	PAGS7	- Shared Page Groups Backed SCM
XDWM..E	PAGT	- Total Frames
XDWM..E	PAGTFC	- Page Frames in Central Storage
XDWM..E	PAGTIS	- Termwait Input Log Swap-Out Candidates
XDWM..E	PAGTISP	- Aux or ES Terminal Input Swaps
XDWM..E	PAGTLS	- Total Logical Swaps
XDWM..E	PAGTOS	- Termwait Output Log Swap-Out Candidates
XDWM..E	PAGTOSP	- Aux or ES Terminal Output Swaps
XDWM..E	PAGTOSWP	- Total Swaps
XDWM..E	PAGTPF	- Total Page Faults
XDWM..E	PAGTS	- Total SCM 4KB Paging Blocks
XDWM..	PAGTSC	- Local Page DS Slots
XDWM..E	PAGTWS	- Terminal Wait Physical Swaps
XDWM..	PAGTXS	- Transition Swaps
XDWM..	PAGU	- Unallocated Local Page DS Slots
XDWM..E	PAGUIC	- Total System High UIC
XDWM..E	PAGULS	- Unilateral Swaps
XDWM..E	PAGUS	- Used SCM 4KB Paging Blocks
XDWM..	PAGV	- Local Page DS VIO Private Slots
XDWM..E	PAGVIN	- VIO Page-Ins

XDWM..E	PAGVIR	- VIO Pages in Central Storage
XDWM..E	PAGVME	- VIO Pages Written to Exp Stor
XDWM..E	PAGVMG	- VIO Pages Migrated from Exp Stor
XDWM..E	PAGVOT	- VIO Page-Outs
XDWM..E	PAGVPX	- VIO Pages in Expanded Storage
XDWM..E	PAGVRE	- VIO Pages Read from Exp Stor
XDWM..E	PAGVRS	- VIO Pages Read from Central Storage
XDWM..	PAGVSC	- Local Page DS Non-VIO Private Slots
XDWM..E	PAGVWS	- VIO Pages Written to Central Storage
XDWM..E	PAGX	- Total Fixed Frames
XDWM..E	PAG1RN	- First Reference Faults

Minimum Data Elements

XDWM..	PAGMNA	- Min Local Page DS Slots
XDWM..	PAGMNACF	- Min Available Central Storage Frames
XDWM..	PAGMNAEF	- Min Available Expanded Storage Frames
XDWM..E	PAGMNAS	- Min Available SCM 4KB Paging Blocks
XDWM..	PAGMNB	- Min Unusable Local Page DS Slots
XDWM..E	PAGMNBS	- Min Bad SCM 4KB Paging Blocks
XDWM..E	PAGMNC	- Min CSA Fixed Frames
XDWM..E	PAGMNCFF	- Min HV Common Storage 4KB Fixed Pages
XDWM..E	PAGMNCO	- Min Memory Objects in HV Common Storage
XDWM..E	PAGMNCR	- Min HV Common Storage 4KB Pages Backed
XDWM..E	PAGMNCS	- Min Aux. Stg Slots for HV Common Pages
XDWM..E	PAGMNCSE	- Min CSA Pages in Expanded Storage
XDWM..E	PAGMNCUI	- Lowest Current System UIC
XDWM..E	PAGMNC1	- Min Total HV Common Memory 4KB Pages
XDWM..E	PAGMNC4	- Min Aux. SCM Slots for HV Common Pages
XDWM..	PAGMNE	- Min Expanded Storage Frames
XDWM..	PAGMNF	- Min Unused Page Frames
XDWM..	PAGMNHCF	- Min High Impact Central Storage Frames
XDWM..	PAGMNHCF	- Min High Impact Expanded Storage Frames
XDWM..E	PAGMNHCF	- Min Hiperspace Pages in Central Storage
XDWM..E	PAGMNHCF	- Min Hiperspace Pages in Exp Stor
XDWM..	PAGMNL	- Min # of Fixed Frames below 16 Meg
XDWM..	PAGMNLCF	- Min Low Impact Central Storage Frames
XDWM..	PAGMNL	- Min Low Impact Expanded Storage Frames
XDWM..E	PAGMNL	- Min LPA Fixed Frames
XDWM..E	PAGMNL	- Min 1MB Memory Objects in System
XDWM..E	PAGMNL	- Min LPA Frames
XDWM..E	PAGMNL	- Min LPA Pages in Expanded Storage
XDWM..E	PAGMNL	- Min LSQA Pages in Expanded Storage
XDWM..E	PAGMNL	- Min LSQA Pages in Central Storage
XDWM..E	PAGMNL	- Min 1MB Pages Backed in Central Storage
XDWM..E	PAGMNL	- Min LSQA Fixed Frames
XDWM..E	PAGMNL	- Min Total 1MB Fixed Frames
XDWM..E	PAGMNL	- Min Available 1MB Fixed Frames
XDWM..E	PAGMNL	- Min Used 1MB Fixed Frames

XDWM..E PAGMNL4 - Min Total 1MB Pageable Frames
 XDWM..E PAGMNL5 - Min Available 1MB Pageable Frames
 XDWM..E PAGMNL6 - Min Used 1MB Pageable Frames
 XDWM..E PAGMNL7 - Min 1MB Frames in LFAREA Not In-Use
 XDWM.. PAGMNM - Min Local Page DS Non-VIO Private Slots
 XDWM.. PAGMNMMA - Min Migration Age
 XDWM.. PAGMNMCF - Min Medium Impact Central Storage Frames
 XDWM.. PAGMNMFEF - Min Medium Impact Exp Storage Frames
 XDWM..E PAGMNP - Min CSA Frames
 XDWM..E PAGMNPFB - Min Pages Fixed Between 16M and 2G
 XDWM..E PAGMNPQ - Min SQA Fixed Frames
 XDWM..E PAGMNP - Min Private Fixed Frames
 XDWM..E PAGMNPGRS - Min Region+SWA Pages in Exp Storage
 XDWM..E PAGMNS - Min Private Space Pageable Frames
 XDWM..E PAGMNSGB - Min Shared Page Groups Fixed<16MB
 XDWM..E PAGMNSGC - Min Shared Page Groups in CS
 XDWM..E PAGMNSGE - Min Shared Page Groups in ES
 XDWM..E PAGMNSGF - Min Shared Page Groups Fixed
 XDWM..E PAGMNSGS - Min Shared Page Groups in System
 XDWM..E PAGMNSGX - Min Shared Page Groups Aux Slots
 XDWM..E PAGMNSO - Min Memory Objects in HV Shared Storage
 XDWM..E PAGMNSQE - Min SQA Pages in Expanded Storage
 XDWM..E PAGMNSQR - Min SQA Pages in Central Storage
 XDWM..E PAGMNSR - Min HV Shr Stor 4KB Pgs Backed Central
 XDWM..E PAGMNS1 - Min Total HV Shared Memory 4KB Pages
 XDWM..E PAGMNS5 - Min Aux. DASD Slots for HV Shared Pages
 XDWM..E PAGMNS6 - Min Aux. SCM Slots for HV Shared Pages
 XDWM..E PAGMNS7 - Min Shared Page Groups Backed SCM
 XDWM.. PAGMNT - Min Total Frames
 XDWM.. PAGMNTFC - Min Page Frames in Central Storage
 XDWM..E PAGMNTS - Min Total SCM 4KB Paging Blocks
 XDWM.. PAGMNU - Min Unallocated Local Page DS Slots
 XDWM.. PAGMNUIC - Min High UIC
 XDWM..E PAGMNUS - Min Used SCM 4KB Paging Blocks
 XDWM.. PAGMNV - Min Local Page DS VIO Private Slots
 XDWM..E PAGMNVIR - Min VIO Pages in Central Storage
 XDWM..E PAGMNVPIX - Min VIO Pages in Expanded Storage
 XDWM.. PAGMNX - Min Total Fixed Frames

Maximum Data Elements

XDWM..E PAGHSBG - Peak Shared Kbytes Allocated Above 2GB
 XDWM..E PAGMSAPF - Max Application Page Faults per Second
 XDWM..E PAGMSDPG - Max Demand Page-Ins per Second
 XDWM..E PAGMSRES - Max Pages/Second Read from Exp Storage
 XDWM..E PAGMSSPC - Max System Paging per Second
 XDWM..E PAGMSSPF - Max System Page Faults per Second
 XDWM..E PAGMSSPG - Max Demand Paging per Second
 XDWM..E PAGMSSPS - Max System Page/Swap Paging per Second

XDWM..E	PAGMSSWP	- Max Swaps per Second
XDWM..E	PAGMSTPF	- Max Total Page Faults per Second
XDWM..	PAGMXA	- Max Local Page DS Slots
XDWM..	PAGMXACF	- Max Available Central Storage Frames
XDWM..	PAGMXAEF	- Max Available Expanded Storage Frames
XDWM..E	PAGMXAS	- Max Available SCM 4KB Paging Blocks
XDWM..	PAGMXB	- Max Unusable Local Page DS Slots
XDWM..E	PAGMXBS	- Max Bad SCM 4KB Paging Blocks
XDWM..E	PAGMXC	- Max CSA Fixed Frames
XDWM..E	PAGMXCFF	- Max HV Common Storage 4KB Fixed Pages
XDWM..E	PAGMXCO	- Max Memory Objects in HV Common Storage
XDWM..E	PAGMXCR	- Max HV Common Storage 4KB Pages Backed
XDWM..E	PAGMXCS	- Max Aux. Stg Slots for HV Common Pages
XDWM..E	PAGMXCSE	- Max CSA Pages in Expanded Storage
XDWM..E	PAGMXCUI	- Highest Current System UIC
XDWM..E	PAGMXC1	- Max Total HV Common Memory 4KB Pages
XDWM..E	PAGMXC4	- Max Aux. SCM Slots for HV Common Pages
XDWM..	PAGMXES	- Max Expanded Storage Frames
XDWM..	PAGMXF	- Max Unused Page Frames
XDWM..	PAGMXHCF	- Max High Impact Central Storage Frames
XDWM..	PAGMXHEF	- Max High Impact Expanded Storage Frames
XDWM..E	PAGMXHIR	- Max Hiperspace Pages in Central Storage
XDWM..E	PAGMXHPX	- Max Hiperspace Pages in Exp Stor
XDWM..	PAGMXL	- Max # of Fixed Frames below 16 Meg
XDWM..	PAGMXLCF	- Max Low Impact Central Storage Frames
XDWM..	PAGMXLEF	- Max Low Impact Expanded Storage Frames
XDWM..E	PAGMXLF	- Max LPA Fixed Frames
XDWM..E	PAGMXLO	- Max 1MB Memory Objects in System
XDWM..E	PAGMXLP	- Max LPA Frames
XDWM..E	PAGMXLPE	- Max LPA Pages in Expanded Storage
XDWM..E	PAGMXLQE	- Max LSQA Pages in Expanded Storage
XDWM..E	PAGMXLQR	- Max LSQA Pages in Central Storage
XDWM..E	PAGMXLR	- Max 1MB Pages Backed in Central Storage
XDWM..E	PAGMXLS	- Max LSQA Fixed Frames
XDWM..E	PAGMXL1	- Max Total 1MB Fixed Frames
XDWM..E	PAGMXL2	- Max Available 1MB Fixed Frames
XDWM..E	PAGMXL3	- Max Used 1MB Fixed Frames
XDWM..E	PAGMXL4	- Max Total 1MB Pageable Frames
XDWM..E	PAGMXL5	- Max Available 1MB Pageable Frames
XDWM..E	PAGMXL6	- Max Used 1MB Pageable Frames
XDWM..E	PAGMXL7	- Max 1MB Frames in LFAREA Not In-Use
XDWM..	PAGMXM	- Max Local Page DS Non-VIO Private Slots
XDWM..	PAGMXMA	- Max Migration Age
XDWM..	PAGMXMCF	- Max Medium Impact Central Storage Frames
XDWM..	PAGMXMEF	- Max Medium Impact Exp Storage Frames
XDWM..E	PAGMXP	- Max CSA Frames
XDWM..E	PAGMXPFB	- Max Pages Fixed Between 16M and 2G
XDWM..E	PAGMXQ	- Max SQA Fixed Frames
XDWM..E	PAGMXR	- Max Private Fixed Frames

XDWM..E PAGMXRGS - Max Region+SWA Pages in Exp Storage
 XDWM..E PAGMXS - Max Private Space Pageable Frames
 XDWM..E PAGMXSGB - Max Shared Page Groups Fixed<16MB
 XDWM..E PAGMXSGC - Max Shared Page Groups in CS
 XDWM..E PAGMXSGE - Max Shared Page Groups in ES
 XDWM..E PAGMXSGF - Max Shared Page Groups Fixed
 XDWM..E PAGMXSGS - Max Shared Page Groups in System
 XDWM..E PAGMXSGX - Max Shared Page Groups Aux Slots
 XDWM..E PAGMXSO - Max Memory Objects in HV Shared Storage
 XDWM..E PAGMXSQE - Max SQA Pages in Expanded Storage
 XDWM..E PAGMXSQR - Max SQA Pages in Central Storage
 XDWM..E PAGMXSR - Max HV Shr Stor 4KB Pgs Backed Central
 XDWM..E PAGMXS1 - Max Total HV Shared Memory 4KB Pages
 XDWM..E PAGMXS5 - Max Aux. DASD Slots for HV Shared Pages
 XDWM..E PAGMXS6 - Max Aux. SCM Slots for HV Shared Pages
 XDWM..E PAGMXS7 - Max Shared Page Groups Backed SCM
 XDWM.. PAGMXT - Max Total Frames
 XDWM.. PAGMXTFC - Max Page Frames in Central Storage
 XDWM..E PAGMXTS - Max Total SCM 4KB Paging Blocks
 XDWM.. PAGMXU - Max Unallocated Local Page DS Slots
 XDWM.. PAGMXUIC - Max High UIC
 XDWM..E PAGMXUS - Max Used SCM 4KB Paging Blocks
 XDWM.. PAGMXV - Max Local Page DS VIO Private Slots
 XDWM..E PAGMXVIR - Max VIO Pages in Central Storage
 XDWM..E PAGMXVPX - Max VIO Pages in Expanded Storage
 XDWM..E PAGMXX - Max Total Fixed Frames

Derived Data Elements

XDWM.. PAGAVA - Avg Local Page DS Slots
 XDWM.. PAGAVACF - Avg Available Central Storage Frames
 XDWM.. PAGAVAEF - Avg Available Expanded Storage Frames
 XDWM..E PAGAVAS - Avg Available SCM 4KB Paging Blocks
 XDWM.. PAGAVB - Avg Unusable Local Page DS Slots
 XDWM..E PAGAVBS - Avg Bad SCM 4KB Paging Blocks
 XDWM..E PAGAVC - Avg CSA Fixed Frames
 XDWM..E PAGAVCFF - Avg HV Common Storage 4KB Fixed Pages
 XDWM..E PAGAVCO - Avg Memory Objects in HV Common Storage
 XDWM..E PAGAVCR - Avg HV Common Storage 4KB Pages Backed
 XDWM..E PAGAVCS - Avg Aux. Stg Slots for HV Common Pages
 XDWM..E PAGAVCSE - Avg CSA Pages in Expanded Storage
 XDWM..E PAGAVCUI - Average Current System UIC
 XDWM..E PAGAVC1 - Avg Total HV Common Memory 4KB Pages
 XDWM..E PAGAVC4 - Avg Aux. SCM Slots for HV Common Pages
 XDWM..E PAGAVES - Average Expanded Storage Frames
 XDWM..E PAGAVF - Avg Unused Page Frames
 XDWM.. PAGAVHCF - Avg High Impact Central Storage Frames
 XDWM.. PAGAVHEF - Avg High Impact Expanded Storage Frames
 XDWM..E PAGAVHIR - Avg Hiperspace Pages in Central Storage

XDWM..E PAGAVHPX - Avg Hiperspace Pages in Exp Stor
 XDWM..E PAGAVL - Avg # of Fixed Frames below 16 Meg
 XDWM.. PAGAVLCF - Avg Low Impact Central Storage Frames
 XDWM.. PAGAVLEF - Avg Low Impact Expanded Storage Frames
 XDWM..E PAGAVLF - Avg LPA Fixed Frames
 XDWM..E PAGAVLO - Avg 1MB Memory Objects in System
 XDWM..E PAGAVLP - Avg LPA Frames
 XDWM..E PAGAVLPE - Avg LPA Pages in Expanded Storage
 XDWM..E PAGAVLQE - Avg LSQA Pages in Expanded Storage
 XDWM..E PAGAVLQR - Avg LSQA Pages in Central Storage
 XDWM..E PAGAVLR - Avg 1MB Pages Backed in Central Storage
 XDWM..E PAGAVLS - Avg LSQA Fix Frames
 XDWM..E PAGAVL1 - Avg Total 1MB Fixed Frames
 XDWM..E PAGAVL2 - Avg Available 1MB Fixed Frames
 XDWM..E PAGAVL3 - Avg Used 1MB Fixed Frames
 XDWM..E PAGAVL4 - Avg Total 1MB Pageable Frames
 XDWM..E PAGAVL5 - Avg Available 1MB Pageable Frames
 XDWM..E PAGAVL6 - Avg Used 1MB Pageable Frames
 XDWM..E PAGAVL7 - Avg 1MB Frames in LFAREA Not In-Use
 XDWM..E PAGAVM - Avg Local Page DS Non-VIO Private Slots
 XDWM..E PAGAVMA - Average Migration Age
 XDWM.. PAGAVMCF - Avg Medium Impact Central Storage Frames
 XDWM.. PAGAVMEF - Avg Medium Impact Exp Storage Frames
 XDWM..E PAGAVP - Avg CSA Frames
 XDWM..E PAGAVPEA - Average Pages Migrated from ES to Aux
 XDWM..E PAGAVPES - Average Pages Moved to Expanded Storage
 XDWM..E PAGAVPFB - Avg Pages Fixed Between 16M and 2G
 XDWM..E PAGAVPSI - Avg Pages per Swap-In from Aux
 XDWM..E PAGAVPSO - Avg Pages per Swap-Out to Aux
 XDWM..E PAGAVQ - Avg SQA Fixed Frames
 XDWM..E PAGAVR - Average Private Fixed Frames
 XDWM..E PAGAVRGS - Avg Region+SWA Pages in Exp Storage
 XDWM..E PAGAVS - Avg Private Space Pageable Frames
 XDWM..E PAGAVSGB - Avg Shared Page Groups Fixed<16MB
 XDWM..E PAGAVSGC - Avg Shared Page Groups in CS
 XDWM..E PAGAVSGE - Avg Shared Page Groups in ES
 XDWM..E PAGAVSGF - Avg Shared Page Groups Fixed
 XDWM..E PAGAVSGS - Avg Shared Page Groups in System
 XDWM..E PAGAVSGX - Avg Shared Page Groups Aux Slots
 XDWM..E PAGAVSHC - Avg HV Shared Pages in Central Storage
 XDWM..E PAGAVSHS - Avg HV Shared Pages in System
 XDWM..E PAGAVSHX - Avg Aux Slots for HV Shared Pages
 XDWM..E PAGAVSO - Avg Memory Objects in HV Shared Storage
 XDWM..E PAGAVSQE - Avg SQA Pages in Expanded Storage
 XDWM..E PAGAVSQR - Avg SQA Pages in Central Storage
 XDWM..E PAGAVSR - Avg HV Shr Stor 4KB Pgs Backed Central
 XDWM..E PAGAVS1 - Avg Total HV Shared Memory 4KB Pages
 XDWM..E PAGAVS5 - Avg Aux. DASD Slots for HV Shared Pages
 XDWM..E PAGAVS6 - Avg Aux. SCM Slots for HV Shared Pages

XDWM..E PAGAVS7 - Avg Shared Page Groups Backed SCM
XDWM..E PAGAVT - Avg Total Frames
XDWM..E PAGAVTFC - Avg Page Frames in Central Storage
XDWM..E PAGAVTS - Avg Total SCM 4KB Paging Blocks
XDWM.. PAGAVU - Avg Unallocated Local Page DS Slots
XDWM..E PAGAVUIC - Average System High UIC
XDWM..E PAGAVUS - Avg Used SCM 4KB Paging Blocks
XDWM.. PAGAVV - Avg Local Page DS VIO Private Slots
XDWM..E PAGAVVIR - Avg VIO Pages in Central Storage
XDWM..E PAGAVVPX - Avg VIO Pages in Expanded Storage
XDWM..E PAGAVX - Avg Total Fixed Frames
XDWM..E PAGPASGI - Shared Pg (>2GB) Pg-Ins from Aux per Sec
XDWM..E PAGPASGO - Shared Pg (>2GB) Pg-Outs to Aux per Sec
XDWM.. PAGPCAPC - APPC Wait Swap Pct
XDWM.. PAGPCASS - Auxiliary Storage Shortage Swap Pct
XDWM.. PAGPCDWS - Detected Wait Swap Pct
XDWM.. PAGPCEES - Enqueue Exchange Swap Pct
XDWM.. PAGPCEXS - Exchange Swap Pct
XDWM.. PAGPCIRS - In-Real Swap Pct
XDWM.. PAGPCISP - Improve System Paging Rate Swap Pct
XDWM.. PAGPCISU - Improve Central Storage Usage Swap Pct
XDWM.. PAGPCLWS - Long Wait Swap Pct
XDWM.. PAGPCNRS - Request Swap Pct
XDWM.. PAGPCOPI - USS Input Wait Swap Pct
XDWM.. PAGPCOPO - USS Output Wait Swap Pct
XDWM.. PAGPCRLS - Room for Long-Swapped User Swap Pct
XDWM.. PAGPCRSS - Central Storage Shortage Swap Pct
XDWM.. PAGPCTIS - Term Wait Log Swap-Out Candidates Pct
XDWM.. PAGPCTOS - Out Buffer Log Swap-Out Candidates Pct
XDWM.. PAGPCTWS - Total Term Wait Physical Swap-Out Pct
XDWM.. PAGPCULS - Unilateral Swap Pct
XDWM..E PAGPSAPF - Application Page Fault Rate
XDWM..E PAGPSASI - Shared Pg Grp Pg-Ins from Aux per Sec
XDWM..E PAGPSASO - Shared Pg Grp Pg-Outs to Aux per Sec
XDWM..E PAGPSBLK - Blocks Paged In per Second
XDWM..E PAGPSDPG - Demand Page-In Rate
XDWM..E PAGPSESI - Shared Pg Grp Pg-Ins from ES per Sec
XDWM..E PAGPSESO - Shared Pg Grp Pg-Outs to ES per Sec
XDWM..E PAGPSFBN - Pages/Sec Backed During GETMAIN Reqs
XDWM..E PAGPSFFN - Pages/Sec Requested to be Fixed (<2GB)
XDWM..E PAGPSFNM - ES Frames Freed Without Migr. per Second
XDWM..E PAGPSFRN - Fix Requests for Storage (<2GB) per Sec
XDWM..E PAGPSGRN - GETMAIN Requests Issued per Sec
XDWM..E PAGPSHIN - Hiperspace Page-Ins per Second
XDWM..E PAGPSHME - Hiperspace Pgs/Sec Written to Exp Stor
XDWM..E PAGPSHMG - Hiperspace Pgs/Sec Migr from Exp Stor
XDWM..E PAGPSHOT - Hiperspace Page-Outs per Second
XDWM..E PAGPSHRE - Hiperspace Pgs/Sec Read from Exp Stor
XDWM..E PAGPSHRS - Hiperspace Pgs/Sec Read from Central Stg

XDWM..E PAGPSHWS - Hiperspace Pgs/Sec Wrt to Central Stor
XDWM..E PAGPSLBI - LPA Block Page Pg-Ins per Sec
XDWM..E PAGPSNRN - Non-First Reference Faults per Sec
XDWM..E PAGPSPWS - Primary Work Set Pages/Sec Migr. From ES
XDWM..E PAGPSRES - Pages/Second Read from Exp Stor
XDWM..E PAGPSSBI - Sys Pageable Areas Blk Pg-Ins per Sec
XDWM..E PAGPSSPC - System Page Rate
XDWM..E PAGPSSPF - System Page Fault Rate
XDWM..E PAGPSSPG - Demand Page Rate
XDWM..E PAGPSSPS - System Page/Swap Page Rate
XDWM..E PAGPSSWP - Swaps per Second
XDWM..E PAGPSTLS - Logical Swaps per Second
XDWM..E PAGPSTPF - Total Page Fault Rate
XDWM..E PAGPSVME - VIO Pages/Second Written to Exp Stor
XDWM..E PAGPSVMG - VIO Pages/Second Migrated from Exp Stor
XDWM..E PAGPSVRE - VIO Pages/Second Read from Exp Stor
XDWM..E PAGPSVRS - VIO Pages/Sec Read from Central Storage
XDWM..E PAGPSVWS - VIO Pages/Sec Written to Central Storage
XDWM..E PAGPS1RN - First Reference Faults per Sec

5.3.1.3 Usage Considerations

Special considerations or techniques related to using the SCPPAG file are provided below.

1. The following data elements in the SCPPAG file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the SCPPAGnn file in the DETAIL timespan.

CYCLETM - Sampling Time Cycle Length
PAGOPT - SRM OPT Member
PAGOLE - On-Line Frames In Expanded Storage
PAGCF - Installed Frames In Expanded Storage
2. Four data elements are maintained for each measure that requires a minimum, average, and maximum value. For example, in addition to PAGLS (LSQA Fixed Frames), the data elements PAGAVLS, PAGMNL, and PAGMXLS also measure average, minimum, and maximum LSQA Fixed Frames. The PAGLS data element should not be referenced because it is a running sum of all values summarized; the PAGAVLS data element should be used instead. When a data element is carried as a running total of the average, minimum, and maximum values, the average should be used instead of the running count. The MIN/MAX/AVG data element section should always be searched ahead of the ACCUMULATED data elements to identify the data element to be used.
3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:

- o STARTTS represents RMF recording interval start time.
- o ENDTS represents RMF recording interval end time.

5.3.1.4 Retrieval Examples

This section presents typical SCPPAG retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diiiit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's system paging rate for each RMF measurement interval:

```
DATA;
SET &PSCPX..SCPPAG01;
PROC PRINT; VAR SYSID STARTTS ENDTS PAGSPG;
```

2. Print yesterday's average and maximum hourly system paging rate for each hour in zone 1:

```
DATA;
SET &PSCPD..SCPPAG01;
IF ZONE='1';
PROC PRINT; VAR SYSID YEAR MONTH DAY HOUR
              PAGPSSPG PAGMSSPG;
```

3. Print the percentage of all swaps over the last six weeks that fell into each of the eight basic swap reason categories during the prime-time (zone 1 hours), by hour:

```
DATA;
SET &PSCPW..SCPPAG01 &PSCPW..SCPPAG02
    &PSCPW..SCPPAG03 &PSCPW..SCPPAG04
    &PSCPW..SCPPAG05 &PSCPW..SCPPAG06;
IF ZONE='1';
PROC PRINT; VAR SYSID YEAR WEEK HOUR PAGPCLWS
              PAGPCDWS PAGPCULS PAGPCNRS PAGPCASS PAGPCRSS
              PAGPCEXS PAGPCEES PAGPCTIS PAGPCTOS PAGPCTWS;
```

4. Print the number of pages moved to expanded storage yesterday, and the percentage of those pages that were migrated to auxiliary storage, by hour.

```
DATA;
```

```
SET &PSCPD..SCPPAG01;  
PERCENT=100*(PAGPEA/PAGPES);  
PROC PRINT;  
VAR SYSID HOUR PAGPES PAGPEA PERCENT;
```

5.3.2 Logical Channel/CU Activity File (SCPLCA)

The Logical Channel/CU Activity File quantifies the utilization of each logical control unit. There is a single record produced for each logical control unit. This file is typically used when reporting on control unit utilization.

This file is derived from the RMF I/O Queuing Activity record, type 78 subtype 3.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.2.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	LCUID	YEAR	MONTH	DAY	
	HOUR	ENDTS				
DAYS	SYSID	LCUID	YEAR	MONTH	DAY	
	HOUR					
WEEKS	SYSID	LCUID	YEAR	WEEK	ZONE	
	HOUR					
MONTHS	SYSID	LCUID	YEAR	MONTH	ZONE	
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-41. SCPLCA Sort Sequence and Data Granularity

5.3.2.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XDWM...E	LCUID	- Logical Control Unit ID
XD.M...E	MONTH	- Month of Year
XDWM...E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year

XDWM..E YEAR - Year of Century
 XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CSSID - Channel Subsystem Identifier
 XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E EXTSTOR - Expanded Storage Flag
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E IODFCCCT - Intvls where I/O Config. Changed
 XDWM..E IODFCPCT - I/O Config Changed Since Power On Reset
 XDWM..E IODFCRTS - IODF Creation Time Stamp
 XDWM..E IODFPICT - Power On Reset Using IODF
 XDWM..E IODFSUFIX - Suffix of IODF Name
 XDWM..E IODFTICT - I/O Config. Token is Invalid
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMLPNO - Logical Partition Number
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM..E RMFESCDR - Intvls with ESCON Director in Config
 XDWM..E RMFESCON - Intvls where Enabled for ESCON
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 XDWM.. RMFMFL - RMF Maintenance Level Indicator
 X.....E RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number
 XDWM..E SAMPLES - RMF Sample Count
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM..E LCADFDCCM - Defined Number of DCM Managed Channels
 XDWM..E LCAIOTYP - I/O Queueing Measurement Source
 X..... LCAISS - RMF Samples Skipped Flag

Accumulated Data Elements

XDWM..E LCAABY - Samples When All Channel Paths were Busy
 XDWM..E LCAADDCT - Intvls with LCU Dynamically Added
 XDWM..E LCABSY - Number of CPMT Samples Channel Path Busy
 XDWM..E LCACHA - Measured Channel Count

XDW..E LCACHACT - Intvls with LCU Config. Change Attempted
XDW..E LCACHALL - Total Channel Count
XDW..E LCACHGCT - Intvls with LCU Dynamically Changed
XDW..E LCACMRM - Command Response Time
XDW..E LCACSWTM - Channel Subsystem Wait Time
XDW..E LCACUB - Requests Deferred: Control Unit Busy
XDW..E LCACUBTM - Control Unit Busy Delay Time
XDW..E LCADCM - Intvls with DCM Managed Channels in LCU
XDW..E LCADCMBS - Control Unit Busy Count for DCM Channels
XDW..E LCADCMCB - Cntl Unit Busy Delay Time (DCM Channels)
XDW..E LCADCMCR - Command Response Time for DCM Channels
XDW..E LCADCMDB - Dir. Port Busy Count for DCM Channels
XDW..E LCADCMPT - Path Taken Count for DCM Channels
XDW..E LCADCMSB - Switch Busy Count Summation (DCM Ch.)
XDW..E LCADPB - Number of Times ESCON Director Port Busy
XDW..E LCADV - Requests Deferred: Device Busy
XDW..E LCADVCTM - Device Connect Time
XDW..E LCADVDTM - Device Disconnect Time
XDW..E LCAFCNCT - Intvls with FICON Channels in LCU
XDW..E LCAHPAVC - Intvls with HyperPAV Devices
XDW.. LCAISMP - Number of Invalid Samples
XDW..E LCAISSCT - Intvls with RMF Samples Skipped
XDW.. LCANDACT - Intvls with No STCP Data Available
XDW.. LCANHWCT - Intvls with No Hardware Measurements
XDW.. LCANUCCT - Intvls with No UCB Found
XDW..E LCAPATCT - Intvls with Valid Path Attributes
XDW..E LCAPT - Number of Times Path was Taken
XDW..E LCAQRQS - Queued Requests
XDW.. LCAQUE - Requests Queued to LCU Accum at IST
XDW..E LCAQDFR - Requests Deferred: Total
XDW..E LCAQRS - Total I/O Requests
XDW..E LCARSMP - Number of RMF Samples
XDW..E LCASAMP - Number of CPMT Samples
XDW..E LCASBS - Switch Busy Count Summation
XDW..E LCASIS - Successful Selection Attempts
XDW..E LCATOHIO - Total HyperPAV I/O Requests
XDW..E LCATONAI - Total HyperPAV I/Os Waiting for Alias
XDW..E LCAVARCT - Intvls when Channel Path was Varied
XDW..E LCAXMBCT - Intvls with Extended I/O Measurements

Minimum Data Elements

XDW..E LCAMNDM - Min Number of DCM Managed Channels Used

Maximum Data Elements

XDW.. LCAMPQD - Max Pct Requests Deferred
XDW.. LCAMSRQD - Max Requests Per Second
XDW..E LCAMXAID - Max HyperPAV Aliases for a Base Device

XDWM..E LCAMXAIU - Max Number of HyperPAV Aliases Used
XDWM..E LCAMXDCM - Max Number of DCM Managed Channels Used
XDWM..E LCAMXIOQ - Max Number of I/O Requests Queued
XDWM.. LCAMXQL - Max Queue Length

Derived Data Elements

XDWM..E LCAAVCMR - Avg Command Response Time
XDWM..E LCAAVCSW - Avg Channel Subsystem Wait Time
XDWM..E LCAAVCUB - Avg Control Unit Busy Delay Time
XDWM..E LCAAVDCB - Avg Cntl Unit Busy Delay Time (DCM Ch.)
XDWM..E LCAAVDCR - Avg Command Response Time (DCM Channels)
XDWM..E LCAAVDPT - Avg Path Taken Rate for DCM Channels
XDWM..E LCAAVOEX - Avg Open Exchanges
XDWM.. LCAAVQL - Avg Queue Length
XDWM..E LCADTCNC - Data Transfer Concurrency
XDWM..E LCAPCABY - Pct of Samples All Channel Paths Busy
XDWM..E LCAPCCUB - Pct Requests Deferred: Control Unit Busy
XDWM..E LCAPCDBS - Pct Control Unit Busy for DCM Channels
XDWM..E LCAPCDDP - Pct Dir. Port Busy for DCM Channels
XDWM..E LCAPCDPB - Pct Requests Deferred: Dir. Port Busy
XDWM..E LCAPCDVB - Pct Requests Deferred: Device Busy
XDWM..E LCAPCNAI - Pct HyperPAV I/Os Waiting for Alias
XDWM..E LCAPCRQD - Pct Requests Deferred
XDWM.. LCAPSRQD - Requests Per Second

5.3.2.3 Usage Considerations

Special considerations or techniques related to using the SCPLCA file are provided below.

1. The following data element in the SCPLCA file has meaning only in the DETAIL timespan; it loses significance once summarization has been performed. This data element should only be referenced when using the SCPLCA file in the DETAIL timespan.

CYCLETM - Sampling Time Cycle Length

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.2.4 Retrieval Examples

This section presents a typical SCPARD retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &ddiit, where d is the database identifier, iiii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print total number of times all channel paths were taken for logical control units 000B, 0001, 0002, and 0003.

```
DATA;  
SET &PSCPX..SCPLCA01;  
IF INDEX('000B 0001 0002 0003', LCUID);  
PROC PRINT; VAR SYSID STARTTS ENDTS LCAPT;
```

2. Print yesterday's average and maximum percent of requests deferred for each hour in zone 1 for all logical channels:

```
DATA;  
SET &PSCPD..SCPLCA01;  
IF ZONE='1';  
PROC PRINT; VAR SYSID YEAR MONTH DAY HOUR  
LCAPSRQD LCAMSRQD;
```

5.3.3 Page/Swap Data Set Activity File (SCPPSD)

The Page/Swap Data Set Activity File quantifies the utilization of auxiliary page slots and the use of the page/swap data sets. There is a single record for each page/swap data set. This file is typically used when reporting on the paging and swapping activity by data set.

This file is derived from the RMF Page/Swap Data Set Activity record, type 75.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.3.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID HOUR	PSDDSN ENDTS	YEAR	MONTH	DAY	
DAYS	SYSID HOUR	PSDDSN	YEAR	MONTH	DAY	
WEEKS	SYSID HOUR	PSDDSN	YEAR	WEEK	ZONE	
MONTHS	N/A					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-42. SCPPSD Sort Sequence and Data Granularity

5.3.3.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD...E	MONTH	- Month of Year
XDW...E	PSDDSN	- Page/Swap Data Set Name
XDW...E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDW...E	YEAR	- Year of Century
XDW...E	ZONE	- Time Zone

Common Data Elements

XDW...E CTLUNAME - Control Unit Name
 XDW...E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDW...E DEVADDR - Device Address/Number
 XDW...E DEVCLASS - Device Class
 XDW...E DEVNAME - Device Name
 XDW...E DEVNUM - Device Number
 XDW...E DEVTYPE - Device Type
 XDW...E DURATION - Recording Interval Time
 XDW...E ENDTS - End Time Stamp
 XDW...E EXTSTOR - Expanded Storage Flag
 XDW...E INTERVLS - Number of Recording Intervals
 XDW...E MICSVER - CA MICS Version Number
 XDW...E MVSLEVEL - MVS Software Level
 XDW...E ORGSYSID - Originating System Identification
 XDW...E PRSMLPNO - Logical Partition Number
 XDW...E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDW...E RMFESAME - z/Architecture Mode Indicator
 XDW...E RMFESCDR - Intvls with ESCON Director in Config
 XDW...E RMFESCON - Intvls where Enabled for ESCON
 XDW... RMFGMTOF - GMT to Local Time Offset
 XDW...E RMFIML - I/O Measurement Level
 XDW... RMFMFL - RMF Maintenance Level Indicator
 X.....E RMFSRL - SMF Record Level Change Number
 XDW...E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDW...E RMFVER - RMF Version Number
 XDW...E SAMPLES - RMF Sample Count
 XDW...E STARTTS - Start Time Stamp
 XDW...E SYSNAME - System Name
 XDW...E SYSPLEX - Sysplex Name
 XDW...E VOLSER - Volume Serial Number

Retained Data Elements

X..... PSDISS - RMF Samples Skipped Flag
 X..... PSDONL - DS Came Online this Intvl Y/N
 XDW...E PSDPST - Page Space Type
 X..... PSDUSABL - Data Set Usable Y/N
 X..... PSDVFF - Data Set Varied Offline This Intvl
 X..... PSDVIO - Data Set Accepts VIO Pages

Accumulated Data Elements

XDW...E PSDBDS - Unusable Slots or Swap Sets
 XDW...E PSDDS - Number of Data Sets
 XDW...E PSDISSCT - Intvls with RMF Samples Skipped

XDW... PSDONLCT - Intvls with DS Varied Online
XDW...E PSDPGX - Pages Transferred
XDW...E PSDREQ - Data Set Requests Observed
XDW...E PSDRSMP - Number of RMF Samples
XDW...E PSDSIO - Data Set I/O Requests
XDW...E PSDSLA - Total Slots in Data Set
XDW...E PSDU - Slots or Swap Sets Used
XDW... PSDUSACT - Intvls with DS Not Usable
XDW...E PSDUSE - Samples when Data Set Used by ASM
XDW...E PSDVFFCT - Intvls when DS was Varied Offline
XDW... PSDVIOCT - Intvls when DS Accepted VIO Pages

Minimum Data Elements

XDW... PSDMNA - Min Allocated Slots
XDW... PSDMNU - Min Used Slots or Swap Sets

Maximum Data Elements

XDW...E PSDMPUSE - Max Pct Data Set Used by ASM
XDW...E PSDMSIOR - Max I/O Requests per Second
XDW... PSDMXA - Max Allocated Slots
XDW...E PSDMXSTM - Max Service Time
XDW...E PSDMXU - Max Used Slots or Swap Sets

Derived Data Elements

XDW...E PSDAVA - Avg Allocated Slots
XDW...E PSDAVSTM - Avg Service Time
XDW...E PSDAVU - Avg Used Slots or Swap Sets
XDW...E PSDPCUSE - Pct Data Set Used by ASM
XDW...E PSDPSIOR - I/O Requests per Second

5.3.3.3 Usage Considerations

Special considerations or techniques related to using the SCPPSD file are provided below.

1. The following data elements in the SCPPSD file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the SCPPSDnn file in the DETAIL timespan.

CYCLETM - Sampling Time Cycle Length
DEVADDR - Device Address
DEVTYPE - Device Type
DEVCLASS - Device Class
VOLSER - Volume Serial
PSDUSABL - Data Set Usable Indicator
PSDONL - Data Set Came Online Indicator

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o DAY and DAYNAME should not be used in WEEKS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.3.4 Retrieval Examples

This section presents a typical SCPSRC retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's average service time for each Page Swap data set for each RMF measurement interval;

```
DATA;
SET &PSCPX..SCPPSD01;
PROC PRINT; VAR SYSID STARTTS ENDTS PSDDSN PSDAVSTM;
```

2. Select page/swap data sets having more than 150,000 I/O requests and a service time in excess of 0.3 seconds for each hour of the day:

```
DATA;
SET &PSCPD..SCPPSD01;
IF PSDREQ GT 150000;
IF PSDAVSTM GT 0.3;
PROC PRINT; VAR SYSID YEAR MONTH DAY HOUR
              PSDDSN PSDREQ PSDAVSTM;
```

3. Rank the page/swap data sets by I/O activity and I/O service time for the last eight weeks using only prime time (zone 1) hours:

```
DATA FILE1;
SET &PSCPW..SCPPSD01 &PSCPW..SCPPSD02
    &PSCPW..SCPPSD03 &PSCPW..SCPPSD04;
IF ZONE='1';
%LET BY = SYSID PSDDSN;
%LET BREAK = PSDDSN;

PROC SORT DATA=FILE1; BY &BY;

DATA FILE1;
SET FILE1;
%PSDSUM;
```



```
PROC SORT DATA=FILE1; BY DESCENDING PSDREQ;
PROC PRINT; VAR SYSID PSDDSN PSDREQ PSDAVSTM;
TITLE 'RANKING OF HIGHEST I/O DATA SETS';

PROC SORT DATA=FILE1; BY DESCENDING PSDAVSTM;
PROC PRINT; VAR SYSID PSDDSN PSDREQ PSDAVSTM;
TITLE 'RANKING OF DATA SETS WITH HIGHEST SERVICE TIME ';
```

5.3.4 Resource Enqueue Activity File (SCPENQ)

The Resource Enqueue Activity File identifies the resources involved in an enqueue or dequeue contention situation. This file is typically used when reporting these resource contention situations.

This file is derived from the RMF Enqueue Activity record, type 77.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.4.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSID	ENQQNM	ENQRNM	ENQRHEX	YEAR	
	MONTH	DAY	HOUR	ENDTS		
DAYS	SYSID	ENQQNM	ENQRNM	ENQRHEX	YEAR	
	MONTH	DAY	HOUR			
WEEKS	SYSID	ENQQNM	ENQRNM	YEAR	WEEK	
	ZONE	HOUR				
MONTHS	N/A					
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-43. SCPENQ Sort Sequence and Data Granularity

5.3.4.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	ENQQNM	- Major Name of Resource
XDW...E	ENQRNM	- Minor Name Of Resource
XDW...E	HOURL	- Hour of Day
XD...E	MONTH	- Month of Year
XDW...E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDW...E	YEAR	- Year of Century

XDW...E ZONE - Time Zone

Common Data Elements

XDW...E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDW...E DURATION - Recording Interval Time
XDW...E ENDTS - End Time Stamp
XDW...E ENQRHEX - Hex Minor Name Expanded
XDW...E EXTSTOR - Expanded Storage Flag
XDW...E INTERVLS - Number of Recording Intervals
XDW...E MICSVER - CA MICS Version Number
XDW...E MVSLEVEL - MVS Software Level
XDW...E ORGSYSID - Originating System Identification
XDW...E PRSMLPNO - Logical Partition Number
XDW...E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDW...E RMFESAME - z/Architecture Mode Indicator
XDW...E RMFESCDR - Intvls with ESCON Director in Config
XDW...E RMFESCON - Intvls where Enabled for ESCON
XDW... RMFGMTOF - GMT to Local Time Offset
XDW...E RMFIML - I/O Measurement Level
XDW... RMFMFL - RMF Maintenance Level Indicator
X.....E RMFSRL - SMF Record Level Change Number
XDW...E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDW...E RMFVER - RMF Version Number
XDW...E STARTTS - Start Time Stamp
XDW...E SYSNAME - System Name
XDW...E SYSPLEX - Sysplex Name

Retained Data Elements

X..... ENQCONST - Resource Still in Contention
X..... ENQD01 - Job Name 1 of Current Resource Owner
X..... ENQD02 - Job Name 2 of Current Resource Owner
X..... ENQDW1 - Job Name 1 Waiting for Resource
X..... ENQDW2 - Job Name 2 Waiting for Resource
X..... ENQFG1 - Enqueue Status Indicator
X..... ENQGLBAL - Scope of Resource: Global or Local
X..... ENQJ01ST - Owner Control: Exclusive or Shared
X..... ENQJW1ST - First Job Waiting: Exclusive or Shared
X..... ENQJW2ST - Second Job Waiting: Exclusive or Shared
XDW... ENQRLN - Minor Name Length
X..... ENQSCOPE - System Scope: Systems (S) or System (P)
X..... ENQS01 - System ID of Job Name 1 Resource Owner
X..... ENQS02 - System ID of Job Name 2 Resource Owner
X..... ENQSW1 - System ID of Job 1 Awaiting Resource
X..... ENQSW2 - System ID of Job 2 Awaiting Resource

Accumulated Data Elements

XDW...	ENQDOW	- Number Current Owners Using Resource
XDW...	ENQDWR	- Current Jobs Waiting for Resource
XDW...	ENQEVN	- Total Contention Events
XDW...	ENQQLT	- Total Waiting Requests
XDW...	ENQQL1	- Enqueue Length 1
XDW...	ENQQL2	- Enqueue Length 2
XDW...	ENQQL3	- Enqueue Length 3
XDW...	ENQQL4	- Enqueue Length 4 or More
XDW...	ENQWTT	- Total Resource Contention Time

Minimum Data Elements

XDW...	ENQMEX	- Min Exclusive Requests
XDW...	ENQMNSH	- Min Shared Requests
XDW...	ENQMNWTT	- Min Resource Contention Time

Maximum Data Elements

XDW...	ENQMXEX	- Max Exclusive Requests
XDW...	ENQMXQL	- Max Queue Length
XDW...	ENQMXSH	- Max Shared Requests
XDW...	ENQMXWTT	- Max Resource Contention Time

Derived Data Elements

XDW...	ENQAVQL	- Avg Queue Length
XDW...	ENQAVWTT	- Avg Resource Contention Time
XDW...	ENQPCQL1	- Pct Queue Length = 1
XDW...	ENQPCQL2	- Pct Queue Length <= 2
XDW...	ENQPCQL3	- Pct Queue Length <= 3

5.3.4.3 Usage Considerations

Special considerations or techniques related to using the SCPENQ file are provided below.

1. The following data elements in the SCPENQ file have meaning only in the DETAIL timespan; they lose significance once summarization has been performed. These data elements should only be referenced when using the SCPENQnn file in the DETAIL timespan.

ENQFG1 - Enqueue Status Indicator
ENQJW1ST - Job 1 Wait Status
ENQJW2ST - Job 2 Wait Status
ENQJ01ST - Job 1 Owner Status
ENQJ02ST - Job 2 Owner Status
ENQCONST - Resource Contention Status
ENQD01 - Job Name 1 of Current Resource Owner
ENQD02 - Job Name 2 of Current Resource Owner
ENQDW1 - Job Name 1 Waiting for Resource
ENQDW2 - Job Name 2 Waiting for Resource
ENQSCOPE - System Scope Status
ENQRHEX - Hex Minor Name Expanded

2. In some cases the ENQRNM data element provides an interpretation of the minor resource field when the field is an encoded binary value.

The ENQRNM data element is built to interpret the ASID contained in the minor resource field for the following major resource names, so that the ENQRNM element equals 'ASID=hhhh':

SYSZIGGI, SYSZTIOT, or SYSSJWTP

The ENQRNM data element is built to interpret the relative block address (RBA) contained in the minor resource field for the following major resource names, so the ENQRNM element equals 'RBA=hhhhhh':

SYSIKJBC

The ENQRNM data element is built to interpret the catalog auxiliary work area (CAXWA) contained in the minor resource field, for the following major resource names, so the ENQRNM element equals 'CAXWA=hhhhhhh':

SYSZRPLW, IEZIGGV3, or SYSZCAXW

The ENQRNM data element is built to interpret the unit control block address (UCBADDR) contained in the minor resource field for the following major resource names so that the ENQRNM element equals 'UCBADDR=hhhhhhhh':

SYSZUSRL or SYSZVMV

For major resource names other than those specified above, hexadecimal and special characters other than . - \$ are set to blank to alleviate unprintable characters being encoded in the ENQRNM field.

3. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o DAY and DAYNAME should not be used in WEEKS.
4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.4.4 Retrieval Examples

This section presents a typical SCPIOC retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's occurrences of the SMF buffer enqueues for each RMF measurement interval;

```
DATA;  
SET &PSCPX..SCPENQ01;  
IF ENQQNM='SYSZSMF1';  
PROC PRINT; VAR SYSID ENDTS ENQRNM ENQLT ENQVET;
```

2. Select resource enqueue conflicts for which the queue exceeded a length of 3 or greater, more than 30% of the time, for each hour of the day:

```
DATA;  
SET &PSCPD..SCPENQ01;  
IF ENQPCQL2 LT 70;  
PROC PRINT; VAR SYSID YEAR MONTH DAY HOUR  
               ENQQNM ENQRNM ENQL1 ENQL2  
               ENQL3 ENQL4;
```


5.3.5 Trace Activity File (SCPTRC)

The Trace Activity File identifies the field names traced, including their minimum, maximum, sum, sum of squares, standard deviation, and average values. This file is typically used when reporting on fields traced.

This file is derived from the RMF Trace Activity record, type 76.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.5.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity				
DETAIL	SYSID	TRCNAME	TRCTYPE	TRCSETNO	ENDTS
DAYS	N/A				
WEEKS	N/A				
MONTHS	N/A				
YEARS	N/A				
TABLES	N/A				

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-44. SCPTRC Sort Sequence and Data Granularity

5.3.5.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

- X....E ENDTS - End Time Stamp
- X....E SYSID - System Identifier
- X....E TRCNAME - Field Name Traced
- X....E TRCSETNO - Interval Sample Set Number
- X....E TRCTYPE - Interval or Set Type Indicator

Common Data Elements

X.....E CYCLETM - RMF Sampling Cycle Interval
X.....E DAYNAME - Name of Day of Week
X.....E DURATION - Recording Interval Time
X.....E EXTSTOR - Expanded Storage Flag
X.....E INTERVLS - Number of Recording Intervals
X.....E MICSVER - CA MICS Version Number
X.....E MVSLEVEL - MVS Software Level
X.....E ORGSYSID - Originating System Identification
X.....E PRSMLPNO - Logical Partition Number
X.....E PRSMUSCT - Intvls Using PR/SM LPAR Feature
X.....E RMFESAME - z/Architecture Mode Indicator
X.....E RMFESCDR - Intvls with ESCON Director in Config
X.....E RMFESCON - Intvls where Enabled for ESCON
X..... RMFGMTOF - GMT to Local Time Offset
X.....E RMFIML - I/O Measurement Level
X..... RMFMFL - RMF Maintenance Level Indicator
X.....E RMFSRL - SMF Record Level Change Number
X.....E RMFSYNCH - Intvls with RMF Synchronized to SMF
X.....E RMFVER - RMF Version Number
X.....E SAMPLES - RMF Sample Count
X.....E STARTTS - Start Time Stamp
X.....E SYSNAME - System Name
X.....E SYSPLEX - Sysplex Name

Retained Data Elements

X.....E TRCDOMFD - Domain Field Flag
X..... TRCDOMTF - Domain Tracing Termination Flag
X.....E TRCENDVA - Last Trace Value
X.....E TRCINV - Invalid Data Flag
X..... TRCISS - RMF Samples Skipped Flag
X..... TRCLPE - LPB Trace Request Ended Flag
X..... TRCLPR - LPB Trace Requested Flag

Accumulated Data Elements

X.....E TRCDMFCT - Intvls with Domain Field Flag Set
X..... TRCDMTCT - Intvls with Domain Tracing Terminated
X.....E TRCINVCT - Intvls with Invalid Data
X.....E TRCISSCT - Intvls with RMF Samples Skipped
X..... TRCLPECT - Intvls with LPB Trace Request Ended
X..... TRCLPRCT - Intvls with LPB Trace Requested
X.....E TRCRSMP - Number of RMF Samples
X..... TRCSSQ - Sum of Squares of Trace Value
X.....E TRCSUM - Sum of Trace Value

Minimum Data Elements

X.....E TRCMN - Minimum Trace Value

Maximum Data Elements

X.....E TRCMX - Maximum Trace Value

Derived Data Elements

X.....E TRCAV - Avg Trace Value

X..... TRCSTDEV - Standard Deviation of Trace Value

5.3.5.3 Usage Considerations

Special considerations or techniques related to using the SCPTRC file are provided below.

1. By default, the SCPTRC file exists in the DETAIL timespan and is compressed. If you code your prefix.MICS.PARMS(RMFOPS) OPTIONS statement to set the RMF trace option to NONE, then the SCPTRC01 file will be empty as described in the OPTIONS statement documentation in section 7.3.1 of this guide.
2. The data element TRCTYPE obtains its value from the RMFOPS OPTIONS statement.
3. The DURATION data element is set to the RMF interval elapsed time if TRCTYPE='I' for interval record. If TRCTYPE='S' for sample set record, DURATION is equal to the RMF interval elapsed time divided by the number of sample sets provided for this trace.
4. The purpose of ENDTS and STARTTS is described below:
 - o STARTTS represents RMF recording interval or sample set start time based on user option defined by TRCTYPE above.
 - o ENDTS represents RMF recording interval or sample set end time.

5.3.5.4 Retrieval Examples

This section presents a typical SCPSWP retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &ddiit, where d is the database identifier, iiii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print trace values for field RCVASMQA.

```
DATA;  
SET &PSCPX..SCPTRC01;  
IF TRCNAME EQ 'RCVASMQA';  
PROC PRINT;  
VAR STARTTS ENDTS CYCLETM  
    TRCNAME TRCTYPE TRCSETNO TRCRSMP  
    TRCENDVA TRCMN TRCMX TRCAV;  
TITLE 'TRACE VALUES FOR FIELD RCVASMQA';
```

5.3.6 Address Space Activity File (SCPARD)

The Address Space Activity File quantifies the resource consumption, service, and status of each address space. A record is written for each address space that exists at the end of the recording interval. This file is typically used when reporting on address space activity.

This file is derived from the RMF Monitor II Activity record, type 79 subtype 2.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.6.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	ASID	ARDTYPE	USER	YEAR
		MONTH	DAY	HOUR	ENDTS	
	DAYS	N/A				
	WEEKS	N/A				
	MONTHS	N/A				
	YEARS	N/A				
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES	N/A				
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-45. SCPARD Sort Sequence and Data Granularity

5.3.6.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

X....E	ARDDTYPE	- Address Space Type
X....E	ASID	- Address Space Identification
X....E	DAY	- Day of Month
X....E	HOURL	- Hour of Day
X....E	MONTH	- Month of Year

X.....E SYSID - System Identifier
 X.....E USER - User Identification
 X.....E WEEK - Week of Year
 X.....E YEAR - Year of Century
 X.....E ZONE - Time Zone

Common Data Elements

X.....E DAYNAME - Name of Day of Week
 X.....E DOMAIN - Domain Number
 X.....E DURATION - Recording Interval Time
 X.....E ENDTS - End Time Stamp
 X.....E EXTSTOR - Expanded Storage Flag
 X.....E INTERVLS - Number of Recording Intervals
 X.....E MICSVER - CA MICS Version Number
 X.....E MVSLEVEL - MVS Software Level
 X.....E ORGSYSID - Originating System Identification
 X.....E PERFGRP - Performance Group Number
 X.....E PERFGRPN - Performance Group Name
 X.....E PRSMLPNO - Logical Partition Number
 X.....E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 X.....E RMFESAME - z/Architecture Mode Indicator
 X.....E RMFESCDR - Intvls with ESCON Director in Config
 X.....E RMFESCON - Intvls where Enabled for ESCON
 X.....E RMFGMTOF - GMT to Local Time Offset
 X.....E RMFIML - I/O Measurement Level
 X.....E RMFMFL - RMF Maintenance Level Indicator
 X.....E RMFM2ID - RMF Monitor II Session ID
 X.....E RMFM2RID - RMF Monitor II Measurement Name
 X.....E RMFM2SST - RMF Monitor II Snapshot Time
 X.....E RMFSRL - SMF Record Level Change Number
 X.....E RMFSUPAV - Intvls with zIIP Processors Available
 X.....E RMFSYNCH - Intvls with RMF Synchronized to SMF
 X.....E RMFVER - RMF Version Number
 X.....E RMFZAPAV - Intvls with zAAP Processors Available
 X.....E STARTTS - Start Time Stamp
 X.....E SYSNAME - System Name
 X.....E SYSPLEX - Sysplex Name
 X.....E WLMCLASS - Service Class Name
 X.....E WLMCLSPD - Service/Report Class Period
 X.....E WLMGROUP - Resource Group Name
 X.....E WLMSUPNF - zIIP Service Time Normalization Factor
 X.....E WLMWRKLD - Workload Name
 X.....E WLMZAPNF - zAAP Service Time Normalization Factor

Retained Data Elements

X.....E ARDLOC - Address Space Status
 X.....E ARDXMEM - Cross Memory Address Space

Accumulated Data Elements

```

X..... ARDASSTM - Additional SRB Service Time
X..... ARDAVABS - Avg Absorption Rate
X.....E ARDAVRSF - Avg Real Frames
X..... ARDCPIN - CSA Page-Ins
X..... ARDCPRC - Intvls with CPU Critical
X..... ARDCPRE - Address Space is Storage Critical
X..... ARDCPRI - Storage Critical Transactions Served
X..... ARDCPUP - Intvls with CPU Protection
X..... ARDCPUTM - Total CPU Time on Behalf
X.....E ARDCSWP - CSA Frames Swapped In
X..... ARDEXCPS - EXCP Count
X..... ARDFXAB - Fixed Frames Between 16M and 2G
X..... ARDFXBL - Fixed Frames Below 16 Meg
X.....E ARDGOAL - Intvls with WLM Goal Honored
X.....E ARDHP - Hiperspace Paging by Current Transact.
X..... ARDLSQA - LSQA Fixed Frames
X.....E ARDLSQE - LSQA Pages in Expanded Storage
X.....E ARDLSQR - LSQA Pages in Real Storage
X.....E ARDLSWP - LPA Frames Swapped In
X..... ARDNLQF - Non-LSQA Fixed Frames
X..... ARDPHTM - Preemptable-class SRB Time
X.....E ARDPIN - Private Area Page-Ins
X..... ARDPPIO - Non-VIO Page-Ins
X..... ARDPRFX - Private Fixed Frames
X..... ARDPSSEC - Step Product of Frame
X..... ARDQSC - Intvls with Address Space Quiesced
X..... ARDRPTTM - Report Time of the Session
X.....E ARDRSM - Intvls with Incorrect RSM Data
X..... ARDSER - Service Units
X.....E ARDSRV - Address Space is a Server
X..... ARDSTOP - Intvls with Storage Protection
X..... ARDSUPCT - zIIP Eligible CPU Time on CP
X..... ARDSUPUT - Un-normalized zIIP CPU Time
X..... ARDSWP - Pages Swapped In
X..... ARDTAFF - Address Space has Temporal Affinities
X..... ARDTAT - Transaction Active Time
X.....E ARDTCBTM - TCB CPU Time
X.....E ARDTCPTM - Home Address Space Total CPU Time
X..... ARDTDEV - Total Device Connect Time
X.....E ARDTRT - Transaction Residency Time
X..... ARDTTM - Elapsed Time of Last Transaction
X..... ARDTTX - Number of Transactions
X.....E ARDTWSS - SRM Target Working Set
X..... ARDTXME - Resp. Time Goals Management Disabled
X..... ARDVPIO - VIO Page-Ins
X.....E ARDXMSCT - Intvls with Cross Memory Service

```

X..... ARDZAPCT - zAAP Eligible CPU Time on CP
X..... ARDZAPUT - Un-normalized zAAP CPU Time

5.3.6.3 Usage Considerations

Special considerations or techniques related to using the SCPARD file are provided below.

1. The start timestamp of the record must be calculated from the end timestamp of the previous ARD record. STARTTS and DURATION are calculated as the difference between two record timestamps. For the first ARD record from a Monitor II session, STARTTS and DURATION are set to missing values.
2. In the first record from a Monitor II session, the values for ARDCTX, ARDCTM, ARDTCBTM, ARDPSSEC, ARDCPUTM, ARDSER, ARDTAT, and ARDEXCPS are the step totals. In all other cases, the values computed are interval totals.
3. ARDTAT, ARDSER, and ARDCTX may only be measured for address spaces in memory when the record is written. These fields are set to missing for address spaces out of memory. The values calculated for these fields represent the values accumulated between successful measurements.

5.3.6.4 Retrieval Examples

This section presents a typical SCPIOP retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print hiperspace paging for job PROD017:

```
DATA;  
SET &PSCPX..SCPARD01;  
IF USER EQ 'PROD017';  
  
PROC PRINT;  
VAR STARTTS ENDTS DURATION USER ARDHP;  
TITLE 'HIPERSPACE PAGING FOR JOB PROD017';
```

5.3.7 Real Storage/CPU/SRM Activity File (SCPSRC)

The Real Storage/CPU/SRM Activity File quantifies the use of real storage, processor utilization, and the length of the ASM and SRM queues. A record is created for each Monitor II interval. This file is typically used when reporting on the use of frames in SQA, CSA, LPA, LSQA, and so on.

This file is derived from the RMF Monitor II Activity record, type 79 subtype 3.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.7.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	YEAR	MONTH	DAY	hour
		ENDTS				
	DAYS	N/A				
	WEEKS	N/A				
	MONTHS	N/A				
	YEARS	N/A				
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES	N/A				
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-46. SCPSRC Sort Sequence and Data Granularity

5.3.7.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

X....E	DAY	- Day of Month
X....E	HOURL	- Hour of Day
X....E	MONTH	- Month of Year
X....E	SYSID	- System Identifier
X....E	WEEK	- Week of Year
X....E	YEAR	- Year of Century
X....E	ZONE	- Time Zone

Common Data Elements

X.....E DAYNAME - Name of Day of Week
 X.....E DURATION - Recording Interval Time
 X.....E ENDTS - End Time Stamp
 X.....E EXTSTOR - Expanded Storage Flag
 X.....E INTERVLS - Number of Recording Intervals
 X.....E MICSVER - CA MICS Version Number
 X.....E MVSLEVEL - MVS Software Level
 X.....E ORGSYSID - Originating System Identification
 X.....E PRSMLPNO - Logical Partition Number
 X.....E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 X.....E RMFESAME - z/Architecture Mode Indicator
 X.....E RMFESCDR - Intvls with ESCON Director in Config
 X.....E RMFESCON - Intvls where Enabled for ESCON
 X..... RMFGMTOF - GMT to Local Time Offset
 X.....E RMFIML - I/O Measurement Level
 X..... RMFMFL - RMF Maintenance Level Indicator
 X..... RMFM2ID - RMF Monitor II Session ID
 X..... RMFM2RID - RMF Monitor II Measurement Name
 X..... RMFM2SST - RMF Monitor II Snapshot Time
 X.....E RMFSRL - SMF Record Level Change Number
 X.....E RMFSYNCH - Intvls with RMF Synchronized to SMF
 X.....E RMFVER - RMF Version Number
 X.....E STARTTS - Start Time Stamp
 X.....E SYSNAME - System Name
 X.....E SYSPLEX - Sysplex Name

Accumulated Data Elements

X..... SRCAFC - Available Frame Count
 X..... SRCASMQ - SRM ASM Queue Length
 X..... SRCCLPA - CSA + LPA Frames
 X..... SRCCLPAF - CSA + LPA Fixed Frames
 X..... SRCCPUU - Processor Utilization
 X..... SRCCSA - CSA Pageable Frames
 X..... SRCCSAF - CSA Fixed Frames
 X..... SRCINQ - Number of ASIDs In Storage
 X..... SRCLOUT - Number of ASIDs Logically Swapped
 X..... SRCLPA - LPA Pageable Frames
 X..... SRCLPAF - LPA Fixed Frames
 X..... SRCLSQA - LSQA Fixed Frames
 X..... SRCLSQE - LSQA Pages in Expanded Storage
 X..... SRCLSQR - LSQA Pages in Central Storage
 X..... SRCNFP - Private Non-LSQA + LSQA Fixed Frames
 X..... SRCNLQF - Private Non-LSQA Fixed Frames
 X..... SRCOTRQ - Number of ASIDs Out and Ready
 X..... SRCREADY - Length of ASCB Ready Queue
 X..... SRCRPTTM - Report Time of the Session

X.....	SRCSQAF	- SQA Fixed Frames
X.....	SRCSQE	- SQA Pages in Expanded Storage
X.....	SRCSQR	- SQA Pages in Central Storage
X.....	SRCUIC	- High UIC Count

5.3.7.3 Usage Considerations

Special considerations or techniques related to using the SCPSRC file are provided below.

1. The start timestamp of the record must be calculated from the end timestamp of the previous SRCS record. STARTTS and DURATION are calculated as the difference between two record timestamps. For the first SRCS record from a Monitor II session, STARTTS and DURATION are set to missing values.

5.3.7.4 Retrieval Examples

This section presents a typical SCPSRC retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print high UIC count from file SCPSRC:

```
DATA;  
SET &PSCPX..SCPSRC01;  
  
PROC PRINT;  
VAR STARTTS ENDTS DURATION SRCUIC;  
TITLE 'HIGH UIC COUNT';
```


5.3.8 I/O Queuing Configuration File (SCPIOC)

@RMF1IOPThe I/O Queuing Configuration File contains data identifying the configuration of the logical control units based on the IOCDS created by the IOCP generation process. For each logical control unit, the channel paths and control units attached to the channel paths are defined. This file is typically used when reporting the channel paths and control units attached to them.

This file is derived from the RMF Queuing Activity record, type 78 subtype 3.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.8.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSID	CSSID	LCUID	CHANNEL	YEAR	
	MONTH	DAY	HOUR	ENDTS		
DAYS	SYSID	CSSID	LCUID	CHANNEL	YEAR	
	MONTH	DAY	HOUR			
WEEKS	SYSID	CSSID	LCUID	CHANNEL	YEAR	
	WEEK	ZONE	HOUR			
MONTHS	SYSID	CSSID	LCUID	CHANNEL	YEAR	
	MONTH	ZONE				
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-47. SCPIOC Sort Sequence and Data Granularity

5.3.8.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XDWM..E	CHANNEL	- Physical Channel Address
XDWM..E	CSSID	- Channel Subsystem Identifier
XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XDWM..E	LCUID	- Logical Control Unit ID
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier

XDW...E WEEK - Week of Year
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E EXTSTOR - Expanded Storage Flag
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
X.....E ONLINE - Online-Offline Status Indicator
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM..E RMFESCDR - Intvls with ESCON Director in Config
XDWM..E RMFESCON - Intvls where Enabled for ESCON
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
XDWM.. RMFMFL - RMF Maintenance Level Indicator
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

X..... IOCCMST - IOP Channel Measurement Failure Flag
X..... IOCCNF - Channel Path is Installed
XDWM..E IOCCU1 - 1st Control Unit
XDWM..E IOCCU2 - 2nd Control Unit
XDWM..E IOCCU3 - 3rd Control Unit
XDWM..E IOCCU4 - 4th Control Unit
XDWM.. IOCDCMHW - DCM Supported by Hardware
X..... IOCDIF - DIAGNOSE Interface Failure Flag
X..... IOCINVLD - IOC Channel Measurement Failure Flag
XDWM..E IOCIOTYP - I/O Queueing Measurement Source
X..... IOCOFF - Channel Path Offline to LCU Devices
XDWM..E IOCPATAT - Channel Path Attributes
X..... IOCPATH - Vary Path to All LCU Devices
X..... IOCVAR - Channel Path was Varied During Intvl

Accumulated Data Elements

XDWL..E IOCBSY - Number of CPMT Samples Channel Path Busy
XDWL..E IOCCMFCT - Intvls with IOP Channel Meas. Failure
XDWL..E IOCCMRMT - Command Response Time
XDWL..E IOCCNFCT - Intvls with Channel Path Installed
XDWL..E IOCCUB - Number of Times Control Unit was Busy
XDWL..E IOCCUBTM - Control Unit Busy Delay Time
XDWL..E IOCDCMCF - Intvls with DCM Managed Channels
XDWL..E IOCDCMCM - Intvls with CHPID Manipulated
XDWL..E IOCDCMCT - Intvls with Channel Managed by DCM
XDWL..E IOCDIFCT - Intvls with DIAGNOSE Interface Failure
XDWL..E IOCDPB - Number of Times ESCON Director Port Busy
XDWL..E IOCINVCT - Intvls with IOC Channel Meas. Failure
XDWL..E IOCMCST - Intvls with Multiple LCSS Supported
XDWL..E IOCOFFCT - Intvls with Chan. Path Offline to LCU
XDWL..E IOCONLCT - Intvls with Channel Path Online
XDWL..E IOCPT - Number of Times Path was Taken
XDWL..E IOCSAMP - Number of CPMT Samples
XDWL..E IOCSBS - Switch Busy Count Summation
XDWL..E IOCVARCT - Intvls when Channel Path was Varied
XDWL..E IOVPCT - Intvls with Vary Path to all Devices

Maximum Data Elements

XDWL..E IOCTOTCU - Number of Control Units Attached

Derived Data Elements

XDWL..E IOCAVCMR - Avg Command Response Time
XDWL..E IOCAVCUB - Avg Control Unit Busy Delay Time
XDWL..E IOCAVPT - Average Channel Path Taken Rate
XDWL..E IOPCBSY - Percent CPMT Samples Channel Path Busy
XDWL..E IOPCUB - Percent Control Unit Busy
XDWL..E IOPCDPB - Pct Requests Deferred: Dir. Port Busy

5.3.8.3 Usage Considerations

Special considerations or techniques related to using the SCPIOC file are provided below.

1. The following elements of the SCPIOC file only have meaning when used in the DETAIL timespan, since significance is lost once summarization has been performed. In the higher timespans, the data elements are retained based on the last reference from the file to be summarized.

- CYCLETM - Sampling Time Cycle Length
- IOCCU1 - First Control Unit Attached
- IOCCU2 - Second Control Unit Attached
- IOCCU3 - Third Control Unit Attached
- IOCCU4 - Fourth Control Unit Attached
- IOCVAR - Channel Path Varied
- IOCCNF - Channel Path Installed
- IOCOFF - Channel Path Offline to LCU Devices

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.

- o HOUR should not be used in MONTHS.
- o DAY and DAYNAME should not be used in WEEKS, MONTHS.
- o WEEK should not be used in MONTHS.

3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:

- o STARTTS represents RMF recording interval start time.
- o ENDTS represents RMF recording interval end time.

4. The data element LCUID is used to identify the logical control unit number.
5. Channel path utilization statistics recorded in the SCPIOC file are generated by the hardware monitor that

uses a different sampling rate than the RMF monitor. Consequently, if converting IOC accumulated variables to a percentage or rate, do not use the SAMPLES or CYCLETM value found in the SCPIOC file. Use the SAMPLES variable as recorded in the HARPCA file. This situation is unavoidable due to the fact that the RMF type 78 subtype 3 record, which is the source for the SCPIOC file, records only the number of RMF samples taken during the interval.

5.3.8.4 Retrieval Examples

This section presents a typical SCPIOC retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diiit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's I/O Configuration during HOUR 13:

```
DATA;  
SET &PSCPX..SCPIOC01;  
IF HOUR=13;  
PROC PRINT;  
VAR SYSID LCUID CHANNEL IOCTOTCU  
      IOCCU1 IOCCU2 IOCCU3 IOCCU4;
```

5.3.9 Swapping Activity File (SCPSWP)

The SCPSWP file is no longer populated beginning with z/OS Version 1.13. Beginning with Version 1.13, RMF no longer includes a Swap Activity section in the RMF type 71 subtype 1 Paging Activity record.

The Swapping Activity File quantifies logical and physical swapping activity, listed by swap reason. This file is also used to monitor swap placement activity in main memory, extended memory, and auxiliary storage. There is one record for each of the eighteen reasons for swapping. This file is typically used when reporting on swapping activity.

This file is derived from Swap Activity section of the RMF Monitor I Paging Activity record, type 71. The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.9.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	SWAPNAME	YEAR	MONTH	DAY
		HOUR	ENDTS			
	DAYS	SYSID	SWAPNAME	YEAR	MONTH	DAY
		HOUR				
	WEEKS	SYSID	SWAPNAME	YEAR	WEEK	ZONE
		HOUR				
	MONTHS	SYSID	SWAPNAME	YEAR	MONTH	ZONE
	YEARS	N/A				
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES	N/A				
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-48. SCPSWP Sort Sequence and Data Granularity

5.3.9.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SWAPNAME	- Swap Reason
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century

XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E EXTSTOR - Expanded Storage Flag
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMLPNO - Logical Partition Number
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM..E RMFESCDR - Intvls with ESCON Director in Config
 XDWM..E RMFESCON - Intvls where Enabled for ESCON
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 XDWM.. RMFMFL - RMF Maintenance Level Indicator
 X.....E RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Accumulated Data Elements

XDWM..E SWPAXD - Aux Storage Directed Physical Swaps
 XDWM..E SWPESD - Expanded Storage Directed Physical Swaps
 XDWM..E SWPLAX - Aux Storage Directed Logical Swaps
 XDWM..E SWPLES - Expanded Storage Directed Logical Swaps
 XDWM..E SWPMIG - Physical Swaps Migrated from ES
 XDWM..E SWPTOSWP - Total Swaps

Derived Data Elements

XDWM..E SWPAUX - Aux Storage Total Swaps
 XDWM..E SWPES - Expanded Storage Total Swaps
 XDWM..E SWPLSWPE - Effective Logical Swaps
 XDWM..E SWPLSWPS - Total Logical Swaps
 XDWM..E SWPNPSWP - Effective Log or Expanded Storage Swaps
 XDWM..E SWPPCLSE - Pct Effective Logical Swaps
 XDWM..E SWPPCLST - Pct Logical Swaps
 XDWM..E SWPPCMIG - Pct Phys Swaps Migrated from ES

5.3.9.3 Usage Considerations

Special considerations or techniques related to using the SCPSWP file are provided below.

1. The following elements in the SCPSWPnn file only have meaning when used in the DETAIL timespan, since significance is lost once summarization has been performed. In the higher timespans, the data elements are retained based on the last reference from the file to be summarized.

CYCLETM - Sampling Time Cycle Length
EXTSTOR - Expanded Storage Indicator

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time; ENDTS is the highest date and time for the data summarized. The data elements have different meanings when used in the DETAIL versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.9.4 Retrieval Examples

This section presents a typical SCPSWP retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's total swap counts, by swap reason, for HOUR=13.

```
DATA;  
SET &PSCPX..SCPSWP01;  
IF HOUR=13;  
PROC PRINT;  
VAR SWAPNAME SWPTOSWP;
```

5.3.10 I/O Processor Activity File (SCPIOP)

@RMF1IOPThe I/O Queuing Configuration File contains data identifying the configuration of the logical control units based on the IOCDs created by the IOCP generation process. For each logical control unit, the channel paths and control units attached to the channel paths are defined. This file is typically used when reporting the channel paths and control units attached to them.

This file is derived from the RMF Queuing Activity record, type 78 subtype 3.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.10.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	IOPID	YEAR	MONTH	DAY	
	HOUR	ENDTS				
DAYS	SYSID	IOPID	YEAR	MONTH	DAY	
	HOUR					
WEEKS	SYSID	IOPID	YEAR	WEEK	ZONE	
	HOUR					
MONTHS	SYSID	IOPID	YEAR	MONTH	ZONE	
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-49. SCPIOP Sort Sequence and Data Granularity

5.3.10.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XDWM..E	IOPID	- I/O Processor ID
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century
XDWM..E	ZONE	- Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E EXTSTOR - Expanded Storage Flag
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E PRSMLPNO - Logical Partition Number
XDW..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW..E RMFESCDR - Intvls with ESCON Director in Config
XDW..E RMFESCON - Intvls where Enabled for ESCON
XDW.. RMFGMTOF - GMT to Local Time Offset
XDW..E RMFIML - I/O Measurement Level
XDW.. RMFMFL - RMF Maintenance Level Indicator
X....E RMFSRL - SMF Record Level Change Number
XDW..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDW..E RMFVER - RMF Version Number
XDW..E STARTTS - Start Time Stamp
XDW..E SYSNAME - System Name
XDW..E SYSPLEX - Sysplex Name

Retained Data Elements

X....E IOPCMST - IOP Channel Measurement Failure Flag
XDW..E IOPDCMHW - DCM Supported by Hardware
X.... IOPDIF - DIAGNOSE Interface Failure Flag

Accumulated Data Elements

XDW..E IOPBSY - Number of Times IOP was Busy
XDW..E IOPCMFCT - Intvls with IOP Channel Meas. Failure
XDW..E IOPDCMCF - Intvls with DCM Managed Channels
XDW..E IOPDIFCT - Intvls with DIAGNOSE Interface Failure
XDW..E IOPIDL - Number of Times IOP was Idle
XDW..E IOPIOFS - I/O Functions Initially Started
XDW..E IOPPIOI - Processed I/O Interrupts
XDW.. IOPQUE - Sum of IOP Queue Lengths
XDW.. IOPRCPB - I/O Retries due to Channel Path Busy
XDW.. IOPRCUB - I/O Retries due to Control Unit Busy
XDW.. IOPRDPB - I/O Retries due to Director Port Busy
XDW.. IOPRDVB - I/O Retries due to Device Busy
XDW..E IOPRETRY - Total Number of I/O Retries
XDW.. IOPRQS - Number of IOP Requests

XDWM..E IOPSAMP - Number of CPMT Samples

Derived Data Elements

XDWM..E IOPAVIFS - Rate of I/O Functions Initially Started
XDWM..E IOPAVPII - Rate of Processed I/O Interrupts
XDWM.. IOPAVQUE - Avg IOP Initiative Queue Length
XDWM.. IOPAVRQS - Rate of IOP Requests
XDWM.. IOPCPBRT - Rate of I/O Retries (Channel Path Busy)
XDWM.. IOPCUBRT - Rate of I/O Retries (Control Unit Busy)
XDWM.. IOPDPBRT - Rate of I/O Retries (Direct. Port Busy)
XDWM.. IOPDVBRT - Rate of I/O Retries (Device Busy)
XDWM..E IOPPCBSY - Percent IOP Busy
XDWM.. IOPPCCPB - Pct I/O Retries due to Channel Path Busy
XDWM.. IOPPCCUB - Pct I/O Retries due to Control Unit Busy
XDWM.. IOPPCDPB - Pct I/O Retries due to Direct. Port Busy
XDWM.. IOPPCDVB - Pct I/O Retries due to Device Busy
XDWM..E IOPPCRTR - Percent I/O Requests Retried
XDWM..E IOPRTRRT - Rate of I/O Requests Retried

5.3.10.3 Usage Considerations

Special considerations or techniques related to using the SCPIOP file are provided below.

1. The following element in the SCPIOPnn file only has meaning when used in the DETAIL timespan, since significance is lost once summarization has been performed. In the higher timespans, the data element is retained based on the last reference from the file to be summarized.

CYCLETM - Sampling Cycle Time Length
2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time; ENDTS is the highest date and time for the data summarized. The data elements also have different meanings when used in the DETAIL versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.10.4 Retrieval Examples

This section presents a typical SCPIOP retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &ddiit, where d is the database identifier, iiii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's total IOP activity rate and queue length for each hour between 8 a.m. and 5 p.m.

```
DATA;  
SET &PSCPX..SCPIOP01;  
IF 8 LE HOUR LE 17;  
PROC PRINT;  
VAR HOUR IOPID IOPAVRQS IOPAVQUE;
```

5.3.11 Logical Control Unit Activity File (SCPLCU)

The Logical Control Unit Activity File captures data on logical and physical control unit activity and other I/O configuration-dependent queuing delays. There is one record for each logical control unit defined. It summarizes the I/O measurement data down to the logical control unit level.

This file is derived from the CA MICS Device Activity, Logical Channel/CU Activity, and I/O Queuing Configuration files.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.11.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	N/A					
DAYS	SYSID	LCUID	YEAR	MONTH	DAY	
	HOUR					
WEEKS	SYSID	LCUID	YEAR	WEEK	ZONE	
	HOUR					
MONTHS	SYSID	LCUID	YEAR	MONTH	ZONE	
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 19, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-50. SCPLCU Sort Sequence and Data Granularity

5.3.11.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Fri, Oct 19, 2012

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

.D....E	DAY	- Day of Month
.DW...E	HOURL	- Hour of Day
.DWM..E	LCUID	- Logical Control Unit ID
.D.M..E	MONTH	- Month of Year
.DWM..E	SYSID	- System Identifier

.DWM...E WEEK - Week of Year
.DWM...E YEAR - Year of Century
.DWM...E ZONE - Time Zone

Common Data Elements

.DWM...E CYCLETM - RMF Sampling Cycle Interval
.D....E DAYNAME - Name of Day of Week
.DWM...E DURATION - Recording Interval Time
.DWM...E ENDTS - End Time Stamp
.DWM...E EXTSTOR - Expanded Storage Flag
.DWM...E INTERVLS - Number of Recording Intervals
.DWM...E IODFCCCT - Intvls where I/O Config. Changed
.DWM...E IODFCPCT - I/O Config Changed Since Power On Reset
.DWM...E IODFCRTS - IODF Creation Time Stamp
.DWM...E IODFPICT - Power On Reset Using IODF
.DWM...E IODFSUFIX - Suffix of IODF Name
.DWM...E IODFTICT - I/O Config. Token is Invalid
.DWM...E MVSLEVEL - MVS Software Level
.DWM...E ORGSYSID - Originating System Identification
.DWM...E PRSMLPNO - Logical Partition Number
.DWM...E PRSMUSCT - Intvls Using PR/SM LPAR Feature
.DWM...E RMFESAME - z/Architecture Mode Indicator
.DWM...E RMFESCDR - Intvls with ESCON Director in Config
.DWM...E RMFESCON - Intvls where Enabled for ESCON
.DWM.. RMFGMTOF - GMT to Local Time Offset
.DWM...E RMFIML - I/O Measurement Level
.....E RMFSRL - SMF Record Level Change Number
.DWM...E RMFSYNCH - Intvls with RMF Synchronized to SMF
.DWM...E RMFVER - RMF Version Number
.DWM...E SAMPLES - RMF Sample Count
.DWM...E STARTTS - Start Time Stamp
.DWM...E SYSNAME - System Name
.DWM...E SYSPLEX - Sysplex Name

Retained Data Elements

.DWM...E LCUCH1 - 1st Channel Path Attached
.DWM...E LCUCH2 - 2nd Channel Path Attached
.DWM...E LCUCH3 - 3rd Channel Path Attached
.DWM...E LCUCH4 - 4th Channel Path Attached
.DWM...E LCUCH5 - 5th Channel Path Attached
.DWM...E LCUCH6 - 6th Channel Path Attached
.DWM...E LCUCH7 - 7th Channel Path Attached
.DWM...E LCUCH8 - 8th Channel Path Attached
.....E LCUCMST - IOP Channel Measurement Failure Flag
.DWM...E LCUCS1 - 1st Channel Path CSSID
.DWM...E LCUCS2 - 2nd Channel Path CSSID
.DWM...E LCUCS3 - 3rd Channel Path CSSID

```

.DWM..E LCUCS4 - 4th Channel Path CSSID
.DWM..E LCUCS5 - 5th Channel Path CSSID
.DWM..E LCUCS6 - 6th Channel Path CSSID
.DWM..E LCUCS7 - 7th Channel Path CSSID
.DWM..E LCUCS8 - 8th Channel Path CSSID
.DWM.. LCUCU1 - 1st Control Unit Attached
.DWM.. LCUCU2 - 2nd Control Unit Attached
.DWM.. LCUCU3 - 3rd Control Unit Attached
.DWM.. LCUCU4 - 4th Control Unit Attached
.DWM.. LCUCU5 - 5th Control Unit Attached
.DWM.. LCUCU6 - 6th Control Unit Attached
.DWM.. LCUCU7 - 7th Control Unit Attached
.DWM.. LCUCU8 - 8th Control Unit Attached
.DWM..E LCUDCMHW - DCM Supported by Hardware
.DWM..E LCUDFCM - Defined Number of DCM Managed Channels
.DWM.. LCUPA1 - 1st Channel Path Attributes
.DWM.. LCUPA2 - 2nd Channel Path Attributes
.DWM.. LCUPA3 - 3rd Channel Path Attributes
.DWM.. LCUPA4 - 4th Channel Path Attributes
.DWM.. LCUPA5 - 5th Channel Path Attributes
.DWM.. LCUPA6 - 6th Channel Path Attributes
.DWM.. LCUPA7 - 7th Channel Path Attributes
.DWM.. LCUPA8 - 8th Channel Path Attributes

```

Accumulated Data Elements

```

.DWM.. LCUALC - Device Allocated
.DWM..E LCUATV - Device Active Time
.DWM..E LCUAVLCT - Available Device-Intervals
.DWM..E LCUCMFCT - Intvls with IOP Channel Meas. Failure
.DWM.. LCUCMRM - Command Response Time
.DWM..E LCUCNN - Device Connect Time
.DWM.. LCUCNNOV - Connect Time Overflow Count
.DWM.. LCUCSWTM - Channel Subsystem Wait Time
.DWM..E LCUCUB - Requests Deferred: Control Unit Busy
.DWM.. LCUCUBTM - Control Unit Busy Delay Time
.DWM..E LCUDCM - Intvls with DCM Managed Channels in LCU
.DWM..E LCUDCMBS - Control Unit Busy Count for DCM Channels
.DWM.. LCUDCMCB - Cntl Unit Busy Delay Time (DCM Channels)
.DWM..E LCUDCMCF - Intvls with DCM Managed Channels
.DWM.. LCUDCMCR - Command Response Time for DCM Channels
.DWM..E LCUDCMDP - Dir. Port Busy Count for DCM Channels
.DWM..E LCUDCMPT - Path Taken Count for DCM Channels
.DWM..E LCUDCMSB - Switch Busy Count Summation (DCM Ch.)
.DWM..E LCUDINTV - Total Device-Intervals
.DWM.. LCUDIS - Device Disconnect Time
.DWM..E LCUDPB - Number of Times ESCON Director Port Busy
.DWM.. LCUDVBTM - Device Busy Delay Time
.DWM.. LCUDVCTM - Device Connect Time

```

.DWM..	LCUDVDTM	- Device Disconnect Time
.DWM..	LCUFCNCT	- Intvls with FICON Channels in LCU
.DWM..E	LCUHPAVC	- Intvls with HyperPAV Devices
.DWM..	LCUICT	- Number of Invalid Samples
.DWM..	LCUIDTTM	- Device Interrupt Delay Time
.DWM..E	LCUISSCT	- Intvls with RMF Samples Skipped
.DWM..E	LCUMEC	- Measurement Event Count
.DWM..	LCUMPTM	- Total Mount Pending Time
.DWM..	LCUMTC	- Number of Mounts
.DWM..	LCUMTP	- Samples - Mount Pending Condition
.DWM..	LCUNDA	- Device Allocation Count
.DWM..	LCUNRD	- Device Not Ready
.DWM..	LCUNSS	- Skipped Samples (too Large Delta Values)
.DWM..	LCUNIX	- Number of PAV/HyperPAV Aliases
.DWM..E	LCUPATCT	- Intvls with Valid Path Attributes
.DWM..	LCUPEN	- Device Pending Time
.DWM..E	LCUPT	- Number of Times Path was Taken
.DWM..E	LCUQRQS	- Queued Requests
.DWM..E	LCUQUE	- Requests Queued
.DWM..E	LCURQDFR	- Total Requests Deferred
.DWM..E	LCURQS	- Requests
.DWM..E	LCURSMPD	- Number of RMF Samples (from DVA)
.DWM..E	LCURSMPL	- Number of RMF Samples (from LCA)
.DWM..	LCURSV	- Device Reserved
.DWM..E	LCUSBS	- Switch Busy Count Summation
.DWM..E	LCUSSC	- Start Subchannel Count
.DWM..E	LCUTOHIO	- Total HyperPAV I/O Requests
.DWM..E	LCUTONAI	- Total HyperPAV I/Os Waiting for Alias
.DWM..	LCUUTL	- Device Reserved and Idle
.DWM..E	LCUXMBCT	- Intvls with Extended I/O Measurements
.DWM..E	LCU1CBD	- Control Unit Busy Delay Time
.DWM..E	LCU1CMR	- Command Response Time
.DWM..E	LCU1CUB	- Number of Times Control Unit was Busy
.DWM..E	LCU1DPB	- Number of Times ESCON Director Port Busy
.DWM..E	LCU1PT	- Number of Times Path Taken
.DWM..E	LCU1SBS	- Switch Busy Count Summation
.DWM..E	LCU2CBD	- Control Unit Busy Delay Time
.DWM..E	LCU2CMR	- Command Response Time
.DWM..E	LCU2CUB	- Number of Times Control Unit was Busy
.DWM..E	LCU2DPB	- Number of Times ESCON Director Port Busy
.DWM..E	LCU2PT	- Number of Times Path Taken
.DWM..E	LCU2SBS	- Switch Busy Count Summation
.DWM..E	LCU3CBD	- Control Unit Busy Delay Time
.DWM..E	LCU3CMR	- Command Response Time
.DWM..E	LCU3CUB	- Number of Times Control Unit was Busy
.DWM..E	LCU3DPB	- Number of Times ESCON Director Port Busy
.DWM..E	LCU3PT	- Number of Times Path Taken
.DWM..E	LCU3SBS	- Switch Busy Count Summation
.DWM..E	LCU4CBD	- Control Unit Busy Delay Time


```
.DWM..E LCU4CMR - Command Response Time
.DWM..E LCU4CUB - Number of Times Control Unit was Busy
.DWM..E LCU4DPB - Number of Times ESCON Director Port Busy
.DWM..E LCU4PT - Number of Times Path Taken
.DWM..E LCU4SBS - Switch Busy Count Summation
.DWM..E LCU5CBD - Control Unit Busy Delay Time
.DWM..E LCU5CMR - Command Response Time
.DWM..E LCU5CUB - Number of Times Control Unit was Busy
.DWM..E LCU5DPB - Number of Times ESCON Director Port Busy
.DWM..E LCU5PT - Number of Times Path Taken
.DWM..E LCU5SBS - Switch Busy Count Summation
.DWM..E LCU6CBD - Control Unit Busy Delay Time
.DWM..E LCU6CMR - Command Response Time
.DWM..E LCU6CUB - Number of Times Control Unit was Busy
.DWM..E LCU6DPB - Number of Times ESCON Director Port Busy
.DWM..E LCU6PT - Number of Times Path Taken
.DWM..E LCU6SBS - Switch Busy Count Summation
.DWM..E LCU7CBD - Control Unit Busy Delay Time
.DWM..E LCU7CMR - Command Response Time
.DWM..E LCU7CUB - Number of Times Control Unit was Busy
.DWM..E LCU7DPB - Number of Times ESCON Director Port Busy
.DWM..E LCU7PT - Number of Times Path Taken
.DWM..E LCU7SBS - Switch Busy Count Summation
.DWM..E LCU8CBD - Control Unit Busy Delay Time
.DWM..E LCU8CMR - Command Response Time
.DWM..E LCU8CUB - Number of Times Control Unit was Busy
.DWM..E LCU8DPB - Number of Times ESCON Director Port Busy
.DWM..E LCU8PT - Number of Times Path Taken
.DWM..E LCU8SBS - Switch Busy Count Summation
```

Minimum Data Elements

```
.DWM..E LCUMNDKM - Min Number of DCM Managed Channels Used
```

Maximum Data Elements

```
.DWM..E LCUMXAID - Max HyperPAV Aliases for a Base Device
.DWM..E LCUMXAIU - Max Number of HyperPAV Aliases Used
.DWM..E LCUMXDCM - Max Number of DCM Managed Channels Used
.DWM..E LCUMXIOQ - Max Number of I/O Requests Queued
.DWM.. LCUMXNDA - Max Device Allocations
.DWM.. LCUMXQUE - Max Requests Queued
.DWM.. LCUMXTAL - Max Allocated Tape Drives
.DWM..E LCUNODEV - Number of Devices on Control Unit
.DWM..E LCUTOTCH - Number of Channel Paths Attached
.DWM.. LCUTOTCU - Number of Control Units Attached
```

Derived Data Elements

.DWM.. LCUACTRT - Avg Device Activity Rate
.DWM.. LCUAVCMR - Avg Command Response Time
.DWM.. LCUAVCNN - Avg Device Connect Time
.DWM.. LCUAVCSW - Avg Channel Subsystem Wait Time
.DWM.. LCUAVCUB - Avg Control Unit Busy Delay Time
.DWM.. LCUAVDCB - Avg Cntl Unit Busy Delay Time (DCM Ch.)
.DWM.. LCUAVDCR - Avg Command Response Time (DCM Channels)
.DWM.. LCUAVDIS - Avg Device Disconnect Time
.DWM..E LCUAVDPT - Avg Path Taken Rate for DCM Channels
.DWM.. LCUAVDVB - Avg Device Busy Pending Time
.DWM.. LCUAVIDT - Avg Device Interrupt Delay Time
.DWM.. LCUAVIOS - Avg Device IOS Queue Time
.DWM.. LCUAVMTM - Avg Mount Time
.DWM.. LCUAVNDA - Avg Device Allocations in Effect
.DWM.. LCUAVOEX - Avg Open Exchanges
.DWM.. LCUAVPEN - Avg Device Pending Time
.DWM..E LCUAVPT - Avg Channel Path Taken
.DWM..E LCUAVQL - Avg Queue Length
.DWM..E LCUAVQUE - Avg Requests Queued
.DWM.. LCUAVRES - Avg Device Response Time
.DWM.. LCUAVSER - Avg I/O Service Time
.DWM.. LCUJTCNC - Data Transfer Concurrency
.DWM.. LCUPADUR - Total Parallel Access Duration
.DWM.. LCUPCALC - Pct Device Allocated
.DWM.. LCUPCCNN - Pct Device Connected
.DWM..E LCUPCCUB - Pct Control Unit Busy
.DWM..E LCUPCDBS - Pct Control Unit Busy for DCM Channels
.DWM..E LCUPCDDP - Pct Dir. Port Busy for DCM Channels
.DWM.. LCUPCMTP - Pct Mount Pending Condition
.DWM..E LCUPCNAI - Pct HyperPAV I/Os Waiting for Alias
.DWM.. LCUPCNRD - Pct Device Not Ready
.DWM.. LCUPCRQD - Pct LCU Requests Deferred
.DWM.. LCUPCRSV - Pct Device Reserved
.DWM.. LCUPCUTL - Pct Device Utilized
.DWM..E LCU1AVCB - Avg Cntl Unit Busy Delay Time (Path 1)
.DWM..E LCU1AVCR - Avg Command Response Time (Path 1)
.DWM..E LCU2AVCB - Avg Cntl Unit Busy Delay Time (Path 2)
.DWM..E LCU2AVCR - Avg Command Response Time (Path 2)
.DWM..E LCU3AVCB - Avg Cntl Unit Busy Delay Time (Path 3)
.DWM..E LCU3AVCR - Avg Command Response Time (Path 3)
.DWM..E LCU4AVCB - Avg Cntl Unit Busy Delay Time (Path 4)
.DWM..E LCU4AVCR - Avg Command Response Time (Path 4)
.DWM..E LCU5AVCB - Avg Cntl Unit Busy Delay Time (Path 5)
.DWM..E LCU5AVCR - Avg Command Response Time (Path 5)
.DWM..E LCU6AVCB - Avg Cntl Unit Busy Delay Time (Path 6)
.DWM..E LCU6AVCR - Avg Command Response Time (Path 6)
.DWM..E LCU7AVCB - Avg Cntl Unit Busy Delay Time (Path 7)
.DWM..E LCU7AVCR - Avg Command Response Time (Path 7)
.DWM..E LCU8AVCB - Avg Cntl Unit Busy Delay Time (Path 8)

.DWM..E LCU8AVCR - Avg Command Response Time (Path 8)

5.3.11.3 Usage Considerations

Special considerations or techniques related to using the SCPLCU file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time; ENDTS is the highest date and time for the data summarized. The data elements also have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. The data element LCUID is used to identify the logical control unit number.

5.3.11.4 Retrieval Examples

This section presents typical SCPLCU retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Print yesterday's total I/O request rate to each logical control unit, and the number of requests through each channel to the logical control unit, for HOUR 13.

```
DATA;
SET &PSCPD..SCPLCU01;
IF HOUR EQ 13;
PROC PRINT;
VAR SYSID LCUID LCUAVPT LCUCH1 LCU1PT LCUCH2 LCU2PT
    LCUCH3 LCU3PT LCUCH4 LCU4PT;
```

2. Print the percentage of I/O requests from each channel connected to each logical control unit, for HOUR 8 of yesterday, for SYSID PROD.

```
DATA;
SET &PSCPD..SCPLCU01;
IF HOUR EQ 8;
IF SYSID EQ 'PROD';
TOTAL=DURATION*LCUAVPT;
PERCENT1=100*(LCU1PT/TOTAL); PERCENT2=100*(LCU2PT/TOTAL);
PERCENT3=100*(LCU3PT/TOTAL); PERCENT4=100*(LCU4PT/TOTAL);
PERCENT5=100*(LCU5PT/TOTAL); PERCENT6=100*(LCU6PT/TOTAL);
PERCENT7=100*(LCU7PT/TOTAL); PERCENT8=100*(LCU8PT/TOTAL);
PROC PRINT;
ID LCUID;
VAR LCUCH1 PERCENT1 LCUCH2 PERCENT2
    LCUCH3 PERCENT3 LCUCH4 PERCENT4
    LCUCH5 PERCENT5 LCUCH6 PERCENT6
    LCUCH7 PERCENT7 LCUCH8 PERCENT8;
```

5.3.12 Virtual Storage System Usage File (SCPVSM)

The Virtual Storage System Usage File quantifies the utilization of virtual storage by system areas such as the nucleus, PSA, CSA, SQA, MLPA, FLPA, PLPA, LSQA, SWA, and other system subpools above and below the 16 MB boundary line. This file is typically used when reporting on virtual storage usage.

This file is derived from the RMF Monitor I Activity record, type 78 subtype 2.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.12.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	YEAR	MONTH	DAY	HOUR
		ENDTS				
	DAYS	SYSID	YEAR	MONTH	DAY	HOUR
	WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR
	MONTHS	SYSID	YEAR	MONTH	ZONE	
	YEARS		N/A			
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES		N/A			
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-51. SCPVSM Sort Sequence and Data Granularity

5.3.12.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century

XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E EXTSTOR - Expanded Storage Flag
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM..E RMFESCDR - Intvls with ESCON Director in Config
XDWM..E RMFESCON - Intvls where Enabled for ESCON
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
XDWM.. RMFMFL - RMF Maintenance Level Indicator
X.....E RMFSRL - SMF Record Level Change Number
XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
XDWM..E RMFVER - RMF Version Number
XDWM..E SAMPLES - RMF Sample Count
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

X..... VSMISS - RMF Samples Skipped Flag
XDWM..E VSMSCSAH - Starting Address ECSA > 16MB
XDWM..E VSMSCSAL - Starting Address CSA < 16MB
XDWM..E VSMSFLPH - Starting Address EFLPA > 16MB
XDWM..E VSMSFLPL - Starting Address FLPA < 16MB
XDWM..E VSMSLPAH - Starting Address EPLPA > 16MB
XDWM..E VSMSLPAL - Starting Address PLPA < 16MB
XDWM..E VSMSMLPH - Starting Address EMLPA > 16MB
XDWM..E VSMSMLPL - Starting Address MLPA < 16MB
XDWM..E VSMSNUCH - Starting Address Extended Nucleus > 16MB
XDWM..E VSMSNUCL - Starting Address Nucleus < 16MB
XDWM..E VSMSPSA - Starting Address PSA <16MB
XDWM..E VSMSPVTH - Starting Address Ext Private Area > 16MB
XDWM..E VSMSPVTL - Starting Address Private Area < 16MB
XDWM..E VSMSQAH - Starting Address ESQA > 16MB
XDWM..E VSMSQAL - Starting Address SQA < 16MB
X.....E VSMYBCSH - D Time Min Large Free Blk ECSA > 16MB
X.....E VSMYBCSL - D Time Min Large Free Blk CSA < 16MB

X.....E VSMYBSQH - D Time Min Large Free Blk ESQA > 16MB
X.....E VSMYBSQL - D Time Min Large Free Blk SQA < 16MB
X.....E VSMYCSQH - D Time Min ESQA Oflow to ECSA > 16MB
X.....E VSMYCSQL - D Time Min SQA Oflow to CSA < 16MB
X.....E VSMYFCSH - D Time Min Free Pg ECSA > 16MB
X.....E VSMYFCSL - D Time Min Free Pg CSA < 16MB
X.....E VSMYFSQH - D Time Min Free Pg ESQA > 16MB
X.....E VSMYFSQL - D Time Min Free Pg SQA < 16MB
X.....E VSMYTCSH - D Time Min Alloc Area ECSA > 16MB
X.....E VSMYTCSL - D Time Min Alloc Area CSA < 16MB
X.....E VSMYTSQH - D Time Min Alloc Area ESQA > 16MB
X.....E VSMYTSQL - D Time Min Alloc Area SQA < 16MB
X.....E VSMYT27L - D Time Min Alc Pg SP 227 CSA < 16MB
X.....E VSMYT28L - D Time Min Alc Pg SP 228 CSA < 16MB
X.....E VSMYT31L - D Time Min Alc Pg SP 231 CSA < 16MB
X.....E VSMYT41L - D Time Min Alc Pg SP 241 CSA < 16MB
X.....E VSMYUCSH - D Time Min Alc Pg ECSA > 16MB
X.....E VSMYUCSL - D Time Min Alc Pg CSA < 16MB
X.....E VSMYUSQH - D Time Min Alc Pg ESQA > 16MB
X.....E VSMYUSQL - D Time Min Alc Pg SQA < 16MB
X.....E VSMY0CSH - D Time Min Alc Pg Key 0 ECSA > 16MB
X.....E VSMY0CSL - D Time Min Alc Pg Key 0 CSA < 16MB
X.....E VSMY027L - D Time Min Alc Pg Key 0 SP 227 CSA < 16MB
X.....E VSMY028L - D Time Min Alc Pg Key 0 SP 228 CSA < 16MB
X.....E VSMY031L - D Time Min Alc Pg Key 0 SP 231 CSA < 16MB
X.....E VSMY041L - D Time Min Alc Pg Key 0 SP 241 CSA < 16MB
X.....E VSMY1CSH - D Time Min Alc Pg Key 1 ECSA > 16MB
X.....E VSMY1CSL - D Time Min Alc Pg Key 1 CSA < 16MB
X.....E VSMY127L - D Time Min Alc Pg Key 1 SP 227 CSA < 16MB
X.....E VSMY128L - D Time Min Alc Pg Key 1 SP 228 CSA < 16MB
X.....E VSMY131L - D Time Min Alc Pg Key 1 SP 231 CSA < 16MB
X.....E VSMY141L - D Time Min Alc Pg Key 1 SP 241 CSA < 16MB
X.....E VSMY2CSH - D Time Min Alc Pg Key 2 ECSA > 16MB
X.....E VSMY2CSL - D Time Min Alc Pg Key 2 CSA < 16MB
X.....E VSMY226L - D Time Min Alc Pg SP 226 SQA < 16MB
X.....E VSMY227L - D Time Min Alc Pg Key 2 SP 227 CSA < 16MB
X.....E VSMY228L - D Time Min Alc Pg Key 2 SP 228 CSA < 16MB
X.....E VSMY231L - D Time Min Alc Pg Key 2 SP 231 CSA < 16MB
X.....E VSMY239L - D Time Min Alc Pg SP 239 SQA < 16MB
X.....E VSMY241L - D Time Min Alc Pg Key 2 SP 241 CSA < 16MB
X.....E VSMY245L - D Time Min Alc Pg SP 245 SQA < 16MB
X.....E VSMY3CSH - D Time Min Alc Pg Key 3 ECSA > 16MB
X.....E VSMY3CSL - D Time Min Alc Pg Key 3 CSA < 16MB
X.....E VSMY327L - D Time Min Alc Pg Key 3 SP 227 CSA < 16MB
X.....E VSMY328L - D Time Min Alc Pg Key 3 SP 228 CSA < 16MB
X.....E VSMY331L - D Time Min Alc Pg Key 3 SP 231 CSA < 16MB
X.....E VSMY341L - D Time Min Alc Pg Key 3 SP 241 CSA < 16MB
X.....E VSMY4CSH - D Time Min Alc Pg Key 4 ECSA > 16MB
X.....E VSMY4CSL - D Time Min Alc Pg Key 4 CSA < 16MB

X.....E VSMY427L - D Time Min Alc Pg Key 4 SP 227 CSA <16MB
X.....E VSMY428L - D Time Min Alc Pg Key 4 SP 228 CSA <16MB
X.....E VSMY431L - D Time Min Alc Pg Key 4 SP 231 CSA <16MB
X.....E VSMY441L - D Time Min Alc Pg Key 4 SP 241 CSA <16MB
X.....E VSMY5CSH - D Time Min Alc Pg Key 5 ECSA > 16MB
X.....E VSMY5CSL - D Time Min Alc Pg Key 5 CSA < 16MB
X.....E VSMY527L - D Time Min Alc Pg Key 5 SP 227 CSA <16MB
X.....E VSMY528L - D Time Min Alc Pg Key 5 SP 228 CSA <16MB
X.....E VSMY531L - D Time Min Alc Pg Key 5 SP 231 CSA <16MB
X.....E VSMY541L - D Time Min Alc Pg Key 5 SP 241 CSA <16MB
X.....E VSMY6CSH - D Time Min Alc Pg Key 6 ECSA > 16MB
X.....E VSMY6CSL - D Time Min Alc Pg Key 6 CSA < 16MB
X.....E VSMY627L - D Time Min Alc Pg Key 6 SP 227 CSA <16MB
X.....E VSMY628L - D Time Min Alc Pg Key 6 SP 228 CSA <16MB
X.....E VSMY631L - D Time Min Alc Pg Key 6 SP 231 CSA <16MB
X.....E VSMY641L - D Time Min Alc Pg Key 6 SP 241 CSA <16MB
X.....E VSMY7CSH - D Time Min Alc Pg Key 7 ECSA > 16MB
X.....E VSMY7CSL - D Time Min Alc Pg Key 7 CSA < 16MB
X.....E VSMY727L - D Time Min Alc Pg Key 7 SP 227 CSA <16MB
X.....E VSMY728L - D Time Min Alc Pg Key 7 SP 228 CSA <16MB
X.....E VSMY731L - D Time Min Alc Pg Key 7 SP 231 CSA <16MB
X.....E VSMY741L - D Time Min Alc Pg Key 7 SP 241 CSA <16MB
X.....E VSMY8CSH - D Time Min Alc Pg Key 8-F ECSA > 16MB
X.....E VSMY8CSL - D Time Min Alc Pg Key 8-F CSA < 16MB
X.....E VSMY827L - D Tm Min Alc Pg Key 8-F SP 227 CSA <16MB
X.....E VSMY828L - D Tm Min Alc Pg Key 8-F SP 228 CSA <16MB
X.....E VSMY831L - D Tm Min Alc Pg Key 8-F SP 231 CSA <16MB
X.....E VSMY841L - D Tm Min Alc Pg Key 8-F SP 241 CSA <16MB
X.....E VSMZBCSH - D Time Max Large Free Blk ECSA > 16MB
X.....E VSMZBCSL - D Time Max Large Free Blk CSA < 16MB
X.....E VSMZBSQH - D Time Max Large Free Blk ESQA > 16MB
X.....E VSMZBSQL - D Time Max Large Free Blk SQA < 16MB
X.....E VSMZCSQH - D Time Max ESQA Oflow to ECSA > 16MB
X.....E VSMZCSQL - D Time Max SQA Oflow to CSA < 16MB
X.....E VSMZFCSH - D Time Max Free Pg ECSA > 16MB
X.....E VSMZFCSL - D Time Max Free Pg CSA < 16MB
X.....E VSMZFSQH - D Time Max Free Pg ESQA > 16MB
X.....E VSMZFSQL - D Time Max Free Pg SQA < 16MB
X.....E VSMZTCSH - D Time Max Alloc Area ECSA > 16MB
X.....E VSMZTCSL - D Time Max Alloc Area CSA < 16MB
X.....E VSMZTSQH - D Time Max Alloc Area ESQA > 16MB
X.....E VSMZTSQL - D Time Max Alloc Area SQA < 16MB
X.....E VSMZT27L - D Time Max Alc Pg SP 227 CSA < 16MB
X.....E VSMZT28L - D Time Max Alc Pg SP 228 CSA < 16MB
X.....E VSMZT31L - D Time Max Alc Pg SP 231 CSA < 16MB
X.....E VSMZT41L - D Time Max Alc Pg SP 241 CSA < 16MB
X.....E VSMZUCSH - D Time Max Alc Pg ECSA > 16MB
X.....E VSMZUCSL - D Time Max Alc Pg CSA < 16MB
X.....E VSMZUSQH - D Time Max Alc Pg ESQA > 16MB

X.....E VSMZUSQL - D Time Max Alc Pg SQA < 16MB
X.....E VSMZ0CSH - D Time Max Alc Pg Key 0 ECSA > 16MB
X.....E VSMZ0CSL - D Time Max Alc Pg Key 0 CSA < 16MB
X.....E VSMZ027L - D Time Max Alc Pg Key 0 SP 227 CSA <16MB
X.....E VSMZ028L - D Time Max Alc Pg Key 0 SP 228 CSA <16MB
X.....E VSMZ031L - D Time Max Alc Pg Key 0 SP 231 CSA <16MB
X.....E VSMZ041L - D Time Max Alc Pg Key 0 SP 241 CSA <16MB
X.....E VSMZ1CSH - D Time Max Alc Pg Key 1 ECSA > 16MB
X.....E VSMZ1CSL - D Time Max Alc Pg Key 1 CSA < 16MB
X.....E VSMZ127L - D Time Max Alc Pg Key 1 SP 227 CSA <16MB
X.....E VSMZ128L - D Time Max Alc Pg Key 1 SP 228 CSA <16MB
X.....E VSMZ131L - D Time Max Alc Pg Key 1 SP 231 CSA <16MB
X.....E VSMZ141L - D Time Max Alc Pg Key 1 SP 241 CSA <16MB
X.....E VSMZ2CSH - D Time Max Alc Pg Key 2 ECSA > 16MB
X.....E VSMZ2CSL - D Time Max Alc Pg Key 2 CSA < 16MB
X.....E VSMZ226L - D Time Max Alc Pg SP 226 SQA < 16MB
X.....E VSMZ227L - D Time Max Alc Pg Key 2 SP 227 CSA <16MB
X.....E VSMZ228L - D Time Max Alc Pg Key 2 SP 228 CSA <16MB
X.....E VSMZ231L - D Time Max Alc Pg Key 2 SP 231 CSA <16MB
X.....E VSMZ239L - D Time Max Alc Pg SP 239 SQA < 16MB
X.....E VSMZ241L - D Time Max Alc Pg Key 2 SP 241 CSA <16MB
X.....E VSMZ245L - D Time Max Alc Pg SP 245 SQA < 16MB
X.....E VSMZ3CSH - D Time Max Alc Pg Key 3 ECSA > 16MB
X.....E VSMZ3CSL - D Time Max Alc Pg Key 3 CSA < 16MB
X.....E VSMZ327L - D Time Max Alc Pg Key 3 SP 227 CSA <16MB
X.....E VSMZ328L - D Time Max Alc Pg Key 3 SP 228 CSA <16MB
X.....E VSMZ331L - D Time Max Alc Pg Key 3 SP 231 CSA <16MB
X.....E VSMZ341L - D Time Max Alc Pg Key 3 SP 241 CSA <16MB
X.....E VSMZ4CSH - D Time Max Alc Pg Key 4 ECSA > 16MB
X.....E VSMZ4CSL - D Time Max Alc Pg Key 4 CSA < 16MB
X.....E VSMZ427L - D Time Max Alc Pg Key 4 SP 227 CSA <16MB
X.....E VSMZ428L - D Time Max Alc Pg Key 4 SP 228 CSA <16MB
X.....E VSMZ431L - D Time Max Alc Pg Key 4 SP 231 CSA <16MB
X.....E VSMZ441L - D Time Max Alc Pg Key 4 SP 241 CSA <16MB
X.....E VSMZ5CSH - D Time Max Alc Pg Key 5 ECSA > 16MB
X.....E VSMZ5CSL - D Time Max Alc Pg Key 5 CSA < 16MB
X.....E VSMZ527L - D Time Max Alc Pg Key 5 SP 227 CSA <16MB
X.....E VSMZ528L - D Time Max Alc Pg Key 5 SP 228 CSA <16MB
X.....E VSMZ531L - D Time Max Alc Pg Key 5 SP 231 CSA <16MB
X.....E VSMZ541L - D Time Max Alc Pg Key 5 SP 241 CSA <16MB
X.....E VSMZ6CSH - D Time Max Alc Pg Key 6 ECSA > 16MB
X.....E VSMZ6CSL - D Time Max Alc Pg Key 6 CSA < 16MB
X.....E VSMZ627L - D Time Max Alc Pg Key 6 SP 227 CSA <16MB
X.....E VSMZ628L - D Time Max Alc Pg Key 6 SP 228 CSA <16MB
X.....E VSMZ631L - D Time Max Alc Pg Key 6 SP 231 CSA <16MB
X.....E VSMZ641L - D Time Max Alc Pg Key 6 SP 241 CSA <16MB
X.....E VSMZ7CSH - D Time Max Alc Pg Key 7 ECSA > 16MB
X.....E VSMZ7CSL - D Time Max Alc Pg Key 7 CSA < 16MB
X.....E VSMZ727L - D Time Max Alc Pg Key 7 SP 227 CSA <16MB

X....E VSMZ728L - D Time Max Alc Pg Key 7 SP 228 CSA <16MB
X....E VSMZ731L - D Time Max Alc Pg Key 7 SP 231 CSA <16MB
X....E VSMZ741L - D Time Max Alc Pg Key 7 SP 241 CSA <16MB
X....E VSMZ8CSH - D Time Max Alc Pg Key 8-F ECSA > 16MB
X....E VSMZ8CSL - D Time Max Alc Pg Key 8-F CSA < 16MB
X....E VSMZ827L - D Tm Max Alc Pg Key 8-F SP 227 CSA <16MB
X....E VSMZ828L - D Tm Max Alc Pg Key 8-F SP 228 CSA <16MB
X....E VSMZ831L - D Tm Max Alc Pg Key 8-F SP 231 CSA <16MB
X....E VSMZ841L - D Tm Max Alc Pg Key 8-F SP 241 CSA <16MB

Accumulated Data Elements

XDWM..E VSMISSCT - Intvls with RMF Samples Skipped
XDWM..E VSMRSMP - Number of RMF Samples
XDWM..E VSMTBCSH - Tot K Large Free Blk ECSA > 16MB
XDWM..E VSMTBCSL - Tot K Large Free Blk CSA < 16MB
XDWM..E VSMTBSQH - Tot K Large Free Blk ESQA > 16MB
XDWM..E VSMTBSQL - Tot K Large Free Blk SQA < 16MB
XDWM..E VSMTCSAH - Tot K Size ECSA > 16MB
XDWM..E VSMTCSAL - Tot K Size CSA < 16MB
XDWM..E VSMTCSQH - Tot K Alc Pg ESQA Oflow ECSA > 16MB
XDWM..E VSMTCSQL - Tot K Alc Pg SQA Oflow CSA < 16MB
XDWM..E VSMTDUPH - Tot K EMLPA/EFLPA Dup EPLPA> 16MB
XDWM..E VSMTDUPL - Tot K MLPA/FLPA Dup PLPA < 16MB
XDWM..E VSMTFCSH - Tot K Large Free Blk ECSA > 16MB
XDWM..E VSMTFCSL - Tot K Large Free Blk CSA < 16MB
XDWM..E VSMTFLPH - Tot K Size EFLPA > 16MB
XDWM..E VSMTFLPL - Tot K Size FLPA < 16MB
XDWM..E VSMTFSQH - Tot K Free Pg ESQA > 16MB
XDWM..E VSMTFSQL - Tot K Free Pg SQA < 16MB
XDWM..E VSMTLPAH - Tot K Size ELPA > 16MB
XDWM..E VSMTLPAL - Tot K Size LPA < 16MB
XDWM..E VSMTMLPH - Tot K Size EMLPA > 16MB
XDWM..E VSMTMLPL - Tot K Size MLPA < 16MB
XDWM..E VSMTNUCH - Tot K Size Extended Nucleus > 16MB
XDWM..E VSMTNUCL - Tot K Size Nucleus < 16MB
XDWM..E VSMTPAKH - Tot K Packing Loss EPLPA > 16MB
XDWM..E VSMTPAKL - Tot K Packing Loss PLPA < 16MB
XDWM..E VSMTPSA - Tot K Size PSA < 16MB
XDWM..E VSMTPVTH - Tot K Size Extended Private Area > 16MB
XDWM..E VSMTPVTL - Tot K Size Private Area < 16MB
XDWM..E VSMTSQA H - Tot K Size ESQA > 16MB
XDWM..E VSMTSQAL - Tot K Size SQA < 16MB
XDWM..E VSMTTCSH - Tot K Alloc Area ECSA > 16MB
XDWM..E VSMTTCSL - Tot K Alloc Area CSA < 16MB
XDWM..E VSMTTSQH - Tot K Alloc Area ESQA Total > 16MB
XDWM..E VSMTTSQL - Tot K Alloc Area SQA Total < 16MB
XDWM..E VSMTT27L - Tot K Alc Pg SP 227 CSA < 16MB
XDWM..E VSMTT28L - Tot K Alc Pg SP 228 CSA < 16MB

XDWM..E VSMTT31L - Tot K Alc Pg SP 231 CSA < 16MB
XDWM..E VSMTT41L - Tot K Alc Pg SP 241 CSA < 16MB
XDWM..E VSMTUCSH - Tot K Alc Pg ECSA > 16MB
XDWM..E VSMTUCSL - Tot K Alc Pg CSA < 16MB
XDWM..E VSMTUSQH - Tot K Alc Pg ESQA > 16MB
XDWM..E VSMTUSQL - Tot K Alc Pg SQA < 16MB
XDWM..E VSMTUSRH - Tot K Size Extended User Region > 16MB
XDWM..E VSMTUSRL - Tot K Size User Region < 16MB
XDWM..E VSMT0CSH - Tot K Alc Pg Key 0 ECSA > 16MB
XDWM..E VSMT0CSL - Tot K Alc Pg Key 0 CSA < 16MB
XDWM..E VSMT027L - Tot K Alc Pg Key 0 SP 227 CSA <16MB
XDWM..E VSMT028L - Tot K Alc Pg Key 0 SP 228 CSA <16MB
XDWM..E VSMT031L - Tot K Alc Pg Key 0 SP 231 CSA <16MB
XDWM..E VSMT041L - Tot K Alc Pg Key 0 SP 241 CSA <16MB
XDWM..E VSMT1CSH - Tot K Alc Pg Key 1 ECSA > 16MB
XDWM..E VSMT1CSL - Tot K Alc Pg Key 1 CSA < 16MB
XDWM..E VSMT127L - Tot K Alc Pg Key 1 SP 227 CSA <16MB
XDWM..E VSMT128L - Tot K Alc Pg Key 1 SP 228 CSA <16MB
XDWM..E VSMT131L - Tot K Alc Pg Key 1 SP 231 CSA <16MB
XDWM..E VSMT141L - Tot K Alc Pg Key 1 SP 241 CSA <16MB
XDWM..E VSMT2CSH - Tot K Alc Pg Key 2 ECSA > 16MB
XDWM..E VSMT2CSL - Tot K Alc Pg Key 2 CSA < 16MB
XDWM..E VSMT226L - Tot K Alc Pg SP 226 SQA < 16MB
XDWM..E VSMT227L - Tot K Alc Pg Key 2 SP 227 CSA <16MB
XDWM..E VSMT228L - Tot K Alc Pg Key 2 SP 228 CSA <16MB
XDWM..E VSMT231L - Tot K Alc Pg Key 2 SP 231 CSA <16MB
XDWM..E VSMT239L - Tot K Alc Pg SP 239 SQA < 16MB
XDWM..E VSMT241L - Tot K Alc Pg Key 2 SP 241 CSA <16MB
XDWM..E VSMT245L - Tot K Alc Pg SP 245 SQA < 16MB
XDWM..E VSMT3CSH - Tot K Alc Pg Key 3 ECSA > 16MB
XDWM..E VSMT3CSL - Tot K Alc Pg Key 3 CSA < 16MB
XDWM..E VSMT327L - Tot K Alc Pg Key 3 SP 227 CSA <16MB
XDWM..E VSMT328L - Tot K Alc Pg Key 3 SP 228 CSA <16MB
XDWM..E VSMT331L - Tot K Alc Pg Key 3 SP 231 CSA <16MB
XDWM..E VSMT341L - Tot K Alc Pg Key 3 SP 241 CSA <16MB
XDWM..E VSMT4CSH - Tot K Alc Pg Key 4 ECSA > 16MB
XDWM..E VSMT4CSL - Tot K Alc Pg Key 4 CSA < 16MB
XDWM..E VSMT427L - Tot K Alc Pg Key 4 SP 227 CSA <16MB
XDWM..E VSMT428L - Tot K Alc Pg Key 4 SP 228 CSA <16MB
XDWM..E VSMT431L - Tot K Alc Pg Key 4 SP 231 CSA <16MB
XDWM..E VSMT441L - Tot K Alc Pg Key 4 SP 241 CSA <16MB
XDWM..E VSMT5CSH - Tot K Alc Pg Key 5 ECSA > 16MB
XDWM..E VSMT5CSL - Tot K Alc Pg Key 5 CSA < 16MB
XDWM..E VSMT527L - Tot K Alc Pg Key 5 SP 227 CSA <16MB
XDWM..E VSMT528L - Tot K Alc Pg Key 5 SP 228 CSA <16MB
XDWM..E VSMT531L - Tot K Alc Pg Key 5 SP 231 CSA <16MB
XDWM..E VSMT541L - Tot K Alc Pg Key 5 SP 241 CSA <16MB
XDWM..E VSMT6CSH - Tot K Alc Pg Key 6 ECSA > 16MB
XDWM..E VSMT6CSL - Tot K Alc Pg Key 6 CSA < 16MB

XDWM..E VSMT627L - Tot K Alc Pg Key 6 SP 227 CSA <16MB
XDWM..E VSMT628L - Tot K Alc Pg Key 6 SP 228 CSA <16MB
XDWM..E VSMT631L - Tot K Alc Pg Key 6 SP 231 CSA <16MB
XDWM..E VSMT641L - Tot K Alc Pg Key 6 SP 241 CSA <16MB
XDWM..E VSMT7CSH - Tot K Alc Pg Key 7 ECSA > 16MB
XDWM..E VSMT7CSL - Tot K Alc Pg Key 7 CSA < 16MB
XDWM..E VSMT727L - Tot K Alc Pg Key 7 SP 227 CSA <16MB
XDWM..E VSMT728L - Tot K Alc Pg Key 7 SP 228 CSA <16MB
XDWM..E VSMT731L - Tot K Alc Pg Key 7 SP 231 CSA <16MB
XDWM..E VSMT741L - Tot K Alc Pg Key 7 SP 241 CSA <16MB
XDWM..E VSMT8CSH - Tot K Alc Pg Key 8-F ECSA > 16MB
XDWM..E VSMT8CSL - Tot K Alc Pg Key 8-F CSA < 16MB
XDWM..E VSMT827L - Tot K Alc Pg Key 8-F SP 227 CSA <16MB
XDWM..E VSMT828L - Tot K Alc Pg Key 8-F SP 228 CSA <16MB
XDWM..E VSMT831L - Tot K Alc Pg Key 8-F SP 231 CSA <16MB
XDWM..E VSMT841L - Tot K Alc Pg Key 8-F SP 241 CSA <16MB

Minimum Data Elements

XDWM..E VSMNBCSH - Min K Large Free Blk ECSA > 16MB
XDWM..E VSMNBCSL - Min K Large Free Blk CSA < 16MB
XDWM..E VSMNBSQH - Min K Large Free Blk ESQA > 16MB
XDWM..E VSMNBSQL - Min K Large Free Blk SQA < 16MB
XDWM..E VSMNCSAH - Min K Size ECSA > 16MB
XDWM..E VSMNCSAL - Min K Size CSA < 16MB
XDWM..E VSMNCSQH - Min K ESQA Oflow to ECSA > 16MB
XDWM..E VSMNCSQL - Min K SQA Oflow to CSA < 16MB
XDWM..E VSMNDUPH - Min K EMLPA/EFLPA Dup EPLPA > 16MB
XDWM..E VSMNDUPL - Min K MLPA/FLPA Dup PLPA < 16MB
XDWM..E VSMNFCSH - Min K Free Pg ECSA > 16MB
XDWM..E VSMNFCSL - Min K Free Pg CSA < 16MB
XDWM..E VSMNFLPH - Min K Size EFLPA > 16MB
XDWM..E VSMNFLPL - Min K Size FLPA < 16MB
XDWM..E VSMNFSQH - Min K Free Pg ESQA > 16MB
XDWM..E VSMNFSQL - Min K Free Pg SQA < 16MB
XDWM..E VSMNLPAH - Min K Size ELPA > 16MB
XDWM..E VSMNLPAL - Min K Size LPA < 16MB
XDWM..E VSMNMLPH - Min K Size EMLPA > 16MB
XDWM..E VSMNMLPL - Min K Size MLPA < 16MB
XDWM..E VSMNNUCH - Min K Size Extended Nucleus > 16MB
XDWM..E VSMNNUCL - Min K Size Nucleus < 16MB
XDWM..E VSMNPAKH - Min K Packing Loss EPLPA > 16MB
XDWM..E VSMNPAKL - Min K Packing Loss PLPA < 16MB
XDWM..E VSMNPSA - Min K Size PSA <16MB
XDWM..E VSMNPVTH - Min K Size Extended Private Area < 16MB
XDWM..E VSMNPVTL - Min K Size Private Area < 16MB
XDWM..E VSMNSQAH - Min K Size ESQA > 16MB
XDWM..E VSMNSQAL - Min K Size SQA < 16MB
XDWM..E VSMNTCSH - Min K Alloc Area ECSA > 16MB

XDWM..E VSMNTCSL - Min K Alloc Area CSA < 16MB
XDWM..E VSMNTSQH - Min K Alloc Area ESQA > 16MB
XDWM..E VSMNTSQL - Min K Alloc Area SQA < 16MB
XDWM..E VSMNT27L - Min K Alc Pg SP 227 CSA < 16MB
XDWM..E VSMNT28L - Min K Alc Pg SP 228 CSA < 16MB
XDWM..E VSMNT31L - Min K Alc Pg SP 231 CSA < 16MB
XDWM..E VSMNT41L - Min K Alc Pg SP 241 CSA < 16MB
XDWM..E VSMNUCSH - Min K Alc Pg ECSA > 16MB
XDWM..E VSMNUCSL - Min K Alc Pg CSA < 16MB
XDWM..E VSMNUSQH - Min K Alc Pg ESQA > 16MB
XDWM..E VSMNUSQL - Min K Alc Pg SQA < 16MB
XDWM..E VSMNUSRH - Min K Alc Pg Extended User Region > 16MB
XDWM..E VSMNUSRL - Min K Alc Pg User Region < 16MB
XDWM..E VSMN0CSH - Min K Alc Pg Key 0 ECSA > 16MB
XDWM..E VSMN0CSL - Min K Alc Pg Key 0 CSA < 16MB
XDWM..E VSMN027L - Min K Alc Pg Key 0 SP 227 CSA < 16MB
XDWM..E VSMN028L - Min K Alc Pg Key 0 SP 228 CSA < 16MB
XDWM..E VSMN031L - Min K Alc Pg Key 0 SP 231 CSA < 16MB
XDWM..E VSMN041L - Min K Alc Pg Key 0 SP 241 CSA < 16MB
XDWM..E VSMN1CSH - Min K Alc Pg Key 1 ECSA > 16MB
XDWM..E VSMN1CSL - Min K Alc Pg Key 1 CSA < 16MB
XDWM..E VSMN127L - Min K Alc Pg Key 1 SP 227 CSA < 16MB
XDWM..E VSMN128L - Min K Alc Pg Key 1 SP 228 CSA < 16MB
XDWM..E VSMN131L - Min K Alc Pg Key 1 SP 231 CSA < 16MB
XDWM..E VSMN141L - Min K Alc Pg Key 1 SP 241 CSA < 16MB
XDWM..E VSMN2CSH - Min K Alc Pg Key 2 ECSA > 16MB
XDWM..E VSMN2CSL - Min K Alc Pg Key 2 CSA < 16MB
XDWM..E VSMN226L - Min K Alc Pg SP 226 SQA < 16MB
XDWM..E VSMN227L - Min K Alc Pg Key 2 SP 227 CSA < 16MB
XDWM..E VSMN228L - Min K Alc Pg Key 2 SP 228 CSA < 16MB
XDWM..E VSMN231L - Min K Alc Pg Key 2 SP 231 CSA < 16MB
XDWM..E VSMN239L - Min K Alc Pg SP 239 SQA < 16MB
XDWM..E VSMN241L - Min K Alc Pg Key 2 SP 241 CSA < 16MB
XDWM..E VSMN245L - Min K Alc Pg SP 245 SQA < 16MB
XDWM..E VSMN3CSH - Min K Alc Pg Key 3 ECSA > 16MB
XDWM..E VSMN3CSL - Min K Alc Pg Key 3 CSA < 16MB
XDWM..E VSMN327L - Min K Alc Pg Key 3 SP 227 CSA < 16MB
XDWM..E VSMN328L - Min K Alc Pg Key 3 SP 228 CSA < 16MB
XDWM..E VSMN331L - Min K Alc Pg Key 3 SP 231 CSA < 16MB
XDWM..E VSMN341L - Min K Alc Pg Key 3 SP 241 CSA < 16MB
XDWM..E VSMN4CSH - Min K Alc Pg Key 4 ECSA > 16MB
XDWM..E VSMN4CSL - Min K Alc Pg Key 4 CSA < 16MB
XDWM..E VSMN427L - Min K Alc Pg Key 4 SP 227 CSA < 16MB
XDWM..E VSMN428L - Min K Alc Pg Key 4 SP 228 CSA < 16MB
XDWM..E VSMN431L - Min K Alc Pg Key 4 SP 231 CSA < 16MB
XDWM..E VSMN441L - Min K Alc Pg Key 4 SP 241 CSA < 16MB
XDWM..E VSMN5CSH - Min K Alc Pg Key 5 ECSA > 16MB
XDWM..E VSMN5CSL - Min K Alc Pg Key 5 CSA < 16MB
XDWM..E VSMN527L - Min K Alc Pg Key 5 SP 227 CSA < 16MB

XDWM..E VSMN528L - Min K Alc Pg Key 5 SP 228 CSA < 16MB
XDWM..E VSMN531L - Min K Alc Pg Key 5 SP 231 CSA < 16MB
XDWM..E VSMN541L - Min K Alc Pg Key 5 SP 241 CSA < 16MB
XDWM..E VSMN6CSH - Min K Alc Pg Key 6 ECSA > 16MB
XDWM..E VSMN6CSL - Min K Alc Pg Key 6 CSA < 16MB
XDWM..E VSMN627L - Min K Alc Pg Key 6 SP 227 CSA < 16MB
XDWM..E VSMN628L - Min K Alc Pg Key 6 SP 228 CSA < 16MB
XDWM..E VSMN631L - Min K Alc Pg Key 6 SP 231 CSA < 16MB
XDWM..E VSMN641L - Min K Alc Pg Key 6 SP 241 CSA < 16MB
XDWM..E VSMN7CSH - Min K Alc Pg Key 7 ECSA > 16MB
XDWM..E VSMN7CSL - Min K Alc Pg Key 7 CSA < 16MB
XDWM..E VSMN727L - Min K Alc Pg Key 7 SP 227 CSA < 16MB
XDWM..E VSMN728L - Min K Alc Pg Key 7 SP 228 CSA < 16MB
XDWM..E VSMN731L - Min K Alc Pg Key 7 SP 231 CSA < 16MB
XDWM..E VSMN741L - Min K Alc Pg Key 7 SP 241 CSA < 16MB
XDWM..E VSMN8CSH - Min K Alc Pg Key 8 ECSA > 16MB
XDWM..E VSMN8CSL - Min K Alc Pg Key 8 CSA < 16MB
XDWM..E VSMN827L - Min K Alc Pg Key 8-F SP 227 CSA < 16MB
XDWM..E VSMN828L - Min K Alc Pg Key 8-F SP 228 CSA < 16MB
XDWM..E VSMN831L - Min K Alc Pg Key 8-F SP 231 CSA < 16MB
XDWM..E VSMN841L - Min K Alc Pg Key 8-F SP 241 CSA < 16MB

Maximum Data Elements

XDWM..E VSMMBCSH - Max K Large Free Blk ECSA > 16MB
XDWM..E VSMMBCSL - Max K Large Free Blk CSA < 16MB
XDWM..E VSMMBSQH - Max K Large Free Blk ESQA > 16MB
XDWM..E VSMMBSQL - Max K Large Free Blk SQA < 16MB
XDWM..E VSMMCSAH - Max K Size ECSA > 16MB
XDWM..E VSMMCSAL - Max K Size CSA < 16MB
XDWM..E VSMMCSHP - Max Pct ECSA Alc Pg Incl ESQA Oflow>16MB
XDWM..E VSMMCSHT - Max K Approx ECSA+ESQA Oflow > 16MB
XDWM..E VSMMCSLP - Max Pct CSA Alc Pg Incl SQA Oflow < 16MB
XDWM..E VSMMCSLT - Max K Approx CSA+SQA Oflow < 16MB
XDWM..E VSMMCSQH - Max K ESQA Oflow to ECSA > 16MB
XDWM..E VSMMCSQL - Max K SQA Oflow to CSA < 16MB
XDWM..E VSMMDUPH - Max K EMLPA/EFLPA Dup EPLPA> 16MB
XDWM..E VSMMDUPL - Max K MLPA/FLPA Dup PLPA< 16MB
XDWM..E VSMMFCSH - Max K Free Pg ECSA > 16MB
XDWM..E VSMMFCSL - Max K Free Pg CSA < 16MB
XDWM..E VSMMFLPH - Max K Size EFLPA > 16MB
XDWM..E VSMMFLPL - Max K Size FLPA < 16MB
XDWM..E VSMMFSQH - Max K Free Pg ESQA > 16MB
XDWM..E VSMMFSQL - Max K Free Pg SQA < 16MB
XDWM..E VSMMLPAH - Max K Size ELPA > 16MB
XDWM..E VSMMLPAL - Max K Size LPA < 16MB
XDWM..E VSMMMLPH - Max K Size EMLPA > 16MB
XDWM..E VSMMMLPL - Max K Size MLPA < 16MB
XDWM..E VSMMNUCH - Max K Size Extended Nucleus > 16MB

XDWM..E VSMMNUCL - Max K Size Nucleus < 16MB
XDWM..E VSMMPAKH - Max K Packing Loss EPLPA > 16MB
XDWM..E VSMMPAKL - Max K Packing Loss PLPA < 16MB
XDWM..E VSMMPSA - Max K Size PSA <16MB
XDWM..E VSMMPVTH - Max K Size Extended Private Area > 16MB
XDWM..E VSMMPVTL - Max K Size Private Area < 16MB
XDWM..E VSMMSQAH - Max K Size ESQA > 16MB
XDWM..E VSMMSQAL - Max K Size SQA < 16MB
XDWM..E VSMMSQHP - Max Pct Alc Pg ESQA > 16MB
XDWM..E VSMMSQLP - Max Pct Alc Pg SQA < 16MB
XDWM..E VSMMTCSH - Max K Alloc Area ECSA > 16MB
XDWM..E VSMMTCSL - Max K Alloc Area CSA < 16MB
XDWM..E VSMMTSQH - Max K Alloc Area ESQA > 16MB
XDWM..E VSMMTSQL - Max K Alloc Area SQA < 16MB
XDWM..E VSMMT27L - Max K Alc Pg SP 227 CSA < 16MB
XDWM..E VSMMT28L - Max K Alc Pg SP 228 CSA < 16MB
XDWM..E VSMMT31L - Max K Alc Pg SP 231 CSA < 16MB
XDWM..E VSMMT41L - Max K Alc Pg SP 241 CSA < 16MB
XDWM..E VSMMUCSH - Max K Alc Pg ECSA > 16MB
XDWM..E VSMMUCSL - Max K Alc Pg CSA < 16MB
XDWM..E VSMMUSQH - Max K Alc Pg ESQA > 16MB
XDWM..E VSMMUSQL - Max K Alc Pg SQA < 16MB
XDWM..E VSMMUSRH - Max K Size Extended User Region > 16MB
XDWM..E VSMMUSRL - Max K Size User Region < 16MB
XDWM..E VSMM0CSH - Max K Alc Pg Key 0 ECSA > 16MB
XDWM..E VSMM0CSL - Max K Alc Pg Key 0 CSA < 16MB
XDWM..E VSMM027L - Max K Alc Pg Key 0 SP 227 CSA < 16MB
XDWM..E VSMM028L - Max K Alc Pg Key 0 SP 228 CSA < 16MB
XDWM..E VSMM031L - Max K Alc Pg Key 0 SP 231 CSA < 16MB
XDWM..E VSMM041L - Max K Alc Pg Key 0 SP 241 CSA < 16MB
XDWM..E VSMM1CSH - Max K Alc Pg Key 1 ECSA > 16MB
XDWM..E VSMM1CSL - Max K Alc Pg Key 1 CSA < 16MB
XDWM..E VSMM127L - Max K Alc Pg Key 1 SP 227 CSA < 16MB
XDWM..E VSMM128L - Max K Alc Pg Key 1 SP 228 CSA < 16MB
XDWM..E VSMM131L - Max K Alc Pg Key 1 SP 231 CSA < 16MB
XDWM..E VSMM141L - Max K Alc Pg Key 1 SP 241 CSA < 16MB
XDWM..E VSMM2CSH - Max K Alc Pg Key 2 ECSA > 16MB
XDWM..E VSMM2CSL - Max K Alc Pg Key 2 CSA < 16MB
XDWM..E VSMM226L - Max K Alc Pg SP 226 SQA < 16MB
XDWM..E VSMM227L - Max K Alc Pg Key 2 SP 227 CSA < 16MB
XDWM..E VSMM228L - Max K Alc Pg Key 2 SP 228 CSA < 16MB
XDWM..E VSMM231L - Max K Alc Pg Key 2 SP 231 CSA < 16MB
XDWM..E VSMM239L - Max K Alc Pg SP 239 SQA < 16MB
XDWM..E VSMM241L - Max K Alc Pg Key 2 SP 241 CSA < 16MB
XDWM..E VSMM245L - Max K Alc Pg SP 245 SQA < 16MB
XDWM..E VSMM3CSH - Max K Alc Pg Key 3 ECSA > 16MB
XDWM..E VSMM3CSL - Max K Alc Pg Key 3 CSA < 16MB
XDWM..E VSMM327L - Max K Alc Pg Key 3 SP 227 CSA < 16MB
XDWM..E VSMM328L - Max K Alc Pg Key 3 SP 228 CSA < 16MB

XDWM..E VSMM331L - Max K Alc Pg Key 3 SP 231 CSA < 16MB
XDWM..E VSMM341L - Max K Alc Pg Key 3 SP 241 CSA < 16MB
XDWM..E VSMM4CSH - Max K Alc Pg Key 4 ECSA > 16MB
XDWM..E VSMM4CSL - Max K Alc Pg Key 4 CSA < 16MB
XDWM..E VSMM427L - Max K Alc Pg Key 4 SP 227 CSA < 16MB
XDWM..E VSMM428L - Max K Alc Pg Key 4 SP 228 CSA < 16MB
XDWM..E VSMM431L - Max K Alc Pg Key 4 SP 231 CSA < 16MB
XDWM..E VSMM441L - Max K Alc Pg Key 4 SP 241 CSA < 16MB
XDWM..E VSMM5CSH - Max K Alc Pg Key 5 ECSA > 16MB
XDWM..E VSMM5CSL - Max K Alc Pg Key 5 CSA < 16MB
XDWM..E VSMM527L - Max K Alc Pg Key 5 SP 227 CSA < 16MB
XDWM..E VSMM528L - Max K Alc Pg Key 5 SP 228 CSA < 16MB
XDWM..E VSMM531L - Max K Alc Pg Key 5 SP 231 CSA < 16MB
XDWM..E VSMM541L - Max K Alc Pg Key 5 SP 241 CSA < 16MB
XDWM..E VSMM6CSH - Max K Alc Pg Key 6 ECSA > 16MB
XDWM..E VSMM6CSL - Max K Alc Pg Key 6 CSA < 16MB
XDWM..E VSMM627L - Max K Alc Pg Key 6 SP 227 CSA < 16MB
XDWM..E VSMM628L - Max K Alc Pg Key 6 SP 228 CSA < 16MB
XDWM..E VSMM631L - Max K Alc Pg Key 6 SP 231 CSA < 16MB
XDWM..E VSMM641L - Max K Alc Pg Key 6 SP 241 CSA < 16MB
XDWM..E VSMM7CSH - Max K Alc Pg Key 7 ECSA > 16MB
XDWM..E VSMM7CSL - Max K Alc Pg Key 7 CSA < 16MB
XDWM..E VSMM727L - Max K Alc Pg Key 7 SP 227 CSA < 16MB
XDWM..E VSMM728L - Max K Alc Pg Key 7 SP 228 CSA < 16MB
XDWM..E VSMM731L - Max K Alc Pg Key 7 SP 231 CSA < 16MB
XDWM..E VSMM741L - Max K Alc Pg Key 7 SP 241 CSA < 16MB
XDWM..E VSMM8CSH - Max K Alc Pg Key 8 ECSA > 16MB
XDWM..E VSMM8CSL - Max K Alc Pg Key 8 CSA < 16MB
XDWM..E VSMM827L - Max K Alc Pg Key 8-F SP 227 CSA < 16MB
XDWM..E VSMM828L - Max K Alc Pg Key 8-F SP 228 CSA < 16MB
XDWM..E VSMM831L - Max K Alc Pg Key 8-F SP 231 CSA < 16MB
XDWM..E VSMM841L - Max K Alc Pg Key 8-F SP 241 CSA < 16MB

Derived Data Elements

XDWM..E VSMABCSH - Avg K Large Free Blk ECSA > 16MB
XDWM..E VSMABCSL - Avg K Large Free Blk CSA < 16MB
XDWM..E VSMABSQH - Avg K Large Free Block ESQA > 16MB
XDWM..E VSMABSQ L - Avg K Large Free Block SQA < 16MB
XDWM..E VSMACSAH - Avg K Size ECSA > 16MB
XDWM..E VSMACSAL - Avg K Size CSA < 16MB
XDWM..E VSMACSHP - Avg Pct ECSA Alc Pg Incl ESQA Oflow>16MB
XDWM..E VSMACSLP - Avg Pct CSA Alc Pg Incl SQA Oflow < 16MB
XDWM..E VSMACSQH - Avg K ESQA Oflow to ECSA > 16MB
XDWM..E VSMACSQ L - Avg K SQA Oflow to CSA < 16MB
XDWM..E VSMADUPH - Avg K EMLPA/EFLPA Dup EPLPA > 16MB
XDWM..E VSMADUPL - Avg K MLPA/FLPA Dup PLPA < 16MB
XDWM..E VSMAFCSH - Avg K Free Pg ECSA > 16MB
XDWM..E VSMAFCSL - Avg K Free Pg CSA < 16MB

XDWM..E VSMAFLPH - Avg K Size EFLPA > 16MB
 XDWM..E VSMAFLPL - Avg K Size FLPA < 16MB
 XDWM..E VSMAFSQH - Avg K Free Pg ESQA > 16MB
 XDWM..E VSMAFSQL - Avg K Free Pg SQA < 16MB
 XDWM..E VSMALPAH - Avg K Size ELPA > 16MB
 XDWM..E VSMALPAL - Avg K Size LPA < 16MB
 XDWM..E VSMAMLPH - Avg K Size EMLPA > 16MB
 XDWM..E VSMAMLPL - Avg K Size MLPA < 16MB
 XDWM..E VSMANUCH - Avg K Size Extended Nucleus > 16MB
 XDWM..E VSMANUCL - Avg K Size Nucleus < 16MB
 XDWM..E VSMAPAKH - Avg K Packing Loss (E)PLPA > 16MB
 XDWM..E VSMAPAKL - Avg K Packing Loss PLPA < 16MB
 XDWM..E VSMAPSA - Avg K Size PSA < 16MB
 XDWM..E VSMAPVTH - Avg K Size Extended Private Area > 16MB
 XDWM..E VSMAPVTL - Avg K Size Private Area < 16MB
 XDWM..E VSMASQAH - Avg K Size ESQA > 16MB
 XDWM..E VSMASQAL - Avg K Size SQA < 16MB
 XDWM..E VSMASQHP - Avg Pct ESQA Alc Pg > 16MB
 XDWM..E VSMASQLP - Avg Pct SQA Alc Pg < 16MB
 XDWM..E VSMATCSH - Avg K Alloc Area ECSA > 16MB
 XDWM..E VSMATCSL - Avg K Alloc Area CSA < 16MB
 XDWM..E VSMATSQH - Avg K Alloc Area ESQA > 16MB
 XDWM..E VSMATSQL - Avg K Alloc Area SQA < 16MB
 XDWM..E VSMAT27L - Avg K Alc Pg SP 227 CSA < 16MB
 XDWM..E VSMAT28L - Avg K Alc Pg SP 228 CSA < 16MB
 XDWM..E VSMAT31L - Avg K Alc Pg SP 231 CSA < 16MB
 XDWM..E VSMAT41L - Avg K Alc Pg SP 241 CSA < 16MB
 XDWM..E VSMAUCSH - Avg K Alc Pg ECSA > 16MB
 XDWM..E VSMAUCSL - Avg K Alc Pg CSA < 16MB
 XDWM..E VSMAUSQH - Avg K Alc Pg ESQA > 16MB
 XDWM..E VSMAUSQL - Avg K Alc Pg SQA < 16MB
 XDWM..E VSMAUSRH - Max K Size Extended User Region > 16MB
 XDWM..E VSMAUSRL - Max K Size User Region < 16MB
 XDWM..E VSMA0CSH - Avg K Alc Pg Key 0 Total ECSA > 16MB
 XDWM..E VSMA0CSL - Avg K Alc Pg Key 0 Total CSA < 16MB
 XDWM..E VSMA027L - Avg K Alc Pg Key 0 SP 227 CSA < 16MB
 XDWM..E VSMA028L - Avg K Alc Pg Key 0 SP 228 CSA < 16MB
 XDWM..E VSMA031L - Avg K Alc Pg Key 0 SP 231 CSA < 16MB
 XDWM..E VSMA041L - Avg K Alc Pg Key 0 SP 241 CSA < 16MB
 XDWM..E VSMA1CSH - Avg K Alc Pg Key 1 Total ECSA > 16MB
 XDWM..E VSMA1CSL - Avg K Alc Pg Key 1 Total CSA < 16MB
 XDWM..E VSMA127L - Avg K Alc Pg Key 1 SP 227 CSA < 16MB
 XDWM..E VSMA128L - Avg K Alc Pg Key 1 SP 228 CSA < 16MB
 XDWM..E VSMA131L - Avg K Alc Pg Key 1 SP 231 CSA < 16MB
 XDWM..E VSMA141L - Avg K Alc Pg Key 1 SP 241 CSA < 16MB
 XDWM..E VSMA2CSH - Avg K Alc Pg Key 2 Total ECSA > 16MB
 XDWM..E VSMA2CSL - Avg K Alc Pg Key 2 Total CSA < 16MB
 XDWM..E VSMA226L - Avg K Alc Pg SP 226 SQA < 16MB
 XDWM..E VSMA227L - Avg K Alc Pg Key 2 SP 227 CSA < 16MB

XDWM..E VSMA228L - Avg K Alc Pg Key 2 SP 228 CSA < 16MB
XDWM..E VSMA231L - Avg K Alc Pg Key 2 SP 231 CSA < 16MB
XDWM..E VSMA239L - Avg K Alc Pg SP 239 SQA < 16MB
XDWM..E VSMA241L - Avg K Alc Pg Key 2 SP 241 CSA < 16MB
XDWM..E VSMA245L - Avg K Alc Pg SP 245 SQA < 16MB
XDWM..E VSMA3CSH - Avg K Alc Pg Key 3 Total ECSA > 16MB
XDWM..E VSMA3CSL - Avg K Alc Pg Key 3 Total CSA < 16MB
XDWM..E VSMA327L - Avg K Alc Pg Key 3 SP 227 CSA < 16MB
XDWM..E VSMA328L - Avg K Alc Pg Key 3 SP 228 CSA < 16MB
XDWM..E VSMA331L - Avg K Alc Pg Key 3 SP 231 CSA < 16MB
XDWM..E VSMA341L - Avg K Alc Pg Key 3 SP 241 CSA < 16MB
XDWM..E VSMA4CSH - Avg K Alc Pg Key 4 Total ECSA > 16MB
XDWM..E VSMA4CSL - Avg K Alc Pg Key 4 Total CSA < 16MB
XDWM..E VSMA427L - Avg K Alc Pg Key 4 SP 227 CSA < 16MB
XDWM..E VSMA428L - Avg K Alc Pg Key 4 SP 228 CSA < 16MB
XDWM..E VSMA431L - Avg K Alc Pg Key 4 SP 231 CSA < 16MB
XDWM..E VSMA441L - Avg K Alc Pg Key 4 SP 241 CSA < 16MB
XDWM..E VSMA5CSH - Avg K Alc Pg Key 5 Total ECSA > 16MB
XDWM..E VSMA5CSL - Avg K Alc Pg Key 5 Total CSA < 16MB
XDWM..E VSMA527L - Avg K Alc Pg Key 5 SP 227 CSA < 16MB
XDWM..E VSMA528L - Avg K Alc Pg Key 5 SP 228 CSA < 16MB
XDWM..E VSMA531L - Avg K Alc Pg Key 5 SP 231 CSA < 16MB
XDWM..E VSMA541L - Avg K Alc Pg Key 5 SP 241 CSA < 16MB
XDWM..E VSMA6CSH - Avg K Alc Pg Key 6 Total ECSA > 16MB
XDWM..E VSMA6CSL - Avg K Alc Pg Key 6 Total CSA < 16MB
XDWM..E VSMA627L - Avg K Alc Pg Key 6 SP 227 CSA < 16MB
XDWM..E VSMA628L - Avg K Alc Pg Key 6 SP 228 CSA < 16MB
XDWM..E VSMA631L - Avg K Alc Pg Key 6 SP 231 CSA < 16MB
XDWM..E VSMA641L - Avg K Alc Pg Key 6 SP 241 CSA < 16MB
XDWM..E VSMA7CSH - Avg K Alc Pg Key 7 Total ECSA > 16MB
XDWM..E VSMA7CSL - Avg K Alc Pg Key 7 Total CSA < 16MB
XDWM..E VSMA727L - Avg K Alc Pg Key 7 SP 227 CSA < 16MB
XDWM..E VSMA728L - Avg K Alc Pg Key 7 SP 228 CSA < 16MB
XDWM..E VSMA731L - Avg K Alc Pg Key 7 SP 231 CSA < 16MB
XDWM..E VSMA741L - Avg K Alc Pg Key 7 SP 241 CSA < 16MB
XDWM..E VSMA8CSH - Avg K Alc Pg Key 8 Total ECSA > 16MB
XDWM..E VSMA8CSL - Avg K Alc Pg Key 8 Total CSA < 16MB
XDWM..E VSMA827L - Avg K Alc Pg Key 8-F SP 227 CSA < 16MB
XDWM..E VSMA828L - Avg K Alc Pg Key 8-F SP 228 CSA < 16MB
XDWM..E VSMA831L - Avg K Alc Pg Key 8-F SP 231 CSA < 16MB
XDWM..E VSMA841L - Avg K Alc Pg Key 8-F SP 241 CSA < 16MB

5.3.12.3 Usage Considerations

Special considerations or techniques related to using the SCPVSM file are provided below.

1. The following element in the SCPVSMnn file only has meaning when used in the DETAIL timespan, since significance is lost once summarization has been performed. In the higher timespans, the data element is retained based on the last reference from the file to be summarized.

CYCLETM - Sampling Cycle Time Length
2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. Be aware of the meaning of those data elements that represent minimum or maximum values of variables and the timestamps for when the minimum or maximum values occurred:
 - o A data element that represents the minimum value of a variable contains the minimum value for all occurrences of that data element in the records processed for the summarization level. This is true for all levels above DETAIL.
 - o A data element that represents the maximum value of a variable contains the maximum value for all occurrences of that data element in the records processed for the summarization level. This is true for all levels above DETAIL.
 - o The timestamps for minimum and maximum values are intended for detailed analysis of short term trends in the usage of virtual storage. As a result, these elements lose most of their significance above the DETAIL timespan, and are not carried into the DAYS, WEEKS, and MONTHS timespans of the CA MICS database.

4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, while ENDTS is the highest date and time, for the data summarized. The data elements also have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in the DETAIL timespan is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.12.4 Retrieval Examples

This section presents typical SCPVSM retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Display minimum and maximum Common Service Area (CSA) usage of virtual storage during the prime zone for each day or the past week:

```
DATA;
  SET &PSCPD..SCPVSM01 &PSCPD..SCPVSM02
      &PSCPD..SCPVSM03 &PSCPD..SCPVSM04
      &PSCPD..SCPVSM05;
  IF ZONE EQ '1';
PROC PRINT; VAR SYSID DAY HOUR
  VSMNBCSH VSMNBCSL VSMNCSAH VSMNCSAL
  VSMBCSH VMMBCSL VMMCSAH VMMCSAL;
```

2. Display average Common Service Area (CSA) usage of virtual storage during yesterday's prime zone for all subpools in protect keys 8 through F:

```
DATA;
  SET &PSCPX..SCPVSM01;
  IF SYSID EQ 'SYSA'; IF ZONE EQ '1';
PROC PRINT; VAR SYSID ENDTS
  VSMA8CSH VSMA8CSL VSMA827L VSMA828L
  VSMA831L VSMA841L;
```

5.3.13 Virtual Storage Private Usage File (SCPVSU)

The Virtual Storage Private Usage File quantifies the utilization of virtual storage by private areas such as regions, subpools, LSQA, SWA, free areas, and so on, above and below the 16 MB line. This file is typically used when reporting on virtual storage usage.

This file is derived from the RMF Monitor I Activity record, type 78 subtype 2.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.3.13.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	JOB	YEAR	MONTH	DAY	
	HOUR	ENDTS				
DAYS	SYSID	JOB	YEAR	MONTH	DAY	
	HOUR					
WEEKS	SYSID	JOB	YEAR	WEEK	ZONE	
	HOUR					
MONTHS	SYSID	JOB	YEAR	MONTH	ZONE	
YEARS	N/A					
TABLES	N/A					

Generation Date: Fri, Oct 12, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-52. SCPVSU Sort Sequence and Data Granularity

5.3.13.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Fri, Oct 12, 2012

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD....E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XDWM..E	JOB	- Job Identification
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier

XDWM...E WEEK - Week of Year
 XDWM...E YEAR - Year of Century
 XDWM...E ZONE - Time Zone

Common Data Elements

XDWM...E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM...E DURATION - Recording Interval Time
 XDWM...E ENDTS - End Time Stamp
 XDWM...E EXTSTOR - Expanded Storage Flag
 XDWM...E INTERVLS - Number of Recording Intervals
 XDWM...E MVSLEVEL - MVS Software Level
 XDWM...E ORGSYSID - Originating System Identification
 XDWM...E PROGRAM - Program Name
 XDWM...E PRSMLPNO - Logical Partition Number
 XDWM...E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM...E RDRTS - Reader Time Stamp
 XDWM...E RMFDATAV - Intvls with Enhanced DAT Architecture
 XDWM...E RMFESAME - z/Architecture Mode Indicator
 XDWM...E RMFESCDR - Intvls with ESCON Director in Config
 XDWM...E RMFESCON - Intvls where Enabled for ESCON
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 XDWM...E RMFIML - I/O Measurement Level
 X....E RMFSRL - SMF Record Level Change Number
 XDWM...E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM...E RMFVER - RMF Version Number
 XDWM...E SAMPLES - RMF Sample Count
 XDWM...E STARTTS - Start Time Stamp
 XDWM.. STEPNAME - Program Step Name
 XDWM...E SYSNAME - System Name
 XDWM...E SYSPLEX - Sysplex Name

Retained Data Elements

XDWM...E VSUMEML - Address Space Memory Limit (Megabytes)
 X....E VSURACTV - Job Active at Start of Intvl
 X....E VSURGMLX - GETMAIN Limit Changed During Intvl
 X....E VSURINVD - RMF ABEND During Sampling: Data Invalid
 X....E VSURJEND - Job Ended During Intvl
 X....E VSUYALSH - D Tm Min Alc Pg ELSQA/ESWA/229/230>16MB
 X....E VSUYALSL - D Time Min Alc Pg LSQA/SWA/229/230 <16MB
 X....E VSUYAUSH - D Time Min Alc Pg Ext User Region > 16MB
 X....E VSUYAUSL - D Time Min Alc Pg User Region < 16MB
 X....E VSUYBLSH - D Time Min LFB ELSQA/ESWA/229/ > 16MB
 X....E VSUYBLSL - D Time Min LFB LSQA/SWA/229/ < 16MB
 X....E VSUYBUSH - D Time Min LFB Ext User Region > 16MB
 X....E VSUYBUSL - D Time Min LFB User Region < 16MB
 X....E VSUYCOBY - D Time Min HV Common Kbytes Allocated

```

X.....E VSUYCOMO - D Time Min HV Common Memory Objects
X.....E VSUYFIFR - D Time Min 1MB Fixed Frames
X.....E VSUYFLSH - D Tm Min Free Pg ELSQA/ESWA/229/230>16MB
X.....E VSUYFLSL - D Time Min Free Pg LSQA/SWA/229/230<16MB
X.....E VSUYFUSH - D Time Min Free Pg Ext User Region >16MB
X.....E VSUYFUSL - D Time Min Free Pg User Region < 16MB
X.....E VSUYLGMO - D Time Min Large Memory Objects
X.....E VSUYPAFR - D Time Min 1MB Pageable Frames
X.....E VSUYSHBG - D Time Min Shr Kbytes Alloc. Above 2GB
X.....E VSUYSHMO - D Time Min HV Shared Memory Objects
X.....E VSUYSLSH - D Tm Min Al Area ELSQA/ESWA/229/230>16MB
X.....E VSUYSLSL - D Tm Min Alc Area LSQA/SWA/229/230 <16MB
X.....E VSUYSUSH - D Time Min Alc Area Ext User Region>16MB
X.....E VSUYSUSL - D Time Min Alc Area User Region < 16MB
X.....E VSUYTOBG - D Time Min Kbytes Allocated Above 2GB
X.....E VSUYTOFR - D Time Min 1MB Frames
X.....E VSUYTOMO - D Time Min HV Memory Objects Allocated
X.....E VSUY000L - D Time Min Alc Pg SP 000 Pvt Area < 16MB
X.....E VSUY229L - D Time Min Alc Pg SP 229 Pvt Area < 16MB
X.....E VSUY230L - D Time Min Alc Pg SP 230 Pvt Area < 16MB
X.....E VSUY236L - D Time Min Alc Pg SP 236 Pvt Area < 16MB
X.....E VSUY237L - D Time Min Alc Pg SP 237 Pvt Area < 16MB
X.....E VSUY251L - D Time Min Alc Pg SP 251 Pvt Area < 16MB
X.....E VSUY252L - D Time Min Alc Pg SP 252 Pvt Area < 16MB
X.....E VSUY255L - D Time Min Alc Pg SP 255 Pvt Area < 16MB
X.....E VSUZALSH - D Tm Max Alc Pg ELSQA/ESWA/229/230>16MB
X.....E VSUZALSL - D Time Max Alc Pg LSQA/SWA/229/230 <16MB
X.....E VSUZAUSH - D Time Max Alc Pg Ext User Region > 16MB
X.....E VSUZAUSL - D Time Max Alc Pg User Region < 16MB
X.....E VSUZBLSH - D Time Max LFB ELSQA/ESWA/229/230 > 16MB
X.....E VSUZBLSL - D Time Max LFB LSQA/SWA/229/230 < 16MB
X.....E VSUZBUSH - D Time Max LFB Ext User Region > 16MB
X.....E VSUZBUSL - D Time Max LFB User Region < 16MB
X.....E VSUZCOBY - D Time Max HV Common Kbytes Allocated
X.....E VSUZCOMO - D Time Max HV Common Memory Objects
X.....E VSUZFIFR - D Time Max 1MB Fixed Frames
X.....E VSUZFLSH - D Tm Max Free Pg ELSQA/ESWA/229/230>16MB
X.....E VSUZFLSL - D Time Max Free Pg LSQA/SWA/229/230<16MB
X.....E VSUZFUSH - D Time Max Free Pg Ext User Region >16MB
X.....E VSUZFUSL - D Time Max Free Pg User Region < 16MB
X.....E VSUZLGMO - D Time Max Large Memory Objects
X.....E VSUZPAFR - D Time Max 1MB Pageable Frames
X.....E VSUZSHBG - D Time Max Shr Kbytes Alloc. Above 2GB
X.....E VSUZSHMO - D Time Max HV Shared Memory Objects
X.....E VSUZSLSH - D Tm Max Al Area ELSQA/ESWA/229/230>16MB
X.....E VSUZSLSL - D Tm Max Alc Area LSQA/SWA/229/230 <16MB
X.....E VSUZSUSH - D Time Max Alc Area Ext User Region>16MB
X.....E VSUZSUSL - D Time Max Alc Area User Region < 16MB
X.....E VSUZTOBG - D Time Max Kbytes Allocated Above 2GB

```

```

X.....E VSUZTOFR - D Time Max 1MB Frames
X.....E VSUZTOMO - D Time Max HV Memory Objects Allocated
X.....E VSUZ000L - D Time Max Alc Pg SP 000 Pvt Area < 16MB
X.....E VSUZ229L - D Time Max Alc Pg SP 229 Pvt Area < 16MB
X.....E VSUZ230L - D Time Max Alc Pg SP 230 Pvt Area < 16MB
X.....E VSUZ236L - D Time Max Alc Pg SP 236 Pvt Area < 16MB
X.....E VSUZ237L - D Time Max Alc Pg SP 237 Pvt Area < 16MB
X.....E VSUZ251L - D Time Max Alc Pg SP 251 Pvt Area < 16MB
X.....E VSUZ252L - D Time Max Alc Pg SP 252 Pvt Area < 16MB
X.....E VSUZ255L - D Time Max Alc Pg SP 255 Pvt Area < 16MB

```

Accumulated Data Elements

```

XDWM..E VSUACTCT - Intvls with Job Active at Start
XDWM..E VSUGMLCT - Intvls with GETMAIN Limit Change
XDWM..E VSUINVCT - Intvls with RMF ABENDs
XDWM..E VSUJENCT - Intvls with Job Ending
XDWM..E VSURSMP - Number of RMF Samples
XDWM..E VSUTALSH - Tot K Alc Pg ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUTALSL - Tot K Alc Pg LSQA/SWA/229/230 < 16MB
XDWM..E VSUTAUSH - Tot K Alc Pg Ext User Region > 16MB
XDWM..E VSUTAUSL - Tot K Alc Pg User Region < 16MB
XDWM..E VSUTBLSH - Tot K LFB ELSQA/ESWA/229/230 >16MB
XDWM..E VSUTBLSL - Tot K LFB LSQA/SWA/229/230 < 16MB
XDWM..E VSUTBUSH - Tot K LFB Ext User Region > 16MB
XDWM..E VSUTBUSL - Tot K LFB User Region < 16MB
XDWM..E VSUTCOPY - Tot HV Common Kbytes Allocated
XDWM..E VSUTCOMO - Tot HV Common Memory Objects
XDWM..E VSUTFIFR - Tot 1MB Fixed Frames
XDWM..E VSUTFLSH - Tot K Free Pg ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUTFLSL - Tot K Free Pg LSQA/SWA/229/230 < 16MB
XDWM..E VSUTFUSH - Tot K Free Pg Ext User Region > 16MB
XDWM..E VSUTFUSL - Tot K Free Pg User Region < 16MB
XDWM..E VSUTGMLH - Tot K Getmain Limit Ext Pvt Area > 16MB
XDWM..E VSUTGMLL - Tot K Getmain Limit Pvt Area < 16MB
XDWM..E VSUTLGMO - Tot Large Memory Objects
XDWM..E VSUTPAFR - Tot 1MB Pageable Frames
XDWM..E VSUTREGR - Total K Region Requested in JCL
XDWM..E VSUTRGAL - Tot K Ext User Region Exit Assigned>16MB
XDWM..E VSUTRGAL - Tot K User Region Exit Assigned < 16MB
XDWM..E VSUTSHBG - Tot Shared Kbytes Allocated Above 2GB
XDWM..E VSUTSHMO - Tot HV Shared Memory Objects
XDWM..E VSUTSLSH - Tot K Alc Area ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUTSLSL - Tot K Alc Area LSQA/SWA/229/230 < 16MB
XDWM..E VSUTSUSH - Tot K Alc Area Ext User Region > 16MB
XDWM..E VSUTSUSL - Tot K Alc Area User Region < 16MB
XDWM..E VSUTTOBG - Tot Kbytes Allocated Above 2GB
XDWM..E VSUTTOFR - Tot 1MB Frames
XDWM..E VSUTTOMO - Tot HV Memory Objects Allocated

```

XDWM..E VSUTURAH - Tot K Ext User Region Address > 16MB
XDWM..E VSUTURAL - Tot K User Region Address < 16MB
XDWM..E VSUT000L - Tot K Alc Pg SP 000 Pvt Area < 16MB
XDWM..E VSUT229L - Tot K Alc Pg SP 229 Pvt Area < 16MB
XDWM..E VSUT230L - Tot K Alc Pg SP 230 Pvt Area < 16MB
XDWM..E VSUT236L - Tot K Alc Pg SP 236 Pvt Area < 16MB
XDWM..E VSUT237L - Tot K Alc Pg SP 237 Pvt Area < 16MB
XDWM..E VSUT251L - Tot K Alc Pg SP 251 Pvt Area < 16MB
XDWM..E VSUT252L - Tot K Alc Pg SP 252 Pvt Area < 16MB
XDWM..E VSUT255L - Tot K Alc Pg SP 255 Pvt Area < 16MB

Minimum Data Elements

XDWM..E VSUNALSH - Min K Alc Pg ELSQA/ESWA/229/230 >16MB
XDWM..E VSUNALSL - Min K Alc Pg LSQA/SWA/229/230 <16MB
XDWM..E VSUNAUSH - Min K Alc Pg Ext User Region > 16MB
XDWM..E VSUNAUSL - Min K Alc Pg User Region < 16MB
XDWM..E VSUNBLSH - Min K LFB ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUNBLSL - Min K LFB LSQA/SWA/229/230 < 16MB
XDWM..E VSUNBUSH - Min K LFB Ext User Region > 16MB
XDWM..E VSUNBUSL - Min K LFB User Region < 16MB
XDWM..E VSUNCOBY - Min HV Common Kbytes Allocated
XDWM..E VSUNCOMO - Min HV Common Memory Objects
XDWM..E VSUNFIFR - Min 1MB Fixed Frames
XDWM..E VSUNFLSH - Min K Free Pg ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUNFLSL - Min K Free Pg LSQA/SWA/229/230 < 16MB
XDWM..E VSUNFUSH - Min K Free Pg Ext User Region > 16MB
XDWM..E VSUNFUSL - Min K Free Pg User Region < 16MB
XDWM..E VSUNGMLH - Min K Extended Getmain Limit > 16MB
XDWM..E VSUNGMLL - Min K Getmain Limit < 16MB
XDWM..E VSUNLGMO - Min Large Memory Objects
XDWM..E VSUNPAFR - Min 1MB Pageable Frames
XDWM..E VSUNREGR - Min K User Region Requested in JCL
XDWM..E VSUNRGAL - Min K Ext User Region Exit Assigned>16MB
XDWM..E VSUNRGAL - Min K User Region Exit Assigned < 16MB
XDWM..E VSUNSHBG - Min Shared Kbytes Allocated Above 2GB
XDWM..E VSUNSHMO - Min HV Shared Memory Objects
XDWM..E VSUNSLSH - Min K Alc Area ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUNSLSL - Min K Alc Area LSQA/SWA/229/230 < 16MB
XDWM..E VSUNSUSH - Min K Alc Area Ext User Region > 16MB
XDWM..E VSUNSUSL - Min K Alc Area User Region < 16MB
XDWM..E VSUNTOBG - Min Kbytes Allocated Above 2GB
XDWM..E VSUNTOFR - Min 1MB Frames
XDWM..E VSUNTOMO - Min HV Memory Objects Allocated
XDWM..E VSUNURAH - Min K Ext User Region Address > 16MB
XDWM..E VSUNURAL - Min K User Region Address < 16MB
XDWM..E VSUN000L - Min K Alc Pg SP 000 Pvt Area < 16MB
XDWM..E VSUN229L - Min K Alc Pg SP 229 Pvt Area < 16MB
XDWM..E VSUN230L - Min K Alc Pg SP 230 Pvt Area < 16MB

```

XDWM..E VSUN236L - Min K Alc Pg SP 236 Pvt Area < 16MB
XDWM..E VSUN237L - Min K Alc Pg SP 237 Pvt Area < 16MB
XDWM..E VSUN251L - Min K Alc Pg SP 251 Pvt Area < 16MB
XDWM..E VSUN252L - Min K Alc Pg SP 252 Pvt Area < 16MB
XDWM..E VSUN255L - Min K Alc Pg SP 255 Pvt Area < 16MB

```

Maximum Data Elements

```

XDWM..E VSUHCOPY - Peak HV Common Kbytes Allocated
XDWM..E VSUHSBHG - Peak Shared Kbytes Allocated Above 2GB
XDWM..E VSUHTOBG - Peak Kbytes Allocated Above 2GB
XDWM..E VSUMALSH - Max K Alc Pg ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUMALSL - Max K Alc Pg LSQA/SWA/229/230 < 16MB
XDWM..E VSUMAUSH - Max K Alc Pg Extended User Region > 16MB
XDWM..E VSUMAUSL - Max K Alc Pg User Region < 16MB
XDWM..E VSUMBLSH - Max K LFB ELSQA/ESWA/229/230 >16MB
XDWM..E VSUMBLSL - Max K LFB LSQA/SWA/229/230 < 16MB
XDWM..E VSUMBUSH - Max K LFB Ext User Region > 16MB
XDWM..E VSUMBUSL - Max K LFB User Region < 16MB
XDWM..E VSUMCOPY - Max HV Common Kbytes Allocated
XDWM..E VSUMCOMO - Max HV Common Memory Objects
XDWM..E VSUMFIFR - Max 1MB Fixed Frames
XDWM..E VSUMFLSH - Max K Free Pg ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUMFLSL - Max K Free Pg LSQA/SWA/229/230 < 16MB
XDWM..E VSUMFUSH - Max K Free Pg Ext User Region > 16MB
XDWM..E VSUMFUSL - Max K Free Pg User Region < 16MB
XDWM..E VSUMGMLH - Max K Extended Getmain Limit > 16MB
XDWM..E VSUMGMLL - Max K Getmain Limit < 16MB
XDWM..E VSUMLGMO - Max Large Memory Objects
XDWM..E VSUMPAPFR - Max 1MB Pageable Frames
XDWM..E VSUMREGR - Max K User Region Requested in JCL
XDWM..E VSUMRGAR - Max K Ext User Region Exit Assigned>16MB
XDWM..E VSUMRGAL - Max K User Region Exit Assigned < 16MB
XDWM..E VSUMSHBG - Max Shared Kbytes Allocated Above 2GB
XDWM..E VSUMSHMO - Max HV Shared Memory Objects
XDWM..E VSUMSLSH - Max K Alc Area ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUMSLSL - Max K Alc Area LSQA/SWA/229/230 < 16MB
XDWM..E VSUMSUSH - Max K Alc Area Ext User Region > 16MB
XDWM..E VSUMSUSL - Max K Alc Area User Region < 16MB
XDWM..E VSUMTOBG - Max Kbytes Allocated Above 2GB
XDWM..E VSUMTOFR - Max 1MB Frames
XDWM..E VSUMTOMO - Max HV Memory Objects Allocated
XDWM..E VSUMURAH - Max K Ext User Region Address > 16MB
XDWM..E VSUMURAL - Max K User Region Address < 16MB
XDWM..E VSUM000L - Max K Alc Pg SP 000 Pvt Area < 16MB
XDWM..E VSUM229L - Max K Alc Pg SP 229 Pvt Area < 16MB
XDWM..E VSUM230L - Max K Alc Pg SP 230 Pvt Area < 16MB
XDWM..E VSUM236L - Max K Alc Pg SP 236 Pvt Area < 16MB
XDWM..E VSUM237L - Max K Alc Pg SP 237 Pvt Area < 16MB

```

XDWM..E VSUM251L - Max K Alc Pg SP 251 Pvt Area < 16MB
XDWM..E VSUM252L - Max K Alc Pg SP 252 Pvt Area < 16MB
XDWM..E VSUM255L - Max K Alc Pg SP 255 Pvt Area < 16MB

Derived Data Elements

XDWM..E VSUAALSH - Avg K Alc Pg ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUAALSL - Avg K Alc Pg LSQA/SWA/229/230 < 16MB
XDWM..E VSUAASH - Avg K Alc Pg Ext User Region > 16MB
XDWM..E VSUAASL - Avg K Alc Pg User Region < 16MB
XDWM..E VSUABLSH - Avg K LFB ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUABLSL - Avg K LFB LSQA/SWA/229/230 < 16MB
XDWM..E VSUABUSH - Avg K LFB Ext User Region > 16MB
XDWM..E VSUABUSL - Avg K LFB User Region < 16MB
XDWM..E VSUACOB - Avg HV Common Kbytes Allocated
XDWM..E VSUACOM - Avg HV-Common Memory Objects cts
XDWM..E VSUAFIFR - Avg 1MB Fixed Frames
XDWM..E VSUAFSLH - Avg K Free Pg ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUAFSL - Avg K Free Pg LSQA/SWA/229/230 < 16MB
XDWM..E VSUAFUSH - Avg K Free Pg Ext User Region < 16MB
XDWM..E VSUAFUSL - Avg K Free Pg User Region < 16MB
XDWM..E VSUAGMLH - Avg K Extended Getmain Limit > 16MB
XDWM..E VSUAGMLL - Avg K Getmain Limit < 16MB
XDWM..E VSUALGMO - Avg Large Memory Objects
XDWM..E VSUAPAFR - Avg 1MB Pageable Frames
XDWM..E VSUAREGR - Avg K User Region Requested in JCL
XDWM..E VSUARGAH - Avg K Ext User Region Exit Assigned>16MB
XDWM..E VSUARGAL - Avg K User Region Exit Assigned < 16MB
XDWM..E VSUASHBG - Avg Shared Kbytes Allocated Above 2GB
XDWM..E VSUASHMO - Avg HV Shared Memory Objects
XDWM..E VSUASLSH - Avg K Alc Area ELSQA/ESWA/229/230 > 16MB
XDWM..E VSUASLSL - Avg K Alc Area LSQA/SWA/229/230 < 16MB
XDWM..E VSUASUSH - Avg K Alc Area Ext User Region > 16MB
XDWM..E VSUASUSL - Avg K Alc Area User Region < 16MB
XDWM..E VSUATOBG - Avg Kbytes Allocated Above 2GB
XDWM..E VSUATOFR - Avg 1MB Frames
XDWM..E VSUATOMO - Avg HV Memory Objects Allocated
XDWM..E VSUAURAH - Avg K Extended User Region Address >16MB
XDWM..E VSUAURAL - Avg K User Region Address < 16MB
XDWM..E VSUA000L - Avg K Alc Pg SP 000 Pvt Area < 16MB
XDWM..E VSUA229L - Avg K Alc Pg SP 229 Pvt Area < 16MB
XDWM..E VSUA230L - Avg K Alc Pg SP 230 Pvt Area < 16MB
XDWM..E VSUA236L - Avg K Alc Pg SP 236 Pvt Area < 16MB
XDWM..E VSUA237L - Avg K Alc Pg SP 237 Pvt Area < 16MB
XDWM..E VSUA251L - Avg K Alc Pg SP 251 Pvt Area < 16MB
XDWM..E VSUA252L - Avg K Alc Pg SP 252 Pvt Area < 16MB
XDWM..E VSUA255L - Avg K Alc Pg SP 255 Pvt Area < 16MB

5.3.13.3 Usage Considerations

Special considerations or techniques related to using the SCPVSU file are provided below.

1. The following element in the SCPVSUnn file only has meaning when used in the DETAIL timespan, since significance is lost once summarization has been performed. In the higher timespans, the data element is retained based on the last reference from the file to be summarized.

CYCLETM - Sampling Time Cycle Length

2. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
3. Be aware of the meaning of those data elements that represent minimum or maximum values of variables and the timestamps for when the minimum or maximum values occurred:
 - o A data element that represents the minimum value of a variable contains the minimum value for all occurrences of that data element in the records processed for the summarization level. This is true for all levels above DETAIL.
 - o A data element that represents the maximum value of a variable contains the maximum value for all occurrences of that data element in the records processed for the summarization level. This is true for all levels above DETAIL.
 - o The timestamps for minimum and maximum values are intended for detailed analysis of short term trends in the usage of virtual storage. As a result, these elements lose most of their significance above the DETAIL timespan and are not carried into the DAYS, WEEKS, and MONTHS timespans of the CA MICS database.
4. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or

MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, while ENDTS is the highest date and time, for the data summarized. The data elements also have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:

- o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
5. The RMF Monitor I VSTOR option, with one or more jobnames, must be specified in order for RMF to collect data for the SCPVSUnn file.

5.3.13.4 Retrieval Examples

This section presents typical SCPVSU retrieval examples.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

1. Display maximum usage of virtual storage for the user region and the combined area of LSQA, SWA, Subpool 229 and Subpool 230, during the prime zone during the past week of program PGMNM018:

```
DATA;
  SET &PSCPD..SCPVSU01 &PSCPD..SCPVSU02
      &PSCPD..SCPVSU03 &PSCPD..SCPVSU04
      &PSCPD..SCPVSU05;
  IF ZONE EQ '1' AND PROGRAM EQ 'PGMNM018';

PROC PRINT; VAR SYSID DAY HOUR
  VSUMAUSH VSUMAUSL VSUMALSH VSUMALSL;
```

2. Display average usage of virtual storage, by subpool, during the prime zone yesterday by program PGMBZZZY:

```
DATA;
  SET &PSCPD..SCPVSU01;
  IF ZONE EQ '1' AND PROGRAM EQ 'PGMBZZZY';

PROC PRINT; VAR SYSID ENDTS
  VSUA000L VSUA229L VSUA230L VSUA236L
  VSUA237L VSUA251L VSUA252L VSUA255L;
```

5.3.14 XCF System Activity File (SCPXY)

The XCF System Activity File is used to store information about Cross-System Coupling Facility (XCF) traffic to, from, and within the system that recorded the data. You can use this information to analyze message traffic and establish the correct message buffer length and space parameters.

The information in the SCPXY file is derived from the system data section of the SMF type 74 subtype 2 record written by RMF Monitor I.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.3.14.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	YEAR	MONTH	DAY	HOUR
		ENDTS	XCFSYSNM	XCFMTDIR	XCFTCLNM	
	DAYS	SYSID	YEAR	MONTH	DAY	HOUR
		XCFSYSNM	XCFMTDIR	XCFTCLNM		
	WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR
		XCFSYSNM	XCFMTDIR	XCFTCLNM		
	MONTHS	SYSID	YEAR	MONTH	ZONE	XCFSYSNM
		XCFMTDIR	XCFTCLNM			
	YEARS		N/A			
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES		N/A			
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-53. SCPXCY Sort Sequence and Data Granularity

5.3.14.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	XCFMTDIR	- XCF Message Traffic Direction
XDWM..E	XCFSYSNM	- XCF System Name

XDWM..E XCFTCLNM - XCF Transport Class
 XDWM..E YEAR - Year of Century
 XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMLPNO - Logical Partition Number
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 X..... RMFSRL - SMF Record Level Change Number
 XDWM..E RMFVER - RMF Version Number
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Accumulated Data Elements

XDWM..E XCYACMXB - Accum Max Msg Buffer Space (1K Blks)
 XDWM..E XCYACTCL - Accum Transport Class Msg Length
 XDWM..E XCYACTCT - Intvls with XCF System Activation
 XDWM..E XCYINACT - Intvls with XCF System Deactivation
 XDWM..E XCYRSCCT - Intvls with XCF Counts Reset
 XDWM..E XCYTOBIG - Msgs Larger than Defined Buffer
 XDWM..E XCYTOBSY - Msgs Rejected
 XDWM..E XCYTOFIT - Msgs Fitting Defined Buffer
 XDWM..E XCYTOMSG - Msgs - Total
 XDWM..E XCYTONOP - Msgs Migrated No Path
 XDWM..E XCYTOOVR - Big Msgs Exceeding Optimum Length
 XDWM..E XCYTOPTH - Paths in Service
 XDWM..E XCYTOSML - Msgs Smaller than Defined Buffer

Maximum Data Elements

XDWM..E XCYABMXB - Abs Max Msg Buffer Space (1K Blks)

Derived Data Elements

XDWM.. XCYAVMXB - Avg Max Msg Buffer Space (1K Blks)
 XDWM.. XCYAVPTH - Avg Paths in Service

XDWM..E XCYAVTCL - Avg Transport Class Message Length
XDWM..E XCYPBIG - Pct Msgs Larger than Defined Buffer
XDWM..E XCYPFIT - Pct Msgs Fitting Defined Buffer
XDWM..E XCYPCOVER - Pct Big Msgs Exceeding Optimum Length
XDWM..E XCYPCSML - Pct Msgs Smaller than Defined Buffer
XDWM..E XCYPBSY - Msgs/Second Rejected
XDWM..E XCYPMSG - Msgs/Second - Total
XDWM..E XCYPNOP - Msgs/Second Migrated No Path

5.3.14.3 Usage Considerations

Special considerations or techniques related to using the SCPXCY file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.15 XCF Member Activity File (SCPXCM)

The XCF Member Activity File is used to store information about signals sent to and from each remote system, further broken down by remote group and member. You can use this information to monitor traffic loads, possibly to look for groups that would perform better if they were put into their own transport classes.

The information in the SCPXCM file is derived from the member data section of the SMF type 74 subtype 2 record written by RMF Monitor I.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.3.15.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan		Level of Data Granularity				
DETAIL	SYSID	YEAR	MONTH	DAY	HOUR	
	ENDTS	XCFSYSNM	XCMGROUP	XCMEMBER	XCMMBRES	
DAYS	SYSID	YEAR	MONTH	DAY	HOUR	
	XCFSYSNM	XCMGROUP	XCMEMBER	XCMMBRES		
WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR	
	XCFSYSNM	XCMGROUP	XCMEMBER	XCMMBRES		
MONTHS	SYSID	YEAR	MONTH	ZONE	XCFSYSNM	
	XCMGROUP	XCMEMBER	XCMMBRES			
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL
option in effect. All data elements defined in
the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-54. SCPXCM Sort Sequence and Data Granularity

5.3.15.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	XCFSYSNM	- XCF System Name
XDWM..E	XCMEMBER	- XCF Member

XDWM..E XCMGROUP - XCF Group
XDWM..E XCMMBRES - XCF Member Residence
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM..E RMFIML - I/O Measurement Level
X..... RMFSRL - SMF Record Level Change Number
XDWM..E RMFVER - RMF Version Number
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

X..... XCMJOBNM - Job Name that Joined the Member
X..... XCMSTATE - Member State
X..... XCMSTINT - Status Checking Interval

Accumulated Data Elements

XDWM..E XCMACTCT - Intvls with Member Activation
XDWM..E XCMINACT - Intvls with Member Deactivation
XDWM.. XCMNOQCT - No Information Returned From IXCQUERY
XDWM.. XCMPARCT - Intvls with Member Partially Not Active
XDWM..E XCMRSCCT - Intvls with XCF Counts Reset
XDWM..E XCMTORCV - Signals Received
XDWM..E XCMTOSNT - Signals Sent

Derived Data Elements

XDWM..E XCMPSRCV - Signals/Second Received
XDWM..E XCMPSSNT - Signals/Second Sent

5.3.15.3 Usage Considerations

Special considerations or techniques related to using the SCPXCM file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.16 XCF Path Activity File (SCPXCA)

The XCF Path Activity File is used to store information about each signalling path connecting the local system to all remote systems. You can use this information to analyze path allocations for under- or over-utilized paths.

The information in the SCPXCA file is derived from the path data section of the SMF type 74 subtype 2 record written by RMF Monitor I.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.3.16.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSID	YEAR	MONTH	DAY	HOUR	
	ENDTS	XCFSYSNM	XCFTMDIR	XCFTCLNM	XCARMSYS	
	XCADEVNO	XCARMDEV				
DAYS	SYSID	YEAR	MONTH	DAY	HOUR	
	XCFSYSNM	XCFTMDIR	XCFTCLNM	XCARMSYS	XCADEVNO	
	XCARMDEV					
WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR	
	XCFSYSNM	XCFTMDIR	XCFTCLNM	XCARMSYS	XCADEVNO	
	XCARMDEV					
MONTHS	SYSID	YEAR	MONTH	ZONE	XCFSYSNM	
	XCFTMDIR	XCFTCLNM	XCARMSYS	XCADEVNO	XCARMDEV	
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-55. SCPXCA Sort Sequence and Data Granularity

5.3.16.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLE AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	XCADEVNO	- Device Number - Local
XDWM..E	XCARMDEV	- Device Number - Remote

XDWM..E XCARMSYS - System Name - Remote
 XDWM..E XCFMTDIR - XCF Message Traffic Direction
 XDWM..E XCFSYSNM - XCF System Name
 XDWM..E XCFTCLNM - XCF Transport Class
 XDWM..E YEAR - Year of Century
 XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E PRSMLPNO - Logical Partition Number
 XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 X..... RMFSRL - SMF Record Level Change Number
 XDWM..E RMFVER - RMF Version Number
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Retained Data Elements

X..... XCACRBUS - Msg Buffer Space 1K Blocks in Use
 X..... XCACROBP - Outbound Signals Pending for Transfer
 X..... XCACRRET - Path Retry Count
 X.....E XCAIOTTM - Avg I/O Transfer Time
 XDWM..E XCAPTYPE - Path Type
 XDWM..E XCAXLSNM - XES List Structure Name

Accumulated Data Elements

XDWM..E XCAACMXB - Accum Max Msg Buffer Space (1K Blks)
 XDWM..E XCAACTCT - Intvls with Path Activation
 XDWM..E XCAINACT - Intvls with Path Deactivation
 XDWM.. XCAQSDCT - Intvls with Path Quiesced
 XDWM.. XCAQSGCT - Intvls with Path Quiescing
 XDWM.. XCARBDCT - Intvls with Path Rebuilding
 XDWM..E XCARETLM - Path Retry Limit
 XDWM..E XCARSCT - Intvls with Path Counts Reset
 XDWM..E XCARSMP - Number of RMF Samples
 XDWM..E XCARSTCT - Intvls with Path Restarting

XDWM.. XCASTFCT - Intvls with Path Stop Failed
XDWM..E XCASTPCT - Intvls with Path Stopping
XDWM..E XCASTRCT - Intvls with Path Starting
XDWM..E XCATOAPP - Path Busy when Selected
XDWM..E XCATOIBR - Inbound Signals Refused: Max Msg Limit
XDWM..E XCATOQLN - Outbound Msg Queue Length
XDWM..E XCATORST - Path Restarts
XDWM..E XCATOSIG - Signals Sent or Received
XDWM..E XCATOSUS - Path Not Busy when Selected
XDWM..E XCAWATCT - Intvls with Comm Link Completion Wait
XDWM..E XCAWRKCT - Intvls with Path Working

Maximum Data Elements

XDWM..E XCAABMXB - Abs Max Msg Buffer Space (1K Blks)

Derived Data Elements

XDWM..E XCAAVMXB - Avg Max Msg Buffer Space (1K Blks)
XDWM..E XCAAVQLN - Avg Outbound Msg Queue Length

5.3.16.3 Usage Considerations

Special considerations or techniques related to using the SCPXCA file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.17 USS Kernel Activity File (SCPKNR)

The USS Kernel Activity File quantifies the Unix System Services (USS) utilization. Statistics about system calls, CPU time consumed, user and process workloads, inter-process communications (for example, semaphore ids), memory map usage, and shared library utilization are also provided.

This file is derived from the RMF USS Kernel Activity Records, type 74 subtype 3.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.3.17.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	YEAR	MONTH	DAY	HOUR
		ENDTS				
	DAYS	SYSID	YEAR	MONTH	DAY	HOUR
	WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR
	MONTHS	SYSID	YEAR	MONTH	ZONE	
	YEARS	N/A				
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES	N/A				
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEfault option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-56. SCPKRN Sort Sequence and Data Granularity

5.3.17.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century
XDWM..E	ZONE	- Time Zone

Common Data Elements

XDW..E	CYCLETM	- RMF Sampling Cycle Interval
XD....E	DAYNAME	- Name of Day of Week
XDW..E	DURATION	- Recording Interval Time
XDW..E	ENDTS	- End Time Stamp
XDW..E	EXTSTOR	- Expanded Storage Flag
XDW..E	INTERVLS	- Number of Recording Intervals
XDW..E	MICSVER	- CA MICS Version Number
XDW..E	MVSLEVEL	- MVS Software Level
XDW..E	ORGSYSID	- Originating System Identification
XDW..E	PRSMLPNO	- Logical Partition Number
XDW..E	PRSMUSCT	- Intvls Using PR/SM LPAR Feature
XDW..E	RMFESAME	- z/Architecture Mode Indicator
XDW..	RMFGMTOF	- GMT to Local Time Offset
X.....E	RMFSRL	- SMF Record Level Change Number
XDW..E	RMFSYNCH	- Intvls with RMF Synchronized to SMF
XDW..E	RMFVER	- RMF Version Number
XDW..E	SAMPLES	- RMF Sample Count
XDW..E	STARTTS	- Start Time Stamp
XDW..E	SYSNAME	- System Name
XDW..E	SYSPLEX	- Sysplex Name

Retained Data Elements

X.....	KRNISS	- Invalid Sample Flag
XDW..E	KRNMAXP	- Maximum USS Processes Allowed
XDW..E	KRNMAXPU	- Maximum USS Processes per User Allowed
XDW..E	KRNMAXU	- Maximum USS Users Allowed
XDW..E	KRNMMAP	- Maximum Memory Map Storage Pages Allowed
XDW..E	KRNMSG	- Maximum Message Queue IDs Allowed
XDW..E	KRNMPAG	- Maximum Shared Storage Pages Allowed
XDW..E	KRNMQDS	- Maximum Queued Signals/Process Allowed
XDW..E	KRNMMSEM	- Maximum Semaphore IDs Allowed
XDW..E	KRNMSHM	- Maximum Shared Memory IDs Allowed
XDW..E	KRNMSLR	- Maximum Shared Library Region Available
XDW..E	KRNMSPG	- Maximum Shared Memory Pages Allowed

Accumulated Data Elements

XDW..E	KRNCLRCT	- Intvls with Max Shr Lib Region Size Chgd
XDW..E	KRNCMACT	- Intvls with Max Mem Map Stg Pages Chgd
XDW..E	KRNCMSCT	- Intvls with Max Message Queue IDs Chgd
XDW..E	KRNCRACT	- Intvls with Max Shared Stg Pages Changed
XDW..E	KRNCPRCT	- Intvls with Max USS Processes Changed
XDW..E	KRNCPUCT	- Intvls with Max USS Processes/User Chgd
XDW..E	KRNCPUTM	- Total USS Kernel CPU Time
XDW..E	KRNCQSCT	- Intvls with Max Queued Signals/Proc Chgd

XDWM..E KRNCSECT - Intvls with Max Semaphore IDs Changed
 XDWM..E KRNCSHCT - Intvls with Max Shared Memory IDs Chgd
 XDWM..E KRNCSPCT - Intvls with Max Shared Memory Pages Chgd
 XDWM..E KRNCUSCT - Intvls with Max USS Users Changed
 XDWM..E KRNISSCT - Intvls with Invalid Samples
 XDWM..E KRNMAPCT - Total Memory Map Storage Pages
 XDWM..E KRNSMSGCT - Total Message Queue IDs
 XDWM..E KRNOMAPC - Overruns - Max Memory Map Storage Pages
 XDWM..E KRNOMSGC - Overruns - Max Message Queue IDs
 XDWM..E KRNOPAGC - Overruns - Max Shared Storage Pages
 XDWM..E KRNOPRCT - Overruns - Maximum Processes
 XDWM..E KRNOPUCT - Overruns - Maximum Processes per User
 XDWM..E KRNOQDSC - Overruns - Max Queued Signals
 XDWM..E KRNOSEMC - Overruns - Max Semaphore IDs
 XDWM..E KRNOSHMC - Overruns - Max Shared Memory IDs
 XDWM..E KRNOSLRC - Overruns - Max Shared Library Region
 XDWM..E KRNOSPGC - Overruns - Max Shared Memory Pages
 XDWM..E KRNOUSCT - Overruns - Maximum Users
 XDWM..E KRNPAGCT - Total Shared Storage Pages
 XDWM..E KRNPROCT - Total USS Processes
 XDWM..E KRNSEMCT - Total Semaphore IDs
 XDWM..E KRNSHMCT - Total Shared Memory IDs
 XDWM..E KRNSLRCT - Total Shared Library Storage Allocated
 XDWM..E KRNSPGCT - Total Shared Memory Pages
 XDWM..E KRNSYSCT - Total USS Kernel System Calls
 XDWM..E KRNTERTCT - Intvls with USS Terminated/Reinstated
 XDWM..E KRNUSRCT - Total USS Users

Minimum Data Elements

XDWM..E KRNMNCPU - Minimum USS Kernel CPU Time
 XDWM..E KRNMNMAP - Minimum Memory Map Storage Pages
 XDWM..E KRNMNMSG - Minimum Message Queue IDs
 XDWM..E KRNMNOMA - Min Overruns - Max Memory Map Stg Pages
 XDWM..E KRNMNOMS - Min Overruns - Max Message Queue IDs
 XDWM..E KRNMNOPA - Min Overruns - Max Shared Storage Pages
 XDWM..E KRNMNOPR - Min Overruns - Maximum Processes
 XDWM..E KRNMNOPU - Min Overruns - Maximum Processes/User
 XDWM..E KRNMNOQD - Min Overruns - Max Queued Signals
 XDWM..E KRNMNOSE - Min Overruns - Max Semaphore IDs
 XDWM..E KRNMNOSH - Min Overruns - Max Shared Memory IDs
 XDWM..E KRNMNOSL - Min Overruns - Max Shr Lib Region Size
 XDWM..E KRNMNOSP - Min Overruns - Max Shared Memory Pages
 XDWM..E KRNMNOUS - Min Overruns - Maximum Users
 XDWM..E KRNMNPAG - Minimum Shared Storage Pages
 XDWM..E KRNMNPRO - Minimum USS Processes
 XDWM..E KRNMNSEM - Minimum Semaphore IDs
 XDWM..E KRNMNSHM - Minimum Shared Memory IDs
 XDWM..E KRNMNSLR - Minimum Shared Library Storage Allocated

XDWM..E KRNMNSPG - Minimum Shared Memory Pages
XDWM..E KRNMNSYS - Minimum USS Kernel System Calls
XDWM..E KRNMNUSR - Minimum USS Users

Maximum Data Elements

XDWM..E KRNMXCPU - Maximum USS Kernel CPU Time
XDWM..E KRNMXMAP - Maximum Memory Map Storage Pages
XDWM..E KRNMXMSG - Maximum Message Queue IDs
XDWM.. KRNMXOMA - Max Overruns - Max Memory Map Stg Pages
XDWM.. KRNMXOMS - Max Overruns - Max Message Queue IDs
XDWM.. KRNMXOPA - Max Overruns - Max Shared Storage Pages
XDWM.. KRNMXOPR - Max Overruns - Maximum Processes
XDWM.. KRNMXOPU - Max Overruns - Maximum Processes/User
XDWM.. KRNMXOQD - Max Overruns - Max Queued Signals
XDWM.. KRNMXOSE - Max Overruns - Max Semaphore IDs
XDWM.. KRNMXOSH - Max Overruns - Max Shared Memory IDs
XDWM.. KRNMXOSL - Max Overruns - Max Shr Lib Region Size
XDWM.. KRNMXOSP - Max Overruns - Max Shared Memory Pages
XDWM.. KRNMXOUS - Max Overruns - Maximum Users
XDWM..E KRNMXPAG - Maximum Shared Storage Pages
XDWM..E KRNMXPRO - Maximum USS Processes
XDWM..E KRNMXSEM - Maximum Semaphore IDs
XDWM..E KRNMXSHM - Maximum Shared Memory IDs
XDWM..E KRNMXSLR - Maximum Shared Library Storage Allocated
XDWM..E KRNMXSPG - Maximum Shared Memory Pages
XDWM..E KRNMXSYS - Maximum USS Kernel System Calls
XDWM..E KRNMXUSR - Maximum USS Users

Derived Data Elements

XDWM..E KRNAVCPU - Avg USS Kernel CPU Time
XDWM..E KRNAVMAP - Avg Memory Map Storage Pages
XDWM..E KRNAVMSG - Avg Message Queue IDs
XDWM..E KRNAVOMA - Avg Overruns - Max Memory Map Stg Pages
XDWM..E KRNAVOMS - Avg Overruns - Max Message Queue IDs
XDWM..E KRNAVOPA - Avg Overruns - Max Shared Storage Pages
XDWM..E KRNAVOPR - Avg Overruns - Maximum Processes
XDWM..E KRNAVOPU - Avg Overruns - Maximum Processes/User
XDWM..E KRNAVOQD - Avg Overruns - Max Queued Signals
XDWM..E KRNAVOSE - Avg Overruns - Max Semaphore IDs
XDWM..E KRNAVOSH - Avg Overruns - Max Shared Memory IDs
XDWM..E KRNAVOSL - Avg Overruns - Max Shr Lib Region Size
XDWM..E KRNAVOSP - Avg Overruns - Max Shared Memory Pages
XDWM..E KRNAVOUS - Avg Overruns - Maximum Users
XDWM..E KRNAVPAG - Avg Shared Storage Pages
XDWM..E KRNAVPRO - Avg USS Processes
XDWM..E KRNAVSEM - Avg Semaphore IDs
XDWM..E KRNAVSHM - Avg Shared Memory IDs

XDWM..E KRNAVSLR - Avg Shared Library Storage Allocated
XDWM..E KRNAVSPG - Avg Shared Memory Pages
XDWM..E KRNAVSYS - Avg USS Kernel System Calls
XDWM..E KRNAVUSR - Avg USS Users
XDWM.. KRNPCOMS - Pct Overruns - Max Message Queue IDs
XDWM.. KRNPCOPR - Pct Overruns - Maximum Processes
XDWM.. KRNPCOSE - Pct Overruns - Max Semaphore IDs
XDWM.. KRNPCOSH - Pct Overruns - Max Shared Memory IDs
XDWM.. KRNPCOUS - Pct Overruns - Maximum Users

5.3.17.3 Usage Considerations

Special considerations or techniques related to using the SCPKRN file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.18 Serialization Delay Details File (SCPSRD)

The Serialization Delay Details file provides contention information at the address space level for different types of suspend locks, GRS enqueues, and GRS latches: CMS locks, CMS enqueue/dequeue locks, CMS latch locks, CMS SMF locks, local locks, and CML locks.

This file is derived from the RMF Serialization Delay Records, type 72 subtype 5.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.3.18.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
	DETAIL	SYSID	YEAR	MONTH	DAY	HOURL
		ENDTS	ASID	JOB	WLMCLASS	WLMCLSPD
		SRDTOKEN				
	DAYS	N/A				
	WEEKS	N/A				
	MONTHS	N/A				
	YEARS	N/A				
+-----+-----+-----+-----+-----+-----+-----+						
	TABLES	N/A				
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Wed, Apr 18, 2012

Generation Date: Wed, Apr 18, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-57. SCPSRD Sort Sequence and Data Granularity

5.3.18.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Wed, Apr 18, 2012

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

X.....E	ASID	- Address Space Identification
X.....E	DAY	- Day of Month
X.....E	HOURL	- Hour of Day
X.....E	JOB	- Job Identification
X.....E	MONTH	- Month of Year
X.....E	SRDTOKEN	- Address Space SToken

X.....E SYSID - System Identifier
 X.....E WEEK - Week of Year
 X.....E WLMCLASS - Service Class Name
 X.....E WLMCLSPD - Service/Report Class Period
 X.....E YEAR - Year of Century
 X.....E ZONE - Time Zone

Common Data Elements

X.....E CYCLETM - RMF Sampling Cycle Interval
 X.....E DAYNAME - Name of Day of Week
 X.....E DURATION - Recording Interval Time
 X.....E ENDTS - End Time Stamp
 X.....E GRSMODE - GRS Mode
 X.....E INTERVLS - Number of Recording Intervals
 X.....E MVSLEVEL - MVS Software Level
 X.....E ORGSYSID - Originating System Identification
 X.....E RMFESAME - z/Architecture Mode Indicator
 X.....E RMFGMTOF - GMT to Local Time Offset
 X.....E RMFIML - I/O Measurement Level
 X.....E RMFSRL - SMF Record Level Change Number
 X.....E RMFSYNCH - Intvls with RMF Synchronized to SMF
 X.....E RMFVER - RMF Version Number
 X.....E SAMPLES - RMF Sample Count
 X.....E STARTTS - Start Time Stamp
 X.....E SYSNAME - System Name
 X.....E SYSPLEX - Sysplex Name

Accumulated Data Elements

X.....E SRDTOCLA - CML Lock Owner Contentions with QLen>1
 X.....E SRDTOCLS - Total CML Lock Owner Contentions
 X.....E SRDTOCLT - Total CML Lock Owner Contention Time
 X.....E SRDTOCMA - CMS Lock Contentions with QLen>1
 X.....E SRDTOCMS - Total CMS Lock Contentions
 X.....E SRDTOCMT - Total CMS Lock Contention Time
 X.....E SRDTOCRA - CML Lock Req. Contentions with QLen>1
 X.....E SRDTOCRS - Total CML Lock Requestor Contentions
 X.....E SRDTOCRT - Total CML Lock Requestor Contention Time
 X.....E SRDTOEDA - CMSEQDQ Lock Contentions with QLen>1
 X.....E SRDTOEDS - Total CMSEQDQ Lock Contentions
 X.....E SRDTOEDT - Total CMSEQDQ Lock Contention Time
 X.....E SRDTOLAA - CMSLatch Lock Contentions with QLen>1
 X.....E SRDTOLAS - Total CMSLatch Lock Contentions
 X.....E SRDTOLAT - Total CMSLatch Lock Contention Time
 X.....E SRDTOLCQ - Latch Set Creator Cont. Time Sum Squares
 X.....E SRDTOLCS - Total Latch Set Creator Contentions
 X.....E SRDTOLCT - Total Latch Set Creator Contention Time
 X.....E SRDTOLQA - Local Lock Contentions with QLen>1

X.....E SRDTOLOS - Total Local Lock Contentions
X.....E SRDTOLOT - Total Local Lock Contention Time
X.....E SRDTOLRQ - Latch Requestor Cont. Time Sum Squares
X.....E SRDTOLRS - Total Latch Requestor Contentions
X.....E SRDTOLRT - Total Latch Requestor Contention Time
X.....E SRDTOSMA - CMSSMF Lock Contentions with QLen>1
X.....E SRDTOSMS - Total CMSSMF Lock Contentions
X.....E SRDTOSMT - Total CMSSMF Lock Contention Time
X.....E SRDTOSSQ - GRS ENQ Systems Cont. Time Sum Squares
X.....E SRDTOSSR - Total GRS ENQ Systems Requests
X.....E SRDTOSSS - Total GRS ENQ Systems Contentions
X.....E SRDTOSST - Total GRS ENQ Systems Contention Time
X.....E SRDTOSTQ - GRS ENQ Step Contention Time Sum Squares
X.....E SRDTOSTR - Total GRS ENQ Step Requests
X.....E SRDTOSTS - Total GRS ENQ Step Contentions
X.....E SRDTOSTT - Total GRS ENQ Step Contention Time
X.....E SRDTOSYQ - GRS ENQ System Cont. Time Sum Squares
X.....E SRDTOSYR - Total GRS ENQ System Requests
X.....E SRDTOSYS - Total GRS ENQ System Contentions
X.....E SRDTOSYT - Total GRS ENQ System Contention Time

Derived Data Elements

X.....E SRDAVCLT - Avg CML Lock Owner Contention Time
X.....E SRDAVCMT - Avg CMS Lock Contention Time
X.....E SRDAVCRT - Avg CML Lock Requestor Contention Time
X.....E SRDAVEDT - Avg CMSEQDQ Lock Contention Time
X.....E SRDAVLAT - Avg CMSLatch Lock Contention Time
X.....E SRDAVLCT - Avg Latch Set Creator Contention Time
X.....E SRDAVLOT - Avg Local Lock Contention Time
X.....E SRDAVLRT - Avg Latch Requestor Contention Time
X.....E SRDAVSMT - Avg CMSSMF Lock Contention Time
X.....E SRDAVSST - Avg GRS ENQ Systems Contention Time
X.....E SRDAVSTT - Avg GRS ENQ Step Contention Time
X.....E SRDAVSYT - Avg GRS ENQ System Contention Time
X.....E SRDLCDEV - Latch Set Creator Cont. Time Std Dev
X.....E SRDLRDEV - Latch Requestor Cont. Time Std Dev
X.....E SRDSSDEV - GRS ENQ Systems Contention Time Std Dev
X.....E SRDSTDEV - GRS ENQ Step Contention Time Std Dev
X.....E SRDSYDEV - GRS ENQ System Contention Time Std Dev

5.3.18.3 Usage Considerations

Special considerations or techniques related to using the SCPSRD file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity decreases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.3.19 Serialization Delay System File (SCPSRS)

The Serialization Delay System file provides system-wide summary contention information for all address spaces, for different types of suspend locks, GRS enqueues, and GRS latches: CMS locks, CMS enqueue/dequeue locks, CMS latch locks, CMS SMF locks, local locks, and CML locks.

This file is derived from the RMF Serialization Delay Records, type 72 subtype 5.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations

5.3.19.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSID	YEAR	MONTH	DAY	HOUR	ENDTS
DAYS	SYSID	YEAR	MONTH	DAY	HOUR	
WEEKS	SYSID	YEAR	WEEK	ZONE	HOUR	
MONTHS	SYSID	YEAR	MONTH	ZONE		
YEARS	N/A					
TABLES	N/A					

Generation Date: Wed, Apr 18, 2012

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-58. SCP5RS Sort Sequence and Data Granularity

5.3.19.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Wed, Apr 18, 2012

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD....E	DAY	- Day of Month
XDW...E	HOUR	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDW...E	WEEK	- Week of Year
XDWM..E	YEAR	- Year of Century

XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E GRSMODE - GRS Mode
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM..E RMFGMTOF - GMT to Local Time Offset
 XDWM..E RMFIML - I/O Measurement Level
 X..... RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSYNCH - Intvls with RMF Synchronized to SMF
 XDWM..E RMFVER - RMF Version Number
 XDWM..E SAMPLES - RMF Sample Count
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E SYSNAME - System Name
 XDWM..E SYSPLEX - Sysplex Name

Accumulated Data Elements

XDWM..E SRSTOCLA - CML Lock Owner Contentions with QLen>1
 XDWM..E SRSTOCLS - Total CML Lock Owner Contentions
 XDWM..E SRSTOCLT - Total CML Lock Owner Contention Time
 XDWM..E SRSTOCMA - CMS Lock Contentions with QLen>1
 XDWM..E SRSTOCMS - Total CMS Lock Contentions
 XDWM..E SRSTOCMT - Total CMS Lock Contention Time
 XDWM..E SRSTOEDA - CMSEQDQ Lock Contentions with QLen>1
 XDWM..E SRSTOEDS - Total CMSEQDQ Lock Contentions
 XDWM..E SRSTOEDT - Total CMSEQDQ Lock Contention Time
 XDWM..E SRSTOLAA - CMSLatch Lock Contentions with QLen>1
 XDWM..E SRSTOLAS - Total CMSLatch Lock Contentions
 XDWM..E SRSTOLAT - Total CMSLatch Lock Contention Time
 XDWM..E SRSTOLCQ - Latch Set Creator Cont. Time Sum Squares
 XDWM..E SRSTOLCS - Total Latch Set Creator Contentions
 XDWM..E SRSTOLCT - Total Latch Set Creator Contention Time
 XDWM..E SRSTOLOA - Local Lock Contentions with QLen>1
 XDWM..E SRSTOLOS - Total Local Lock Contentions
 XDWM..E SRSTOLOT - Total Local Lock Contention Time
 XDWM..E SRSTOSMA - CMSSMF Lock Contentions with QLen>1
 XDWM..E SRSTOSMS - Total CMSSMF Lock Contentions
 XDWM..E SRSTOSMT - Total CMSSMF Lock Contention Time
 XDWM..E SRSTOSSQ - GRS ENQ Systems Cont. Time Sum Squares
 XDWM..E SRSTOSSR - Total GRS ENQ Systems Requests
 XDWM..E SRSTOSSS - Total GRS ENQ Systems Contentions

XDWM..E SRSTOSST - Total GRS ENQ Systems Contention Time
XDWM..E SRSTOSTQ - GRS ENQ Step Contention Time Sum Squares
XDWM..E SRSTOSTR - Total GRS ENQ Step Requests
XDWM..E SRSTOSTS - Total GRS ENQ Step Contentions
XDWM..E SRSTOSTT - Total GRS ENQ Step Contention Time
XDWM..E SRSTOSYQ - GRS ENQ System Cont. Time Sum Squares
XDWM..E SRSTOSYR - Total GRS ENQ System Requests
XDWM..E SRSTOSYS - Total GRS ENQ System Contentions
XDWM..E SRSTOSYT - Total GRS ENQ System Contention Time

Derived Data Elements

XDWM..E SRSAVCLT - Avg CML Lock Owner Contention Time
XDWM..E SRSAVCMT - Avg CMS Lock Contention Time
XDWM..E SRSAVEDT - Avg CMSEQDQ Lock Contention Time
XDWM..E SRSAVLAT - Avg CMSLatch Lock Contention Time
XDWM..E SRSAVLCT - Avg Latch Set Creator Contention Time
XDWM..E SRSAVLOT - Avg Local Lock Contention Time
XDWM..E SRSAVSMT - Avg CMSSMF Lock Contention Time
XDWM..E SRSAVSST - Avg GRS ENQ Systems Contention Time
XDWM..E SRSAVSTT - Avg GRS ENQ Step Contention Time
XDWM..E SRSAVSYT - Avg GRS ENQ System Contention Time
XDWM..E SRSLCDEV - Latch Set Creator Cont. Time Std Dev
XDWM..E SRSSSDEV - GRS ENQ Systems Contention Time Std Dev
XDWM..E SRSSTDEV - GRS ENQ Step Contention Time Std Dev
XDWM..E SRSSYDEV - GRS ENQ System Contention Time Std Dev

5.3.19.3 Usage Considerations

Special considerations or techniques related to using the SCPSRS file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity decreases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4 WLM Information Area Files

This section identifies each file in the WLM Information Area and defines its levels of summarization and data sequencing. Also, it presents the list of available data elements for each file.

The files maintained in the WLM Information Area include:

- 1 - Service Definition File (WLMSDE)
- 2 - Resource Group File (WLMRGP)
- 3 - Service Client File (WLM SVC)
- 4 - Service Class Subsystem Delay States (WLMSDS)
- 5 - Service Class File (WLMSEA)
- 6 - Report Class File (WLM_EA)
- 7 - Service Class Resource Consumption File (WLMSEC)
- 8 - Report Class Resource Consumption File (WLM_EC)
- 9 - Service Class Response Time (WLMSEM)
- 10 - Report Class Response Time (WLM_EM)
- 11 - Service Class General Execution Delay File (WLMSED)
- 12 - Report Class General Execution Delay File (WLM_ED)
- 13 - Report Class Subsystem Delay States File (WLM_EW)

5.4.1 Service Definition File (WLMSDE)

The Service Definition File contains information about the Workload Manager service definition installed at the time the measurements were taken. The file contains measurement status flags, resource coefficients and factors, and other information common to all WLM measurements.

Information in the WLMSDE file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

Note: Placing Service Definition information in a single database file rather than in each observation in all WLM-related files results in a significant reduction in storage requirements.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.1.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSPLX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	SYSID		
DAYS	SYSPLX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	SYSID			
WEEKS	SYSPLX	WLMSDFNM	WLMSDFTS	YEAR	WEEK	
	ZONE	HOUR	SYSID			
MONTHS	SYSPLX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	ZONE	SYSID				
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAult option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the DERIVED option.

Figure 5-61. WLMSDE Sort Sequence and Data Granularity

5.4.1.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSPLX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDWM..E WLMSDFNM - Service Definition Name
XDWM..E WLMSDFTS - Service Definition Installation Time Sta
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E PRSMLPNO - Logical Partition Number
XDWM..E PRSMUSCT - Intvls Using PR/SM LPAR Feature
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
XDWM.. RMFIML - I/O Measurement Level
X..... RMFSRL - SMF Record Level Change Number
XDWM..E RMFSUPAV - Intvls with zIIP Processors Available
XDWM..E RMFVER - RMF Version Number
XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
XDWM..E STARTTS - Start Time Stamp
XDWM..E SYSNAME - System Name
XDWM..E WLMDATID - Dynamic PAV Alias Tuning Indicator
XDWM..E WLMERF - Resource Factor Coefficient - ERV
XDWM.. WLMOPT - IEAOPTxx Suffix
XDWM..E WLMSCCPU - Service Coefficient - CPU
XDWM..E WLMSCIOC - Service Coefficient - I/O
XDWM..E WLMSCMSO - Service Coefficient - Storage
XDWM..E WLMSCSRB - Service Coefficient - SRB
XDWM.. WLMSDFDE - Service Definition Description
XDWM.. WLMSDUSR - Service Definition Installer
XDWM..E WLMSUCPU - SU:CPU-second Conversion Factor
XDWM..E WLMSUPNF - zIIP Service Time Normalization Factor
XDWM..E WLMZAPNF - zAAP Service Time Normalization Factor

Accumulated Data Elements

XDWM..E SDECNACT - Intvls with Collector Info Not Avail
XDWM..E SDEIFAHO - Intvls with IFAHonorPriority
XDWM..E SDEIFAXO - Intvls with IFACrossOver
XDWM..E SDEIIPHO - Intvls with IIPHonorPriority
XDWM..E SDEPNACT - Intvls with Policy Info Not Avail
XDWM..E SDERSMP - Number of RMF Samples

5.4.1.3 Usage Considerations

Special considerations or techniques related to using the WLM SDE file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.1.4 Retrieval Examples

This section presents a typical WLM SDE retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diiit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Service Definition History

```
TITLE1 "SERVICE DEFINITION HISTORY";

PROC SORT NODUPKEY
  OUT=WORK.SDE
  DATA=&PWLMX..WLM SDE01 (KEEP=
    SYS PLEX SYSNAME SYSID WLM SDFNM
    WLM SDFTS WLM SDFDE WLM S DUSR);
  BY SYS PLEX SYSNAME SYSID WLM SDFNM WLM SDFTS;
RUN;

PROC PRINT DATA=WORK.SDE;
  BY SYS PLEX; PAGEBY SYS PLEX; ID SYSNAME;
  VAR SYSID WLM SDFNM WLM SDFTS WLM SDFDE WLM S DUSR;
RUN;
```

5.4.2 Resource Group File (WLMRGP)

The Resource Group File contains information about the resource groups assigned to service classes, including the minimum and maximum processor capacity if defined.

Information in the WLMRGP file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.2.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+							
Timespan		Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+							
	DETAIL	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
		DAY	HOUR	ENDTS	WLM POLCY	SYSNAME	
		SYSID	WLM CLASS	WLM GROUP			
	DAYS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
		DAY	HOUR	WLM POLCY	SYSNAME	SYSID	
		WLM CLASS	WLM GROUP				
	WEEKS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	WEEK	
		ZONE	HOUR	WLM POLCY	SYSNAME	SYSID	
		WLM CLASS	WLM GROUP				
	MONTHS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
		ZONE	WLM POLCY	SYSNAME	SYSID	WLM CLASS	
		WLM GROUP					
	YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+							
	TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+							

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not

is controlled by the complex definition of the
DERIVED option.

Figure 5-62. WLMRGP Sort Sequence and Data Granularity

5.4.2.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

- XD...E DAY - Day of Month
- XDW...E HOUR - Hour of Day
- XD.M..E MONTH - Month of Year
- XDWM..E SYSID - System Identifier
- XDWM..E SYSNAME - System Name

XDWM..E SYSPLEX - Sysplex Name
XDW...E WEEK - Week of Year
XDWM..E WLMCLASS - Service Class Name
XDWM..E WLMGROUP - Resource Group Name
XDWM..E WLMPOLCY - Service Policy Name
XDWM..E WLMSDFNM - Service Definition Name
XDWM..E WLMSDFTS - Service Definition Installation Time Sta
XDWM..E YEAR - Year of Century
XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDWM..E DURATION - Recording Interval Time
XDWM..E ENDTS - End Time Stamp
XDWM..E INTERVLS - Number of Recording Intervals
XDWM..E MICSVER - CA MICS Version Number
XDWM..E MVSLEVEL - MVS Software Level
XDWM..E ORGSYSID - Originating System Identification
XDWM..E RMFESAME - z/Architecture Mode Indicator
XDWM.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDWM..E RMFSUPAV - Intvls with zIIP Processors Available
XDWM..E RMFVER - RMF Version Number
XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
XDWM..E STARTTS - Start Time Stamp
XDWM..E WLMCLSPD - Service/Report Class Period
XDWM.. WLMGRPDE - Resource Group Description
XDWM..E WLMWRKLD - Workload Name

Retained Data Elements

XDWM..E RGPCAPTP - Capacity Entitlement Type

Minimum Data Elements

XDWM..E RGPMNCAP - Minimum Capacity

Maximum Data Elements

XDWM..E RGPMXCAP - Maximum Capacity

5.4.2.3 Usage Considerations

Special considerations or techniques related to using the WLMRGP file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.2.4 Retrieval Examples

This section presents a typical WLMRGP retrieval example.

_ins1003

Service Class Resource Group Assignments

```
TITLE1 "Service Class Resource Group Assignments";

DATA WORK.RGP1
(KEEP=SYSPLEX WLMDFNM WLMDFTS WLMCLASS WMPOLCY
 WMLCDE WLMGROUP WLMGRPDE RGMNCAP RGMXCAP);
MERGE
  &PWLX..WLMSEA01 (IN=SEA)
  &PWLX..WLMRGP01 (IN=RGP);
BY SYSID ENDTS WLMDFNM WLMDFTS WLMCLASS WMPOLCY;
IF (SEA & RGP) THEN OUTPUT WORK.RGP1;
RUN;

PROC SORT NODUPKEY OUT=WORK.RGP2 DATA=WORK.RGP1;
  BY SYSPLEX WLMDFNM WLMDFTS WLMCLASS WMPOLCY
    WLMGROUP;
RUN;

PROC PRINT DATA=WORK.RGP2;
  BY SYSPLEX WLMDFNM WLMDFTS; ID WLMCLASS;
  VAR WMLCDE WMPOLCY
    WLMGROUP WLMGRPDE RGMNCAP RGMXCAP;
RUN;
```

5.4.3 Service Client File (WLMSVC)

The WLM recognizes subsystem address spaces that function as transaction servers, such as CICS application owning regions (AOR). Servers are managed to achieve the goals of the transactions they are processing rather than the goals of the service class with which they themselves are associated.

The Service Client File contains the names of all client service classes served by transaction servers, and the number of work requests or transactions served.

Information in the WLMSVC file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.3.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLM POLCY	SYSNAME	
	SYSID	WLM CLASS	SVCCLTNM			
DAYS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	WLM POLCY	SYSNAME	SYSID	
	WLM CLASS	SVCCLTNM				
WEEKS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	WEEK	
	ZONE	HOUR	WLM POLCY	SYSNAME	SYSID	
	WLM CLASS	SVCCLTNM				
MONTHS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	ZONE	WLM POLCY	SYSNAME	SYSID	WLM CLASS	
	SVCCLTNM					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-63. WLMSVC Sort Sequence and Data Granularity

5.4.3.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SVCCLTNM	- Client Name
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name

XDW...E WEEK - Week of Year
XDW..E WLMCLASS - Service Class Name
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMWRKLD - Workload Name

Accumulated Data Elements

XDW..E SVCCLTSC - Client Service Count

Derived Data Elements

XDW..E SVCCLTRT - Client Service Rate

5.4.3.3 Usage Considerations

Special considerations or techniques related to using the WLMSVC file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.3.4 Retrieval Examples

This section presents a typical WLM SVC retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Service Client Activity

```
TITLE1 "Service Client Activity";

DATA WORK.SVC1
(KEEP=SYSLEX WLMDFNM WLMDFTS WLMCLASS WMPOLCY
 WLMCLDE SVCCLNM SVCCLTSC SVCCLTRT ENDTS);
MERGE
  &PWLX..WLMSEA01 (IN=SEA)
  &PWLX..WLMSC01 (IN=SVC);
BY SYSID ENDTS WLMDFNM WLMDFTS WLMCLASS WMPOLCY;
IF (SEA & SVC) THEN OUTPUT WORK.SVC1;
RUN;

PROC SORT NODUPKEY OUT=WORK.SVC2 DATA=WORK.SVC1;
  BY SYSLEX WLMDFNM WLMDFTS ENDTS
  WLMCLASS WMPOLCY SVCCLNM;
RUN;

PROC PRINT LABEL DATA=WORK.SVC2;
  BY SYSLEX WLMDFNM WLMDFTS; ID ENDTS;
  VAR WLMCLASS WLMCLDE WMPOLCY
  SVCCLNM SVCCLTSC SVCCLTRT;
RUN;
```

5.4.4 Service Class Subsystem Delay States (WLMSDS)

The Service Class Subsystem Delay States File contains information characterizing the effect of sampled subsystem server address space status on client work requests and transactions. This information is organized by service class period.

Execution and delay states are reported by transaction class even though the information comes from sampling the server address space states.

Information in the WLMSDS file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.4.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSLEX	WMSDFNM	WMSDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLMPOLCY	SYSNAME	
	SYSID	WLMCLASS	WLMCLSPD	SDSSUBNM	SDSPHASE	
DAYS	SYSLEX	WMSDFNM	WMSDFTS	YEAR	MONTH	
	DAY	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD	SDSSUBNM	SDSPHASE		
WEEKS	SYSLEX	WMSDFNM	WMSDFTS	YEAR	WEEK	
	ZONE	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD	SDSSUBNM	SDSPHASE		
MONTHS	SYSLEX	WMSDFNM	WMSDFTS	YEAR	MONTH	
	ZONE	WLMPOLCY	SYSNAME	SYSID	WLMCLASS	
	WLMCLSPD	SDSSUBNM	SDSPHASE			
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=DEFAULT option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-64. WLMSDS Sort Sequence and Data Granularity

5.4.4.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SDSPHASE	- Phase
XDWM..E	SDSSUBNM	- Subsystem Name
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name

XDWM..E SYSPLEX - Sysplex Name
 XDW...E WEEK - Week of Year
 XDWM..E WLMCLASS - Service Class Name
 XDWM..E WLMCLSPD - Service/Report Class Period
 XDWM..E WLMPOLCY - Service Policy Name
 XDWM..E WLMSDFNM - Service Definition Name
 XDWM..E WLMSDFTS - Service Definition Installation Time Sta
 XDWM..E YEAR - Year of Century
 XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 X..... RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSUPAV - Intvls with zIIP Processors Available
 XDWM..E RMFVER - RMF Version Number
 XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E WLMWRKLD - Workload Name

Accumulated Data Elements

XDWM..E SDSRSMP - Number of Samples
 XDWM..E SDSTOACT - Samples - Active
 XDWM..E SDSTOAPP - Samples - Active Application
 XDWM..E SDSTOBPM - Samples - Buffer Pool Misses
 XDWM..E SDSTOIDL - Samples - Idle
 XDWM..E SDSTORDY - Samples - Ready
 XDWM..E SDSTOSSL - Samples - Continued Local
 XDWM..E SDSTOSSN - Samples - Continued Network
 XDWM..E SDSTOSSS - Samples - Continued Sysplex
 XDWM..E SDSTOTRR - In-Storage Residency Time
 XDWM..E SDSTOWCO - Samples - Waiting for Conversation
 XDWM..E SDSTOWDS - Samples - Waiting for Distrib Request
 XDWM..E SDSTOWIO - Samples - Waiting for I/O
 XDWM..E SDSTOWLO - Samples - Waiting for Lock
 XDWM..E SDSTOWMS - Samples - Waiting for (Unidentified)
 XDWM..E SDSTOWNL - Samples - Waiting for New Latch
 XDWM..E SDSTOWOP - Samples - Waiting for Other Product
 XDWM..E SDSTOWRT - Samples - Waiting for Regular Thread

XDWM..E SDSTOWSL - Samples - Waiting for Local Session
XDWM..E SDSTOWSN - Samples - Waiting for Network Session
XDWM..E SDSTOWSS - Samples - Waiting for Sysplex Session
XDWM..E SDSTOWST - Samples - Waiting for SSL Thread
XDWM..E SDSTOWTM - Samples - Waiting for Timer
XDWM..E SDSTOWWR - Samples - Waiting for Work Table Reg.

Derived Data Elements

XDWM..E SDSAVMPL - Avg Multiprogramming Level
XDWM..E SDSPCACT - Pct Active
XDWM..E SDSPCAPP - Pct Active Application
XDWM..E SDSPCBPM - Pct Buffer Pool Misses
XDWM..E SDSPCIDL - Pct Idle
XDWM..E SDSPCRDY - Pct Ready
XDWM..E SDSPCSSL - Pct Continued Local
XDWM..E SDSPCSSN - Pct Continued Network
XDWM..E SDSPCSSS - Pct Continued Sysplex
XDWM..E SDSPCWCO - Pct Waiting for Conversation
XDWM..E SDSPCWDS - Pct Waiting for Distrib Request
XDWM..E SDSPCWI0 - Pct Waiting for I/O
XDWM..E SDSPCWLO - Pct Waiting for Lock
XDWM..E SDSPCWMS - Pct Waiting for (Unidentified)
XDWM..E SDSPCWNL - Pct Waiting for New Latch
XDWM..E SDSPCWOP - Pct Waiting for Other Product
XDWM..E SDSPCWRT - Pct Waiting for Regular Thread
XDWM..E SDSPCWSL - Pct Waiting for Local Session
XDWM..E SDSPCWSN - Pct Waiting for Network Session
XDWM..E SDSPCWSS - Pct Waiting for Sysplex Session
XDWM..E SDSPCWST - Pct Waiting for SSL Thread
XDWM..E SDSPCWTM - Pct Waiting for Timer
XDWM..E SDSPCWWR - Pct Waiting for Work Table Reg.

5.4.4.3 Usage Considerations

Special considerations or techniques related to using the WLMSDS file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

More About the WLMSDS File

As stated earlier, the WLMSDS file contains information characterizing the effect of sampled subsystem server address space status on client work requests and transactions, organized by service class period. Execution and delay states are reported by transaction class even though the information comes from sampling the server address space states.

The life span of a transaction is divided into two phases, the begin-to-end phase and the execution phase:

- o The begin-to-end phase encompasses all states from the time the transaction is received by a subsystem work

manager until the transaction is executed and terminated.

- o The execution phase comprises the states experienced by the transaction only during the time the subsystem processes the transaction.

For example, a CICS transaction is received by the terminal-owning region (TOR), begins processing, is sent to an application-owning region (AOR) for execution, and then is served by a database-owning region (DOR), which in turn calls on the DB2 subsystem for service. The transaction is then returned to the TOR and terminated. The phase in which the TOR receives the transaction and subsequently ends it is the begin-to-end phase. The phase in which the transaction is in the AOR, DOR or elsewhere is the execution phase.

In the begin-to-end phase samples, a transaction in its execution phase is characterized as "continued." Three scopes of continuation are recognized depending on where the execution takes place:

- o Within the same system as the begin-to-end phase
- o On another system in the sysplex
- o Elsewhere in the network

In our example, the begin-to-end phase is associated with the CICS subsystem. Once the transaction is passed to the AOR, it is shown as continued. In the execution phase, the various states of the transaction are associated with the CICS subsystem until the time DB2 begins its services. The transaction is then continued a second time and additional execution phase information is collected under the DB2 subsystem. When DB2 services complete, the execution phase continues in CICS until the transaction passes back to the TOR, when the execution phase ends. When the response is made to the terminal and the transaction ends, the begin-to-end phase completes.

The information in the WLMSDS file makes it possible to analyze the complex relationships between client transactions and multiple subsystem server address spaces.

5.4.4.4 Retrieval Examples

This section presents a typical WLM SDS retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Service Class Subsystem Delays

```
TITLE1 "Service Class Subsystem Delays";

DATA WORK.SDS1
(KEEP=SYSPLEX WLMDFNM WLMDFTS SYSNAME
 WLMCLASS WMPOLCY WMLCLDE ENDTS
 SDSSUBNM SDSPHASE SDSPACT SDSPCRDY SDSPCIDL
 SDSPCSSL SDSPCSSS SDSPCSSN);
MERGE
  &PWLMX..WLMSEA01 (IN=SEA)
  &PWLMX..WLMDS01 (IN=SDS);
BY SYSID ENDTS WLMDFNM WLMDFTS WLMCLASS WMPOLCY;
IF (SEA & SDS) THEN OUTPUT WORK.SDS1;
RUN;

PROC SORT NODUPKEY OUT=WORK.SDS2 DATA=WORK.SDS1;
  BY SYSPLEX WLMDFNM WLMDFTS SYSNAME ENDTS
  WLMCLASS WMPOLCY SDSSUBNM SDSPHASE;
RUN;

PROC PRINT LABEL DATA=WORK.SDS2;
  BY SYSPLEX WLMDFNM;
  ID SYSNAME ENDTS;
  VAR WLMCLASS WMPOLCY
  SDSSUBNM SDSPHASE SDSPACT SDSPCRDY
  SDSPCIDL SDSPCSSL SDSPCSSS SDSPCSSN;
RUN;
```

5.4.5 Service Class File (WLMSEA)

The Service Class File contains information about the service classes, with one observation per service class period, into which work with similar resource needs and identical goals is grouped. Information in this file includes goal types, target values, and indicators showing the presence or absence of transaction response time, resource usage, and general execution delay data. Use these indicators to determine if there are pertinent observations for a service class period in these files:

- o WLMSEC - Service Class Resource Consumption
- o WLMSED - Service Class General Execution Delay
- o WLMSEM - Service Class Response Time

Information in the WLMSEA file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.5.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLMPOLCY	SYSNAME	
	SYSID	WLMCLASS	WLMCLSPD			
DAYS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD				
WEEKS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	WEEK	
	ZONE	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD				
MONTHS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	ZONE	WLMPOLCY	SYSNAME	SYSID	WLMCLASS	
	WLMCLSPD					
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-65. WLMSEA Sort Sequence and Data Granularity

5.4.5.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDW..E WLMCLASS - Service Class Name
XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW.. WLMCLSDE - Service Class Description
XDW..E WLMCLTYP - Class Type
XDW..E WLMGOLPC - Service Goal - Resp Time Percentile
XDW..E WLMGOLRI - Service Goal - Relative Importance
XDW..E WLMGOLRT - Service Goal - Response Time
XDW..E WLMGOLTP - Service Goal Type
XDW..E WLMGOLVE - Service Goal - Velocity
XDW..E WLMGROUP - Resource Group Name
XDW..E WLMPDDUR - Service/Report Class Period Duration
XDW.. WLMPOLDE - Service Policy Description
XDW.. WLMPOLTS - Service Policy Activation Time Stamp
XDW.. WLMWKLDE - Workload Description
XDW..E WLMWRKLD - Workload Name

Retained Data Elements

XDW..E SEAPERDS - Number of Service/Report Class Periods

Accumulated Data Elements

XDW..E SEACPPCT - Intvls with CPU Protection
XDW..E SEANDRCT - Intvls with Resource Data Unavail
XDW..E SEANDTCT - Intvls with Resp Time Data Unavail
XDW..E SEANDXCT - Intvls with Exec Delay Data Unavail

XDWM..E SEASTPCT - Intvls with Storage Protection

5.4.5.3 Usage Considerations

Special considerations or techniques related to using the WLMSEA file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.5.4 Retrieval Examples

This section presents a typical WLMSEA retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Service Class Definitions by Workload

```
TITLE1 "Service Class Definitions by Workload";

PROC SORT NODUPKEY
  OUT=WORK.SEA
  DATA=&PWLMX..WLMSEA01 (KEEP=
    SYSPLEX WLMSDFNM WMSDFTS
    WLMWRKLD WLMWLDE
    WLMCLASS WLMCLSDE WLMCLSPD
    WLMGOLTP WLMGOLRI
    WLMGOLVE WLMGOLRT WLMGOLPC);
  BY SYSPLEX WLMSDFNM WMSDFTS
    WLMWRKLD WLMCLASS WLMCLSPD;
RUN;

PROC PRINT DATA=WORK.SEA;
  BY SYSPLEX WLMSDFNM WMSDFTS;
  PAGEBY WLMSDFNM;
  ID WLMWRKLD WLMCLASS WLMCLSPD;
  VAR WLMGOLTP WLMGOLRI WLMGOLVE WLMGOLRT WLMGOLPC;
RUN;
```

5.4.6 Report Class File (WLM_EA)

The Report Class File contains information about the optional report classes to which work requests or transactions may be assigned. This is a CA MICS parallel file containing a subset of the same data elements as the Service Class File (WLMSEA). Information in this file includes indicators showing the presence or absence of transaction response times, resource usage data, and general delays data. Use these indicators to determine if there are pertinent observations for a report class in these files:

- o WLM_EC - Report Class Resource Consumption
- o WLM_ED - Report Class General Execution Delay
- o WLM_EM - Report Class Response Time

Because report groups usually consist of aggregates of service classes with differing goals, no goal information is provided for report classes.

Information in the WLM_EA file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

Note: Placing report class information in separate database files eliminates the possibility of double-counting service consumption during workload analyses.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.6.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+							
Timespan		Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+							
	DETAIL	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
		DAY	HOUR	ENDTS	WLMPOLCY	SYSNAME	
		SYSID	WLMRPTCL	WLMCLSPD			
	DAYS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
		DAY	HOUR	WLMPOLCY	SYSNAME	SYSID	
		WLMRPTCL	WLMCLSPD				
	WEEKS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	WEEK	
		ZONE	HOUR	WLMPOLCY	SYSNAME	SYSID	
		WLMRPTCL	WLMCLSPD				
	MONTHS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
		ZONE	WLMPOLCY	SYSNAME	SYSID	WLMRPTCL	
		WLMCLSPD					
	YEARS		N/A				
+-----+-----+-----+-----+-----+-----+-----+							
	TABLES		N/A				
+-----+-----+-----+-----+-----+-----+-----+							

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not

is controlled by the complex definition of the
DERIVED option.

Figure 5-66. WLM_EA Sort Sequence and Data Granularity

5.4.6.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMRPTCL - Report Class Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMCLTYP - Class Type
XDW..E WLMGOLPC - Service Goal - Resp Time Percentile
XDW..E WLMGOLRI - Service Goal - Relative Importance
XDW..E WLMGOLRT - Service Goal - Response Time
XDW..E WLMGOLTP - Service Goal Type
XDW..E WLMGOLVE - Service Goal - Velocity
XDW..E WLMHETRO - Heterogeneous Report Class Period Indica
XDW..E WMLCSCL - Last Contributing Service Class
XDW..E WLMPPDUR - Service/Report Class Period Duration
XDW.. WLMPOLDE - Service Policy Description
XDW.. WLMPOLTS - Service Policy Activation Time Stamp
XDW.. WLMRPTDE - Report Class Description

Retained Data Elements

XDW..E SEAPERDS - Number of Service/Report Class Periods

Accumulated Data Elements

XDW..E SEACPPCT - Intvls with CPU Protection
XDW..E SEANDRCT - Intvls with Resource Data Unavail
XDW..E SEANDTCT - Intvls with Resp Time Data Unavail
XDW..E SEANDXCT - Intvls with Exec Delay Data Unavail
XDW..E SEASTPCT - Intvls with Storage Protection

5.4.6.3 Usage Considerations

Special considerations or techniques related to using the WLM_EA file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.6.4 Retrieval Examples

This section presents a typical WLM_EA retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Report Classes

```
TITLE1 "Report Classes";

PROC SORT NODUPKEY
  OUT=WORK._EA
  DATA=&PWLMX..WLM_EA01 (KEEP=
    SYSPLEX WLM$DFNM WLM$DFTS WLMRPTCL WLMRPTDE);
  BY SYSPLEX WLM$DFNM WLM$DFTS WLMRPTCL;
RUN;

PROC PRINT LABEL DATA=WORK._EA;
  BY SYSPLEX WLM$DFNM WLM$DFTS;
  PAGEBY WLM$DFNM;
  VAR WLMRPTCL WLMRPTDE;
RUN;
```

5.4.7 Service Class Resource Consumption File (WLMSEC)

The Service Class Resource Consumption File quantifies resource consumption by service class period. Measurements in this file include service units consumed, storage occupied, paging and swapping activity, and hiperspace usage. Observations are written to this file only if the measurements are available.

The WLMSEC file is commonly used in conjunction with these related files:

- o WLMSEA - Service Class
- o WLMSED - Service Class General Execution Delay
- o WLMSEM - Service Class Response Time

Information in the WLMSEC file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.7.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLMPCY	SYSNAME	
	SYSID	WLMCLASS	WLMCLSPD			
DAYS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
	DAY	HOUR	WLMPCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD				
WEEKS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	WEEK	
	ZONE	HOUR	WLMPCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD				
MONTHS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
	ZONE	WLMPCY	SYSNAME	SYSID	WLMCLASS	
	WLMCLSPD					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-67. WLMSEC Sort Sequence and Data Granularity

5.4.7.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDW..E WLMCLASS - Service Class Name
XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMGOLPC - Service Goal - Resp Time Percentile
XDW..E WLMGOLRI - Service Goal - Relative Importance
XDW..E WLMGOLRT - Service Goal - Response Time
XDW..E WLMGOLTP - Service Goal Type
XDW..E WLMGOLVE - Service Goal - Velocity
XDW..E WLMSCCPU - Service Coefficient - CPU
XDW..E WLMSCSRB - Service Coefficient - SRB
XDW..E WLMSCUCPU - SU:CPU-second Conversion Factor
XDW..E WLMSUPNF - zIIP Service Time Normalization Factor
XDW..E WLMWRKLD - Workload Name
XDW..E WLMXVCID - Exec Velocity Component Indicator
XDW..E WLMZAPNF - zAAP Service Time Normalization Factor

Accumulated Data Elements

XDW..E SECCPUTM - CPU Time on CP
XDW..E SECCRCTM - Total CPU Time Prom. Chronic Res. Mgmt
XDW..E SECCTCTM - Total CPU Time Promoted Enqueue Mgmt
XDW..E SECCTR1 - Cumulative Trans thru Bucket 1
XDW..E SECCTR10 - Cumulative Trans thru Bucket 10
XDW..E SECCTR11 - Cumulative Trans thru Bucket 11
XDW..E SECCTR12 - Cumulative Trans thru Bucket 12
XDW..E SECCTR13 - Cumulative Trans thru Bucket 13
XDW..E SECCTR14 - Cumulative Trans thru Bucket 14

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```

XDWM..E SECTOHST - Hiperspace Service Time
XDWM..E SECTOIIT - I/O Interrupt Time
XDWM..E SECTOIIOC - I/O Service Units
XDWM..E SECTOIUS - Total WLM I/O Usings
XDWM..E SECTOMSO - Storage Service Units
XDWM..E SECTONCP - Transactions Comp Execution Phase
XDWM..E SECTONDD - Non-DASD I/O Using or Delay
XDWM..E SECTOPIE - Page-Ins - Expanded
XDWM..E SECTOPIN - Page-Ins - Total
XDWM..E SECTOPRS - Page Residency - CS+ES
XDWM..E SECTOQDT - Total Queue Delay Time
XDWM..E SECTORCP - Transactions Completed
XDWM..E SECTORCT - Region Control Task Time
XDWM..E SECTOSAM - Total Delay Samples
XDWM..E SECTOSCU - Samples - zIIP Eligible Using CPU on CP
XDWM..E SECTOSPA - Shared Page-Ins from Auxiliary
XDWM..E SECTOSPE - Shared Page-Ins from ES
XDWM..E SECTOSRB - SRB CPU Service Units
XDWM..E SECTOSRS - Page Residency - Shared Pages
XDWM..E SECTOSRV - Total Service Units
XDWM..E SECTOSUD - Samples - CPU Delay on zIIP
XDWM..E SECTOSUP - CPU Service Units on zIIP
XDWM..E SECTOSUU - Samples - Using CPU on zIIP
XDWM..E SECTOSWC - Swaps
XDWM..E SECTOTAT - Transaction Active Time
XDWM..E SECTOTET - Transaction Elapsed Time
XDWM..E SECTOTRR - In-Storage Residency Time
XDWM..E SECTOUSE - Total WLM Usings
XDWM..E SECTOXET - Transaction Execution Time
XDWM..E SECTOZAP - CPU Service Units on zAAP
XDWM..E SECTOZCU - Samples - zAAP Eligible Using CPU on CP
XDWM..E SECTOZPD - Samples - CPU Delay on zAAP
XDWM..E SECTOZPU - Samples - Using CPU on zAAP
XDWM..E SECTSUPC - zIIP Eligible CPU Service Units on CP
XDWM..E SECTZAPC - zAAP Eligible CPU Service Units on CP
XDWM..E SECXECT - Total Multi-system Enclave Active Time
XDWM..E SECZAPCT - zAAP Eligible CPU Time on CP
XDWM..E SECZAPTM - CPU Time on zAAP (Normalized)
XDWM..E SECZAPUT - Un-normalized zAAP CPU Time

```

Derived Data Elements

```

XDWM..E SECAVCRS - Avg Storage Used - CS
XDWM..E SECAVCTC - Avg CPU Time Promoted Enqueue Mgmt
XDWM..E SECAVDCT - Average DASD Connect Time
XDWM..E SECAVDDT - Average DASD Disconnect Time
XDWM..E SECAVDST - Average DASD Service Time
XDWM..E SECAVDWT - Average DASD Wait Time
XDWM..E SECAVERS - Avg Storage Used - ES

```


XDWL..E SECAVFEA - Avg Foreign Enclaves Active
XDWL..E SECAVIEA - Avg Independent Enclaves Active
XDWL..E SECAVMPL - Avg Multiprogramming Level
XDWL..E SECAVNCP - Avg Trans Time - Execution Phase
XDWL..E SECAVPRS - Avg Storage Used - CS+ES
XDWL..E SECAVQUE - Avg Transaction Queue Time
XDWL..E SECAVRTE - Avg Transaction Service Rate
XDWL..E SECAVSRS - Avg Storage Used - Shared Pages
XDWL..E SECAVTET - Avg Transaction Elapsed Time
XDWL..E SECAVTRN - Avg Transactions Active
XDWL..E SECAVXEA - Avg Multi-system Enclaves Active
XDWL..E SECAVXET - Avg Transaction Execution Time
XDWL..E SECEXVEL - Execution Velocity
XDWL..E SECPINDX - Performance Index
XDWL..E SECPSANC - Trans per Second - Exec Phase Abnormal
XDWL..E SECPSARC - Transactions per Second - Abnormal
XDWL..E SECPSHPI - Page-Ins per Second - Hiperspace
XDWL..E SECPSINS - SUs per Res Sec (Absorption Rate)
XDWL..E SECPSNCP - Transactions per Second - Exec Phase
XDWL..E SECPSPIE - Page-Ins per Second - Expanded
XDWL..E SECPSPIN - Page-Ins per Second - Total
XDWL..E SECPSRCP - Transactions per Second
XDWL..E SECPSSPA - Shared Page-Ins from Auxiliary per Sec
XDWL..E SECPSSPE - Shared Page-Ins from ES per Sec
XDWL..E SECPSSRV - Service Units per Elapsed Second
XDWL..E SECPSSWC - Swaps per Second
XDWL..E SECSDTET - Standard Deviation of Avg Elapsed Time
XDWL..E SECSPT - Swaps per Ended Transaction
XDWL..E SECTOQUE - Total Transaction Queue Time

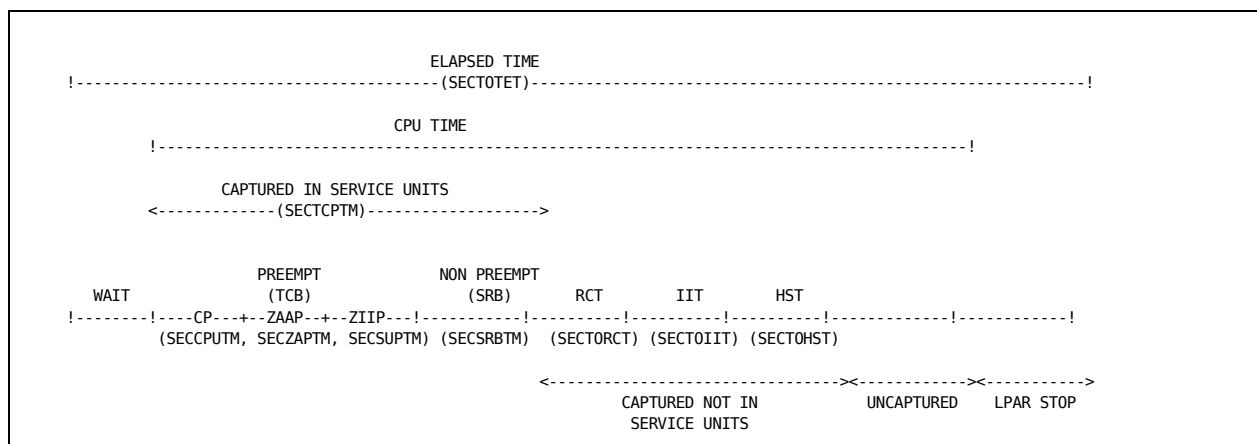
5.4.7.3 Usage Considerations

Special considerations or techniques related to using the WLMSEC file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.
3. z/OS CPU Time Considerations Related to WLM Analysis

An important aspect of performance management is capturing performance data for report generation. z/OS collects CPU time consumed by dispatchable units such as tasks (TCBs) and service requests (SRBs) associated to executed transactions.

Below is a diagram of the CPU time components and how they relate to the various CPU time related data elements in the WLMSEC file (this diagram also applies to report classes in the WLM_EC file):



When a TCB or an SRB is dispatched, an x value is loaded in the CPU timer (a hardware clock that decreases its contents). When the TCB or SRB is interrupted, the current CPU timer (x-y) is stored in memory. Then, y is accumulated in the ASCB control block (or in an enclave ENCB control block). There are two counters in ASCB: one for preemptable dispatchable units, such as TCBs, SRB clients, SRB enclaves, and one for non-preemptable dispatchable units, such as traditional SRBs.

The accumulated time is called captured time and is converted into CPU service units. It typically accounts for 85-90% of the total CPU time for systems with a high utilization. The value can be significantly smaller in under-utilized systems depending on the activation of the Alternate Wait Management.

z/OS (or the LPAR) also accounts for the CP wait time (logical and physical), when the CPU is placed in wait state because there is no work to be done. Then, wait time is the time that the logical CP was in wait state due to the lack of activity in the logical partition.

There is also a captured time not converted in CPU SUs. It is the captured CPU time not included in ASCB preemptable or non-preemptable counters, and consequently not converted to CPU SUs. The three components generating such times are the following:

- o IIT, the CPU time spent in I/O SLIH routine
- o RCT, the CPU time spent in the address space region control task
- o HST, the CPU time spent accessing hyperspace

There are also other activities executed in the CPU that are not accounted by z/OS. This time is called non-captured time. It can be numerically derived by subtracting the captured time from the total busy time. Non captured time includes the following:

- o Overhead such as page faults and swaps
- o Global services such as dispatcher, WLM sampling, SRM, where there is no address space or enclave in charge

- o Services where it is impossible to find the task that requests the service, such as I/O FLIH processing
- o LPAR processing associated with the logical partition

5.4.7.4 Retrieval Examples

This section presents a typical WLMSEC retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diiit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Service Class Resource Consumption

```
TITLE1 "Service Class Resource Consumption";

DATA WORK.SEC1
  (KEEP=SYSPLEX WLMDFNM WLMDFTS SYSNAME
   WLMCLASS WLMCLSPD WMPOLCY WMLCDE ENDS
   SECAVPL SECCPUTM SECPSSRV SECPSINS);
MERGE
  &PWLX..WLMSEA01 (IN=SEA)
  &PWLX..WLMSEC01 (IN=SEC);
BY SYSID ENDS WLMDFNM WLMDFTS
  WLMCLASS WLMCLSPD WMPOLCY;
IF (SEA & SEC) THEN OUTPUT WORK.SEC1;
RUN;

PROC SORT NODUPKEY OUT=WORK.SEC2 DATA=WORK.SEC1;
  BY SYSPLEX WLMDFNM WLMDFTS SYSNAME ENDS
  WLMCLASS WLMCLSPD WMPOLCY;
RUN;

PROC PRINT LABEL DATA=WORK.SEC2;
  BY SYSPLEX WLMDFNM;
  ID SYSNAME ENDS;
  VAR WLMCLASS WLMCLSPD WMPOLCY
  SECAVPL SECCPUTM SECPSSRV SECPSINS;
RUN;
```

5.4.8 Report Class Resource Consumption File (WLM_EC)

The Report Class Resource Consumption File quantifies resource consumption by optional report class. This is a parallel file containing a subset of the same data elements as the Service Class Resource Consumption File (WLMSEC). Measurements in this file include service units consumed, storage occupied, paging and swapping activity, and hiperspace usage. Observations are written to this file only if the measurements are available.

The WLM_EC file is commonly used in conjunction with these related files:

- o WLM_EA - Report Class
- o WLM_ED - Report Class General Execution Delay
- o WLM_EM - Report Class Response Time

Information in the WLM_EC file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.8.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLMPOLCY	SYSNAME	
	SYSID	WLMRPTCL	WLMCLSPD			
DAYS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMRPTCL	WLMCLSPD				
WEEKS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	WEEK	
	ZONE	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMRPTCL	WLMCLSPD				
MONTHS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	ZONE	WLMPOLCY	SYSNAME	SYSID	WLMRPTCL	
	WLMCLSPD					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-68. WLM_EC Sort Sequence and Data Granularity

5.4.8.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPCOLY - Service Policy Name
XDW..E WLMRPTCL - Report Class Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMGOLPC - Service Goal - Resp Time Percentile
XDW..E WLMGOLRI - Service Goal - Relative Importance
XDW..E WLMGOLRT - Service Goal - Response Time
XDW..E WLMGOLTP - Service Goal Type
XDW..E WLMGOLVE - Service Goal - Velocity
XDW..E WLMHETRO - Heterogeneous Report Class Period Indica
XDW..E WMLCSCL - Last Contributing Service Class
XDW..E WLMSCCPU - Service Coefficient - CPU
XDW..E WLMSCSRB - Service Coefficient - SRB
XDW..E WLMSCUCPU - SU:CPU-second Conversion Factor
XDW..E WLMSUPNF - zIIP Service Time Normalization Factor
XDW..E WLMXVCID - Exec Velocity Component Indicator
XDW..E WLMZAPNF - zAAP Service Time Normalization Factor

Accumulated Data Elements

XDW..E SECCPUTM - CPU Time on CP
XDW..E SECCRCTM - Total CPU Time Prom. Chronic Res. Mgmt
XDW..E SECCTCTM - Total CPU Time Promoted Enqueue Mgmt
XDW..E SECCTR1 - Cumulative Trans thru Bucket 1
XDW..E SECCTR10 - Cumulative Trans thru Bucket 10
XDW..E SECCTR11 - Cumulative Trans thru Bucket 11
XDW..E SECCTR12 - Cumulative Trans thru Bucket 12
XDW..E SECCTR13 - Cumulative Trans thru Bucket 13

XDWM..E SECCTR14 - Cumulative Trans thru Bucket 14
 XDWM..E SECCTR2 - Cumulative Trans thru Bucket 2
 XDWM..E SECCTR3 - Cumulative Trans thru Bucket 3
 XDWM..E SECCTR4 - Cumulative Trans thru Bucket 4
 XDWM..E SECCTR5 - Cumulative Trans thru Bucket 5
 XDWM..E SECCTR6 - Cumulative Trans thru Bucket 6
 XDWM..E SECCTR7 - Cumulative Trans thru Bucket 7
 XDWM..E SECCTR8 - Cumulative Trans thru Bucket 8
 XDWM..E SECCTR9 - Cumulative Trans thru Bucket 9
 XDWM..E SECDCNT - DASD I/O Count
 XDWM..E SECDCTM - DASD I/O Connect Time
 XDWM..E SECDDTM - DASD I/O Disconnect Time
 XDWM..E SECDWTM - DASD I/O Wait Time
 XDWM..E SECFEACT - Total Foreign Enclave Active Time
 XDWM..E SECIEACT - Total Independent Enclave Active Time
 XDWM..E SECPROTM - Total CPU Time Promoted Blocked Wklds
 XDWM..E SECSRBTM - SRB CPU Time
 XDWM..E SECSUPCT - zIIP Eligible CPU Time on CP
 XDWM..E SECSUPTM - CPU Time on zIIP (Normalized)
 XDWM..E SECSUPUT - Un-normalized zIIP CPU Time
 XDWM..E SECTBADT - Total Batch Affinity Delay Time
 XDWM..E SECTBCDT - Total Batch JCL Conv Delay Time
 XDWM..E SECTBPDt - Total Batch Post Conv Delay Time
 XDWM..E SECTCPTM - Total CPU Time
 XDWM..E SECTDIQT - Total DASD IOS Queue Time
 XDWM..E SECTDSTM - Total DASD Service Time
 XDWM..E SECTOAMD - Samples - Crypto AM Processor Delay
 XDWM..E SECTOAMU - Samples - Using Crypto AM Processor
 XDWM..E SECTOANC - Trans Comp Execution Phase Abnormal
 XDWM..E SECTOAPD - Samples - Crypto Assist Processor Delay
 XDWM..E SECTOAPU - Samples - Using Crypto Assist Processor
 XDWM..E SECTOARC - Transactions Completed Abnormal
 XDWM..E SECTOBKA - Blocks Paged In - Auxiliary
 XDWM..E SECTOBKE - Blocks Paged In - Expanded
 XDWM..E SECTOBPE - Block Page-Ins - Exp
 XDWM..E SECTOBPI - Block Page-Ins - Auxiliary
 XDWM..E SECTOCOD - Samples - Resource Contention Delay
 XDWM..E SECTOCOU - Samples - Resource Contention Using
 XDWM..E SECTOCPU - CPU Service Units on CP
 XDWM..E SECTOCRD - Samples - Crypto Processors Delay
 XDWM..E SECTOCRM - ESO Hiperspace Read Misses
 XDWM..E SECTO CRS - Page Residency - CS
 XDWM..E SECTOCRU - Samples - Using Crypto Processors
 XDWM..E SECTOCUS - Samples - Using CPU on CP
 XDWM..E SECTODSB - Total Exec Delay Samples with Batch
 XDWM..E SECTOERS - Page Residency - ES
 XDWM..E SECTOESQ - Trans Elapsed Time Sum of Squares
 XDWM..E SECTOEXS - Total Execution Samples
 XDWM..E SECTOFQD - Samples - Feature Queue Delay

```

XDWM..E SECT0HPI - Page-Ins - Hiperspace
XDWM..E SECT0HST - Hiperspace Service Time
XDWM..E SECT0IIT - I/O Interrupt Time
XDWM..E SECT0IOC - I/O Service Units
XDWM..E SECT0IUS - Total WLM I/O Usings
XDWM..E SECT0MSO - Storage Service Units
XDWM..E SECT0NCP - Transactions Comp Execution Phase
XDWM..E SECT0NDD - Non-DASD I/O Using or Delay
XDWM..E SECT0PIE - Page-Ins - Expanded
XDWM..E SECT0PIN - Page-Ins - Total
XDWM..E SECT0PRS - Page Residency - CS+ES
XDWM..E SECT0QDT - Total Queue Delay Time
XDWM..E SECT0RCP - Transactions Completed
XDWM..E SECT0RCT - Region Control Task Time
XDWM..E SECT0SAM - Total Delay Samples
XDWM..E SECT0SCU - Samples - zIIP Eligible Using CPU on CP
XDWM..E SECT0SPA - Shared Page-Ins from Auxiliary
XDWM..E SECT0SPE - Shared Page-Ins from ES
XDWM..E SECT0SRB - SRB CPU Service Units
XDWM..E SECT0SRS - Page Residency - Shared Pages
XDWM..E SECT0SRV - Total Service Units
XDWM..E SECT0SUD - Samples - CPU Delay on zIIP
XDWM..E SECT0SUP - CPU Service Units on zIIP
XDWM..E SECT0SUU - Samples - Using CPU on zIIP
XDWM..E SECT0SWC - Swaps
XDWM..E SECT0TAT - Transaction Active Time
XDWM..E SECT0TET - Transaction Elapsed Time
XDWM..E SECT0TRR - In-Storage Residency Time
XDWM..E SECT0USE - Total WLM Usings
XDWM..E SECT0XET - Transaction Execution Time
XDWM..E SECT0ZAP - CPU Service Units on zAAP
XDWM..E SECT0ZCU - Samples - zAAP Eligible Using CPU on CP
XDWM..E SECT0ZPD - Samples - CPU Delay on zAAP
XDWM..E SECT0ZPU - Samples - Using CPU on zAAP
XDWM..E SECT0SUPC - zIIP Eligible CPU Service Units on CP
XDWM..E SECT0ZAPC - zAAP Eligible CPU Service Units on CP
XDWM..E SECXEACT - Total Multi-system Enclave Active Time
XDWM..E SECZAPCT - zAAP Eligible CPU Time on CP
XDWM..E SECZAPTM - CPU Time on zAAP (Normalized)
XDWM..E SECZAPUT - Un-normalized zAAP CPU Time

```

Derived Data Elements

```

XDWM..E SECAVCRS - Avg Storage Used - CS
XDWM..E SECAVCTC - Avg CPU Time Promoted Enqueue Mgmt
XDWM..E SECAVDCT - Average DASD Connect Time
XDWM..E SECAVDDT - Average DASD Disconnect Time
XDWM..E SECAVDST - Average DASD Service Time
XDWM..E SECAVDWT - Average DASD Wait Time

```

XDWL..E SECAVERS - Avg Storage Used - ES
XDWL..E SECAVFEA - Avg Foreign Enclaves Active
XDWL..E SECAVIEA - Avg Independent Enclaves Active
XDWL..E SECAVMPL - Avg Multiprogramming Level
XDWL..E SECAVNCP - Avg Trans Time - Execution Phase
XDWL..E SECAVPRS - Avg Storage Used - CS+ES
XDWL..E SECAVQUE - Avg Transaction Queue Time
XDWL..E SECAVRTE - Avg Transaction Service Rate
XDWL..E SECAVSRS - Avg Storage Used - Shared Pages
XDWL..E SECAVTET - Avg Transaction Elapsed Time
XDWL..E SECAVTRN - Avg Transactions Active
XDWL..E SECAVXEA - Avg Multi-system Enclaves Active
XDWL..E SECAVXET - Avg Transaction Execution Time
XDWL..E SECEXVEL - Execution Velocity
XDWL..E SECPINDX - Performance Index
XDWL..E SECPSANC - Trans per Second - Exec Phase Abnormal
XDWL..E SECPSARC - Transactions per Second - Abnormal
XDWL..E SECPSHPI - Page-Ins per Second - Hiperspace
XDWL..E SECPSINS - SUs per Res Sec (Absorption Rate)
XDWL..E SECPSNCP - Transactions per Second - Exec Phase
XDWL..E SECPSPIE - Page-Ins per Second - Expanded
XDWL..E SECPSPIN - Page-Ins per Second - Total
XDWL..E SECPSRCP - Transactions per Second
XDWL..E SECPSSPA - Shared Page-Ins from Auxiliary per Sec
XDWL..E SECPSSPE - Shared Page-Ins from ES per Sec
XDWL..E SECPSSRV - Service Units per Elapsed Second
XDWL..E SECPSSWC - Swaps per Second
XDWL..E SECSDTET - Standard Deviation of Avg Elapsed Time
XDWL..E SECSPT - Swaps per Ended Transaction
XDWL..E SECTOQUE - Total Transaction Queue Time

5.4.8.3 Usage Considerations

Special considerations or techniques related to using the WLM_EC file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.8.4 Retrieval Examples

This section presents a typical WLM_EC retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diiit, where d is the database identifier, iii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Report Class Resource Consumption

```
TITLE1 "Report Class Resource Consumption";

DATA WORK._EC1
  (KEEP=SYSPLEX WLMDFNM WLMDFTS SYSNAME
   WLMRPTCL WMPOLCY WLMRPTDE ENDTS
   SECAVMP L SECCPUTM SECPSSRV SECPSINS);
MERGE
  &PWLMX._WLM_EA01 (IN=_EA)
  &PWLMX._WLM_EC01 (IN=_EC);
BY SYSID ENDTS WLMDFNM WLMDFTS
  WLMRPTCL WMPOLCY;
IF (_EA & _EC) THEN OUTPUT WORK._EC1;
RUN;

PROC SORT NODUPKEY OUT=WORK._EC2 DATA=WORK._EC1;
  BY SYSPLEX WLMDFNM WLMDFTS SYSNAME ENDTS
  WLMRPTCL WMPOLCY;
RUN;

PROC PRINT LABEL DATA=WORK._EC2;
  BY SYSPLEX WLMDFNM;
  ID SYSNAME ENDTS;
  VAR WLMRPTCL WMPOLCY
  SECAVMP L SECCPUTM SECPSSRV SECPSINS;
RUN;
```

5.4.9 Service Class Response Time (WLMSEM)

The Service Class Response Time File quantifies transaction response time by service class period. Measurements in this file include transaction counts and processing rates, total and average elapsed and execution times, standard deviation of response time, and the number and percent of transactions completed within fixed percentages of the specified goal, or response time distributions. Observations are written to this file only if the service class has either average or percentile response time goals, and if the measurements are available.

The WLMSEM file is commonly used in conjunction with these related files:

- o WLMSEA - Service Class
- o WLMSEC - Service Class Resource Consumption
- o WLMSED - Service Class General Execution Delay

Information in the WLMSEM file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.9.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLM POLCY	SYSNAME	
	SYSID	WLM CLASS	WLM CLSPD			
DAYS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	WLM POLCY	SYSNAME	SYSID	
	WLM CLASS	WLM CLSPD				
WEEKS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	WEEK	
	ZONE	HOUR	WLM POLCY	SYSNAME	SYSID	
	WLM CLASS	WLM CLSPD				
MONTHS	SYSLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	ZONE	WLM POLCY	SYSNAME	SYSID	WLM CLASS	
	WLM CLSPD					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-69. WLMSEM Sort Sequence and Data Granularity

5.4.9.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

X - DETAIL
 D - DAYS
 W - WEEKS
 M - MONTHS
 Y - YEARS
 T - TABLES AREA
 . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDW..E WLMCLASS - Service Class Name
XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMGOLPC - Service Goal - Resp Time Percentile
XDW..E WLMGOLRI - Service Goal - Relative Importance
XDW..E WLMGOLRT - Service Goal - Response Time
XDW..E WLMGOLTP - Service Goal Type
XDW..E WLMWRKLD - Workload Name

Accumulated Data Elements

XDW..E SEMNTR1 - Trans Within Cutoff 1
XDW..E SEMNTR10 - Trans Between Cutoffs 9 & 10
XDW..E SEMNTR11 - Trans Between Cutoffs 10 & 11
XDW..E SEMNTR12 - Trans Between Cutoffs 11 & 12
XDW..E SEMNTR13 - Trans Between Cutoffs 12 & 13
XDW..E SEMNTR14 - Trans Greater Than Cutoff 13
XDW..E SEMNTR2 - Trans Between Cutoffs 1 & 2
XDW..E SEMNTR3 - Trans Between Cutoffs 2 & 3
XDW..E SEMNTR4 - Trans Between Cutoffs 3 & 4
XDW..E SEMNTR5 - Trans Between Cutoffs 4 & 5
XDW..E SEMNTR6 - Trans Between Cutoffs 5 & 6
XDW..E SEMNTR7 - Trans Between Cutoffs 6 & 7
XDW..E SEMNTR8 - Trans Between Cutoffs 7 & 8
XDW..E SEMNTR9 - Trans Between Cutoffs 8 & 9
XDW..E SEMTOANC - Trans Comp Execution Phase Abnormal
XDW..E SEMTOARC - Trans Completed Abnormal

XDWM..E SEMTONCP - Trans Comp Execution Phase
XDWM..E SEMTORCP - Trans Completed
XDWM..E SEMTOTET - Trans Elapsed Time
XDWM..E SEMTOXET - Trans Execution Time

Derived Data Elements

XDWM..E SEMPCR1 - Pct Trans Within Cutoff 1
XDWM..E SEMPCR10 - Pct Trans Within Cutoff 10
XDWM..E SEMPCR11 - Pct Trans Within Cutoff 11
XDWM..E SEMPCR12 - Pct Trans Within Cutoff 12
XDWM..E SEMPCR13 - Pct Trans Within Cutoff 13
XDWM..E SEMPCR14 - Pct Trans Greater Than Cutoff 13
XDWM..E SEMPCR2 - Pct Trans Within Cutoff 2
XDWM..E SEMPCR3 - Pct Trans Within Cutoff 3
XDWM..E SEMPCR4 - Pct Trans Within Cutoff 4
XDWM..E SEMPCR5 - Pct Trans Within Cutoff 5
XDWM..E SEMPCR6 - Pct Trans Within Cutoff 6
XDWM..E SEMPCR7 - Pct Trans Within Cutoff 7
XDWM..E SEMPCR8 - Pct Trans Within Cutoff 8
XDWM..E SEMPCR9 - Pct Trans Within Cutoff 9

5.4.9.3 Usage Considerations

Special considerations or techniques related to using the WLMSEM file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.9.4 Retrieval Examples

This section presents a typical WLMSEM retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Service Class Average Response Time

```
TITLE1 "Service Class Average Response Time";

DATA WORK.SEM1
(KEEP=SYSPLEX WLMDFNM WLMDFTS SYSNAME WLMRKLD
 WLMCLASS WLMCLSPD WLMPCOLY WLMCLDE ENDTS
 WLMGOLRT SEMTORCP SEMAVTET);
MERGE
  &PWLMX..WLMSEA01 (IN=SEA)
  &PWLMX..WLMSEM01 (IN=SEM
  WHERE=(WLMGOLTP="RESP TIME AVG"));
BY SYSID ENDTS WLMDFNM WLMDFTS
  WLMCLASS WLMCLSPD WLMPCOLY;
IF (SEA & SEM) THEN OUTPUT WORK.SEM1;
RUN;

PROC SORT NODUPKEY OUT=WORK.SEM2 DATA=WORK.SEM1;
  BY SYSPLEX WLMDFNM WLMDFTS SYSNAME ENDTS
  WLMCLASS WLMCLSPD WLMPCOLY;
RUN;

PROC PRINT LABEL DATA=WORK.SEM2;
  BY SYSPLEX WLMDFNM;
  ID SYSNAME ENDTS;
  VAR WLMRKLD WLMCLASS WLMCLSPD WLMPCOLY
  WLMGOLRT SEMTORCP SEMAVTET;
RUN;
```

5.4.10 Report Class Response Time (WLM_EM)

The Report Class Response Time File quantifies transaction response time by optional report class. This is a parallel file containing a subset of the same data elements as the Service Class Response Time File (WLMSEM). Measurements in this file include transaction counts and processing rates, average elapsed times and standard deviations, and for percentile goals, the number of transactions completed within fixed percentages of the specified goals. Observations are written to this file only if the service class has either average or percentile response time goals, and if the measurements are available.

The WLM_EM file is commonly used in conjunction with these related files:

- o WLM_EA - Report Class
- o WLM_EC - Report Class Resource Consumption
- o WLM_ED - Report Class General Execution Delay

Information in the WLM_EM file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.10.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLMPOLCY	SYSNAME	
	SYSID	WLMRPTCL	WLMCLSPD			
DAYS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMRPTCL	WLMCLSPD				
WEEKS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	WEEK	
	ZONE	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMRPTCL	WLMCLSPD				
MONTHS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	ZONE	WLMPOLCY	SYSNAME	SYSID	WLMRPTCL	
	WLMCLSPD					
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-70. WLM_EM Sort Sequence and Data Granularity

5.4.10.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMRPTCL - Report Class Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMGOLPC - Service Goal - Resp Time Percentile
XDW..E WLMGOLRI - Service Goal - Relative Importance
XDW..E WLMGOLRT - Service Goal - Response Time
XDW..E WLMGOLTP - Service Goal Type
XDW..E WLMHETRO - Heterogeneous Report Class Period Indica
XDW..E WMLCSCCL - Last Contributing Service Class

Accumulated Data Elements

XDW..E SEMNTR1 - Trans Within Cutoff 1
XDW..E SEMNTR10 - Trans Between Cutoffs 9 & 10
XDW..E SEMNTR11 - Trans Between Cutoffs 10 & 11
XDW..E SEMNTR12 - Trans Between Cutoffs 11 & 12
XDW..E SEMNTR13 - Trans Between Cutoffs 12 & 13
XDW..E SEMNTR14 - Trans Greater Than Cutoff 13
XDW..E SEMNTR2 - Trans Between Cutoffs 1 & 2
XDW..E SEMNTR3 - Trans Between Cutoffs 2 & 3
XDW..E SEMNTR4 - Trans Between Cutoffs 3 & 4
XDW..E SEMNTR5 - Trans Between Cutoffs 4 & 5
XDW..E SEMNTR6 - Trans Between Cutoffs 5 & 6
XDW..E SEMNTR7 - Trans Between Cutoffs 6 & 7
XDW..E SEMNTR8 - Trans Between Cutoffs 7 & 8
XDW..E SEMNTR9 - Trans Between Cutoffs 8 & 9
XDW..E SEMTOANC - Trans Comp Execution Phase Abnormal

XDWM..E SEMTOARC - Trans Completed Abnormal
XDWM..E SEMTONCP - Trans Comp Execution Phase
XDWM..E SEMTORCP - Trans Completed
XDWM..E SEMTOTET - Trans Elapsed Time
XDWM..E SEMTOXET - Trans Execution Time

Derived Data Elements

XDWM..E SEMPCR1 - Pct Trans Within Cutoff 1
XDWM..E SEMPCR10 - Pct Trans Within Cutoff 10
XDWM..E SEMPCR11 - Pct Trans Within Cutoff 11
XDWM..E SEMPCR12 - Pct Trans Within Cutoff 12
XDWM..E SEMPCR13 - Pct Trans Within Cutoff 13
XDWM..E SEMPCR14 - Pct Trans Greater Than Cutoff 13
XDWM..E SEMPCR2 - Pct Trans Within Cutoff 2
XDWM..E SEMPCR3 - Pct Trans Within Cutoff 3
XDWM..E SEMPCR4 - Pct Trans Within Cutoff 4
XDWM..E SEMPCR5 - Pct Trans Within Cutoff 5
XDWM..E SEMPCR6 - Pct Trans Within Cutoff 6
XDWM..E SEMPCR7 - Pct Trans Within Cutoff 7
XDWM..E SEMPCR8 - Pct Trans Within Cutoff 8
XDWM..E SEMPCR9 - Pct Trans Within Cutoff 9

5.4.10.3 Usage Considerations

Special considerations or techniques related to using the WLM_EM file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.10.4 Retrieval Examples

This section presents a typical WLM_EM retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Report Class Average Response Time

```
TITLE1 "Report Class Average Response Time";
```

```
DATA WORK._EM1
  (KEEP=SYSPLEX WLMSDFNM WLMSDFTS SYSNAME
   WLMRPTCL WLMPOLCY ENDTS
   SEMTORCP SEMAVTET SEMAVXET);
MERGE
  &PWLMX..WLM_EA01 (IN=_EA)
  &PWLMX..WLM_EM01 (IN=_EM);
BY SYSID ENDTS WLMSDFNM WLMSDFTS
  WLMRPTCL WLMPOLCY;
IF (_EA & _EM) THEN OUTPUT WORK._EM1;
RUN;
```

```
PROC SORT NODUPKEY OUT=WORK._EM2 DATA=WORK._EM1;
  BY SYSPLEX WLMSDFNM WLMSDFTS SYSNAME ENDTS
  WLMRPTCL WLMPOLCY;
RUN;
```

```
PROC PRINT LABEL DATA=WORK._EM2;
  BY SYSPLEX WLMSDFNM;
  ID SYSNAME ENDTS;
  VAR WLMRPTCL WLMPOLCY SEMTORCP SEMAVTET SEMAVXET;
RUN;
```

5.4.11 Service Class General Execution Delay File (WLMSED)

The Service Class General Execution Delay File contains sampled execution state information, organized by service class period. Measurements in this file include how often work was using or waiting for CPU, waiting for auxiliary storage access, idle, or in some other condition. Observations are written to this file only if the measurements are available.

The WLMSED file is commonly used in conjunction with these related files:

- o WLMSEA - Service Class
- o WLMSEC - Service Class Resource Consumption
- o WLMSEM - Service Class Response Time

Information in the WLMSED file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.11.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

Timespan	Level of Data Granularity					
DETAIL	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLMPCY	SYSNAME	
	SYSID	WLMCLASS	WLMCLSPD			
DAYS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
	DAY	HOUR	WLMPCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD				
WEEKS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	WEEK	
	ZONE	HOUR	WLMPCY	SYSNAME	SYSID	
	WLMCLASS	WLMCLSPD				
MONTHS	SYSLEX	WLMDFNM	WLMDFTS	YEAR	MONTH	
	ZONE	WLMPCY	SYSNAME	SYSID	WLMCLASS	
	WLMCLSPD					
YEARS	N/A					
TABLES	N/A					

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-71. WLMSED Sort Sequence and Data Granularity

5.4.11.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name

XDW...E WEEK - Week of Year
XDW..E WLMCLASS - Service Class Name
XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD...E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMGOLRI - Service Goal - Relative Importance
XDW..E WLMGOLVE - Service Goal - Velocity
XDW..E WLMWRKLD - Workload Name
XDW..E WLMXVCID - Exec Velocity Component Indicator

Accumulated Data Elements

XDW..E SEDTOAMD - Samples - Crypto AM Processor Delay
XDW..E SEDTOAMU - Samples - Using Crypto AM Processor
XDW..E SEDTOAPD - Samples - Crypto Assist Processor Delay
XDW..E SEDTOAPU - Samples - Using Crypto Assist Processor
XDW..E SEDTOCOD - Samples - Resource Contention Delay
XDW..E SEDTOCOU - Samples - Resource Contention Using
XDW..E SEDTOCRD - Samples - Crypto Processors Delay
XDW..E SEDTOCRU - Samples - Using Crypto Processors
XDW..E SEDTOCUS - Samples - Using CPU on CP
XDW..E SEDTODCC - Samples - CPU Capping Delay
XDW..E SEDTODCP - Samples - CPU Delay on CP
XDW..E SEDTODES - Samples - ESO Hiperspc Pg-In from Aux
XDW..E SEDTODHS - Samples - Std Hiperspc Pg-In from Aux
XDW..E SEDTODID - Samples - Idle
XDW..E SEDTODMP - Samples - MPL Delay
XDW..E SEDTODPC - Samples - CSA Page-In from Aux

XDWL..E SEDTODPP - Samples - Pvt Page-In from Aux
XDWL..E SEDTODQU - Samples - Quiesce
XDWL..E SEDTODRG - Samples - Resource Group Capping
XDWL..E SEDTODSB - Samples - Total Exec Delay with Batch
XDWL..E SEDTODSD - Samples - DASD I/O Delay
XDWL..E SEDTODSI - Samples - Swap-In Delay
XDWL..E SEDTODUN - Samples - Unknown
XDWL..E SEDTODVI - Samples - VIO Page-In from Aux
XDWL..E SEDTODXM - Samples - Cross Mem Page-In from Aux
XDWL..E SEDTOEXS - Total Execution Samples
XDWL..E SEDTOFQD - Samples - Feature Queue Delay
XDWL..E SEDTOIUS - Total WLM I/O Usings
XDWL..E SEDTONDD - Non-DASD I/O Using or Delay
XDWL..E SEDTOSAC - Sampled Address Space Count
XDWL..E SEDTOSAM - Total Execution Delay Samples
XDWL..E SEDTOSCU - Samples - zIIP Eligible Using CPU on CP
XDWL..E SEDTOSHP - Samples - Server Hiperspace Paging
XDWL..E SEDTOSMP - Samples - Server MPL
XDWL..E SEDTOSPP - Samples - Server Private Area Paging
XDWL..E SEDTOSQU - Samples - Server Queue Delay
XDWL..E SEDTOSSI - Samples - Server Swap-In
XDWL..E SEDTOSST - Total Sampled States
XDWL..E SEDTOSUD - Samples - CPU Delay on zIIP
XDWL..E SEDTOSUU - Samples - Using CPU on zIIP
XDWL..E SEDTOSVP - Samples - Server Space VIO Paging
XDWL..E SEDTOUSE - Total WLM Usings
XDWL..E SEDTOZCU - Samples - zAAP Eligible Using CPU on CP
XDWL..E SEDTOZPD - Samples - CPU Delay on zAAP
XDWL..E SEDTOZPU - Samples - Using CPU on zAAP

Derived Data Elements

XDWL..E SEDAVSAC - Avg Sampled Address Spaces
XDWL..E SEDEXVEL - Execution Velocity
XDWL..E SEDPCAMD - Pct Wait - Crypto AM Processor
XDWL..E SEDPCAMU - Pct Using Crypto AM Processor
XDWL..E SEDPCAPD - Pct Wait - Crypto Assist Processor
XDWL..E SEDPCAPU - Pct Using Crypto Assist Processor
XDWL..E SEDPCCOD - Pct Wait - Resource Contention
XDWL..E SEDPCCOU - Pct Using - Resource Contention
XDWL..E SEDPCCRD - Pct Wait - Crypto Processors
XDWL..E SEDPCCRU - Pct Using Crypto Processors
XDWL..E SEDPCCUS - Pct Using CPU on CP
XDWL..E SEDPCDCC - Pct Wait - CPU Capping
XDWL..E SEDPCDCP - Pct Wait - CPU on CP
XDWL..E SEDPCDES - Pct Wait - ESO Hiperspc Pg-In from Aux
XDWL..E SEDPCDHS - Pct Wait - Std Hiperspc Pg-In from Aux
XDWL..E SEDPCDID - Pct Idle
XDWL..E SEDPCDMP - Pct Wait - MPL Delay

XDWM..E SEDPCDPC - Pct Wait - CSA Page-In from Aux
XDWM..E SEDPCDPP - Pct Wait - Pvt Page-In from Aux
XDWM..E SEDPCDQU - Pct Wait - Quiesce
XDWM..E SEDPCDRG - Pct Wait - Resource Group Capping
XDWM..E SEDPCDSD - Pct Wait - DASD I/O Delay
XDWM..E SEDPCDSI - Pct Wait - Swap-In
XDWM..E SEDPCDUN - Pct Wait - Unknown
XDWM..E SEDPCDVI - Pct Wait - VIO Page-In from Aux
XDWM..E SEDPCDXM - Pct Wait - Cross Mem Page-In from Aux
XDWM..E SEDPCFQD - Pct Wait - Feature Queue
XDWM..E SEDPCIUS - Pct Using I/O
XDWM..E SEDPCSCU - Pct zIIP Eligible Using CPU on CP
XDWM..E SEDPCSHP - Pct Wait - Server Hiperspace Paging
XDWM..E SEDPCSMP - Pct Wait - Server MPL
XDWM..E SEDPCSPP - Pct Wait - Server Private Area Paging
XDWM..E SEDPCSQU - Pct Wait - Server Queue Delay
XDWM..E SEDPCSSI - Pct Wait - Server Swap-In
XDWM..E SEDPCSUD - Pct Wait - CPU on zIIP
XDWM..E SEDPCSUU - Pct Using CPU on zIIP
XDWM..E SEDPCSVP - Pct Wait - Server Space VIO Paging
XDWM..E SEDPCZCU - Pct zAAP Eligible Using CPU on CP
XDWM..E SEDPCZPD - Pct Wait - CPU on zAAP
XDWM..E SEDPCZPU - Pct Using CPU on zAAP

5.4.11.3 Usage Considerations

Special considerations or techniques related to using the WLMSED file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.11.4 Retrieval Examples

This section presents a typical WLMSED retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Service Class Execution Velocity

```
TITLE1 "Service Class Execution Velocity";

DATA WORK.SED1
(KEEP=SYSPLEX WLMDFNM WLMDFTS SYSNAME WLMRKLD
 WLMCLASS WLMCLSPD WLMPCY WLMCLDE ENDTS SEDEXVEL);
MERGE
  &PWLX..WLMSEA01 (IN=SEA)
  &PWLX..WLMSED01 (IN=SED);
BY SYSID ENDTS WLMDFNM WLMDFTS
  WLMCLASS WLMCLSPD WLMPCY;
IF (SEA & SED) THEN OUTPUT WORK.SED1;
RUN;

PROC SORT NODUPKEY OUT=WORK.SED2 DATA=WORK.SED1;
  BY SYSPLEX WLMDFNM WLMDFTS SYSNAME ENDTS
  WLMCLASS WLMCLSPD WLMPCY;
RUN;

PROC PRINT LABEL DATA=WORK.SED2;
  BY SYSPLEX WLMDFNM;
  ID SYSNAME ENDTS;
  VAR WLMRKLD WLMCLASS WLMCLSPD WLMPCY SEDEXVEL;
RUN;
```


5.4.12 Report Class General Execution Delay File (WLM_ED)

The Report Class General Execution Delay File quantifies sampled execution state information by optional report class. This is a parallel file that contains a subset of the same data elements as the Service Class General Execution Delay File (WLMSED). Measurements in this file include how often work was using or waiting for CPU, waiting for auxiliary storage access, idle, or in some other condition. Observations are written to this file only if the measurements are available.

The WLM_ED file is commonly used in conjunction with these related files:

- o WLM_EA - Report Class
- o WLM_EC - Report Class Resource Consumption
- o WLM_EM - Report Class Response Time

Information in the WLM_ED file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.12.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan		Level of Data Granularity				
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSPLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLM POLCY	SYSNAME	
	SYSID	WLM RPTCL	WLM CLSPD			
DAYS	SYSPLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	DAY	HOUR	WLM POLCY	SYSNAME	SYSID	
	WLM RPTCL	WLM CLSPD				
WEEKS	SYSPLEX	WLM SDFNM	WLM SDFTS	YEAR	WEEK	
	ZONE	HOUR	WLM POLCY	SYSNAME	SYSID	
	WLM RPTCL	WLM CLSPD				
MONTHS	SYSPLEX	WLM SDFNM	WLM SDFTS	YEAR	MONTH	
	ZONE	WLM POLCY	SYSNAME	SYSID	WLM RPTCL	
	WLM CLSPD					
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not

is controlled by the complex definition of the
DERIVED option.

Figure 5-72. WLM_ED Sort Sequence and Data Granularity

5.4.12.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name
XDWM..E	SYSPLEX	- Sysplex Name
XDW...E	WEEK	- Week of Year

XDWM..E WLMCLSPD - Service/Report Class Period
 XDWM..E WLMPCOLY - Service Policy Name
 XDWM..E WLMRPTCL - Report Class Name
 XDWM..E WLMSDFNM - Service Definition Name
 XDWM..E WLMSDFTS - Service Definition Installation Time Sta
 XDWM..E YEAR - Year of Century
 XDWM..E ZONE - Time Zone

Common Data Elements

XDWM..E CYCLETM - RMF Sampling Cycle Interval
 XD....E DAYNAME - Name of Day of Week
 XDWM..E DURATION - Recording Interval Time
 XDWM..E ENDTS - End Time Stamp
 XDWM..E INTERVLS - Number of Recording Intervals
 XDWM..E MICSVER - CA MICS Version Number
 XDWM..E MVSLEVEL - MVS Software Level
 XDWM..E ORGSYSID - Originating System Identification
 XDWM..E RMFESAME - z/Architecture Mode Indicator
 XDWM.. RMFGMTOF - GMT to Local Time Offset
 X..... RMFSRL - SMF Record Level Change Number
 XDWM..E RMFSUPAV - Intvls with zIIP Processors Available
 XDWM..E RMFVER - RMF Version Number
 XDWM..E RMFZAPAV - Intvls with zAAP Processors Available
 XDWM..E STARTTS - Start Time Stamp
 XDWM..E WLMGOLRI - Service Goal - Relative Importance
 XDWM..E WLMGOLVE - Service Goal - Velocity
 XDWM..E WLMHETRO - Heterogeneous Report Class Period Indica
 XDWM..E WMLCSCL - Last Contributing Service Class
 XDWM..E WLMXVCID - Exec Velocity Component Indicator

Accumulated Data Elements

XDWM..E SEDTOAMD - Samples - Crypto AM Processor Delay
 XDWM..E SEDTOAMU - Samples - Using Crypto AM Processor
 XDWM..E SEDTOAPD - Samples - Crypto Assist Processor Delay
 XDWM..E SEDTOAPU - Samples - Using Crypto Assist Processor
 XDWM..E SEDTOCOD - Samples - Resource Contention Delay
 XDWM..E SEDTOCOU - Samples - Resource Contention Using
 XDWM..E SEDTOCRD - Samples - Crypto Processors Delay
 XDWM..E SEDTOCRU - Samples - Using Crypto Processors
 XDWM..E SEDTOCUS - Samples - Using CPU on CP
 XDWM..E SEDTODCC - Samples - CPU Capping Delay
 XDWM..E SEDTODCP - Samples - CPU Delay on CP
 XDWM..E SEDTODES - Samples - ESO Hiperspc Pg-In from Aux
 XDWM..E SEDTODHS - Samples - Std Hiperspc Pg-In from Aux
 XDWM..E SEDTODID - Samples - Idle
 XDWM..E SEDTODMP - Samples - MPL Delay
 XDWM..E SEDTODPC - Samples - CSA Page-In from Aux

XDWL..E SEDTODPP - Samples - Pvt Page-In from Aux
XDWL..E SEDTODQU - Samples - Quiesce
XDWL..E SEDTODRG - Samples - Resource Group Capping
XDWL..E SEDTODSB - Samples - Total Exec Delay with Batch
XDWL..E SEDTODSD - Samples - DASD I/O Delay
XDWL..E SEDTODSI - Samples - Swap-In Delay
XDWL..E SEDTODUN - Samples - Unknown
XDWL..E SEDTODVI - Samples - VIO Page-In from Aux
XDWL..E SEDTODXM - Samples - Cross Mem Page-In from Aux
XDWL..E SEDTOEXS - Total Execution Samples
XDWL..E SEDTOFQD - Samples - Feature Queue Delay
XDWL..E SEDTOIUS - Total WLM I/O Usings
XDWL..E SEDTONDD - Non-DASD I/O Using or Delay
XDWL..E SEDTOSAC - Sampled Address Space Count
XDWL..E SEDTOSAM - Total Execution Delay Samples
XDWL..E SEDTOSCU - Samples - zIIP Eligible Using CPU on CP
XDWL..E SEDTOSHP - Samples - Server Hiperspace Paging
XDWL..E SEDTOSMP - Samples - Server MPL
XDWL..E SEDTOSPP - Samples - Server Private Area Paging
XDWL..E SEDTOSQU - Samples - Server Queue Delay
XDWL..E SEDTOSSI - Samples - Server Swap-In
XDWL..E SEDTOSST - Total Sampled States
XDWL..E SEDTOSUD - Samples - CPU Delay on zIIP
XDWL..E SEDTOSUU - Samples - Using CPU on zIIP
XDWL..E SEDTOSVP - Samples - Server Space VIO Paging
XDWL..E SEDTOUSE - Total WLM Usings
XDWL..E SEDTOZCU - Samples - zAAP Eligible Using CPU on CP
XDWL..E SEDTOZPD - Samples - CPU Delay on zAAP
XDWL..E SEDTOZPU - Samples - Using CPU on zAAP

Derived Data Elements

XDWL..E SEDAVSAC - Avg Sampled Address Spaces
XDWL..E SEDEXVEL - Execution Velocity
XDWL..E SEDPCAMD - Pct Wait - Crypto AM Processor
XDWL..E SEDPCAMU - Pct Using Crypto AM Processor
XDWL..E SEDPCAPD - Pct Wait - Crypto Assist Processor
XDWL..E SEDPCAPU - Pct Using Crypto Assist Processor
XDWL..E SEDPCCOD - Pct Wait - Resource Contention
XDWL..E SEDPCCOU - Pct Using - Resource Contention
XDWL..E SEDPCCRD - Pct Wait - Crypto Processors
XDWL..E SEDPCCRU - Pct Using Crypto Processors
XDWL..E SEDPCCUS - Pct Using CPU on CP
XDWL..E SEDPCDCC - Pct Wait - CPU Capping
XDWL..E SEDPCDCP - Pct Wait - CPU on CP
XDWL..E SEDPCDES - Pct Wait - ESO Hiperspc Pg-In from Aux
XDWL..E SEDPCDHS - Pct Wait - Std Hiperspc Pg-In from Aux
XDWL..E SEDPCDID - Pct Idle
XDWL..E SEDPCDMP - Pct Wait - MPL Delay

XDWL..E SEDPCDPC - Pct Wait - CSA Page-In from Aux
XDWL..E SEDPCDPP - Pct Wait - Pvt Page-In from Aux
XDWL..E SEDPCDQU - Pct Wait - Quiesce
XDWL..E SEDPCDRG - Pct Wait - Resource Group Capping
XDWL..E SEDPCDSD - Pct Wait - DASD I/O Delay
XDWL..E SEDPCDSI - Pct Wait - Swap-In
XDWL..E SEDPCDUN - Pct Wait - Unknown
XDWL..E SEDPCDVI - Pct Wait - VIO Page-In from Aux
XDWL..E SEDPCDXM - Pct Wait - Cross Mem Page-In from Aux
XDWL..E SEDPCFQD - Pct Wait - Feature Queue
XDWL..E SEDPCIUS - Pct Using I/O
XDWL..E SEDPCSCU - Pct zIIP Eligible Using CPU on CP
XDWL..E SEDPCSHP - Pct Wait - Server Hiperspace Paging
XDWL..E SEDPCSMP - Pct Wait - Server MPL
XDWL..E SEDPCSPP - Pct Wait - Server Private Area Paging
XDWL..E SEDPCSQU - Pct Wait - Server Queue Delay
XDWL..E SEDPCSSI - Pct Wait - Server Swap-In
XDWL..E SEDPCSUD - Pct Wait - CPU on zIIP
XDWL..E SEDPCSUU - Pct Using CPU on zIIP
XDWL..E SEDPCSVF - Pct Wait - Server Space VIO Paging
XDWL..E SEDPCZCU - Pct zAAP Eligible Using CPU on CP
XDWL..E SEDPCZPD - Pct Wait - CPU on zAAP
XDWL..E SEDPCZPU - Pct Using CPU on zAAP

5.4.12.3 Usage Considerations

Special considerations or techniques related to using the WLM_ED file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance; they should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS, MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

5.4.12.4 Retrieval Examples

This section presents a typical WLM_ED retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Report Class Execution Velocity

```
TITLE1 "Report Class Execution Velocity";

DATA WORK._ED1
  (KEEP=SYSPLEX WLMDFNM WLMDFTS SYSNAME WLMRPTCL
   WLMRPTDE WLMPCY ENDS SEDEXVEL);
MERGE
  &PWLWX..WLM_EA01 (IN=_EA)
  &PWLWX..WLM_ED01 (IN=_ED);
BY SYSID ENDS WLMDFNM WLMDFTS
  WLMRPTCL WLMPCY;
IF (_EA & _ED) THEN OUTPUT WORK._ED1;
RUN;

PROC SORT NODUPKEY OUT=WORK._ED2 DATA=WORK._ED1;
  BY SYSPLEX WLMDFNM WLMDFTS SYSNAME ENDS
    WLMRPTCL WLMPCY;
RUN;

PROC PRINT LABEL DATA=WORK._ED2;
  BY SYSPLEX WLMDFNM;
  ID SYSNAME ENDS;
  VAR WLMRPTCL WLMRPTDE WLMPCY SEDEXVEL;
RUN;
```

5.4.13 Report Class Subsystem Delay States (WLM_EW)

The Report Class Subsystem Delay States File contains information characterizing the effect of sampled subsystem server address space status on client work requests and transactions. This information is organized by report class period.

Execution and delay states are reported by transaction class even though the information comes from sampling the server address space states.

Information in the WLM_EW file is derived from the type 72 subtype 3 RMF Workload Activity and Storage Data record.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - File Organization
- 2 - Data Elements List
- 3 - Usage Considerations
- 4 - Retrieval Examples

5.4.13.1 File Organization

The table below identifies data elements by which the file is sequenced and summarized in each timespan. N/A indicates that the file is not supported in a timespan. At the DETAIL level, data is sequenced but not summarized.

NOTE: The timespans in which a file is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

+-----+-----+-----+-----+-----+-----+-----+						
Timespan	Level of Data Granularity					
+-----+-----+-----+-----+-----+-----+-----+						
DETAIL	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	ENDTS	WLMPOLCY	SYSNAME	
	SYSID	WLMRPTCL	WLMCLSPD	SDSSUBNM	SDSPHASE	
DAYS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	DAY	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMRPTCL	WLMCLSPD	SDSSUBNM	SDSPHASE		
WEEKS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	WEEK	
	ZONE	HOUR	WLMPOLCY	SYSNAME	SYSID	
	WLMRPTCL	WLMCLSPD	SDSSUBNM	SDSPHASE		
MONTHS	SYSLEX	WLMSDFNM	WLMSDFTS	YEAR	MONTH	
	ZONE	WLMPOLCY	SYSNAME	SYSID	WLMRPTCL	
	WLMCLSPD	SDSSUBNM	SDSPHASE			
YEARS	N/A					
+-----+-----+-----+-----+-----+-----+-----+						
TABLES	N/A					
+-----+-----+-----+-----+-----+-----+-----+						

Generation Date: Tue, May 12, 2009

NOTE: This file was generated with ESSENTIAL=ALL option in effect. All data elements defined in the file are generated.

NOTE: This file was generated with DERIVED=Default option in effect. Whether data elements are kept on the file on auxiliary storage or not is controlled by the complex definition of the

DERIVED option.

Figure 5-73. WLM_EW Sort Sequence and Data Granularity

5.4.13.2 Data Elements List

The table below identifies data elements contained in this file. The entries for each data element are:

TIMESPAN: Defines the timespans in which the data element is supported. The timespans are indicated by the letters "XDWMYT" as follows:

- X - DETAIL
- D - DAYS
- W - WEEKS
- M - MONTHS
- Y - YEARS
- T - TABLES AREA
- . - File is not supported

The timespan field also indicates Essential Elements with the letter E, if applicable.

DATA ELEMENT: The data element name.

DATA ELEMENT DESCRIPTION: The data element's long name.

The timespans in which a data element is supported are defined by each installation when CA MICS is installed. Therefore, this table has been generated as part of the installation process to accurately reflect the CA MICS system at your installation.

GENERATION DATE: Tue, May 12, 2009

Note: Essential data elements are identified by an "E" under the Timespan asterisk (*) column.

Time- Span *	Data Element	Data Element Description (LABEL)
-----	-----	-----

Sequence/Summary Data Elements

XD...E	DAY	- Day of Month
XDW...E	HOURL	- Hour of Day
XD.M..E	MONTH	- Month of Year
XDWM..E	SDSPHASE	- Phase
XDWM..E	SDSSUBNM	- Subsystem Name
XDWM..E	SYSID	- System Identifier
XDWM..E	SYSNAME	- System Name

XDW..E SYSPLEX - Sysplex Name
XDW...E WEEK - Week of Year
XDW..E WLMCLSPD - Service/Report Class Period
XDW..E WLMPOLCY - Service Policy Name
XDW..E WLMRPTCL - Report Class Name
XDW..E WLMSDFNM - Service Definition Name
XDW..E WLMSDFTS - Service Definition Installation Time Sta
XDW..E YEAR - Year of Century
XDW..E ZONE - Time Zone

Common Data Elements

XDW..E CYCLETM - RMF Sampling Cycle Interval
XD....E DAYNAME - Name of Day of Week
XDW..E DURATION - Recording Interval Time
XDW..E ENDTS - End Time Stamp
XDW..E INTERVLS - Number of Recording Intervals
XDW..E MICSVER - CA MICS Version Number
XDW..E MVSLEVEL - MVS Software Level
XDW..E ORGSYSID - Originating System Identification
XDW..E RMFESAME - z/Architecture Mode Indicator
XDW.. RMFGMTOF - GMT to Local Time Offset
X..... RMFSRL - SMF Record Level Change Number
XDW..E RMFSUPAV - Intvls with zIIP Processors Available
XDW..E RMFVER - RMF Version Number
XDW..E RMFZAPAV - Intvls with zAAP Processors Available
XDW..E STARTTS - Start Time Stamp
XDW..E WLMHETRO - Heterogeneous Report Class Period Indica
XDW..E WMLCSCCL - Last Contributing Service Class

Accumulated Data Elements

XDW..E SDSRSMP - Number of Samples
XDW..E SDSTOACT - Samples - Active
XDW..E SDSTOAPP - Samples - Active Application
XDW..E SDSTOBPM - Samples - Buffer Pool Misses
XDW..E SDSTOIDL - Samples - Idle
XDW..E SDSTORDY - Samples - Ready
XDW..E SDSTOSSL - Samples - Continued Local
XDW..E SDSTOSSN - Samples - Continued Network
XDW..E SDSTOSSS - Samples - Continued Sysplex
XDW..E SDSTOTRR - In-Storage Residency Time
XDW..E SDSTOWCO - Samples - Waiting for Conversation
XDW..E SDSTOWDS - Samples - Waiting for Distrib Request
XDW..E SDSTOWIO - Samples - Waiting for I/O
XDW..E SDSTOWLO - Samples - Waiting for Lock
XDW..E SDSTOWMS - Samples - Waiting for (Unidentified)
XDW..E SDSTOWNL - Samples - Waiting for New Latch
XDW..E SDSTOWOP - Samples - Waiting for Other Product

XDWM..E SDSTOWRT - Samples - Waiting for Regular Thread
XDWM..E SDSTOWSL - Samples - Waiting for Local Session
XDWM..E SDSTOWSN - Samples - Waiting for Network Session
XDWM..E SDSTOWSS - Samples - Waiting for Sysplex Session
XDWM..E SDSTOWST - Samples - Waiting for SSL Thread
XDWM..E SDSTOWTM - Samples - Waiting for Timer
XDWM..E SDSTOWWR - Samples - Waiting for Work Table Reg.

Derived Data Elements

XDWM..E SDSAVMPL - Avg Multiprogramming Level
XDWM..E SDSPCACT - Pct Active
XDWM..E SDSPCAPP - Pct Active Application
XDWM..E SDSPCBPM - Pct Buffer Pool Misses
XDWM..E SDSPCIDL - Pct Idle
XDWM..E SDSPCRDY - Pct Ready
XDWM..E SDSPCSSL - Pct Continued Local
XDWM..E SDSPCSSN - Pct Continued Network
XDWM..E SDSPCSSS - Pct Continued Sysplex
XDWM..E SDSPCWCO - Pct Waiting for Conversation
XDWM..E SDSPCWDS - Pct Waiting for Distrib Request
XDWM..E SDSPCWI0 - Pct Waiting for I/O
XDWM..E SDSPCWL0 - Pct Waiting for Lock
XDWM..E SDSPCWMS - Pct Waiting for (Unidentified)
XDWM..E SDSPCWNL - Pct Waiting for New Latch
XDWM..E SDSPCWOP - Pct Waiting for Other Product
XDWM..E SDSPCWRT - Pct Waiting for Regular Thread
XDWM..E SDSPCWSL - Pct Waiting for Local Session
XDWM..E SDSPCWSN - Pct Waiting for Network Session
XDWM..E SDSPCWSS - Pct Waiting for Sysplex Session
XDWM..E SDSPCWST - Pct Waiting for SSL Thread
XDWM..E SDSPCWTM - Pct Waiting for Timer
XDWM..E SDSPCWWR - Pct Waiting for Work Table Reg.

5.4.13.3 Usage Considerations

Special considerations or techniques related to using the WLM_EW file are provided below.

1. Care must be exercised in using the special date and time data elements contained in each CA MICS file. As the file's granularity increases in higher timespans, certain fields lose significance and should not be used in those cases.
 - o HOUR should not be used in MONTHS.
 - o DAY and DAYNAME should not be used in WEEKS or MONTHS.
 - o WEEK should not be used in MONTHS.
2. ENDTS and STARTTS, when appearing in the DAYS, WEEKS, or MONTHS timespans, bound the span of time over which the data has been summarized. STARTTS is the lowest date and time, and ENDTS is the highest date and time for the data summarized. These data elements have different meanings when used in the DETAIL timespan versus the DAYS, WEEKS, and MONTHS timespans. Their purpose in DETAIL is described below:
 - o STARTTS represents RMF recording interval start time.
 - o ENDTS represents RMF recording interval end time.

More About the WLM_EW File

As stated earlier, the WLM_EW file contains information characterizing the effect of sampled subsystem server address space status on client work requests and transactions, organized by report class period. Execution and delay states are reported by transaction class even though the information comes from sampling the server address space states.

The life span of a transaction is divided into two phases, the begin-to-end phase and the execution phase:

- o The begin-to-end phase encompasses all states from the time the transaction is received by a subsystem work manager until the transaction is executed and

terminated.

- o The execution phase comprises the states experienced by the transaction only during the time the subsystem processes the transaction.

For example, a CICS transaction is received by the terminal-owning region (TOR), begins processing, is sent to an application-owning region (AOR) for execution, and then is served by a database-owning region (DOR), which in turn calls on the DB2 subsystem for service. The transaction is then returned to the TOR and terminated. The phase in which the TOR receives the transaction and subsequently ends it is the begin-to-end phase. The phase in which the transaction is in the AOR, DOR or elsewhere is the execution phase.

In the begin-to-end phase samples, a transaction in its execution phase is characterized as "continued." Three scopes of continuation are recognized depending on where the execution takes place:

- o Within the same system as the begin-to-end phase
- o On another system in the sysplex
- o Elsewhere in the network

In our example, the begin-to-end phase is associated with the CICS subsystem. Once the transaction is passed to the AOR, it is shown as continued. In the execution phase, the various states of the transaction are associated with the CICS subsystem until the time DB2 begins its services. The transaction is then continued a second time and additional execution phase information is collected under the DB2 subsystem. When DB2 services complete, the execution phase continues in CICS until the transaction passes back to the TOR, when the execution phase ends. When the response is made to the terminal and the transaction ends, the begin-to-end phase completes.

The information in the WLM_EW file makes it possible to analyze the complex relationships between client transactions and multiple subsystem server address spaces.

5.4.13.4 Retrieval Examples

This section presents a typical WLM_EW retrieval example.

In the examples, a SAS macro variable is used to specify the DDname part of the CA MICS file name. These macro variables are a standard part of CA MICS and are available for all files. The macro variable name has the form &diit, where d is the database identifier, ii is the information area name, and t is the timespan. For the examples, a database identifier of P is used. The identifier is installation dependent, so you should find out what the identifiers are at your installation.

Report Class Subsystem Delays

```
TITLE1 "Report Class Subsystem Delays";

DATA WORK._EW1
(KEEP=SYSPLEX WLMDFNM WLMDFTS SYSNAME
 WLMRPTCL WMPOLCY WLMRPTDE ENDTS
 SDSSUBNM SDSPHASE SDSPACT SDSPCRDY SDSPCIDL
 SDSPCSSL SDSPCSSS SDSPCSSN);
MERGE
  &PWLWX._WLM_EA01 (IN=_EA)
  &PWLWX._WLM_EW01 (IN=_EW);
BY SYSID ENDTS WLMDFNM WLMDFTS WLMRPTCL WMPOLCY;
IF (_EA & _EW) THEN OUTPUT WORK._EW1;
RUN;

PROC SORT NODUPKEY OUT=WORK._EW2 DATA=WORK._EW1;
  BY SYSPLEX WLMDFNM WLMDFTS SYSNAME ENDTS
  WLMRPTCL WMPOLCY SDSSUBNM SDSPHASE;
RUN;

PROC PRINT LABEL DATA=WORK._EW2;
  BY SYSPLEX WLMDFNM;
  ID SYSNAME ENDTS;
  VAR WLMRPTCL WMPOLCY
  SDSSUBNM SDSPHASE SDSPACT SDSPCRDY
  SDSPCIDL SDSPCSSL SDSPCSSS SDSPCSSN;
RUN;
```

Chapter 6: DATA SOURCES

The CA MICS Hardware and SCP Analyzer allows consistent analysis of system resource activity as reflected in RMF.

RMF (Resource Measurement Facility) operates exclusively on z/OS operating systems. RMF measures performance, utilization, resource consumption, and workload levels for z/OS systems. RMF data is recorded in SMF records 70 through 79 in the SMF data sets.

There are three RMF monitors:

- o RMF Monitor I is the primary monitor and is active on most systems.
- o RMF Monitor II performs many measurements similar to RMF Monitor I. However, some system activity is only measured by RMF Monitor II, such as reserve activity. RMF Monitor II is often used as an interactive monitor but can also be run as a background session that produces SMF records.
- o RMF Monitor III measures workload delays. RMF Monitor III can write SMF records.

The parameters that control these monitors are set in the ERBRMFxx members of SYS1.PARMLIB.

The CA MICS Hardware and SCP Analyzer processes all records generated by RMF Monitor I. In addition, some records are processed from RMF Monitor II background sessions. Section 6.2 identifies and defines the records processed by the CA MICS Hardware and SCP Analyzer.

The CA MICS Hardware and SCP Analyzer uses the type 70 through 79 SMF records created by the RMF to populate files in the HAR, SCP, and WLM Information Areas. Consult with your organization's system programmer to ensure that these records are available from your systems.

Details about records used by this CA MICS product are discussed later in this chapter.

This chapter contains information on the following topics:

- 1 - Data Collector Considerations
- 2 - Record Descriptions
- 3 - Contention for "Logical" (ENQ) Resources

- 4 - Expanded Storage Concepts
- 5 - RMF LCU Summarized File
- 6 - Notes on RMF Samples
- 7 - z/Architecture Highlights
- 8 - PR/SM LPAR Concepts
- 9 - CA MICS and CA SMF Director Interface

This section contains the following topics:

- [6.1 Data Collector Considerations](#) (see page 942)
- [6.2 Record Descriptions](#) (see page 944)
- [6.3 Contention For "Logical" \(ENQ\) Resources](#) (see page 952)
- [6.4 Expanded Storage Concepts](#) (see page 955)
- [6.5 RMF LCU Summarized File](#) (see page 970)
- [6.6 Notes on RMF Samples](#) (see page 975)
- [6.7 z/Architecture Highlights](#) (see page 981)
- [6.8 PR/SM LPAR Concepts](#) (see page 984)
- [6.9 CA MICS and CA SMF Director Interface](#) (see page 1049)

6.1 Data Collector Considerations

Before installing the Hardware and SCP Analyzer, the CA MICS system administrator must address the data collection considerations that RMF and HIS require. These include space considerations and the availability of the RMF and HIS data in the SMF data sets.

The RMF records are written to VSAM data sets named SYS1.MANx where x is any number or letter. At least two data sets must be specified. When one data set is filled, data is then written to the next data set specified. The system operator is notified that the MANx data set is full and then must initiate a program to copy its contents into another file. This frees the MANx data set for reuse. The file receiving a copy of the MANx contents later is used as input to the CA MICS system.

Specification of the RMF Monitor I SYNC Parameter

The RMF Monitor I SYNC(nn) parameter may be used to specify whether or not RMF intervals are to be synchronized with the hour of the day, and, if so, the number of minutes after the hour when synchronization is to occur. The synchronization is accomplished by shortening the first RMF interval so that a subsequent interval within the first hour begins nn minutes after the hour in which RMF is started. If the requested length of the RMF interval is evenly divisible into 60 minutes, all subsequent intervals will be synchronized.

For example, if INTERVAL(30) and SYNC(00) are specified and RMF is started at 07:05, then the first interval will start immediately and it will end at 07:30, for a duration of 25 minutes rather than the 30 minutes requested. This shortening will result in the second interval starting at 07:30, the requested synchronization point. The ending timestamp (ENDTS) for each RMF record written to SMF at the end of an interval will be at 30 minutes after the hour and on the hour.

In CA MICS, DETAIL RMF data may be summarized, not into the hour in which the measured activity took place but into the following hour, because the product summarizes by HOUR and ZONE, both of which are derived from ENDTS. In the above example, data that were collected by RMF between 07:30 and 08:00 will have an ENDTS of 08:00:00.00 or possibly a few seconds later due to internal delays. The HOUR value for

this interval is 8, even though most of the measurements represent information for the previous hour.

Specifying SYNC(59) and using an INTERVAL value that is evenly divisible into 60 solves this problem. As a result of the SYNC(59), no more than the last minute of the last interval within an hour is summarized into the next hour, instead of the entire last interval. The margin of error has been reduced from INTERVAL minutes to 1 minute.

Instead of the RMF synchronization with the hour, if you use the synchronization with SMF, with the SYNC(SMF) parameter, RMF records will be written as specified via SYNCVAL and INTVAL general SMF options.

Therefore, the CA MICS recommendation for RMF synchronization is:

- o RMF synchronization only:
 - RMF options:
 - SYNC(59)
 - INTERVAL(nn) where nn can be 05, 10, 12, 15, 20, 30 or 60
- o RMF synchronization with SMF recording:
 - RMF options:
 - SYNC(SMF)
 - (INTERVAL value is ignored)
 - SMF options:
 - SYNCVAL(59)
 - INTVAL(nn) where nn can be 05, 10, 12, 15, 20, 30 or 60

For more information on SYNC and related RMF options, see the IBM manual "Resource Measurement Facility (RMF) User's Guide (SC33-7990)."

For more information on starting the HISPROC address space, see the IBM manual "z/OS MVS System Commands (SA22-7627)."
IBM manual "Resource Measurement Facility (RMF) User's Guide (SC33-7990)."

6.2 Record Descriptions

The CA MICS Hardware and SCP Analyzer uses SMF record types 70 through 79, written by the RMF (Resource Management Facility), and the SMF type 113 subtype 2 record written by the CPU Measurement Facility (CPU MF) Hardware Instrumentation Services (HIS). Following are brief descriptions of these records:

TYPE 70 - RMF Processor Activity

The type 70 records processed by CA MICS are CPU, PR/SM, and ICF Activity (subtype 1), and Cryptographic Hardware Activity (subtype 2).

- o The type 70 subtype 1 record contains CPU measurement data. It reports CPU wait time and the serial and version numbers, as well as the number of I/O interrupts and the number of interrupts for each processor. It indicates the number of jobs and the percentage of jobs in the following states:
 - IN - Tasks in real memory on the SRM IN queue.
 - IN-READY - Tasks in real memory and ready to execute.
 - OUT-WAIT - Tasks not in real memory that are waiting before they will be ready to execute.
 - LOGICAL-OUT-READY - Tasks logically swapped out but not yet physically swapped out that are now ready to execute.
 - LOGICAL-OUT-WAIT - Tasks logically swapped out but not yet physically swapped out that are waiting.

It recognizes five different types of jobs: batch, TSO, started task, ASCH, and USS. For each type, the minimum, average, and maximum number of users in the recording interval are captured.

It also contains the PR/SM and ICF information used to track logical partitions configuration and utilization.

- o The type 70 subtype 2 record contains measurement data for cryptographic coprocessors and accelerators, as well as selected Integrated Cryptographic Service

Facility (ICSF) activities.

TYPE 71 - RMF Paging Activity

The type 71 record contains paging and swapping measurement data. Swapping is the primary way the system resource manager deals with resource shortages or overutilization.

Information regarding CSA, LPA, SQA, LSQA, and private areas is reported. This information includes the minimum, average, and maximum frames used in these areas for both fixed and pageable frames.

The type 71 record also contains paging information. For CSA, LPA, Private VIO, and Private non-VIO areas, RMF records the number of pages read in, the number of pages written out, and shared page group activity. From this information and the duration of the recording interval, a number of different paging rates are calculated.

TYPE 72 - RMF Workload Activity, Storage Data, and Serialization Delay

The type 72 records processed by CA MICS are Workload Activity (subtype 3), and Serialization Delay (subtype 5).

- o The type 72 subtype 3 record contains data pertaining to systems that are using the Workload Manager. These records are written for each service or report class defined in the active service policy, and include the goals and actual measured values for each class.

CPU data contained in the type 72 records is in CPU service units, not CPU seconds. This data can be converted to CPU seconds by multiplying by the coefficient appropriate for model and type of CPU. I/O and memory utilization information is also captured in this record. The number of ended transactions and the total elapsed time of these transactions are also recorded.

- o The type 72 subtype 5 record contains serialization data at the system and address space levels for different types of suspend locks, GRS enqueues, and GRS latches. While the control section contains

system-wide delays, the data sections contain serialization delay data for up to twenty address spaces sorted by total contention time.

TYPE 73 - RMF Channel Path Activity

The type 73 record contains physical and logical channel activity measurement data. The data contains information for each channel path indicating the type of channel and channel-busy time.

TYPE 74 - RMF Activity of Several Resources

The type 74 records processed by CA MICS are Device Activity (subtype 1), Cross-system Coupling Facility Activity (subtype 2), USS Kernel Activity (Unix System Services) (subtype 3), CF/XES Activity (Coupling Facility/Cross-System Extended Services) (subtype 4), Cache Subsystem Activity (subtype 5), FICON Director Statistics (subtype 7), and Enterprise Disk System Statistics (subtype 8).

- o The type 74 subtype 1 record contains information for each device about the number of Start Subchannels (SSCHs) or Start I/Os (SIOs) for the device, the number of I/O requests deferred, the device active time, connect time, disconnect time, pending time, and the number of allocations in effect on the device.
- o The type 74 subtype 2 record contains information for its system on the amount of traffic to, from, and within the system; the number of signals sent to and from each remote system, group, and member; and the signaling path connecting the local system to all remote systems.
- o The type 74 subtype 3 record contains system-wide information about Unix System Services (USS) utilization, including user and process load, inter-process communication, memory map, and shared library measurements.

Note: Unix System Services was previously known as OpenEdition MVS.
- o The type 74 subtype 4 record contains information on the Coupling Facility such as name, amount of storage installed and used, and number and utilization of

processors. It contains the names of the other systems in the sysplex connected to the CF, names and storage resources of all structures allocated in the CF, and detailed information identifying the cross-system request activity to and from the system. It also describes the hardware paths between the system and the other structures in the sysplex.

- o The type 74 subtype 5 record contains information on the Cache Subsystem such as control information, return codes from the interfaces, cache statistics at the device, RAID rank, and control unit level.
- o The type 74 subtype 7 record contains configuration and statistics for FICON directors (switches) and ports.
- o The type 74 subtype 8 record contains capacity and performance statistics for Enterprise Disk Systems' adapters, extent pools, and ranks.

TYPE 75 - RMF Page Data Set Activity

The type 75 record contains Page Data Set Activity measurement data. The data contains information for each page data set. Information captured includes the number of pages transferred, the number of I/O requests, and the number of slots available and used for each data set.

TYPE 76 - RMF Trace Activity

The type 76 record contains trace measurement data. The data contains information for each field traced. Information captured includes the field name and its last value.

TYPE 77 - RMF Enqueue Activity

The type 77 record contains enqueue measurement data. The data contains information for each device that was enqueued during the RMF recording interval. Information captured includes the current owner, the waiting users, and the queue length for each enqueue event.

TYPE 78 - RMF Virtual Storage and I/O Queuing Activity

The type 78 records are the Virtual Storage Activity record (subtype 2) and the I/O Queuing Activity record (subtype 3).

- o The type 78 subtype 2 record contains information concerning the amount of virtual storage reserved for the CSA, MLPA, FLPA, PLPA, SQA, and nucleus, both below and above the 16 MB line. The amount of storage allocated for SQA is recorded by subpool and, for CSA, by subpool and storage key. SQA expansion into CSA is also recorded. Private virtual storage usage information is recorded for jobs specified with the RMF Monitor I VSTOR option.
- o The type 78 subtype 3 record contains information on the I/O configuration, I/O activity rates, and queue lengths recorded for logical control units (LCUs). This record also contains measurements pertaining to the IOPs (I/O processors).

TYPE 79 - RMF Monitor II Activity

The type 79 record contains RMF Monitor II measurement data. RMF Monitor II is often run to diagnose a specific problem or to gather more detailed data. Type 79 records are only generated when RMF Monitor II is run as a background session. The type 79 subtype records processed by CA MICS are Address Space Resource (subtype 2), Real Storage/Processor/SRM (subtype 3), and Reserve (subtype 6).

- o The type 79 subtype 2 record contains measurements on CPU time, EXCP count, paging statistics, fixed frames used, and hiperspace pages used for given address spaces. Its data reflects systems using the Workload Manager.
- o The type 79 subtype 3 record contains measurements on real storage and expanded storage usage for some storage categories, UIC count, processor utilization, and some of the SRM queues on a system-wide basis.
- o The type 79 subtype 6 record contains information on the RESERVE macros that were issued. This can be very useful in a shared DASD environment. Included in the information recorded is the volume serial number, the job that issued the reserve, major and minor resource names, and the status of the reserve.

TYPE 113 - Hardware capacity, reporting, and statistics

- o The type 113 subtype 2 record contains CPC hardware event counter information, recorded for each online z/OS logical processor while dispatched on physical CPC processor chips. Included in the information is the number of CPC cycles, instruction counts, level 1 cache miss sourcing, translation lookaside buffer activity, cryptographic processor usage, and other information useful in determining how efficiently workloads exploit the CPC hardware cache and memory architecture.

Figure 6-1 shows the relationship between the various SMF record types processed, and the CA MICS Hardware and SCP Analyzer files.

SMF Record Type	CA MICS File
70 subtype 1	HARCPU HARIPU HARLPC HARVPA
70 subtype 2	HARCRA HARCRF HARCRP
71	SCPPAG SCPSWP
72 subtype 3	WLMUDE WLMRGP WLM SVC WLM SDS WLM_EW WLMSEA WLM_EA WLMSEC WLM_EC WLMSEM WLM_EM WLMSED WLM_ED
72 subtype 5	SCPSRD SCPSRS
73	HARPCA
74 subtype 1	HARDVA HARDTA HARSGA SCPLCU *
74 subtype 2	SCPXCY SCPXCA SCPXCM
74 Subtype 3	SCPKRN

Figure 6-1. Record Type and File Table (Part 1 of 2)

SMF Record Type	CA MICS File
74 subtype 4	HARCFP HARCFC HARCFS HARCFR HARCFH HARCFD
74 subtype 5	HARCCU HARCVA HARRRA
74 subtype 7	HARFDC HARFDP
74 subtype 8	HARELS HARXPS HARERS
75	SCPPSD
76	SCPTRC
77	SCPENQ
78 subtype 2	SCPVSM SCPVSU
78 subtype 3	SCPIOC SCPIOP SCPLCA SCPLCU *
79 subtype 2	SCPARD
79 subtype 3	SCPSRC
79 subtype 6	HARRSV
113 subtype 2	HARCME HARCML HARCMT

* The SCPLCU file is created by merging information from the
HARDVA, SCPIOC and SCPLCA files.

Figure 6-1. Record Type and File Table (Part 2 of 2)

6.3 Contention For "Logical" (ENQ) Resources

Contention exists for a logical resource (ENQ) whenever a task in memory requests use of it, and that request is forced to wait because it may not have it. For all logical resources with a "scope" (see ENQSCOPE) of SYSTEM or SYSTEMS, RMF is informed that this has happened because an ENQHOLD SYSEVENT is issued to inform SRM of this occurrence. RMF has an exit that gets control at this point if the user has requested ENQ measurements. Note that IEAVENQ1 (the ENQ/DEQ routine) does not issue SYSEVENTs for ENQ contention for resources with a scope of STEP.

SRM needs to be informed about ENQ contention because it would like to take some action to expedite the execution of the holders of the resource. Memories that are IN/READY are marked as not to be swapped out until they have received an ERV's (Enqueue Residency Value) worth of service. Memories holding the resource that are OUT/READY are marked for consideration for swap-in the next time IRARMCAP gets control. IRARMCAP will swap such memories in even if to do so would take the target domain over its target or even max MPL. At the same time, IRARMCAP will attempt to swap out IN/READY users to "make room" for the memory coming in (memories swapped out to make room are said to be OUT/READY because of an ENQ EXCHANGE swap) if necessary to maintain MPL limits. Also, if a memory holding a desired resource is executing in the mean-time-to-wait group, it is given the maximum MTW priority to expedite its processing.

To understand the RMF ENQ measurements, you must know when and why ENQHOLD and ENQRLSE SYSEVENTs are issued, and how RMF responds to these SYSEVENTs when it gets control.

IEAVENQ1 issues a ENQHOLD whenever a RESERVE ENQ is issued by an authorized program and that program gets control of the resource. The purpose of this appears to be to expedite memories holding inter-CPU resources without leaving a hole in SRM control to be exploited by unscrupulous non-authorized users. RMF filters out ENQHOLDs issued for resources for which there are no requests waiting, so this is not a problem. Similarly, RMF filters out the ENQRLSE that is issued when the same authorized program releases the RESERVE via the DEQ macro instruction.

IEAVENQ1 also issues ENQHOLDs whenever it queues the FIRST waiting request for a resource. ENQHOLD actually supplies the ASID of the holders of the ENQ, not of the waiter,

because it is the holders that must be given extra execution consideration. An ENQHOLD is issued for EACH holder; there may be more than one when the resource is held SHR and the waiter requests OLD (exclusive).

IEAVENQ1 issues ENQRLSE whenever a DEQ is issued for a resource for which there is a queue. The ENQRLSE passes the ASID of the releasing memory to SRM so that memory can be taken out of special ERV status. Note, however, that the waiters for the ENQ do not necessarily get control at this point; the ENQ may have been held SHR with multiple holders. The first waiter (if OLD (exclusive) requested) or possibly waiters (if SHR) requested on the queue will not be given the resource until ALL holders have DEQ'ed (and, therefore, ENQRLSEs have been issued for them).

Note that the above would not quite work if it were possible for a SHR requestor to be given control of a resource currently held SHR while an OLD (exclusive) requestor was waiting in the queue for it. RMF would see more ENQRLSEs than ENQHOLDS. This does not happen because a SHR requestor for a resource held SHR will wait behind an OLD (exclusive) waiter. This is done to prevent the OLD (exclusive) requestor from waiting indefinitely if there is a parade of SHR requestors.

If there is a queue of requestors for a resource, not all of which will get control when the current holders release control (for example, if there are a number of OLD exclusive requests waiting), there will be no ENQHOLDS outstanding at the time the queue is promoted. When the first waiters are given control, IEAVENQ1 notes that there is a waiter for the resource and will issue ENQHOLDS for holders just given control.

For each resource (unique major name/minor name/scope combination) being tracked, ERBMFEEQ keeps a counter that is incremented for an ENQHOLD and decremented for an ENQRLSE. The purpose of this counter is to prevent multiple-counting of statistics when multiple ENQHOLD/ENQRLSE sequences occur because there was more than one holder (SHR) of the resource when a request had to wait.

RMF counts a "contention event" when this counter goes from zero to one, begins timing the contention event at this point, and gathers information about the holders and waiters. RMF does not, however, update most data elements that come out in the record until the ENQRLSE is received, which causes this internal counter to go to zero. Note that what is being counted here as a contention event is not the same thing that

is documented in the RMF manual. The RMF manual implies that a contention event begins when delay begins (the first request is queued) and ends when the last request queued gets control. Actually, a new contention event is counted each time the queue for the resource is promoted, even if there are still waiters after this happens.

When the "last" ENQRLSE is received (the one that causes the internal counter to go to zero), RMF decides that the "contention event" has ended and determines its elapsed time. It also sets a number of statistics about the event such as the number of waiters in the queue (the queue has not been promoted at this point so there must be at least one waiter). This statistic find its way out as SMF77QLT.

There is an RMF concept called the "period of maximum contention." (In the description of the RMF Enqueue Activity (type 77) record, variables whose values are taken at what RMF determines to be the period of maximum contention are called "current" values).

RMF (module ERBMFEEQ) maintains a control block for each major/minor qname (ENQ) being monitoring. In the control block RMF maintains essentially two sets of fields for all those variables defined as being at "maximum contention." An example is SMF77D01, which is defined in the RMF manual as "Job Name 1 of current resource owner."

When an ENQHOLD occurs for a resource, RMF runs the QELs to count the number of waiters for it. If the count is greater than his old "maximum waiters" counter, then its value replaces the old maximum. At the same time, RMF decides it is at maximum contention for this resource WITHIN THIS SPECIFIC CONTENTION EVENT, so it stores the jobname of the first job on the queue that owns the contended-for resource in a holding field. When the last ENQRLSE (the one that causes it to decrement the internal counter mentioned above to zero) comes through, ERBMFEEQ notes how long the "contention event" (first ENQHOLD to last ENQRLSE) existed. If this time is greater than the previous longest time for this resource during the current interval, then RMF will copy the jobname it saved in the holding field to SMF77D01. If it is not the longest contention event, then the old value of SMF77D01 is not replaced, even though the queue length for the resource may have been much longer during this shorter contention event than it was during the longest one so far, from which the SMF77D01 value was taken.

In summary, then, the period of "maximum contention" is the

moment at which the longest queue existed for the resource during the longest contention event that existed during the interval. Note that this is at variance with the explanation in the RMF manual, which implies that the period of maximum contention is that point at which the longest queue existed.

The same logic is used for all the "maximum contention" fields.

6.4 Expanded Storage Concepts

When the 3090 processor series was first introduced, IBM referred to "extended storage" and "expanded storage" interchangeably. Since then, IBM has begun standardizing the use of the expression "expanded storage," but the term "extended storage" is still present in much of its documentation. In our constant goal of maintaining complete compatibility with IBM developments, CA MICS data element names and documentation sometimes refer to "extended storage."

The following sections explain the expanded storage concepts.

- 1 - Overview
- 2 - Expanded Storage Control
- 3 - Swapping and Migration to Auxiliary Storage
- 4 - Effectiveness of Logical and Expanded Storage Swaps
- 5 - Users of Expanded Storage
- 6 - Measurement and Analysis of Expanded Storage Activity
- 7 - Expanded Storage Management
- 8 - Related CA MICS Data Elements

6.4.1 Overview

Expanded storage is optional, high-speed semiconductor storage initially made available for the IBM 3090 processor series. The storage is installed in the central processor complex; that is, it is an integrated part of the complex and not a stand-alone piece of equipment.

In some respects, expanded storage can be thought of as a slower speed extension of central storage. The two differ in that expanded storage is not directly addressable and can be accessed only by moving 4 KB blocks of data from expanded storage into central storage. All data movement to and from expanded storage must be through central storage. There is no way to directly transfer data between expanded storage and auxiliary or online storage.

In other respects, expanded storage is similar to high-performance paging devices. However, the system control program knows more about expanded storage than it does about solid state paging devices, and uses this intelligence to optimize storage access, including paging and swapping operations as well as special kinds of application and system control data.

z/OS in z/Architecture mode does not support expanded storage anymore. The hiperspace APIs and internal uses of expanded storage are reimplemented to use real storage.

The primary use of expanded storage is as a substitute for auxiliary storage (page/swap data sets on DASD) in situations demanding higher speed. The time it takes to read a page from auxiliary to central storage in a well-tuned system may range from a few milliseconds (with cached DASD controllers or solid-state channel-attached devices on dedicated paging channels) to 20 to 30 milliseconds for non-cached 3380 DASD on non-dedicated channels. Indirect measurements suggest that typical times for page transfers from expanded to central storage take something less than 100 microseconds. This represents a reduction in page resolution time of approximately two orders of magnitude.

Expanded storage, therefore, adds a new level to the storage hierarchy between central and auxiliary storage. Now, page movement within the storage hierarchy can be divided into the following categories:

From	To	Terminology

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Central	Auxiliary	Page-out or swap-out
Auxiliary	Central	Page-in or swap-in
Central	Expanded	Expanded storage write
Expanded	Central	Expanded storage read
Expanded	Auxiliary	Page migration

When expanded storage was first introduced, the system control program used it exclusively for paging and swapping. New SCP versions have introduced additional uses of expanded storage, such as virtual I/O (VIO) and hiperspaces (both conventional and expanded-storage-only).

6.4.2 Expanded Storage Control

The Real Storage Manager (RSM) handles the transfer of pages between central and expanded storage. The RSM determines both whether a page will be written to expanded storage, and when a page in expanded storage should be migrated to auxiliary storage. It bases these decisions on four values:

1. Criteria age

The installation-specified time value that is used by the RSM to determine whether a page should be transferred from central to expanded storage. Criteria ages are specified for various categories of pages and workloads in the SYS1.PARMLIB member IEAOPTxx. IBM supplies default values that are reasonable for most normal processing environments.

2. System-high unreferenced interval count (UIC)

The time since the least recently referenced page in central storage was referenced. This value is therefore an inverse measure of central storage contention (a low UIC indicates a high demand for central storage). It is not possible to explicitly define a minimum value for the UIC, but it is influenced by several parameters in the IEAOPTxx member of SYS1.PARMLIB.

3. Migration age

The time that a page has remained unreferenced in expanded storage. It is an inverse measure of expanded storage contention (a low migration age indicates a high demand for expanded storage). In periods of contention, the RSM moves pages in expanded storage that have remained unreferenced for this period of time into central storage, and the auxiliary storage manager (ASM) then pages them out to auxiliary storage. This process is referred to as page migration.

4. Think time

The average delay between the time when the system is ready for new input from a terminal user and the time when the terminal user actually provides such input by pressing the "enter" key or equivalent. This value is used primarily to control logical swapping, but is also used in terminal input and output wait swapping to expanded storage.

The first value, criteria age, is specified for individual types of pages and address space by the installation (or allowed to default to IBM-specified values). The last three are measured by the system control program and will vary with the nature and volume of work being performed and with system configuration. All are specified or measured in seconds.

In paging situations, the RSM sends changed and unchanged stolen pages, virtual fetch pages, and page-out requested pages to expanded storage when the migration age is greater than the criteria age.

In swapping situations, the RSM normally sends both swap-out trim and working set pages to expanded storage when the migration age is greater than the criteria age for the type of address space in question. However, TSO terminal wait, steal, and pageout users' working sets are sent to expanded storage when the sum of migration age and UIC is greater than the sum of criteria age plus think time.

When a page is required in central storage, the RSM first checks to see if the page is in expanded storage. If it is not, a page fault is generated and the page is retrieved asynchronously from auxiliary storage by the ASM with a normal page-in operation. If the page is in expanded storage, however, a page fault is not generated and the RSM immediately transfers the page into central storage. This transfer happens synchronously with program execution. It is important to emphasize that a page fault is not generated in this case, and the expanded-to-central transfer is not considered a page-in.

6.4.3 Swapping and Migration to Auxiliary Storage

Swapping to expanded storage differs from swapping to auxiliary storage. When an address space is swapped out to expanded storage, the RSM and the System Resources Manager (SRM) divide the working set pages into primary and secondary working set groups. The primary group, which is managed by the RSM as a single entity, contains all LSQA and fixed pages, plus one page from each virtual storage segment included in the whole working set. The secondary group comprises all other working set pages not included in the primary group.

Once the address space has been swapped out to expanded storage, the RSM recognizes the difference between the primary and secondary working sets when it makes its decisions about migration. Secondary pages are migrated first, and only after all secondary pages have been migrated will the primary working set be migrated.

If the address space is swapped back in before it has been migrated, the primary working set is swapped in first, at which time the address space becomes dispatchable. Secondary working set pages are then treated the same as all other pages in expanded storage. This means that if they are migrated, they will be sent to local page data sets rather than swap data sets. If you do a substantial amount of swapping to expanded storage, this could be an argument in favor of an auxiliary storage subsystem configuration consisting only of local page data sets with no swap data sets.

6.4.4 Effectiveness of Logical and Expanded Storage Swaps

The concept of an effective swap placement decision refers to the ability of the RSM and SRM to predict the address space's future activity, allowing the swap pages to reside in the most effective storage medium. An address space can be logically swapped and remain primarily in central storage, or physically swapped either to expanded or auxiliary storage.

Logical swapping (also referred to as SRM demand swapping) is used under certain conditions in an attempt to save the processor cycles and expanded storage or I/O overhead of physical swapping. A TSO address space in a terminal wait condition or any class of address space in a long or detected wait condition is eligible for logical swapping. When this happens, the LSQA, fixed, and most recently referenced pages are kept in central storage.

A logical swap is effective only if the address space is swapped back in before being converted to a physical swap. An expanded storage physical swap is effective only if the address space is swapped back in before being migrated through central to auxiliary storage.

6.4.5 Users of Expanded Storage

Unauthorized programs cannot directly allocate or manipulate expanded storage. Rather, expanded storage is used as a system control program resource and controlled by the RSM to maximize responsiveness and throughput of the system.

The RSM categorizes expanded storage use by the type of paging group and by the status of the page being considered for placement in expanded storage. The paging group can be a:

Type 0 - Privileged or non-swappable (including all common areas) address space,

Type 1 - Any other type of page not included in types 0 or 2, or

Type 2 - A page belonging to a TSO user waiting for terminal I/O to complete, or pages paged-out or stolen from a TSO user.

The page's status is categorized as a:

Changed paged-out page
Changed swapped-out page
Changed stolen page
Unchanged paged-out page
Unchanged swapped-out page
Unchanged stolen page
Working set page ready for swap-out
Virtual fetch page
VIO swapped-out page
Hiperspace page

Different criteria ages can be specified for each combination of paging type and page status with the exceptions of virtual fetch, VIO, and hiperspace pages. These last three categories have a single criteria age specification without paging type classification differences. This allows the installation to tailor the configuration so that expanded storage usage is prioritized by the type of address spaces that are most important in the specific processor complex. Indeed, it is possible to set the parameters so that some of the combinations are eligible and others ineligible to use expanded storage.

6.4.6 Measurement and Analysis of Expanded Storage Activity

RMF measures and reports many data elements concerning paging, swapping, and memory use. Numerous metrics are provided that differentiate between paging or swapping to expanded versus auxiliary storage, and between the use of central versus expanded storage for CSA, LPA, SQA, and other pages. Obviously, expanded storage has added to the complexity of understanding and managing the storage hierarchy.

Even though well-tuned systems or systems with low storage contention are likely to experience expanded storage-related delays so small as to be relatively unimportant when compared to other sources of delay, installations with expanded storage should now monitor its utilization and activity as well as auxiliary storage activity. Expanded storage delay can become substantial to the point of significantly reducing the benefit from your investment in it.

In a system with expanded storage, the degradation due to page movement delay from expanded storage to central storage is not directly measurable. While the system control program maintains (and RMF records) the average time that it takes to read a page from auxiliary to central storage, no such estimate is made of the time it takes to transfer a page from expanded to central storage.

Page migration should be a primary concern because, if excessive, it represents ineffective page placement and ineffective use of expanded storage, just as we've already seen in swapping situations. If there is contention for expanded storage, it makes no sense to move a page from central to expanded storage if that page will eventually be moved back into central and then paged out to auxiliary. It would be much better to page it out directly to auxiliary storage.

Minimizing such ineffective page placement depends on how accurately an address space's future activity and storage references can be predicted. The RSM makes these predictions based on the criteria age values specified in the IEA0PTxx parameters for the various categories of expanded storage use.

6.4.7 Expanded Storage Management

Expanded storage can be used to reduce the response time of online systems, to increase the capacity of the processor complex, or a combination of the two. The best way of using expanded storage depends on the business and technical environment in which it is used.

Unfortunately, the mechanisms used to control expanded storage allocation do not provide for workload assignments, such as performance group or domain. It is therefore necessary to have a good understanding of the storage utilization characteristics of the individual workloads and the system as a whole before attempting to modify the criteria ages that affect expanded storage control.

There are some general guidelines that apply to all systems, however. For example, if you wish to improve the response times of online systems running as non-swappable address spaces, you could set low criteria ages for type 0 and high ones for types 1 and 2. This will favor the onlines over other work, but only if there is other work in the same system. In a system used for application development and testing with ISPF/PDF users submitting batch compiles and executions, you might want to favor type 2 over types 0 and 1. If you have a processor complex that is performing a wide variety of tasks and with changing workload characteristics over time, then it is quite possible that you would achieve both somewhat better response time and more throughput by using the default values for all criteria ages.

When making criteria age changes, keep in mind the following:

- o Assigning a low criteria age to a particular page type and status is saying, in effect, that you want the RSM to move such pages to expanded storage before other page type/status classifications even if the contention for expanded storage is high. You would do this if (a) you regard the workload owning the page as important and deserving of a performance improvement, or (b) you expect the page to be referenced quickly and want to lower the load on the ASM by making it unnecessary to page-out and then page-in the same page in a brief time period.
- o Assigning a high criteria age to pages has the opposite effect: such pages are sent to expanded storage by the RSM after page types with lower criteria ages. In periods of contention, such pages tend to go to auxiliary storage instead. You would do this if you either (a) want to use

your expanded storage resources for more important work, or (b) expect that such a page will not be referenced for a relatively long time and would be migrated to auxiliary storage anyway.

Although IBM has established reasonable default values, it is ultimately the responsibility of individual installations to set these values for best use of expanded storage. The performance analyst must monitor page movement to ensure that the specified values are optimizing the use of expanded storage for the installation's requirements. If criteria ages are set too low, expanded storage will tend to be over-utilized. This will result in a low migration age, large values for both central-to-expanded page movement, and page migration. If the difference between these two measurements is small, it could indicate that too many pages are being migrated.

6.4.8 Related CA MICS Data Elements

The variables in the CA MICS database that directly concern paging and swapping performance and expanded storage usage are the following:

Common data element:

EXTSTOR Extended Storage Indicator

Paging Activity File (SCPPAG) elements:

General:

PAGOPT SRM OPT Member

Overall storage frame counts:

PAGAVTFC Avg Page Frames in Real Storage
PAGCF Installed Frames in Expanded Storage
PAGOLE Online Frames in Expanded Storage
PAGAVES Avg Expanded Storage Frames
PAGAVF Avg Unused Page Frames

Central storage use by type (fixed and not fixed):

PAGAVLP Avg LPA Pageable Frames
PAGAVP Avg CSA+LPA Pageable Frames
PAGAVS Avg Private Pageable Frames
PAGAVT Avg Total Pageable Frames
PAGAVLF Avg LPA Fixed Frames
PAGAVC Avg CSA+LPA Fixed Frames
PAGAVR Avg Private Fixed Frames
PAGAVX Avg Total Fixed Frames
PAGAVLS Avg LSQA Fixed Frames
PAGAVQ Avg SQA Fixed Frames
PAGAVL Avg # of Fixed Frames below 16 Meg

Expanded storage use by type:

PAGAVCSE Avg CSA Pages in Expanded Storage
PAGAVLPE Avg LPA Pages in Expanded Storage
PAGAVLQE Avg LSQA Pages in Expanded Storage
PAGAVLQR Avg LSQA Pages in Real Storage
PAGAVRGS Avg Region+SWA Pages in Exp Storage
PAGAVSQE Avg SQA Pages in Expanded Storage
PAGAVSQR Avg SQA Pages in Real Storage
PAGAVHPX Avg Hiperspace Pages in Exp Stor
PAGAVVPX Avg VIO Pages in Expanded Storage

Page faults:

PAGAPF Address Space Page Faults
 PAGPIN+PAGVIN-PAGSNI

PAGPSAPF	Application Page Fault Rate
PAGPSSPF	System Page Fault Rate
PAGTPF	Total Page Faults PAGPIN+PAGVIN

PAGPSTPF	System Page Fault Rate

Page-ins:

PAGLNI	LPA Page-Ins
PAGPIN	Non-VIO Non-Swap Page-Ins
PAGPSDPG	Demand Page-In Rate
PAGSNI	CSA+LPA Page-Ins
PAGVIN	Vio Page-Ins
PAGHIN	Hiperspace Page-Ins
PAGPSHIN	Hiperspace Page-Ins per Second

Page-outs:

PAGPOUT	Non-VIO Non-Swap Page-Outs
PAGSNO	Common Page-Outs
PAGVOT	VIO Page-Outs
PAGHOT	Hiperspace Page-Outs
PAGPSHOT	Hiperspace Page-Outs per Second

Swaps:

PAGLFS	Log and Phy Swapped-Out Address Spaces PAGLES+PAGLAX
PAGSIN	Pages Swapped In
PAGSOT	Pages Swapped Out
PAGSSQ	Address Space Swap Sequences
PAGPSSWP	Swaps per Second
PAGAXD	Aux Storage Directed Physical Swaps
PAGESD	Expanded Storage Directed Phys. Swaps
PAGLAX	Aux Storage Directed Logical Swaps
PAGLES	Expanded Storage Directed Log. Swaps
PAGMIG	Physical Swaps Migrated from ES
PAGTISP	Aux or ES Terminal Input Swaps
PAGTOSP	Aux or ES Terminal Output Swaps

Expanded storage movement:

PAGAVPEA	Avg Pages Migrated from ES to Aux
PAGAVPES	Avg Pages Moved to Expanded Storage
PAGRES	Pages Read from Exp Stor
PAGPSRES	Pages/Second Read from Exp Stor
PAGVME	VIO Pages Written to Exp Stor
PAGPSVME	VIO Pages/Second Written to Exp Stor
PAGVMG	VIO Pages Migrated from Exp Stor
PAGPSVMG	VIO Pages/Second Migr. from Exp Stor
PAGVRE	VIO Pages Read from Exp Stor
PAGPSVRE	VIO Pages/Second Read from Exp Stor

PAGHME	Hiperspace Pages Written to Exp Stor
PAGPSHME	Hiperspace Pgs/Sec Written to Exp Stor
PAGHMG	Hiperspace Pages Migr. from Exp Stor
PAGPSHMG	Hiperspace Pgs/Sec Migr from Exp Stor
PAGHRE	Hiperspace Pages Read from Exp Stor
PAGPSHRE	Hiperspace Pgs/Sec Read from Exp Stor

Paging and expanded storage control:

PAGAVMA	Avg Migration Age
PAGMNMA	Min Migration Age
PAGMXMA	Max Migration Age
PAGAVUIC	Avg System High UIC
PAGMXUIC	Max High UIC
PAGMNUIC	Min High UIC

Other/composite:

PAGSPS	System Page/Swap Page Count PAGPIN+PAGPOUT+PAGVIN+ PAGVOT+PAGSIN+PAGSOT
PAGPSSPS	System Page/Swap Page Rate
PAGPMV	Total # of Pages Moved (w/in central)
PAGSPC	System Page Count PAGPIN+PAGPOUT+PAGVIN+PAGVOT
PAGPSSPC	System Page Rate
PAGSPG	Demand Page Count PAGPIN+PAGPOUT
PAGPSSPG	Demand Page Rate

Swap Activity File (SCPSWP) elements:

SWAPNAME	Swap Reason Name
SWPTOSWP	Total Swaps
SWPAXD	Aux Storage Directed Physical Swaps
SWPLAX	Aux Storage Directed Logical Swaps
SWPESD	Expanded Storage Directed Physical Swaps
SWPLES	Expanded Storage Directed Logical Swaps
SWPMIG	Physical Swaps Migrated from ES
SWPAUX	Aux Storage Total Swaps $SWPAXD+SWPLAX+SWPMIG$
SWPES	Expanded Storage Total Swaps $SWPLES+SWPESD$
SWPLSWPS	Total Logical Swaps $SWPTOSWP-(SWPAXD+SWPESD)$
SWPLSWPE	Effective Logical Swaps $SWPLSWPS-(SWPLES+SWPLAX)$
SWPNPSWP	Effective Log or Expanded Storage Swaps $SWPTOSWP-(SWPAXD+SWPLAX+SWPMIG)$
SWPPCMIG	Pct Phys Swaps Migrated from ES $SWPMIG/(SWPLES+SWPESD) * 100$

SWPPCLSE	Pct Effective Logical Swaps
	SWPLSWPE/SWPLSWPS * 100
SWPPCLST	Pct Logical Swaps
	SWPLSWPS/SWPTOSWP * 100

6.5 RMF LCU Summarized File

The Logical Control Unit (LCU) Activity File in CA MICS provides a single, convenient location for summarized input/output configuration-related measurement data. The LCU file consolidates RMF data that is spread across several CA MICS files for improved usability and understanding of the I/O subsystem measurements.

The LCU summarized file in CA MICS is created from the DAYS level versions of the following files, summarized to the LCU level:

HARDVA - Device Activity File
SCPLCA - Logical Channel/Channel Path Activity File
SCPIOC - I/O Queuing Configuration File

It contains all of the information related to configuration dependent delays, summarized in one convenient file for reporting and analysis.

The summarized DVA information in the LCU file can be used to quantify configuration-dependent delays. The summarized IOC information in the LCU file provides data on the physical I/O configuration itself. The summarized device utilizations are provided in the LCU file and can be distributed across the configuration. Information on device selection failures due to configuration-dependent delays is also provided.

I/O configuration tuning involves changes to the I/O configuration to minimize the amount of delay time associated with configuration-dependent queuing. In a well configured system, channels, control units, heads of string and device activity are distributed across the I/O workload to minimize the delays. RMF directly measures device and channel activity, but control unit and head of string activity must be derived from the basic measurements.

Devices are known to RMF only by their logical addresses, or device numbers. However, there is information on the physical configuration at the logical control unit level in the SMF type 78 (Monitor I Activity) record subtype 3. The IOC file of CA MICS, for instance, contains information on the channels that are attached to each LCU, as well as the physical control units that are attached to these channels. In addition, control unit and head of string utilizations can be derived from other measurement data by distributing the connect time for devices across the heads of string and

physical control units to which they are attached.

I/O processing has been largely offloaded from the host system to a dedicated channel subsystem. This hardware facility is called the I/O Processor (IOP).

During Initial Microprogram Load (IMPL), the channel subsystem reads the I/O Configuration Data Set (IOCDS) generated by the I/O Configuration Program (IOCP). This file describes the I/O configuration in detail, including information related to the channel paths and physical addresses of all devices connected to the system. This information is mapped to control blocks in a reserved area of main memory (the Hardware System Area, or HSA) that is used to manage the communication between the channel subsystem and the host.

An I/O request that is initiated on the host is passed to the channel subsystem via a Start Subchannel (SSC) instruction, referencing a logical device number. The channel subsystem converts the device number to a physical address and determines the paths to the device. The channel subsystem is responsible for initiating the I/O request over one of the available paths. It also provides measurement data directly on the I/O event.

I/O request scheduling, queuing, and measurement are focused on what is known as the logical control unit, or LCU. An LCU represents one to eight physical control units sharing common devices. Logical control units are defined by the IOCP based on the specifications of devices and control unit connections. Each physical control unit is assigned to one (and only one) logical control unit at that time. At the device level, the LCU specification is also unique.

Once the channel subsystem is notified of an I/O request, it begins timing the operation, and maintains timers for pending time, connect time, and disconnect time.

The first step of initiating the I/O operation is the establishment of a path to the device or device selection. The channel subsystem continuously polls the LCUs to determine if any new I/O requests have been made for the devices that are attached to the LCU. If so, the LCU is placed on the channel subsystem initiative queue. All of the time between the SSC request and the successful initiation of the I/O request (establishing the path to the device), is measured and maintained as pending time.

If the device is busy from another system, or the head of string or control unit attached to the channel path is busy, then initial selection fails and the request must be requeued. If device busy was detected, then the operation is deferred until a signal (Device End) is received from the device indicating that it has completed its prior operation: the source of contention at the device level has been relieved. If control unit busy is detected, the channel subsystem will attempt another path.

The channel subsystem counts the number of selection attempts and keeps track of the delay reasons. These data are available at the LCU level. The delay reason is associated directly with the active device, with pending time broken into component parts for delays that are due to control unit and device busy conditions. The delay reason counts are reported only at the individual device level, and not for the LCU.

Pending time also includes delays associated with queuing for the IOP or the channel path, or contention within the LCU itself. Once the I/O is successfully started, the channel subsystem keeps track of the amount of time that is used to complete the I/O request, dividing the I/O service time into time spent where only the device is busy (disconnect time) and time where the device, control unit, and channel are all busy (connect time).

The sections below detail the following:

- 1 - I/O Queuing in the I/O Processor
- 2 - Sample Data Elements in the RMF LCU Summarized File

6.5.1 I/O Queueing in the I/O Processor

The I/O processor, in addition to monitoring the status of the I/O configuration, is also responsible for starting and redriving queued I/O requests. Each IOP has one initiative queue, which is continuously scanned in an attempt to handle active I/O requests. When requests are blocked due to contention, the IOP temporarily removes them from the initiative queue rather than continuing to redrive them.

If the contention is for a device, the request is deferred until the IOP receives notification (device end) that the busy condition has subsided.

If the contention is for the control unit, the IOP places the LCU that is requesting service on the control unit header (CU-HDR) queue. A request is placed on this queue when all paths to the device are busy and at least one path to the physical control unit is busy. Once the contention is resolved, the IOP requeues the request from the CU-HDR back to the IOP initiative queue. The length of the CU-HDR queue, consequently, is a measure of contention at the control unit level.

6.5.2 Sample Data Elements in the RMF LCU Summarized File

The LCU file is created from the HARDVA, SCPIOC, and SCPLCA files. Since some of the data elements are computed from RMF sample counts, and the sample counts from the source files vary, two separate sample count data elements are stored in the LCU file:

LCURSMPD is the RMF sample count from the HARDVA file
LCURSMPL is the RMF sample count from the SCPLCA file

The CA MICS Summarization Facility uses the appropriate data elements when resummarizing LCU data elements. However, if calculations are performed manually, it is important to know which total to use.

The following data elements are affected by or related to RMF sampling. Read the data dictionary entries for these elements before attempting to perform calculations with them.

From the HARDVA file:

LCUALC - Device Allocated
LCUAVDSO - Average Data Sets Open on Device
LCUAVIOS - Average Device IOS Queue Time
LCUAVQUE - Average Requests Queued
LCUAVRES - Average Device Response Time
LCUDSO - Data Sets Open on Device
LCUICT - Number of Invalid Samples
LCUMPT - Mount Pending Condition
LCUNRD - Device Not Ready
LCUPCALC - Percent Device Allocated
LCUPCMTP - Percent Mount Pending Condition
LCUPCNRD - Percent Device Not Ready
LCUPCRSV - Percent Device Reserved
LCUPCUTL - Percent Device Utilized
LCURSMPD - RMF Sample Count (from DVA)
LCURSV - Device Reserved
LCUUTL - Device Reserved and Idle

From the SCPLCA file:

LCURSMPL - RMF Sample Count (from LCA)

6.6 Notes on RMF Samples

Many statistics are recorded by RMF in the form of a count of samples when a particular condition is true. The total number of samples taken are used to calculate averages and percentages based on these sample count statistics.

For example, to gather statistics about input/output devices, RMF periodically scans each Unit Control Block (UCB) of eligible I/O devices to determine the state of each one. Along with other indicators, there is a bit indicator (UCBALOC) in the UCB which, when set, indicates that the device is currently allocated. RMF then reports the number of times when this bit was set during the measurement interval in field SMF74ALC of the Device Activity Record. The total number of times that samples were taken from field SMF74ALC must be known to determine the percentage of time when a particular device was allocated by using the following formula:

$$DVAPCALC=(DVAALC*100)/DVARSMIP;$$

Where

DVAPCALC = Percent Device Allocated
DVAALC = Number of Samples When UCBALOC Was Set
DVARSMIP = Total Number of Samples Taken During the
Measurement Interval

The following sections detail the various issues associated with RMF samples counts:

- 1 - Names and Presence of RMF Sample Count Elements
- 2 - Skipped Samples
- 3 - Number of Samples and Statistical Validity
- 4 - Sample Count Differences and Merging Files

6.6.1 Names and Presence of RMF Sample Count Elements

Every CA MICS RMF data base file that contains sample count statistics in this form has a data element that contains a count of total samples taken. The name of the data element is fffRSMP, where "fff" is the file identifier, such as "DVA" for the Device Activity File used in the example above.

The following sections provide more detail.

- 1 - Derivation of RMF Sample Counts
- 2 - Exceptions to the Normal Derivation of Sample Counts
- 3 - Special Cases

6.6.1.1 Derivation of RMF Sample Counts

The fffRSMP data element is normally read directly from field SMFnnSAM in the RMF Product Section of the RMF record, where "nn" indicates the SMF record types listed below:

- o Type 70 - CPU Activity Record, used to create CA MICS file HARCPU
- o Type 71 - Paging Activity Record, used to create CA MICS file SCPPAG
- o Type 73 - Channel Activity Record, used to create CA MICS files HARPCA and SCPLCA
- o Type 74 - Device Activity Record, used to create CA MICS files HARDVA and SCPLCU
- o Type 75 - Page/Swap Data Set Activity Record, used to create CA MICS file SCPPSD

6.6.1.2 Exceptions to the Normal Derivation of Sample Counts

For type 76 Trace Activity records, whose information is stored in the SCPTRC file, the derivation depends on the RMF trace options. These options are specified for each SYSID in member RMFOPS in sharedprefix.MICS.PARMS, and may take on the following values:

- o INTVL - Create one observation for the measurement interval, with the value of TRCTYPE="I."
- o SET - Create one observation for the measurement interval, with the value of TRCTYPE="I," and one observation for each sample set in the record, with the value of TRCTYPE="S."
- o NONE - Do not write an observation for this SYSID.

If the entire sample set is recorded (option SET), the value of TRCRSMP is the number of samples in the set, usually 60. Only the interval value is recorded (option INTVL). The value of fffRSMP is derived in the same manner as the other RMF records.

Reference: CA MICS Hardware and SCP Analyzer guide, section 7.3.1.

6.6.1.3 Special Cases

The SCPLCU file is created by summarizing observations from the SCPIOC, SCPLCA, and HARDVA files. This poses special problems with keeping track of sample counts. There are no RMF sample data elements in the SCPIOC file, but the counts of the summarized observations from the SCPLCA and HARDVA files that are used to create an observation in the SCPLCU file will be different. Since each is needed for calculating derived elements, two separate counts are maintained.

- o LCURSPD is the sum of all occurrences of DVARSP found during summarization.
- o LCURSMPL is the sum of all occurrences of LCARSMP found during summarization.

The derived element code for the SCPLCU file uses the proper sample count data elements in each of its calculations.

6.6.2 Skipped Samples

The field SMFnnFLA in the RMF Product Section contains a bit indicator, SMFnnISS, which, when set, means that RMF has not taken samples for every cycle during the measurement interval ("nn" is the record type, and may be from 71 to 79; the type 70 CPU Activity record does not have this indicator). Except for the type 71 Paging Activity Record (discussed later), there is no reason given for the skipped samples. The data elements "ffffRSMP" will contain the actual number of samples taken, so that calculations will continue to be accurate, even if less statistically significant.

Many files in the CA MICS database that contain RMF sample data elements also contains information on skipped samples. In the DETAIL timespan, the data element fffISS contains the value "Y" if samples were skipped during the RMF interval, or "N" if not. In all timespans, the data element fffISSCT contains the number of RMF intervals with skipped samples that were used to create the summarized observation (in the DETAIL timespan, fffISSCT will have the value of 0 or 1). The only exception to this is the HARCPU file because the type 70 Record does not have a skipped samples flag.

The type 71 Paging Activity Record contains not only the SMF71ISS flag, but also two fields recording the number of samples skipped due to negative calculations or count failures. These are recorded in the SCPPAG file as data elements PAGSKNEG and PAGSKCNT, respectively. These skipped samples only affect values describing private or CSA+LPA fixed-frame allocations, and not any other data elements in the SCPPAG file. The affected elements are:

PAGC PAGAVC PAGMNC PAGMXC
PAGR PAGAVR PAGMNR PAGMXR

For convenience, a data element whose value is equal to the normal total sample count less samples skipped has been added to the SCPPAG file. This data element, PAGRSMP2, is calculated by means of the formula:

$$\text{PAGRSMP2} = \text{SUM}(\text{PAGRSMP}, (-\text{PAGSKNEG}), (-\text{PAGSKCNT}));$$

6.6.3 Number of Samples and Statistical Validity

The number of RMF samples that will be present in a database observation is determined by the sampling rate, the length of each measurement interval, and the number of intervals in the observation. The sampling rate is determined by the CYCLE statement, and the interval length by the INTERVAL statement. Each is specified in the RMF control member ERBRMFnn in the system parameter library SYS1.PARMLIB ("nn" default is "00"). Each RMF file in the CA MICS database contains common data elements that provide this information:

- o CYCLETM - The length of an RMF cycle, in seconds.
- o DURATION - The length of the measurement interval. In the DETAIL timespan this is the length of an RMF interval. In higher timespans, it is the total duration of all intervals that were in the summarized observation.
- o INTERVLS - The number of RMF intervals. In the DETAIL timespan, this is always 1. In higher timespans, it is the total number of RMF intervals that were in the summarized observation.

The number of samples expected in an observation in any timespan is equal to DURATION/CYCLETM. However, in the summarized file HARDTA, fffRSMP is set to the value of all fffRSMP occurrences in ALL the records that are being summarized. For example, DTARSMP in a single HARDTA record is the sum of DVARSMPS for each of the HARDVA records for that time interval and devices of that type. For this reason, fffRSMP may be much larger than DURATION and CYCLETM would predict.

The statistical confidence that you have in a measurement is related to the number of samples from which it is derived. There is a short discussion of this subject in the section "INTERVAL and CYCLE Options" in the RMF User's Guide.

The value of the fffRSMP field should be used whenever you perform calculations to determine percentage or average values from the raw sample counts that were processed into a CA MICS file. This avoids the taking of the "average of averages" when measurements do not include the same number of samples.

6.6.4 Sample Count Differences and Merging Files

It is absolutely necessary to use the fffRSMP data elements whenever files are combined by means of the MERGE With BY facility in SAS, and calculations are then made based on sample counts.

DO NOT USE the data element SAMPLES. Due to skipped samples, the value of the common data element SAMPLES in different files may vary in records covering the same period of time. Since the value of any SAS variable whose name is found in more than one input file is determined by its value in the last input file found in the MERGE statement, the ability to recompute sampled statistics for data elements in other than this last file is lost.

With the use of the fffRSMP data elements, whose identity and value are not lost during the MERGE, these computations are possible. Be sure to use the correct one: the file prefix of both the measurement and the sample count data elements must match.

6.7 z/Architecture Highlights

The z/Architecture allows full 64-bit real and virtual storage support. Used in conjunction with the Intelligent Resource Director (IRD), it is intended to eliminate bottlenecks associated with the lack of addressable memory, and dynamically manage the system resources to priority workloads.

Since the immediate benefit of z/Architecture implementation can be realized in the storage management area by the elimination of the overhead of Central to Expanded pages movement and ESA/390 2GB real storage constraint relief, the following sections will focus on these two topics:

- 1 - Support for 64-bit Real Storage
- 2 - Removal of Expanded Storage

6.7.1 Support for 64-bit Real Storage

z/Architecture eliminates the overhead of moving data into and out of expanded storage by providing full 64-bit real storage addressing. Instead of arbitrarily partitioning memory into real and expanded regions, data centers will be able to run a single system and have the full amount of installed memory available as real storage eliminating paging to expanded storage.

Real storage management changes in z/Architecture mode include:

- Non-fixed pages (including DREF) can be backed anywhere in real storage
- Nucleus, SQA and LSQA (except DREF) will be backed below 2 GB
- Paging I/O is done directly to/from any real frame
- VIO uses frames above 2GB
- Swap page data sets, duplexing of PLPA and common page data sets, and virtual fetch are no longer supported
- Expanded storage support is removed. The hiperspace APIs and internal uses of expanded storage are reimplemented to use real storage

6.7.2 Removal of Expanded Storage

z/OS in z/Architecture mode does not support expanded storage anymore. In order to retain support for applications that use these services, hiperspace and VIO pages are now in real storage. SRM has to make a placement decision for these pages between real and auxiliary, as opposed to between expanded and auxiliary in ESA/390 mode. Instead of basing this decision on the expanded storage migration age, the system high UIC is compared to the criteria table value of the page type (Hiperspace or VIO). If the high UIC is less than this value, the page is put in real storage. Otherwise it is sent to auxiliary storage.

There is a performance concern related to frame queues growing much larger than in ESA/390 environment. Changes to UIC Steal and Update have been required so that the CPU cost of these functions does not impact other functions in the system. Previously, the UIC interval was 1 second, meaning that when a frame's UIC value was increased by 1, it represented 1 second when the frame was not referenced. In z/Architecture mode, the UIC increment has been increased to 10 seconds to reduce the overhead of the UIC Update.

Also, z/Architecture introduces a new storage "line": the 2-gigabyte line. As systems grow much larger than 2 GB, the area between 16 MB and 2 GB becomes a scarce resource, and there will probably always be applications with a dependency on real in this range. This is why these regions are managed as a separate resource when SRM detects pageable frame shortages. The logic is driven by new SRM counts of frames between 16 MB and 2 GB.

6.8 PR/SM LPAR Concepts

System Management Facility (SMF) records created by IBM's Resource Measurement Facility (RMF) contain measurements in support of the Processor Resource/Systems Manager (PR/SM) feature when operating in Logical Partition (LPAR) mode. The information characterizes the activity of logical partitions defined in the PR/SM complex, making it possible to analyze PR/SM LPAR mode effects on processor and system activity.

The CA MICS Hardware and SCP Analyzer contains many measurements and status indicators describing PR/SM LPAR operations.

The following sections discuss various aspects of the PR/SM feature as well as the relationships between IBM's RMF measurements and the CA MICS Hardware and SCP Analyzer files and data elements.

- 1 - Introduction
- 2 - How PR/SM Works
- 3 - Support of PR/SM LPAR Mode by RMF
- 4 - Interpreting PR/SM Data
- 5 - Data Analysis

6.8.1 Introduction

The PR/SM feature is an intermediate step between physical (or hardware) partitioning, such as the reconfiguration of a 4-processor system into the equivalent of two separately IPLable 2-processor systems, and software partitioning, as implemented in the Virtual Machine Facility (VM).

PR/SM allows multiple Operating System Control Programs (SCPs), such as z/OS or z/VM, to share the facilities of a single central processor complex (CPC) or one side of a physically partitioned complex. The PR/SM hardware can be used by two IBM products: a microcode feature called Logical Partitioning Mode (LPAR) and Virtual Machine Facility Multiple Preferred Guest. The PR/SM hardware can support either of these two products, but not both simultaneously. This is because the CPC or physical partition must be reinitialized to switch from one mode to the other.

This chapter addresses only LPAR mode operations.

The processor, storage, and I/O resources of a PR/SM-equipped processor complex can be divided and allocated to several logical partitions, which can then be IPLed and operated independently of each other. Up to sixty partitions per physical partition are allowed. Further on in this chapter, the terms CPC and complex are used interchangeably, and refer to one half of a physically partitioned complex as well as the entire complex.

SCPs that are supported for operations in a complex initialized in LPAR mode are:

- o z/OS
- o z/TPF
- o z/VM
- o Linux on System z
- o z/VSE

6.8.2 How PR/SM Works

When a partition is defined, its channel paths are assigned and dedicated. They cannot be shared by other partitions. If the partitions are executing SCPs that support the ability to vary channels offline and online, a channel may be varied offline in one partition, reassigned to another, and then be varied online. However, channel paths can be shared across multiple logical partitions either using Multiple Image Facility (MIF), or by defining managed channels in a Dynamic Channel-Path Management (DCM) environment.

Storage (both central and expanded) is also dedicated; it cannot be shared between nor accessed in any way by other partitions. When PR/SM LPAR was originally introduced, in order to change a logical partition's storage allocation, it was necessary to modify the partition definition, deactivate it, reactivate it, and then re-IPL the partition. IBM has subsequently made it possible to reconfigure storage dynamically.

A partition can be defined with up to the number of physical processors in the processor complex, minus the total number of dedicated processors, if any. Within a single complex it is possible to mix dedicated and shared processors, assuming sufficient central processors exist. For any partition with more than one defined logical processor, however, all of them must be dedicated or all must be shared.

The LPAR dispatcher allocates processor resources by assigning central processors to logical processors as needed by the active partitions. If the total demand of active partitions is less than the total resources of the complex, there is normally no limit placed on the availability of central processors to any partition other than the limit implied by the number of logical processors defined for the partition: there can never be more central processors allocated than the number of defined logical processors. When demand exceeds supply, however, the dispatcher prioritizes central processor allocations based on partition weight values specified when the partitions were defined. (This weighting can be modified dynamically by an authorized operator.)

Subsequent to the earliest versions of PR/SM LPAR, IBM added the option of partition capping. This option is used to impose a maximum limit on the amount of dispatch time allowed for a particular partition, even during periods with no

contention for processor time. This limit is based on the processor weights of the active partitions in the same way as it is done during periods of processor contention.

IBM further enhanced resource management across logical partitions, by introducing its Intelligent Resource Director (IRD), running on zSeries models with the z/OS operating system.

A partition's LP is dispatched by means of time slicing. Normally, the duration of the time slice is determined dynamically by the LPAR microcode and is based on the total number of non-dedicated central processors and the number of active shared LPs. The duration of a time slice can range from a minimum of 12.5 milliseconds (ms) to a theoretical maximum of 300 ms. A logical processor will remain dispatched until either the time slice expires or the SCP running in the partition attempts to place the LP in the wait state. When this happens the central processor will be made available to another logical processor if one is ready with work and has a higher processor weight, or for LPAR management functions.

This control can be overridden by the console operator or system programmer by means of enabling the wait assist feature and setting a fixed time slice. When this is done, the LPAR dispatcher will not undispach the LP when it goes into the wait state, but instead leaves the central processor under the partition's control for the entire duration of the time slice. In addition, if wait assist is enabled, the processing weights are always in effect, whether or not there is any processor contention.

A note on terminology: in IBM and other documentation, two terms, Wait Assist Enabled/Disabled and Wait Completion Yes/No are used. They have the same meaning. For simplicity's sake, in this guide we will use the terms Wait Enabled or Wait Disabled.

PR/SM LPAR resource management exacts a price: the LPAR feature itself uses some of the processor resources that it is managing and allocating on behalf of the logical partitions. This is referred to as LPAR management time. This "overhead," usually quite small, is directly related to the ratio of active logical processors to the number of physical processors under LPAR control and to the logical processor dispatch rate.

The use of dedicated processors reduces this overhead to as

low as 0.1 percent. This is so low that in some circumstances it is possible to use LPAR mode to increase rather than decrease the throughput of a PR/SM-equipped complex. Since the overhead involved in managing, coordinating, and synchronizing multiple processors by a single SCP can be substantial, reducing or eliminating multiple central processors can result in significant savings of processor resources. If several workloads currently supported simultaneously within a single multiple-processor system can be divided into multiple single-processor logical partitions with dedicated processors, up to a 10 percent increase in overall throughput is possible.

An additional advantage of dedicated processors is the improvement in the utilization of the processors' high speed cache. Cache management of dedicated processors continues uninterrupted. Dispatching a shared LP causes the physical processor to experience a brief period when it has to wait longer for instruction and operand fetching from main memory until the cache is filled again.

Another way to reduce the LPAR overhead, is to use the LPAR Vary CPU function of the Intelligent Resource Director. This facility allows the Workload Manager (WLM) to dynamically vary offline unneeded CPUs, maximizing the efficient use of the available central processor resources.

With the Intelligent Resource Director (IRD), the LPAR interaction within a CPC is not only driven by the relative weights of each partition, but also by the LPAR capacity (in terms of service units) and by the importance of workloads running in each partition. The available CPU resources are now dynamically distributed based on these criterias.

The following sections will introduce the two important functions of the IRD affecting fundamental measurements of logical partitions utilization:

- 1 - Introduction to LPAR CPU Management
- 2 - Introduction to LPAR Soft-Capping

6.8.2.1 Introduction to LPAR CPU Management

Basically, the z/OS Intelligent Resource Director (IRD) helps data centers move resources to where the workloads need them (even in different logical partitions). IRD combines the powers of three elements: Workload Manager (WLM), Parallel Sysplex, and PR/SM. It consists of three separate functions: dynamic channel path management (DCM), channel subsystem I/O priority queuing, and WLM LPAR CPU management.

The rest of this chapter focuses on this last function of the IRD, as it is the only one that directly affects RMF measurements related to CPU utilization in a PR/SM context.

LPAR CPU management, available for LPARs with shared processors, consists of two parts:

- o WLM LPAR weight management, which dynamically adjusts the relative weights of logical partitions to help workloads that are missing their goals.
- o WLM LPAR Vary CPU management, which dynamically adjusts the number of online (actually assigned) logical processors in a partition, so that the CPU resource available to the LPAR matches the capacity required.

For an LPAR to be a candidate for WLM LPAR CPU management, it must:

- o Be running z/OS in z/Architecture (64-bit) mode
- o Be running in LPAR mode on an IBM System z
- o Be using shared standard CP processors
- o Not be hard capped
- o Be in WLM goal mode
- o Be in a parallel sysplex

WLM LPAR CPU Management functions occur within an LPAR cluster, which is a set of logical partitions running on the same CPC and belonging to the same parallel sysplex. Other LPARs (outside of the cluster) are not affected.

- 1 - WLM LPAR Weight Management
- 2 - WLM LPAR Vary CPU Management

6.8.2.1.1 WLM LPAR Weight Management

In an LPAR environment, access to central processors is based on the active partitions' relative weights. When an LPAR is not managed by WLM, its processing weight is set when the partition is defined and can be modified at any time by the console operator. The problem is, that, if the workload mix changes, weights would have to be manually adjusted in order to optimize the CPU resource utilization. This would require 24/7 human monitoring of the workload performance, as well as an outstanding ability to anticipate workload variations, not an easy task in the new eBusiness world. Alternatively, you could configure enough capacity to handle peak periods, but, outside of these periods, the excess capacity goes unused, and, therefore, is lost.

With WLM LPAR weight management, the relative shares of the participating partitions will be automatically adjusted, so that the LPARs hosting the most important workloads, based on WLM policy, get the necessary CPU resources.

This process occurs within a set of partitions, explicitly defined as being managed by WLM, an LPAR cluster, and the total weight of the cluster remains constant. This way, LPARs outside of the cluster, are not affected.

6.8.2.1.2 WLM LPAR Vary CPU Management

This function allows WLM to dynamically vary unneeded standard CP processors offline. It means that, from RMF perspective, a standard CP processor can actually be online to a partition for only a portion of its recording interval, instead of the complete interval duration as before. The immediate impact of this capability is that, for WLM managed logical partitions, the reported number of standard CP processors for an LPAR is not the number of defined processors anymore, but the number of online (in fact, actually assigned by WLM) standard CP processors. This value can be fractional.

But, the most important change is in the definition of the "CPU Time," and hence, the way CPU busy calculations are performed:

Before IRD:

CPU Time = Interval Time - Wait Time

and

$$\text{CPU (\%)} = \frac{\text{CPU Time}}{\text{Interval Time} * \text{No. Processors}} * 100$$

After IRD:

CPU Time = Online Time - Wait Time

and

$$\text{CPU (\%)} = \frac{\text{CPU Time}}{\text{Online Time}} * 100$$

The SMF type 70 subtype 1 CPU Activity record provides the time, within the RMF interval, when a processor was online to the logical partition (SMF70ONT). From CA MICS perspective, all data elements representing online times come from this raw field, which is always available, whether the LPAR is managed by WLM or not.

6.8.2.2 Introduction to LPAR Soft-Capping

Workload charging enables data centers to use both hardware and software to manage costs and system capacity: customers determine the portion of processing capacity needed to run their workloads; and, for the selected products used to run these workloads, charges are based on a site-defined capacity, rather than on the entire CPC capacity.

The measurement unit used to define and monitor an LPAR capacity is the MSU (millions of service units per hour), which is calculated as follows:

$$\text{MSU} = (\text{su/sec} * \text{Nb\_of\_CPs} * 3600) / 1000000$$

where su/sec is the physical CPU adjustment factor. Its value does not correlate to the adjustment factor from the SMF type 72 Workload Activity record. The value in the type 72 record is based on the number of logical processors assigned to the partition. In the type 70 record, it is based on the number of physical processors in the CPC and is constant from LPAR to LPAR.

It is important to understand that, depending on the way you size your logical partitions, both software charges and system performance will be impacted. When under WLM control, the system will continuously monitor the actual MSU consumption of an LPAR, and, depending on the LPAR size, will restrict the partition from using more CPU resource than its allowed capacity.

The method of assigning a defined capacity to an LPAR, also called a soft cap, overcomes the traditional capping methods limitations. It also allows spikes in your workload: when an LPAR has a defined capacity, the Workload Manager (WLM) compares this limit to the average MSUs consumed during a four-hour rolling interval. As long as the four-hour rolling average stays below the defined capacity limit for the LPAR, utilization is allowed to spike. As soon as this average rises above the defined capacity limit, WLM restricts the partition from using more CPU resource than its defined capacity limit, and the LPAR remains capped (restricted) until the four-hour rolling average drops below the defined capacity limit.

This is the recommended method for setting up Variable Workload License Charges (VWLC) for a product: charges are based on the defined capacity; spikes in your workload, up to the total LPAR size, are allowed. However, correctly

sizing your LPARs capacity limits (and hence, your ability to achieve savings on software license charges by tailoring your license certificates) requires the tracking of your peak four-hour rolling average values as well as the WLM capping percentage.

If the peak value is constantly lower than the defined limit, you may consider decreasing the LPAR capacity until WLM begins capping the partition (a capping percentage of 1% to 5% ensures the work is done optimally at the lowest cost). Capping affects all workloads running in the partition and can result in elongated response times and generally unacceptable performance.

If the peak value exceeds the defined capacity for long periods (high WLM capping percentage reported), you may consider increasing the LPAR capacity limit until the WLM capping percentage falls to within an acceptable range.

If the peak value occasionally exceeds the defined capacity (low WLM capping percentage), you may consider shifting some workloads to a time of day when the LPAR is less busy.

Ideally, your peak value should always be as close as possible to the defined capacity, without exceeding it, while your WLM capping percentage should always be near to zero.

6.8.3 Support of PR/SM LPAR Mode by RMF

All RMF records, at least to a small extent, contain PR/SM information. Records other than the type 70 subtype 1 CPU, PR/SM, and ICF Activity record have been modified to add both an indicator that RMF was running in a logical partition and the assigned partition number. All substantive changes have been confined to the type 70 subtype 1 record. One minor exception is the type 79 subtype 3 (Monitor II SRCS) record: processor utilization, usually a value between 0 and 128, has a value of 32,767 (hexadecimal 7FFF) when true utilization is not available in a PR/SM LPAR environment.

The rest of this chapter details the structure of the SMF type 70 subtype 1 CPU, PR/SM, and ICF Activity record.

As with many SMF records, the data contained in the SMF type 70 Subtype 1 CPU Activity record is presented in separate sections, with the separate sections providing information specific to CPU, PR/SM, and ICF activities. An initial record header contains such information as system ID, record type, and the date and time the record was written. Also in the header are triplets identifying the subsequent sections. A triplet comprises the length of a section type, the location of the first one, and how many of them there are. The type 70 subtype 1 record contains seven sections:

- o RMF Product Section (1 per record)
- o CPU Control Section (1 per record)

The use of control and data sections is common in RMF records. Typically, the control section contains information that does not need to be recorded more than once or is needed to properly process the data sections.

- o CPU Data Section (1 per processor)
- o ASID Data Section (1 per record)
- o PR/SM Partition Data Section (1 for each defined partition)

This section, sometimes referred to as the PR/SM or LPAR Control Section, contains logical partition identification and status information and provides for quick location of measurements of activity of the individual logical processors defined for the partition.

- o PR/SM Logical Processor Data Section (1 for each logical processor in each configured partition)

This section, sometimes called the PR/SM or LPAR Data Section (as opposed to the PR/SM Control Section described previously) contains individual logical processor information.

- o CPU Identification Section (1 per unique CPU type)

Processors are configured either as standard CP processors (CP) or as special purpose processors. The special purpose category includes the following types of engines: Internal Coupling Facility (ICF), Integrated Facility for Linux (IFL), Application Assist Processor (zAAP), and Integrated Information Processor (zIIP).

Starting with the IBM System z9, ICFs, IFLs, zAAPs, and zIIPs are defined and managed separately.

It is important to emphasize that the two PR/SM sections contain information about ALL logical partitions, not just the one from which the RMF records are written. If multiple partitions are active in the complex, each one can record the activity of the others. Furthermore, if the type 70 subtype 1 records from such multiple active systems are analyzed together, care must be taken to avoid duplication.

If LPAR management time reporting is in effect, an extra logical partition with the name of PHYSICAL is included in the measurement data. This partition is not included in the count of defined partitions in IBM's RMF Post Processor CPU and Partition Data report.

6.8.4 Interpreting PR/SM Data

The study of activity in a PR/SM LPAR complex is significantly different from the study of activity in non-LPAR systems. The information contained in the type 70 subtype 1 records makes it possible, not only to look at activity within an individual LPAR, but also to look at the utilization levels of the PR/SM LPAR complex as a whole, and to compare the activity of multiple partitions executing concurrently within a single complex so as to understand the nature of interactions between them.

By combining all the information available in the type 70 subtype 1 record, it is possible to accurately characterize the work being done by a system within a logical partition. This can be done by matching the partition number recorded in the RMF Product section of the record with the partition number in the PR/SM Partition Data section, and then matching the processor addresses in the CPU Data sections with the logical processor addresses in the PR/SM Logical Processor Data sections that pertain to the partition being examined. (Remember that, although there is a match between the CPU and logical processor addresses, there is no correspondence between these addresses and the actual hardware central processor addresses.)

With all of the data elements that compose these sections available at one time, logical processor utilization can be determined regardless of the wait assist status.

The following sections will help to understand the meaning of key measurements:

- 1 - Meaning of "Dispatch Time"
- 2 - Meaning of "CPU Busy" and "CPU Wait"
- 3 - Logical Partition Interaction

6.8.4.1 Meaning of "Dispatch Time"

The PR/SM Logical Processor Data section contains the single most important measurement needed to analyze PR/SM LPAR system activity: dispatch time.

Total logical processor dispatch time is the sum of the time intervals during which the logical processor was dispatched on a physical processor. Total dispatch time includes LPAR management time that is attributable to the specific partition. If LPAR management time reporting is in effect, effective dispatch time is also reported in this section. Effective dispatch time does not include LPAR management time. The difference between total and effective dispatch time is the LPAR overhead.

It is important to understand the meaning of the word "dispatch" in the PR/SM LPAR sense (the meaning is not the same as when it is used to describe address space activity within the system). LPAR dispatch time is accumulated when the logical processor is available for use by the partition, regardless of whether the processor is actually busy. This time includes wait time if wait-assist is enabled and a fixed-time-slice value is specified.

In other words, logical processor dispatch time is CPU busy time only if wait-assist is disabled. If it is enabled, you must subtract the value of the CPU wait time recorded in the CPU Data section from this dispatch time in order to arrive at CPU busy time.

Also important to understand is that there is no permanent correspondence between logical processors and physical processors except for the brief duration of a time slice, because a ready logical processor can be dispatched on any available central processor. RMF may be accumulating measurements for what it regards as CPU 1, but the actual address of the central processor assigned as CPU 1 may be any of those available at the time.

Individual central processor utilization levels in a PR/SM LPAR complex cannot be calculated from RMF data. However, by adding the dispatch times from all of the active logical processors in the complex, it is possible to calculate complex-wide utilization, or average processor busy.

Each PR/SM Logical Processor Data section also contains the logical processor address and the wait-assist status. The LP

address is essential when calculating processor utilizations for wait-enabled partitions because, while the dispatch time is recorded in the logical processor section, processor wait time is recorded in the CPU Data section. The wait-assist status is available in the form of a bit within a status byte that also contains indications of a change in the wait-state status or processor relative share within the measurement interval.

The processor relative share represents a mechanism for allocating processor resources in a CPC during periods of high utilization and contention, or when partition capping is in effect. It is a dimensionless number, the absolute value of which is meaningful only when compared to the relative share value of the other active logical partitions in the complex. If a partition has dedicated processors, the recorded value of the processor relative share is 65,535 (hexadecimal FFFF).

6.8.4.2 Meaning of "CPU Busy" and "CPU Wait"

From the point of view of z/OS running in a logical partition, CPU busy time is the sum of the durations of the periods during which the logical processor is actually executing instructions. For shared processor wait-disabled partitions, this is equal to the PR/SM dispatch time. For wait-enabled partitions, however, CPU busy time is equal to the dispatch time minus the CPU wait time recorded in the CPU Data section.

From the point of view of the entire complex, on the other hand, central processor utilization does not depend on the wait assist status. If a logical processor is dispatched, the central processor it uses is unavailable for other use, whether it is actually executing instructions or is in the wait state. The amount of time during which the central processor is unavailable to other partitions or for LPAR management functions is equal to the dispatch time in both cases. In order to differentiate this measurement from "CPU busy" as described previously, we can think of the dispatch time as "CPU allocation" time.

CPU wait time in the LPAR environment can be defined as "CPU not busy." This covers the amount of time represented by the difference between the overall duration of the measurement interval and CPU busy time. For wait-disabled partitions, this is the duration of the measurement interval minus the dispatch time. For wait-enabled partitions, this is the interval duration minus the difference between the dispatch time and the CPU wait time recorded in the CPU Data section.

The following formulas can be used to calculate processor utilization statistics:

- o For partitions with dedicated processors

$$\text{PCT\_BUSY} = \frac{\text{INTERVAL} - \text{WAITTIME}}{\text{INTERVAL}} \times 100$$

$$\text{PCT\_ALLC} = 100 \text{ (constant)}$$

$$\text{PCT\_WAIT} = \frac{\text{WAITTIME}}{\text{INTERVAL}} \times 100$$

$$\text{PCT\_NBSY} = \text{PCT\_WAIT}$$

- o For partitions with shared processors and with wait-assist disabled

$$\text{PCT\_BUSY} = \frac{\text{DISPTIME}}{\text{INTERVAL}} \times 100$$

$$\text{PCT\_ALLC} = \text{PCT\_BUSY}$$

$$\text{PCT\_WAIT} = 0 \text{ (constant)}$$

$$\text{PCT\_NBSY} = \frac{\text{INTERVAL} - \text{DISPTIME}}{\text{INTERVAL}} \times 100$$

- o For partitions with shared processors and with wait-assist enabled

$$\text{PCT\_BUSY} = \frac{\text{DISPTIME} - \text{WAITTIME}}{\text{INTERVAL}} \times 100$$

$$\text{PCT\_ALLC} = \frac{\text{DISPTIME}}{\text{INTERVAL}} \times 100$$

$$\text{PCT\_WAIT} = \frac{\text{WAITTIME}}{\text{INTERVAL}} \times 100$$

$$\text{PCT\_NBSY} = \frac{\text{INTERVAL} - (\text{DISPTIME} - \text{WAITTIME})}{\text{INTERVAL}} \times 100$$

where:

label	meaning	CA MICS element
PCT_BUSY	Percent processor busy	IPUPCBS
PCT_ALLC	Percent processor allocated	IPUPCDT
PCT_WAIT	Percent processor wait	IPUPCVW
PCT_NBSY	Percent not using processor	IPUPCWT
INTERVAL	Measurement interval	DURATION
WAITTIME	processor wait time	IPUWTM
DISPTIME	processor dispatch time	IPUDTM

6.8.4.3 Logical Partition Interaction

Prior to the introduction of the PR/SM LPAR environment, the Virtual Machine Facility (VM) was commonly used to run multiple SCPs in a single CPC. LPAR mode makes this possible without the additional VM system control program. The fact that RMF measures and records the activity of all the partitions in a PR/SM LPAR complex simplifies the problems encountered when analyzing MVS activity under VM.

In VM, collecting, synchronizing, and summarizing measurement information from each guest with the measurements from a system-wide VM monitor makes the analysis of this environment extremely challenging. With the LPAR mode measurements from RMF, many, if not all, of the effects of sharing a physical complex among multiple SCPs can be characterized with measurement data from a single source.

Since memory and channel paths are dedicated to individual partitions (except when MIF is used), the analysis of the utilization of these resources is largely unchanged when compared to LPAR operations. The single exception is in the measurements of the activity of the I/O Processor (IOP). These are global to the IOP and, therefore, apply to the sum of the activity of all active partitions. There is no direct way to determine the load on the IOP imposed by a specific partition.

As long as the demand for processor resources is less than the availability of central processors, the activity in one logical partition will have little or no impact on other partitions. It is only during periods of contention for processor resources, or when partition capping is in effect, that inter-partition effects can be expected. With capping, it is the presence of other active partitions, not their level of activity, that limits processor dispatching.

Because the LPAR dispatcher prioritizes access to central processors based on the active partitions' relative weights, the effect of contention or partition capping is less processor time available for a logical partition than it would have had in a non-LPAR complex.

The initial relative share of processor resources available to each partition is controlled by the user. The processing weight for a partition is set when the partition is defined and can be modified for an active partition at any time by the console operator. The actual numeric values are meaningful only when compared to each other. Before being

applied, the weight is divided by the number of active logical processors for the partition. The weights are then applied to the sum of the activity of all logical processors active in the partition. Thus, during a period of high contention for processor resources, the sum of the dispatch times for all of the logical processors for a partition with a relative weight of 200 will be twice the sum of the dispatch times of a second partition with a weight of 100.

A partition with fewer logical processors defined will receive a higher proportion of an individual logical processor than a partition with more logical processors defined. For example, assume a triadic CPC with three logical partitions is defined, all with equal relative weights. SYS1 is defined with one logical processor, SYS2 with two LPs, and SYS3 with 3 LPs. During periods of contention, all would accumulate approximately equal amounts of dispatch time. Ignoring the effects of LPAR management time, SYS1's single processor would be 100% dispatched, SYS2's two LPs would each be 50% dispatched, and SYS3's three LPs would each be 33% dispatched.

An important consideration is that the number of logical processors defined for a partition can limit its total processor utilization to a value less than that implied by its relative weight. In other words, if a partition has only one logical processor defined, it can never receive more than 50% of the resources of a dyadic CPC, even if it has a high relative weight as compared to the weights of any other active partition.

- 1 - Dispatching Frequency
- 2 - Logical Processor Dispatching and Execution Rate
- 3 - Logical Processor Dispatching and I/O Operations

6.8.4.3.1 Dispatching Frequency

If the time slice is not explicitly specified by the user, it is calculated by the LPAR dispatcher. This dynamically calculated value is not recorded in the type 70 subtype 1 record. Although we know from IBM documentation the formula that is used, a change to the formula would be impossible to detect from the information recorded by RMF. If it does change, any programs or procedures based on the formula will require modification. Since the time-slice value changes only when partitions are activated or deactivated, or when logical processors or central processors are varied online or offline, we can expect this to happen relatively infrequently. However, the length of the dynamically determined time slice is actually a maximum value. Unless a partition is wait-enabled, the time slice for dispatching one of its LPs ends immediately upon an attempt to put the central processor into the wait state.

If the count of the dispatch events were known, it would then be possible to calculate the average time slice, which would likely vary considerably from the dynamic time-slice value. Without this number, it is impossible to quantify some of the effects of logical processor dispatching. This includes the effective slowing of processor execution speed and I/O operations.

6.8.4.3.2 Logical Processor Dispatching and Execution Rate

Modern processors have a special high-speed memory cache that allows the fetching of instructions and operands much more quickly than is possible from main memory. A cache management algorithm analyzes memory accesses and attempts to satisfy a significant proportion of future memory accesses from the cache rather than from main memory. When the cache is empty, it takes time for the cache manager to analyze access patterns and fill the cache. During this period, the processor is effectively slowed because instructions and operands are fetched from main memory, which takes more machine cycles than fetching from cache.

Each time a central processor is redispached as a logical processor, the cache is effectively empty because the contents do not reflect recent memory accesses. If the number of processor dispatches were known, it would be possible to estimate the effect on processor speed.

6.8.4.3.3 Logical Processor Dispatching and I/O Operations

I/O operations are prioritized in a manner similar to processor weighting. Although the exact details of this process are not documented, this prioritization is at least partially based on the processor shares and on the relative success of the LPAR dispatcher in accurately allocating the central processor resources among competing partitions. If two partitions are given equal weight, the one that is a little "behind" will receive higher priority than the one that is a little "ahead." This means that an I/O interrupt for a partition with a higher priority may cause the central processor to switch away from a lower priority partition in order to process the interrupt. This will obviously have a detrimental effect on the lower priority partition. In addition, this switching effectively increases the rate of LP dispatching, causing processor cache to be less effectively managed and slowing the effective instruction execution rate.

Unfortunately, no mechanism exists for measuring this effective lengthening of the I/O service time. Although the queue, pending, connect, and disconnect times are accumulated for each device measured by RMF, the actual time it takes an I/O operation to complete may be in excess of the sum of these values if LPAR dispatching causes a delay in processing an interrupt.

If the average time-slice value were available, it would be possible to estimate the effects. By using the duration of the measurement interval, the sum of the dispatch times, the number of dispatches, and the average real I/O service time of a device, the probability that an I/O operation would be delayed and the average duration of the delay could be calculated.

6.8.5 Data Analysis

The advent of low-cost specialized processors that are able to process workloads that were traditionally executed on standard CP processors modifies the way computer systems running under PR/SM in LPAR mode must be dealt with.

PR/SM logical processors can be configured as standard CP processors, Internal Coupling Facilities (ICF), Integrated Facilities for Linux (IFL), Application Assist Processors (zAAP), or Integrated Information Processors (zIIP).

Starting with the IBM System z9, processors defined as ICF, IFL, zAAP, or zIIP are managed separately.

For previous systems, it is important to understand that they are grouped together for allocation within and across the logical partitions in a special purpose processors' pool, under the generic name of ICF, which is seen and managed by PR/SM separately from the standard CP processors' pool.

Therefore, you should, more than ever, adopt a high level processor pool approach when reporting on PR/SM activity. Furthermore, as soon as a PR/SM configuration contains LPARs defined with a mix of standard CP and special purpose processors, the classical analysis method, which consists of measuring global CPU resources at the logical partition level, does not provide the precision required for performance and capacity planning decision-making anymore.

The following sections will help you understand the structure of the PR/SM related CA MICS Hardware and SCP Analyzer files, in order to address both individual LPAR and processor pool level analyses.

- 1 - PR/SM Related Hardware and SCP Analyzer Files
- 2 - LPAR Level Analysis
- 3 - Processor Pool Level Analysis

6.8.5.1 PR/SM Related Hardware and SCP Analyzer Files

The organization of the PR/SM logical partitions' information within the CA MICS Hardware and SCP Analyzer files is driven by the structure of the SMF type 70 subtype 1 CPU, PR/SM, and ICF Activity record as described in section 6.8.3 of this guide.

Four files are derived from the SMF type 70 subtype 1 record:

- o HARIPU: Individual Processor Activity File
- o HARCPU: CPU Processor Activity File
- o HARVPA: Logical Processor Activity File
- o HARLPC: Logical Partition Activity File

As far as CPU resource consumption is concerned, they should be seen as two pairs of parallel files:

- o The HARIPU/HARCPU files provide an "inside z/OS" view of the system that created the SMF record.
- o The HARVPA/HARLPC files describe the activity of all logical partitions defined, as seen from PR/SM perspective. This not only includes the recording system, but also all other LPARs, even if they do not produce any SMF record.

- 1 - HARIPU/HARCPU Relationship
- 2 - HARVPA/HARLPC Relationship

6.8.5.1.1 HARIPU/HARCPU Relationship

All the information stored in the HARIPU file is summarized in the HARCPU file. The only difference is data granularity. HARIPU contains logical processors' detailed information, while HARCPU contains LPAR level totals. In order to fully understand the structural differences between these two files, it is important to remember that, currently, only one type of logical partition can create SMF type 70 records, and hence, populate the HARIPU/HARCPU files: z/OS images.

A z/OS LPAR may be configured either with standard CP processors only or a mix of standard CP and specialized processors (zAAPs, zIIPs). Specialized processors' activity must be kept separate from standard CP processors' activity.

Think of the HARIPU/HARCPU files' organization in terms of tables with rows and columns. The HARIPU file contains one row per logical processor configured within a logical partition. In each row, one column is used to identify whether the remaining metrics are attributable to a standard CP, zAAP, or zIIP processor. The same information is represented in the HARCPU file by a single row for each logical partition with three sets of summarized data columns: one for standard CP processors' metrics, one for zAAP metrics, and one for zIIP metrics.

Example

Let's assume the following PR/SM configuration:

- o SYS1 is z/OS LPAR configured with two standard CP processors, one zAAP, and one zIIP.
- o SYS2 is z/OS LPAR configured with two standard CP processors.

HARIPU structure

System Name	Processor Address	Engine Type	Processor Busy Time
-----	-----	-----	-----
SYS1	0	CP	07:00
SYS1	1	CP	07:00
SYS1	2	IFA	12:00
SYS1	3	IIP	05:00


```

SYS2      0      CP      03:00
SYS2      1      CP      03:00

```

HARCPU structure

System	Std CP	zAAP	zIIP
Name	Busy Time	Busy Time	Busy Time
-----	-----	-----	-----
SYS1	14:00	12:00	05:00
SYS2	06:00	00:00	00:00

For SYS1, busy times for processors 0 and 1 have been consolidated in the overall busy time for all standard CP processors (same for SYS2), busy time for the zAAP (processor 2) has been summarized in the SYS1 overall busy time for all zAAPs, and busy time for the zIIP (processor 3) has been summarized in the SYS1 overall busy time for all zIIPs.

6.8.5.1.2 HARVPA/HARLPC Relationship

The same kind of relationship exists between the HARVPA and HARLPC files as between the HARIPU and HARCPU files: all the information stored in the HARVPA file is summarized in the HARLPC file. The only difference is data granularity. HARVPA contains logical processors' detailed information, while HARLPC contains LPAR level totals.

However, it is very important to emphasize that the scope of the HARVPA/HARLPC files is different due to the nature of the data they are derived from: they only reflect the LPAR's activity from the PR/SM perspective.

Furthermore, the way information from the HARVPA file is consolidated in the HARLPC file depends on the type of system z/OS is executing on:

- 1 - zSeries and Earlier Models' Data Organization
- 2 - System z9 and Later Models' Data Organization

6.8.5.1.2.1 zSeries and Earlier Models' Data Organization

On zSeries and earlier models, PR/SM manages processor resources in two pools: the standard CP processors and the special purpose processors. It is not able to distinguish between the various physical engines' types within the special purpose processors' pool (Internal Coupling Facilities, Integrated Facilities for Linux, or zSeries Application Assist Processors). For PR/SM, they all belong to the generic ICF category. Fortunately, although not available in the SMF data, this information can be obtained by examining the configuration of a logical partition, and included in the HARVPA file's key sequence, providing an additional insight into the generic special purpose processors' pool.

There is no parallel way, for the HARLPC file, to accurately provide more detailed information about a logical partition purpose, like its system control program for example, than its type (general purpose or special purpose LPAR). This is the reason why the structure and organization of this file sticks to the processor pool approach, providing separate sets of measurements for standard CP processors and special purpose (ICF) processors.

Note that the HARLPC file contains a separate specialized processor management flag, LPCSEPPU, that can be used to determine the scope of ICF processors, related data elements: For zSeries and earlier models, LPCSEPPU is equal to N, indicating that the data elements related to ICF processors encompass the activity of all specialized processors (internal coupling facilities, IFLs, and zAAPs).

Let's have a closer look at the HARVPA/HARLPC files' organization. If we speak in terms of tables with rows and columns, we can say that the HARVPA file contains one row per logical processor configured within a logical partition. In each row, one column is used to identify whether the remaining metrics pertain to a standard CP or special purpose (ICF) processor, and another column further identifies the type of physical engine dispatched to this special purpose processor (ICF, IFL, or IFA for zAAP). The same information is represented in the HARLPC file by a single row for each logical partition with two sets of summarized data columns: one for standard CP processors' metrics, and one for special purpose (ICF) processors, regardless of their physical types.

Example

Let's assume the following PR/SM configuration:

- o ZOS1 is z/OS LPAR configured with two standard CP processors and one zAAP.
- o ZOS2 is z/OS LPAR configured with two standard CP processors.
- o CF1 is a coupling facility LPAR configured with one Internal Coupling Facility (ICF).
- o LNX1 is Linux only LPAR configured with one Integrated Facility for Linux (IFL).

HARVPA structure

LPAR Name	Log. Proc Address	Log Proc Type	Engine Type	Processor Busy Time
-----	-----	-----	-----	-----
ZOS1	0	CP	CP	07:00
ZOS1	1	CP	CP	07:00
ZOS1	2	ICF	IFA	12:00
ZOS2	0	CP	CP	03:00
ZOS2	1	CP	CP	03:00
CF1	0	ICF	ICF	15:00
LNX1	0	ICF	IFL	15:00

HARLPC structure

LPAR Name	LPAR Type	Std CP Busy Time	ICF Procs Busy Time
-----	-----	-----	-----
ZOS1	CP	14:00	12:00
ZOS2	CP	06:00	00:00
CF1	ICF	00:00	15:00
LNX1	ICF	00:00	15:00

For ZOS1, busy times for processors 0 and 1 have been consolidated in the overall busy time for all standard CP processors (same for ZOS2); and busy time for the zAAP (processor 2) has been summarized in the ZOS1 overall busy

time for all processors belonging to the special purpose (ICF) processors' pool. CF1 with its Integrated Coupling Facility only contributes to the special purpose pool, as LNX1 does with its Integrated Facility for Linux.

On zSeries and earlier models, PR/SM manages processor resources in two pools: the standard CP processors and the special purpose processors. It is not able to distinguish between the various physical engines' types within the special purpose processors' pool (Internal Coupling Facilities, Integrated Facilities for Linux, or zSeries Application Assist Processors). For PR/SM, they all belong to the generic ICF category. Fortunately, although not available in the SMF data, this information can be obtained by examining the configuration of a logical partition, and included in the HARVPA file's key sequence, providing an additional insight into the generic special purpose processors' pool.

There is no parallel way, for the HARLPC file, to accurately provide more detailed information about a logical partition purpose, like its system control program for example, than its type (general purpose or special purpose LPAR). This is the reason why the structure and organization of this file sticks to the processor pool approach, providing separate sets of measurements for standard CP processors and special purpose (ICF) processors.

Note that the HARLPC file contains a separate specialized processor management flag, LPCSEPPU, that can be used to determine the scope of ICF processors, related data elements: For zSeries and earlier models, LPCSEPPU is equal to N, indicating that the data elements related to ICF processors encompass the activity of all specialized processors (internal coupling facilities, IFLs, and zAAPs).

Let's have a closer look at the HARVPA/HARLPC files' organization. If we speak in terms of tables with rows and columns, we can say that the HARVPA file contains one row per logical processor configured within a logical partition. In each row, one column is used to identify whether the remaining metrics pertain to a standard CP or special purpose (ICF) processor, and another column further identifies the type of physical engine dispatched to this special purpose processor (ICF, IFL, or IFA for zAAP). The same information is represented in the HARLPC file by a single row for each logical partition with two sets of summarized data columns: one for standard CP processors' metrics, and one for special purpose (ICF) processors, regardless of their physical types.

Example

Let's assume the following PR/SM configuration:

- o ZOS1 is z/OS LPAR configured with two standard CP processors and one zAAP.
- o ZOS2 is z/OS LPAR configured with two standard CP processors.
- o CF1 is a coupling facility LPAR configured with one Internal Coupling Facility (ICF).
- o LNX1 is Linux only LPAR configured with one Integrated Facility for Linux (IFL).

HARVPA structure

LPAR Name	Log. Proc Address	Log Proc Type	Engine Type	Processor Busy Time
----	-----	-----	-----	-----
ZOS1	0	CP	CP	07:00
ZOS1	1	CP	CP	07:00
ZOS1	2	ICF	IFA	12:00
ZOS2	0	CP	CP	03:00
ZOS2	1	CP	CP	03:00
CF1	0	ICF	ICF	15:00
LNX1	0	ICF	IFL	15:00

HARLPC structure

LPAR Name	LPAR Type	Std CP Busy Time	ICF Procs Busy Time
----	----	-----	-----
ZOS1	CP	14:00	12:00
ZOS2	CP	06:00	00:00
CF1	ICF	00:00	15:00
LNX1	ICF	00:00	15:00

For ZOS1, busy times for processors 0 and 1 have been consolidated in the overall busy time for all standard CP processors (same for ZOS2); and busy time for the zAAP (processor 2) has been summarized in the ZOS1 overall busy time for all processors belonging to the special purpose

(ICF) processors' pool. CF1 with its Integrated Coupling Facility only contributes to the special purpose pool, as LNX1 does with its Integrated Facility for Linux.

6.8.5.1.2.2 System z9 and Later Models' Data Organization

Starting with the IBM System z9, processors defined as ICF, IFL, IFA (zAAP), or IIP (zIIP) are managed in four separate pools, in addition to the standard CP processors' pool. The HARVPA and HARLPC files provide separate sets of measurements for each of the five possible pools (CP, ICF, IFL, zAAP, zIIP), simplifying management of the processor resources within a PR/SM configuration.

Note that the HARLPC file contains a separate specialized processor management flag, LPCSEPPU, that can be used to determine the scope of data elements related to ICF processors. For System z9 and later models, LPCSEPPU is equal to Y, indicating that the data elements related to ICF processors only describe the activity of internal coupling facilities, while additional sets of data elements, specific to IFLs, zAAPs, and zIIPs, are available.

Think of the HARVPA/HARLPC files' organization in terms of tables with rows and columns. The HARVPA file contains one row per logical processor configured within a logical partition. In each row, one column is used to identify whether the remaining metrics pertain to a standard CP processor, an internal coupling facility (ICF), an integrated facility for Linux (IFL), a System z9 Application Assist Processor (zAAP), or a System z9 Integrated Information Processor (zIIP). The same information is represented in the HARLPC file by a single row for each logical partition with five sets of summarized data columns for standard CP processors, internal coupling facilities (ICF), integrated facilities for Linux (IFL), System z9 Application Assist Processors (zAAP), and System z9 Integrated Information Processors (zIIP).

Example

Let's assume the following PR/SM configuration:

- o ZOS1 is z/OS LPAR configured with two standard CP processors, one zAAP, and one zIIP.
- o ZOS2 is z/OS LPAR configured with two standard CP processors.
- o CF1 is a coupling facility LPAR configured with one internal coupling facility (ICF).

- o LNX1 is Linux only LPAR configured with one integrated facility for Linux (IFL).

HARVPA structure

LPAR Name	Log. Proc Address	Log Proc Type	Processor Busy Time
----	-----	-----	-----
ZOS1	0	CP	07:00
ZOS1	1	CP	07:00
ZOS1	2	IFA	12:00
ZOS1	3	IIP	05:00
ZOS2	0	CP	03:00
ZOS2	1	CP	03:00
CF1	0	ICF	15:00
LNX1	0	IFL	15:00

HARLPC structure

LPAR Name	LPAR Type	Std CP Busy Tm	ICFs Busy Tm	IFLs Busy Tm	zAAPs Busy Tm	zIIPs Busy Tm
----	----	-----	-----	-----	-----	-----
ZOS1	CP	14:00	00:00	00:00	12:00	05:00
ZOS2	CP	06:00	00:00	00:00	00:00	00:00
CF1	ICF	00:00	15:00	00:00	00:00	00:00
LNX1	ICF	00:00	00:00	15:00	00:00	00:00

For ZOS1, busy times for processors 0 and 1 have been consolidated in the overall busy time for all standard CP processors (same for ZOS2), busy time for the zAAP (processor 2) has been summarized in the ZOS1 overall busy time for all processors belonging to the zAAP pool, and busy time for the zIIP (processor 3) has been summarized in the ZOS1 overall busy time for all processors belonging to the zIIP pool. CF1 with its internal coupling facility only contributes to the ICF pool, and LNX1 with its integrated facility for Linux only contributes to IFL pool.

6.8.5.2 LPAR Level Analysis

Before tracking utilization at the individual logical partition level, the most important item that determines the strategy used in measuring CPU time used is the logical processor configuration. Because LPAR measurements may be distributed across several processor pools' sets of CA MICS data elements, you need to know the types of resources an LPAR may consume: standard CP, special purpose (ICF, IFL, zAAP, zIIP), or both.

The way an LPAR is configured, along with its PR/SM mode of operation, defines its type, which can be either general purpose or special purpose. The following table provides you with all possible LPAR configurations, and the last column (LPAR Type) helps you find information in the rest of this chapter:

LPAR Mode of Operation	Standard CP Proc.	Special Purpose				LPAR Type
		ICF	IFL	zAAP	zIIP	
!ESA/390	X					General
!ESA/390	X			X		General
!ESA/390	X				X	General
!ESA/390	X			X	X	General
!Linux Only	X					General
!Linux Only			X			Special
!Coupl. Facil.	X					General
!Coupl. Facil.		X				Special
!Coupl. Facil.	X	X				Special

1 - General Purpose LPARs

2 - Special Purpose LPARs

6.8.5.2.1 General Purpose LPA/Rs

The general purpose LPAR type encompasses the following:

- o z/OS logical partitions
- o z/VM logical partitions operating in PR/SM ESA/390 mode
- o z/VSE logical partitions
- o z/TPF logical partitions

General purpose logical partitions exclusively use resources from the standard CP processors' pool. The only exceptions are z/OS LPARs configured with zAAPs and/or zIIPs.

Because only z/OS logical partitions can create SMF type 70 subtype 1 records, the amount of information available to track non-z/OS general purpose LPARs' activity is limited to the contents of the HARLPC file, that is, to the high level PR/SM perspective. For these partitions, RMF does not provide any view from inside the operating system, unlike z/OS LPARs.

- 1 - z/OS LPARs Without Specialized Processors
- 2 - z/OS LPARs With Specialized Processors
- 3 - Non-z/OS LPARs

6.8.5.2.1.1 z/OS LPARs Without Specialized Processors

If a z/OS logical partition does not use any specialized processors such as zAAP, zIIP, ICF or IFL then the only type of CPU resources it can consume comes from the standard CP pool of processors of the CPC. Your ability to accurately track its utilization depends on two key factors: does it use shared or dedicated processors, and is the wait assist facility enabled?

Shared Standard CP Processors

If the LPAR is configured with shared standard CP processors and wait assist is disabled (Wait Completion = No), the time the logical processors are dispatched, from PR/SM management routines, is equal to the actual busy time as seen from inside the LPAR. In other words, the value of LPCTODTM in the HARLPC file is the same as CPUTODTM as well as CPUTOBTM in the HARCPU file.

Although, in theory, you could choose to report from either the HARCPU or the HARLPC files, we recommend you use the HARLPC file measurements. The main reason for this is that the HARCPU file will only contain information for logical partitions running RMF and whose SMF type 70 subtype 1 records are processed by CA MICS. For example, the HARCPU file should not be used for non z/OS LPARs, or if you input to CA MICS the SMF records from only one of your z/OS LPARs. This problem does not apply to the HARLPC file because, as long as one or more logical partitions has its SMF type 70 subtype 1 records processed by CA MICS, it will contain information about all LPARs defined in the configuration.

However, care must be taken when using the HARLPC file because, if multiple z/OS systems are active in the complex, each one can record the activity of the others. It is therefore necessary to select only one system (SYSID) from the HARLPC file, in order to avoid data duplication. We recommend that you select the SYSID that is most often active during the day. If you have 3 LPARs defined and one is a production machine that will be active all the time, and the other 2 are test machines that come up and down, use the production machine's SYSID.

Listed below are examples for your shared LPARs analysis:

- o To know how much of its allocated CPU resources an LPAR consumed, use the following data element from the HARLPC file:

LPCPCVPU - LPAR CP Processors Utilization

LPCPCVPU is computed by the formula:

$$\text{LPCTODTM} * 100 / \text{LPCTOOTM}$$

where LPCTODTM is the Total CP Processors Dispatch Time and LPCTOOTM is the Total CP Processors Online Time.

- o To know how many of the resources of the pool of standard CP processors were used by one LPAR, use the following data element from the HARLPC file:

LPCPCTSU - LPAR Total CP Processors Utilization

LPCPCTSU is computed by the formula:

$$\frac{100 * \text{LPCTODTM}}{\text{DURATION} * \text{PRSMTCP} / \text{INTERVLS}}$$

where DURATION contains the number of seconds in the recording interval, PRSMTCP is the Total CP Processors in the Complex, and INTERVLS is the number of RMF intervals.

Note: If all processors from the standard CP pool are shared, this element is equal to LPCPCSSU (LPAR Shared CP Processors Utilization).

A Capacity Planning Consideration

When using either LPCPCVPU or LPCPCTSU in capacity planning studies, keep in mind that LPCPCTSU is the percent of CP processors utilization over all of the CP processors in the complex. This includes processors that are not active.

Since LPCPCVPU is the CP processors utilization over only those processors that are online, you should decide whether LPCPCVPU or LPCPCTSU is more appropriate for your capacity analysis.

Dedicated Standard CP Processors

When the logical processors of an LPAR configured with dedicated standard CP processors are dispatched, the resources they use are unavailable for other use whether they are actually executing instructions or are in the wait state. From the PR/SM perspective, the dispatch time is equal to the measurement interval time, regardless of actual processor utilization, and the LPAR appears as being used 100% of the time in the HARLPC file.

In order to determine the actual utilization, the total time in seconds that the logical processors were not busy (wait time) must be subtracted from the total dispatch time. Since this wait time is not available in the HARLPC file, dedicated LPARs' utilization must be tracked from the HARCPU file. However, in regards to the amount of total CPU resources allocated to these LPARs, and thus unavailable to others, you can still use information from the HARLPC file.

Listed below are examples for your dedicated LPARs analysis:

- o To know how much of its allocated CPU resources an LPAR consumed, use the following data element from the HARCPU file:

CPUPCBSY - Pct CP Processors Busy

- o To know how many of the resources of the pool of standard CP processors were dispatched to one LPAR, use the following data element from the HARLPC file:

LPCPCTSU - LPAR Total CP Processors Utilization

Note: If there are dedicated processors that are not active, then they would not be counted among the online processors during an RMF interval. In this case, using LPCPCVPU might be more appropriate for capacity studies.

Wait Assist Enabled

When the Wait Assist function is enabled, it indicates that the LPAR's logical processors remain dispatched until the end of the user-specified interval, called time slice, even when they are in the wait state. In this case dispatch time includes wait time.

Dedicated LPARs do not use the wait-assist feature because they are dedicated to specific physical processors and have them whether or not they wait.

Shared LPARs are where the wait-assist feature comes into play. As for dedicated LPARs, if the feature is enabled, although you can still use the information from the HARLPC file to get the amount of total CPU resources allocated to such an LPAR, you must look into the HARCPU file to get the actual LPAR utilization.

- o To know how much of its allocated CPU resources an LPAR consumed, use the following data element from the HARCPU file:

CPUPCBSY - Pct CP Processors Busy

- o To know how many of the resources of the pool of standard CP processors were dispatched to an LPAR, use the following data element from the HARLPC file:

LPCPCTSU - LPAR Total CP Processors Utilization

Note: If you need to know the percent of the pool of online standard CP processors were dispatched to an LPAR, use the LPCPCVPU element.

6.8.5.2.1.2 z/OS LPARs With Specialized Processors

Prior to the zAAP, CPU capacity tracking and planning for z/OS dealt with only one processor type, the standard CP (or general purpose) processor. With the introduction of the zAAP and zIIP specialized processors, three types of processors are used by z/OS, and separate sets of measurements must be used to analyze LPAR utilization.

Three simple examples illustrate that traditional capacity methods must be updated as soon as you include specialized processors in your pool of CPU resources, in order to answer the same questions always asked: How effectively are my CPU resources used? Do I need more and which type?

Example 1

Logical partition ZOS1 is configured with two standard CP processors and one specialized processor. Last month, the average utilization of each of these processors was:

CP Processor 1: 80%
 CP Processor 2: 80%
 Special Proc. : 20%

Using the traditional method, the average utilization of the ZOS1 LPAR for the month would appear to be 60% (180%/3). Does this information provide the answers to the previous questions? Obviously not, since all the processors are reported together, hiding the relatively important load of the standard CPs compared to the low utilization of the specialized processor. We cannot make any decision based on such an overall perspective.

Now, using an updated method, we end up with two utilization percentages, showing that the standard CPs were busy 80% of the time, and the specialized processor only 20%. This is much more valuable in regards to the important questions:

- o How effectively are my CPU resources used?

This LPAR is correctly sized in terms of standard CP processors. 80% busy means it really needs its two standard CPs to handle the classical z/OS workload. On the other hand the specialized processor is only used 20% of the time. We can maximize its utilization either by moving the eligible workload from other LPARs into ZOS1;

or even by removing the specialized processor from ZOS1 (the standard CPs might support the workload previously only executed on this processor) and assigning it to another LPAR. (This assumes the specialized processor is executing at the same speed as the standard CP processors, since the RMF records the CPU times at the physical engine speed.)

- o Do I need more CPU resources and which type?

With this current configuration, you know you can handle an 80% increase in special workload, but only 20% in other z/OS processing. Note that the 20% might be further reduced if your data center allows special work to be executed on both standard and specialized processors.

Example 2

Logical partition ZOS2 is configured with two standard CP processors and one specialized processor. Last month, the average utilization of each of these processors was:

CP Processor 1: 30%
CP Processor 2: 30%
Special Proc. : 100%

Using the traditional method, the average utilization of the ZOS2 LPAR for the month would appear to be 53% (160%/3). Does this information provide the answers to the previous questions? Here, again, we cannot make any decision based on such combined information.

Now, using an updated method, we end up with two utilization percentages, showing that the standard CPs were busy 30% of the time, and the specialized processor 100%. A lot more useful information would be as follows:

- o How effectively are my CPU resources used?

This time, the LPAR is underutilizing its standard CP processors because 30% busy means only one standard CP would be sufficient to handle all classical z/OS workload. On the other hand, the specialized processor is 100% busy. We could not make any better profit of this low-cost assistant.

- o Do I need more CPU resources and which type?

In this configuration, the specialized processor cannot accept any additional workload, but the standard CP processors could support a 70% increase before reaching their full capacity. Since, depending on the system parameters, this extra capacity could be used by both special and classical z/OS workload, a trade-off has to be found between spending standard CP processor CPU cycles for special work (and thus increasing the MSU consumption of the LPAR), or adding a new low-cost specialized processor. Performance is also a factor when a specialized processor is too heavily loaded because special work might be queued waiting for it while standard CPs are available.

Example 3

The two previous examples were intended to show you how reporting solely at the overall LPAR level could be misleading, but in a real configuration, you might have to deal with LPARs where both types of processors are loaded in a comparable way. This last example shows that the information CA MICS obtains from PR/SM is not sufficient to have a full understanding of such LPARs' utilization, and that a complete analysis requires gathering additional measurements from WLM at the workload level.

Logical partition ZOS3 is configured with two standard CP processors and one specialized processor. Last month, the average utilization of each of these processors was:

CP Processor 1: 90%
CP Processor 2: 90%
Special Proc. : 90%

Using the traditional method, the average utilization of the ZOS3 LPAR for the month would appear to be 90% (270%/3). This time, at least, this percentage tells us that there is not much room left for additional workload. But, again it does not answer the main capacity planning questions.

Let's assume the specialized processor is a zAAP. Not surprisingly, using the updated method, we end up with two similar utilization percentages, showing that both the standard CPs and zAAP were busy 90% of the time. But, if we know the zAAP can only be busy with Java work, we must determine what is actually making the standard CPs so busy too.

If the data center does not allow any Java work to run on standard CPs, there is no doubt: these processors are busy with non-Java work only, and as such, there is no way to dispatch part of their workload to a zAAP, in order to reduce their utilization. Therefore they might only support a 10% load increase.

Things become more complex if Java work is allowed to execute both on zAAP and standard CPs. Java work running on a standard CP is called "zAAP eligible," and the CPU time consumed by this type of work is not recorded separately in the SMF type 70 subtype 1 record. RMF gathers this information from the Workload Manager (WLM), and you must retrieve it from the WLMSEC, Service Class Resource Consumption file.

Suppose you determined that half of the CPU time consumed on the standard CPs was attributable to zAAP eligible time. This means that your 90% busy for the standard CPs is now distributed as follows:

```
CP Processors Busy: 90%
Java Workload      : 45%
non-Java Workload  : 45%
```

With this information, it is now possible to evaluate the potential solutions: for example, install a new zAAP; then force Java work to run on zAAPs only; and finally, since the standard CPs utilization has decreased to 45%, remove one of them and reduce the LPAR MSU capacity.

Data Elements for Utilization Analysis

Below is a matrix of basic data elements you can use as a starting point for dual standard CP and specialized processor utilization analysis. Before using these elements, one should keep in mind how they can be compared with each other.

For capacity studies, one should decide whether to base the analysis on all of the processors for each type within the complex or only on the processors that are online. If all of the processors are online most of the time, then one would probably want to base the analysis on all the processors. If the number of online processors is less than the number of available processors almost all of the time, then one would likely base the analysis only on the online processors.

To base capacity analysis on all the processors, use the elements LPCPCTSU, LPCPCTIU, LPCPCTZU, and LPCPCTDU. If you need to restrict the study to online processors, then you should use LPCPCVPU, LPCPCVIU, LPCPCVZU, and LPCPCVSU.

When an LPAR uses shared processors of any of the types CP, zAAP, or zIIP and wait assist is disabled, then one would expect that the percents of time the processors are busy as reported by the CPUPCBSY, CPUPCBZP, or CPUPCBSU elements would be the same as the corresponding percents based on dispatch times as reported in the HARLPC file. Since CPUPCBSY, CPUPCBZP, and CPUPCBSU are computed from busy time divided by online time, the comparable elements from HARLPC would be those that are computed by busy time divided by online time. In this case, CPUPCBSY should have a value close to LPCPCVPU; CPUPCBZP should have a value close to LPCPCVZU; and CPUPCBSU should have a value close to LPCPCVSU.

Here is an example, showing how zIIP processor utilization is tracked for an LPAR where three zIIP processors are defined in the complex but only two are online during the measurement interval. Therefore, the online time (LPCTSOTM) for the zIIP processors is 30 minutes in a 15 minute RMF interval. The value for CPUPCBSU and LPCPCVSU is 93.12% since both are based on online time only. LPCPCTDU takes on the value 62.08% since it is based on the total number of zIIP processors in the complex. Once again, the following computations make sense only when the processors are shared and wait assist is disabled.

```

LPCTSDTM = 0:27:56.24
LPCTSOTM = 0:30:00.00
DURATION = 0:15:00.00
PRSMTSP  = 3
CPUPCBSU = 0:27:56.24 / 0:30:00.00 = 93.12 %
LPCPCVSU = 0:27:56.24 / 0:30:00.00 = 93.12 %
LPCPCTDU = 0:27:56.24 / (0:15:00.00 * 3) = 62.08 %

```

```

+-----+-----+
! File:   !      HARCPU - CPU Activity File      !
!         !                                     !
+=====+=====+
! Element ! Label                                     !
+-----+-----+
! CPUAVONL ! Avg Number of Online CP Processors      !
! CPUAVOZP ! Avg Number of Online zAAP Processors     !
! CPUAVOSU ! Avg Number of Online zIIP Processors     !
+-----+-----+

```

```

! CPUPCBSY ! Pct CP Processors Busy !
! CPUPCBZP ! Pct zAAP Processors Busy !
! CPUPCBSU ! Pct zIIP Processors Busy !
+-----+-----+
! CPUPCTDT ! Pct CP Proc. Dispatched - Effective !
! CPUPCTDZ ! Pct zAAP Proc. Dispatched - Effective !
! CPUPCTDS ! Pct zIIP Proc. Dispatched - Effective !
+-----+-----+
! CPUTOBTM ! Total Time CP Processors Busy !
! CPUZPBTM ! Total Time zAAP Processors Busy !
! CPUSBTM ! Total Time zIIP Processors Busy !
+-----+-----+
! CPUTODTM ! Total CP Processors Dispatch Time !
! CPUZPDTM ! Total zAAP Processors Dispatch Time !
! CPUSUDTM ! Total zIIP Processors Dispatch Time !
+-----+-----+
! CPUTOOTM ! Total CP Processors Online Time !
! CPUZPOTM ! Total zAAP Processors Online Time !
! CPUSUOTM ! Total zIIP Processors Online Time !
+-----+-----+

+-----+-----+
! File:    ! HARLPC - PR/SM LPAR Config/Activity File !
!          ! ! !
+=====+=====+
! Element ! Label !
+-----+-----+
! LPCAVCPU ! Avg Number of Active CP Processors !
! LPCAVICF ! Avg Number of Active ICF Processors (zSeries) !
! LPCAVZAP ! Avg Number of Active zAAP Processors (z9) !
! LPCAVSUP ! Avg Number of Active zIIP Processors (z9) !
+-----+-----+
! LPCPCSSU ! LPAR Shared CP Processors Utilization !
! LPCPCSIU ! LPAR Shared ICF Procs. Utilization (zSeries) !
! LPCPCSZU ! LPAR Shared zAAP Procs. Utilization (z9) !
! LPCPCSDU ! LPAR Shared zIIP Procs. Utilization (z9) !
+-----+-----+
! LPCPCTSU ! LPAR Total CP Processors Utilization !
! LPCPCTIU ! LPAR Total ICF Processors Utilization (zSeries)!
! LPCPCTZU ! LPAR Total zAAP Processors Utilization (z9) !
! LPCPCTDU ! LPAR Total zIIP Processors Utilization (z9) !
+-----+-----+
! LPCPCVPU ! LPAR CP Processors Utilization !
! LPCPCVIU ! LPAR ICF Processors Utilization (zSeries) !
! LPCPCVZU ! LPAR zAAP Processors Utilization (z9) !
! LPCPCVSU ! LPAR zIIP Processors Utilization (z9) !
+-----+-----+
! LPCTODTM ! Total CP Processors Dispatch Time !
! LPCTIDTM ! Total ICF Processors Dispatch Time (zSeries) !

```

```

! LPCTZDTM ! Total zAAP Processors Dispatch Time (z9)      !
! LPCTSDTM ! Total zIIP Processors Dispatch Time (z9)      !
+-----+-----+
! LPCTOEDT ! Total CP Proc. Effective Dispatch Time        !
! LPCTIEDT ! Total ICF Proc. Effective Dispatch Tm (zSeries)!
! LPCTZEDT ! Total zAAP Proc. Effective Dispatch Time (z9) !
! LPCTSEDt ! Total zIIP Proc. Effective Dispatch Time (z9) !
+-----+-----+
! LPCTO0TM ! Total CP Processors Online Time                !
! LPCTI0TM ! Total ICF Processors Online Time (zSeries)     !
! LPCTZ0TM ! Total zAAP Processors Online Time (z9)         !
! LPCTS0TM ! Total zIIP Processors Online Time (z9)         !
+-----+-----+

+-----+-----+
! File:    !WLMSEC - Service Class Resource Consumption  +
!          !                                             !
+=====+=====+
! Element  ! Label                                         !
+-----+-----+
! WLMZAPNF ! zAAP Service Time Normalization Factor        !
! WLMSUPNF ! zIIP Service Time Normalization Factor        !
+-----+-----+
! SECCPUTM ! CPU Time on CP                                !
! SECZAPTM ! CPU Time on zAAP (Normalized)                  !
! SECSUPTM ! CPU Time on zIIP (Normalized)                  !
! SECZAPCT ! zAAP Eligible CPU Time on CP                   !
! SECSUPCT ! zIIP Eligible CPU Time on CP                   !
! SECZAPUT ! Un-normalized zAAP CPU Time                    !
! SECSUPUT ! Un-normalized zIIP CPU Time                    !
+-----+-----+
! SECTOCPU ! CPU Service Units on CP                        !
! SECTOZAP ! CPU Service Units on zAAP                      !
! SECTOSUP ! CPU Service Units on zIIP                      !
! SECTZAPC ! zAAP Eligible CPU Service Units on CP         !
! SECTSUPC ! zIIP Eligible CPU Service Units on CP         !
+-----+-----+

+-----+-----+
! File:    !      WLMsDE - Service Definition              !
!          !                                             !
+=====+=====+
! Element  ! Label                                         !
+-----+-----+
! SDEIFAHO ! Intvls with IFAHonorPriority                  !
+-----+-----+
! SDEIFAX0 ! Intvls with IFACrossOver                      !
+-----+-----+

```

6.8.5.2.1.3 Non z/OS LPARs

Since non z/OS logical partitions do not run RMF, and thus do not create their own SMF type 70 subtype 1 records, they are not represented in the HARIPU/HARIPU files. Therefore there is no way to report on what is occurring inside their operating systems. Such detailed analysis can only be conducted using their own monitoring tools, such as z/VM Monitor.

However their PR/SM activity is still reported in the HARVPA/HARLPC files, providing valuable information about the time logical processors were dispatched, both in regards to LPAR capacity and overall standard CP resources utilization.

Listed below are examples for your non-z/OS LPARs analysis:

- o To know how much of its allocated CPU resources an LPAR consumed, use the following data element from the HARLPC file:

LPCPCVPU - LPAR CP Processors Utilization

- o To know how much of the total capacity of the standard CP processors pool an LPAR consumed, use the following data element from the HARLPC file:

LPCPCTSU - LPAR Total CP Processors Utilization

- o To know how many of the resources of the pool of shared standard CP processors were consumed by one LPAR, use the following data element from the HARLPC file:

LPCPCSSU - LPAR Shared CP Processors Utilization

Note: If all processors from the standard CP pool are shared, LPCPCSSU is equal to LPCPCTSU.

Note: If you need to know the percent of only the online CP processors that are used by an LPAR, then LPCPCVPU is the appropriate element. If you need to know the percent of all CP processors that are used by an LPAR, then LPCPCTSU is the appropriate element.

6.8.5.2.2 Special Purpose LPARs

The following types of logical partitions are included in the special purpose category:

- o Coupling Facility LPARs using Integrated Coupling Facilities (ICF)
- o Linux Only LPARs using Integrated Facilities for Linux (IFL)

Special purpose logical partitions do not run RMF, and therefore, as for non-z/OS general purpose LPARs, the amount of information available to track their activity is limited to the contents of the HARVPA and HARLPC files, that is, to the high level PR/SM perspective.

- 1 - Integrated Coupling Facilities
- 2 - Integrated Facilities for Linux

6.8.5.2.2.1 Internal Coupling Facilities

The Internal Coupling Facility (ICF) is a specialized processor unit configured as a coupling facility engine. It can only run Coupling Facility Control Code (CFCC or ICMF) in an LPAR operating in Coupling Facility (CF) mode.

As already stated, these LPARs do not run RMF, and therefore the PR/SM related CA MICS files contain very little information about the actual utilization of coupling facility functions. Therefore, just as for z/OS dedicated LPARs for which you had to acquire the actual utilization from an operating-system-oriented file such as HARCPU, tracking coupling facility LPARs must be performed from an inside perspective. The file you can use for this purpose is the CF Configuration and Activity (HARCFP) file. At the end of this section is a list of the CA MICS data elements that are commonly used to report on coupling facility LPARs' activity.

Depending on your data center's requirements for availability, connectivity, cost, and performance, CF logical partitions may be configured with ICFs in four different ways. Each of these options is briefly described below:

Dedicated ICFs only

The performance of a logical partition configured with dedicated ICFs is similar to that of a standalone Coupling Facility, because a dedicated LPAR requires only a little PR/SM dispatching overhead. Furthermore, while ensuring high coupling efficiency, this configuration does not remove any processing capacity from the operating system partitions.

From a reporting standpoint, it is not possible to determine the actual utilization of such a coupling facility LPAR using the HARLPC file because the Coupling Facility Control Code (the "CF operating system") is always running, either processing or searching for service, and hence never enters into a wait state. This results in an LPAR utilization percentage being always close to 100%.

Dedicated ICFs and shared standard CPs

The Dynamic ICF Expansion function, available for any logical partition defined with ICF processors, gives the ability to define shared and dedicated processors to support CF activity. When using Dynamic ICF Expansion, a CF partition

running on servers with dedicated ICFs, can acquire, if needed, extra resources from the shared standard CP processors' pool normally used to execute z/OS applications on the same server. Most CF requests are handled by dedicated ICFs; however dynamic expansion takes place, and the standard CP processors help to handle CF activity when the ICFs are very busy. There is a performance trade-off when using this function. If expansion should take place and the standard CP processors start to handle CF requests, the amount of capacity available to the other LPARs using these shared processors is reduced. In this case, lower priority work may start to see throughput reductions as capacity is used by the CF expansion.

As in the previous case, actual utilization of the dedicated ICFs cannot be tracked from the HARLPC file, but you can monitor the capacity of shared standard CP processing "stolen" to the other LPARs.

Shared ICF processors only

It is possible for multiple coupling facility LPARs to share ICFs. Generally some of these LPARs have very low activity rates, but since each coupling facility is continuously polling, even the ones with little activity show up as 100% busy and take their full share of ICF resources. However, if dynamic CF dispatching is enabled for an LPAR, it enters into a wait state as soon as there is no more request in the CF Receiver buffer, hence saving processor cycles. It may be a good option to be used by a production backup coupling facility, or a testing environment coupling facility.

When dynamic CF dispatching is turned on, the LPAR should not appear as being 100% busy anymore in the HARLPC file, but should be closer to what could provide an in-depth coupling facility analysis performed from the HARCFP file.

Dedicated ICFs and shared ICFs

With an enhancement to the Dynamic ICF Expansion function, a CF partition running with dedicated ICFs, can acquire, if needed, extra resources from the pool of shared ICF processors. Again, most CF requests are handled by dedicated ICFs, and expansion only takes place when the CF activity exceeds the dedicated ICFs capacity.

Data elements related to ICF activity

The following data elements help you to identify and report on ICFs. Please refer to their data dictionary entries for more detailed information, such as how they are used in the computation of derived data elements.

o From the HARVPA file:

- PRSMP RTP: Logical Processor Type

This element identifies the pool of processors to which a logical processor belongs. For zSeries and earlier models, a value of ICF in this data element does not imply the processor is an internal coupling facility. It could be an IFL or a zAAP as well. Use CPUTYPE described below to accurately identify true ICFs.

- CPUTYPE: Physical Engine Type

Internal coupling facilities are identified by a value of ICF in this element (other possible values are CP, IFL, IFA, and IIP). Subsetting or summarizing the HARVPA information by this data element allows you to isolate statistics only pertaining to ICFs. Note that, for System z9 and later models, CPUTYPE contains the same value as PRSMP RTP.

o From the HARLPC file:

- PRSMLP TP: Logical Partition Type

CF partitions using ICF processors are identified by the value of ICF in this data element. However, they are not the only type of LPAR in this category, which also includes Linux-only LPARs configured with IFLs. Therefore, when using PRSMLP TP for subsetting or summarizing HARLPC data, be careful to use your configuration knowledge to select only coupling facility LPARs.

- LPCTIDTM: Total ICF Processors Dispatch Time

For a CF partition using dedicated ICF processors, this element will be very close to

the interval duration (DURATION). If the LPAR uses shared ICF processors, LPCTIDTM will vary according to the LPAR's weight, and the status of dynamic CF dispatching.

- LPCTODTM: Total CP Processors Dispatch Time

For a CF partition using ICF processors, this element will always be equal to zero, unless the LPAR used some resources from the standard CP processors' pool using the dynamic ICF expansion feature.

- LPCSIDTM: Total Shared ICF Proc. Dispatch Time

For a CF partition using dedicated ICF processors only, this element will be equal to zero.

For a CF partition using shared ICF processors only, this element will be equal to LPCTIDTM, since all resources used by the LPAR are from the shared pool.

For a CF partition using a mix of dedicated and shared ICF processors, it will be a subset of LPCTIDTM, and it will represent the capacity of the shared ICF processors' pool used by the LPAR while using the enhanced dynamic ICF expansion function.

o From the HARCFP file:

- CFPPCEBS: Effective Processors Utilization

This data element represents the logical utilization of the logical processors in the coupling facility, that is, only the utilization of the effective processors. This is the actual load of the coupling facility.

- CFPEFCPU: Effective Processors

This data element contains the number of effective logical processors available to the coupling facility. It will differ from the number of processors defined to the LPAR if the ICF processors are shared.

6.8.5.2.2.2 Integrated Facilities for Linux

The Integrated Facility for Linux (IFL) is a specialized processor unit devoted exclusively to Linux workloads. It can run either a single Linux image under the Linux operating system, or multiple Linux images under the control of z/VM Version 4 and higher, in an LPAR operating in Linux-Only mode.

As for internal coupling facilities, LPARs configured with IFLs do not run RMF; therefore, their utilization statistics are limited. The SMF records created by RMF do not provide any information from inside Linux, and PR/SM is only aware of the total amount of time the special purpose processors assigned to these LPARs were dispatched.

Depending on your data center's requirements, IFLs may be configured as either dedicated or shared:

Dedicated IFLs

Dedicated IFLs are considered by PR/SM as always dispatched. Therefore, the dispatch time is equal to the measurement interval time, regardless of actual processor utilization; and the LPAR appears as being used 100% of the time in the HARLPC file.

Shared IFLs Only

When an LPAR is configured with shared IFLs, that LPAR should not appear as being 100% busy anymore in the HARLPC file. It should report the actual amount of time PR/SM allocated to its operating system.

Data Elements Related to IFL Activity

The following data elements help you to identify and report on IFLs. Please refer to their data dictionary entries for more detailed information, such as how they are used in the computation of derived data elements.

o From the HARVPA file:

- PRSMP RTP: Logical Processor Type

This element identifies the pool of processors to which a logical processor belongs. For zSeries and earlier models, IFLs belong to the generic ICF processors' pool, thus they have a value of ICF in PRSMP RTP. Use CPUTYPE described below to accurately identify IFLs. For System z9 and later models, the value of PRSMP RTP is IFL.

- CPUTYPE: Physical Engine Type

Integrated facilities for Linux are identified by a value of IFL in this element (other possible values are CP, ICF, IFA, and IIP). Subsetting or summarizing the HARVPA information by this data element allows you to isolate statistics only pertaining to IFLs. Note that, for System z9 and later models, CPUTYPE contains the same value as PRSMP RTP.

- o From the HARLPC file:

- PRSMLPTP: Logical Partition Type

Linux-only logical partitions using IFLs are identified by the value of ICF in this data element. However, they are not the only type of LPAR in this category, which also includes CF LPARs configured with ICFs. Therefore, when using PRSMLPTP for subsetting or summarizing HARLPC data, be careful to use your configuration knowledge to select only Linux LPARs.

- LPCTIDTM: Total ICF Processors Dispatch Time (zSeries)
 - LPCTNDTM: Total IFL Processors Dispatch Time (z9)

For an LPAR using dedicated IFLs, this element will be very close to the interval duration (DURATION). If the LPAR uses shared IFLs, it will vary according to the LPAR's weight, and the actual system load.

- LPCTODTM: Total CP Processors Dispatch Time

For an LPAR using IFLs, this element will always be equal to zero.

- LPCSIDTM: Total Shared ICF Proc. Dispatch Time (zSeries)

LPCSNDTM: Total Shared IFL Proc. Dispatch Time (z9)

For an LPAR using dedicated IFLs, this element will be equal to zero.

For an LPAR using shared IFLs, this element will be equal to LPCTIDTM (or LPCTNDTM for z9 and later models), since all resources used by the LPAR are from the shared pool.

6.8.5.3 Processor Pool Level Analysis

From a CPC high-level perspective, each pool of processors must be tracked separately, as they represent distinct types of resources. The method differs, depending on the type of machine present in your configuration: on zSeries servers, all the specialized processors (ICF, IFL, zAAP) are grouped together in a special purpose processors' pool, under the generic name of ICF, that is seen and managed by PR/SM separately from the standard CP processors' pool. On System z9 and later models, processors defined as ICF, IFL, zAAP, or zIIP are managed separately as four distinct pools.

- 1 - zSeries Processors' Pools
- 2 - System z9 Processors' Pools

6.8.5.3.1 zSeries Processors' Pools

The following sections describe the easiest way to summarize resource pool consumption data for zSeries and earlier models. They also focus on an important performance issue related to the shared special purpose processors' weight management.

- 1 - Summarizing Processor Pool Data
- 2 - Special Purpose Processors' Weight Management

6.8.5.3.1.1 Summarizing Processor Pool Data

You should be able to perform the most common analysis at the summarized processor pool level by taking advantage of the PR/SM LPAR Config/Activity (HARLPC) file's organization. This straightforward process is described in the following example.

Assume that the HARLPC file's granularity at the DAYS timespan is:

```
SYSID  PRSMLPNM  PRSMLPTP  YEAR  MONTH  DAY  HOUR
```

This organization basically means that the HARLPC file contains one observation per logical partition for each hour of a day within a given recording system. Besides its specific data elements pertaining to a single LPAR, each observation also carries various PR/SM common data elements that total consumptions by processors' pool.

We can report on the totals in the HARLPC file's specific data elements using the CA MICS standard data summarization technique, by selecting the following new key/sequence:

```
SYSID  YEAR  MONTH  DAY  HOUR
```

The following data elements directly provide processor pool measurements, at the CEC level:

- o LPCTODTM:

This element now represents the total dispatch time for all the processors in the standard CP pool.

- o LPCTOMSU:

This is the total MSUs consumption for the whole CEC. Note that only standard CPs contribute to this total.

- o LPCTIDTM:

This element now represents the total dispatch time for all the processors in the special purpose (ICF) pool.

Additionally we can compute a number of new measurements based on the PR/SM common data elements, such as:

- o CP pool total utilization:

To know how much of the total physical standard CP processors' capacity was used, apply the following formula:

$$\text{TOTCP\_BS} = \frac{\text{PRSMTCDT}}{\text{DURATION} \times \frac{\text{PRSMTCP}}{\text{INTERVLS}}} \times 100$$

- Number of standard CPs used:

The above percentage can also be represented as a number of physical standard CP processors used in regards to the pool's size:

$$\text{NBRCP\_BS} = \frac{\text{TOTCP\_BS} \times \text{PRSMACP}}{100}$$

For example, a total utilization of 24% from a 7 physical CP processors' pool would result in the number of processors used being equal to 1.68, meaning the system load would actually only require 2 physical processors.

- Shared CP pool utilization:

To know how much of the shared physical standard CP processors' capacity was used, apply the following formula:

$$\text{SHRCP\_BS} = \frac{\text{PRSMTCST}}{\text{DURATION} \times \frac{\text{PRSMTCP} - \text{PRSMTCP}}{\text{INTERVLS}}} \times 100$$

- ICF pool total utilization:

To know how much of the total physical special purpose processors' capacity was used, apply the following formula:

$$\text{TOTICFBS} = \frac{\text{PRSMITDT}}{\text{DURATION} \times \frac{\text{PRSM TIP}}{\text{INTERVLS}}} \times 100$$

- Number of special processors used:

The above percentage can also be represented as a number of physical special purpose processors used in regards to the pool's size:

$$\text{NBRICFBS} = \frac{\text{TOTICFBS} \times \text{PRSMAIP}}{100}$$

- Shared ICF pool utilization:

To know how much of the shared physical special purpose processors' capacity was used, apply the following formula:

$$\text{SHRICFBS} = \frac{\text{PRSMTIST}}{\text{DURATION} \times \frac{\text{PRSMTIP} - \text{PRSMTIDP}}{\text{INTERVLS}}} \times 100$$

6.8.5.3.1.2 Special Purpose Processors' Weight Management

The distribution of the shared CPU resources is determined by the weight assigned to each LPAR configured with shared processors. PR/SM manages shared standard CP and shared special purpose processors as separate pools of physical resources. As such, the processing weights assigned to logical partitions using shared special purpose processors are totaled and managed independently from the total weights derived from all of the logical partitions using shared standard CP processors. As a result, any shared IFLs or zAAPs in the configuration are combined with the shared ICFs (Integrated Coupling Facilities).

When a logical partition uses shared processors, the zAAPs defined to the partition use shared special purpose processors and the weight given to the zAAPs is equal to the partition's weight. Since logical special purpose processors (zAAP, IFL, ICF) are dispatched on the same type of physical processing unit, their relative weights need to be carefully adjusted in order to avoid a negative impact on performance, especially when the configuration includes shared coupling facility LPARs. These logical partitions tend to be continuously dispatched due to their "active wait" polling algorithm; and, if their weights are too high compared to other LPARs sharing the special purpose processors (for example, a z/OS partition with shared zAAPs), they dominate the usage of the processors' time slices, thus possibly interfering with work that wants to be dispatched on zAAPs.

The following example demonstrates the requirement to update weights of Coupling Facility or Linux logical partitions when a shared zAAP is added to the configuration:

Base configuration:

NUMBER OF PHYSICAL PROCESSORS: 5

CP : 4

ICF : 1

LPAR NAME	WEIGHT	PROCESSOR NUM	TYPE	ALLOWED RESOURCE
ZOS1	900	4	CP	90%
ZOS2	100	4	CP	10%
	=====			=====
	1000			100%

ICF1	550	1	ICF	55%
ICF2	450	1	ICF	45%
	=====			=====
	1000			100%

In this configuration, the ZOS1 LPARs may use the capacity of 3.6 standard CP processors, and ZOS2 may use 0.4 processor.

On the other hand, the two coupling facility LPARs sharing a single special purpose processor (ICF) each use about half of the ICF.

Adding a zAAP:

Adding a zAAP to the ZOS2 LPAR without adjusting the weights of the special purpose processors' pool results in the following:

NUMBER OF PHYSICAL PROCESSORS: 5
 CP : 4
 ICF : 2 (1 ICF + 1 zAAP)

		PROCESSOR		ALLOWED	
LPAR NAME	WEIGHT	NUM	TYPE	RESOURCE	
-----		---	----	-----	
ZOS1	900	4	CP	90%	
ZOS2	+--> 100	4	CP	10%	
!	=====			=====	
!	1000			100%	
!					
ICF1	!	550	1	ICF	50%
ICF2	!	450	1	ICF	41%
ZOS2	+--> 100	1	ICF	9%	
	=====			=====	
	1100			100%	

Looking at the above numbers, nothing changed for the z/OS LPARs in regards to their relative share of the standard CP processors; but instead of adding a full zAAP to the Z0S2 LPAR, we actually only added a small portion of a zAAP. Considering how PR/SM manages weights, the ICF1 coupling facility LPAR has now 50% of all shared special purpose processors' capacity available. The pool being now comprised of 2 processors (the ICF plus the zAAP we just added), ICF1 can actually use up to one full physical engine. Similarly, ICF2 now has 41% of these total resources, meaning it can use 0.82 physical engine. This only allows 0.18 for the zAAP

work on the ZOS2 LPAR.

To allow the full zAAP capacity to be used by the ZOS2 LPAR, adjust the weights of the shared special purpose processors' pool as follows:

- 1) Always start with zAAP weight over which we have no control, and sum up the weights of the partitions that have shared zAAPs, as well as the total number of shared zAAPs:

$TOT\_ZAAP\_WEIGHT = \text{sum of LPARs' weights with shr zAAPs}$

$TOT\_ZAAP\_PROCS = \text{total number of shared zAAPs}$

In our example we only have one LPAR configured with zAAPs and only one shared zAAP; therefore this total is equal to 100.

- 2) The above total divided by the number of shared zAAPs gives the weight of one processor in the special purpose processors' pool:

$ONE\_SPPROC\_WEIGHT = TOT\_ZAAP\_WEIGHT / TOT\_ZAAP\_PROCS$

- 3) Use the above value to reset the weight of the other special purpose LPARs (in our example ICF1 and ICF2) to the same ratio we had before the zAAP, using the following formula:

$LPAR\_NEW\_WEIGHT = ONE\_SPPROC\_WEIGHT \times (\text{previous share})$

In our example the adjusted weights for the two ICF1 and ICF2 LPARs are:

$ICF1\_NEW\_WEIGHT = 100 \times 55\% = 55$

$ICF2\_NEW\_WEIGHT = 100 \times 45\% = 45$

Once the weights are adjusted, the configuration should look like this:

NUMBER OF PHYSICAL PROCESSORS: 5

CP : 4

ICF : 2 (1 ICF + 1 zAAP)

LPAR NAME	WEIGHT	NUM	PROCESSOR TYPE	ALLOWED RESOURCE
-----	-----	---	----	-----

Z0S1	900	4	CP	90%
Z0S2	100	4	CP	10%
	1000			100%
ICF1	55	1	ICF	27.5%
ICF2	45	1	ICF	22.5%
Z0S2	100	1	ICF	50%
	200			100%

6.8.5.3.2 System z9 Processors' Pools

Unlike for zSeries and earlier models, the specialized processors on System z9 and later models are reported separately as four distinct processors' pools: the internal coupling facilities (ICFs), the integrated facilities for Linux (IFLs), the Application Assist Processors (zAAPs), and the Integrated Information Processors (zIIPs).

Note that the HARLPC file contains a separate specialized processor management flag, LPCSEPPU, that can be used to determine the scope of ICF processors' related data elements: For System z9 and later models, LPCSEPPU is equal to Y, indicating that the data elements related to ICF processors only describe the activity of internal coupling facilities, while additional sets of data elements, specific to IFLs, zAAPs, and zIIPs, are available.

You should be able to perform the most common analysis at the summarized processor pool level by taking advantage of the PR/SM LPAR Config/Activity (HARLPC) file's organization. This straightforward process is described in the following example.

Assume that the HARLPC file's granularity at the DAYS timespan is:

```
SYSID  PRSMLPNM  PRSMLPTP  YEAR  MONTH  DAY  HOUR
```

This organization basically means that the HARLPC file contains one observation per logical partition for each hour of a day within a given recording system. Besides its specific data elements pertaining to a single LPAR, each observation also carries various PR/SM common data elements that total consumptions by processors' pool.

We can report on the totals in the HARLPC file's specific data elements using the CA MICS standard data summarization technique, by selecting the following new key/sequence:

```
SYSID  YEAR  MONTH  DAY  HOUR
```

The following data elements directly provide processor pool measurements, at the CEC level:

- o LPCTODTM:

This element now represents the total dispatch time for all the processors in the standard CP pool.

- o LPCTOMSU:

This is the total MSUs consumption for the whole CEC.
Note that only standard CPs contribute to this total.

- o LPCTIDTM:

This element now represents the total dispatch time for all the internal coupling facilities (ICFs).

- o LPCTNDTM:

This element now represents the total dispatch time for all the integrated facilities for Linux (IFLs).

- o LPCTZDTM:

This element now represents the total dispatch time for all the Application Assist Processors (zAAPs).

- o LPCTSDTM:

This element now represents the total dispatch time for all the Integrated Information Processors (zIIPs).

Additionally we can compute a number of new measurements based on the PR/SM common data elements, such as:

- o CP pool total utilization:

To know how much of the total physical standard CP processors' capacity was used, apply the following formula:

$$\text{TOTCP\_BS} = \frac{\text{PRSMTCDT}}{\text{DURATION} \times \frac{\text{PRSMTCP}}{\text{INTERVLS}}} \times 100$$

- Number of standard CPs used:

The above percentage can also be represented as a number of physical standard CP processors used in regards to the pool's size:

$$\text{NBRCP\_BS} = \frac{\text{TOTCP\_BS} \times \text{PRSMACP}}{\text{-----}}$$

100

For example, a total utilization of 24% from a 7 physical CP processors' pool would result in the number of processors used being equal to 1.68, meaning the system load would actually only require 2 physical processors.

- Shared CP pool utilization:

To know how much of the shared physical standard CP processors' capacity was used, apply the following formula:

$$\text{SHRCP\_BS} = \frac{\text{PRSMTCST}}{\text{DURATION} \times \frac{\text{PRSMTCP} - \text{PRSMCDP}}{\text{INTERVLS}}} \times 100$$

- o Specialized processors' utilization:

To know how much of the total physical internal coupling facilities' capacity was used, apply the following formula (the same formulas can be used to track IFLs, zAAPs, or zIIPs, using the appropriate data elements):

- Internal coupling facilities total utilization:

To know how much of the total physical internal coupling facilities' capacity was used, apply the following formula:

$$\text{TOTICFBS} = \frac{\text{PRSMTIDT}}{\text{DURATION} \times \frac{\text{PRSM TIP}}{\text{INTERVLS}}} \times 100$$

- Number of internal coupling facilities used:

The above percentage can also be represented as a number of physical ICFs used in regards to the internal coupling facilities pool's size:

$$\text{NBRICFBS} = \frac{\text{TOTICFBS} \times \text{PR SMAIP}}{100}$$

- Shared internal coupling facilities utilization:

To know how much of the shared physical internal coupling facilities' capacity was used, apply the following formula:

$$\text{SHRICFBS} = \frac{\text{PRSM TIST}}{\text{PRSM TIP} - \text{PRSM IDP}} \times 100$$

$$\text{DURATION} \times \frac{\text{INTERVLS}}{\text{DURATION}}$$

6.9 CA MICS and CA SMF Director Interface

CA SMF Director is an SMF management product with special features that can be used to optimize CA MICS processing. CA SMF Director can significantly reduce operational overhead by creating content specific files while simultaneously creating an SMF historical archive during the SMF dump process.

CA MICS DAILY and incremental update operational jobs can be modified to take advantage of this product, provided your site is licensed for and has CA SMF Director installed in your environment.

CA SMF Director provides functions that extract SMF data at dump time or from previously archived SMF files. These functions eliminate the need for any external utilities used for preprocessing of the SMF dump tape for data extraction prior to execution of the DAILY job. In addition, the DAYSMF step of the CA MICS DAILY job may no longer be required. For details on how to eliminate the DAYSMF step, see section 5.10, Removing the DAYSMF Step from the DAILY Job of the PIOM guide.

CA SMF Director SPLIT and EXTRACT statement operands provide a way for you to create content specific files to meet your requirements. The main functions of the operands include the ability to:

- o Select system identifiers
- o Select or exclude SMF record types and subtypes
- o Use conditional statements for granularity
- o Define time boundaries for SMF data

To use the SPLIT function of CA SMF Director for CA MICS components, one or more SPLIT statements must be coded. The split is performed at SMF dump time and the files can then be used as input to products in one or more units. The same results can be accomplished by using the EXTRACT function of CA SMF Director, which retrieves data from the previously created history files. For more information on the SPLIT and EXTRACT functions, see the CA SMF Director User Guide at <http://ca.com/support>.

A complete set of SMF record types and subtypes, for each CA MICS component that inputs SMF data, can be found in `sharedprefix.MICS.PARMS(cccSMFD)`, where `ccc` is the three-character product identifier. Each PARMS member lists the available SMF record types and subtypes for that component in a format suitable for use in CA SMF Director SPLIT and EXTRACT statements. These members are provided as examples only; the CA SMF Director JCL should not reference `sharedprefix.MICS.PARMS(cccSMFD)`.

Chapter 7: PARAMETERS

Defining the product parameters requires that you gain the necessary understanding of your installation and its needs and translate that understanding into CA MICS parameters.

In particular, this chapter requests that you:

- o Make several policy decisions
- o Complete various worksheets
- o Translate the worksheet entries into the corresponding CA MICS parameter library entries

These activities represent the major portion of the product installation process.

The CA MICS System Administrator should use this chapter as a detailed reference when installing or modifying the product in conjunction with the PIOM. Chapters 2 and 3 of the PIOM document the mechanics of the CA MICS installation process and include checklists that describe each installation step.

If you have a question at any time during your review of the material presented here, contact the CA MICS Product Support Group.

This section contains the following topics:

[7.1 Environmental Considerations](#) (see page 1052)

[7.2 Complex Level Parameters](#) (see page 1053)

[7.3 Unit Level Parameters](#) (see page 1056)

7.1 Environmental Considerations

Before coding product parameters, you need to know about the environments at your site. Before you specify parameters for the product:

- o Review the default options for the parameters to determine their applicability to your site.
- o Review current CA MICS parameter specifications:
 - Review database unit specifications to determine which unit or units should include RMF data.
 - Review the SYSID parameter to determine whether it correlates to the RMF data. Your site's SYSID definition is located in the prefix.MICS.PARMS data set associated with each database unit.
 - Review the CA MICS ZONE parameter to ensure that it reflects the variations in RMF data. This parameter is located in the prefix.MICS.PARMS data set associated with each database unit.

7.2 Complex Level Parameters

Complex level parameters describe components to the CA MICS system. Each CA MICS component has a generation definition member in the sharedprefix.MICS.GENLIB library. The generation definition member for the Hardware and SCP Analyzer is RMFGENIN.

Section 4.2.4 of the System Modification Guide describes the generator definition statements in detail. The discussion presented here provides RMF component-specific details about the following generator definition statements:

- o the COMPJOB statement
- o the INPUTSOURCE statement
- o the FILE statements
- o the CYCLES statements
- o the COMPRESS statement

Note: The RMFGENIN member contains uppercase and lowercase characters. Enter the keywords in UPPERCASE.

COMPJOB Statement

The optional COMPJOB statement defines product processing in the operational jobs.

By default, the Hardware and SCP Analyzer's data is processed by the DAILY, WEEKLY, MONTHLY, and YEARLY jobs. Exceptions will be reported by the DAILY, WEEKLY, and MONTHLY jobs, and archive audit, weekly history, and monthly history files will be maintained.

If you choose to change these specifications following the guidance in the System Modification Guide, the new specifications will not take effect until an RMFCGEN is successfully completed.

INPUTSOURCE Statement

The optional INPUTSOURCE statement lists the data source (SMF) and record types supported by the Hardware and SCP Analyzer.

The default statement delivered with the product is:

INPUTSOURCE SMF 70 71 72 73 74 75 76 77 78 79

indicating that the data source is SMF data from records 70 through 79. Edit this statement if your site does not use all of these record types, and run an RMFCGEN to activate your new definitions.

FILE Statements

Each file supported by the Hardware and SCP Analyzer is defined by a required FILE statement. FILE statements are described in Section 4.2.4.2.1 of the System Modification Guide.

The timespan activation values in the Hardware and SCP Analyzer FILE statements specify whether the file is active in each particular timespan.

Considerations for Derived Files:

Certain Hardware and SCP Analyzer files are derived from other files. Derived files cannot be turned on in any timespan unless their source files are turned on and have a cycle retention value (see CYCLES Statements below) of at least one in the DAYS timespan.

Derived files contain an E in their DAYS timespan definition indicating that special processing must be performed on the file by means of an exit. Derived files cannot be turned on:

- o In the DETAIL timespan
- o In any other timespan unless their source files are turned on and have a cycle retention value of at least one in the DAYS timespan

Following is a list of derived and source Hardware and SCP Analyzer files:

Derived File	Source Files
-----	-----
HARDTA	HARDVA
HARSGA	HARDVA
HARPHY	HARDVA, HARIPU
SCPLCU	HARDVA, SCPLCA, SCPIOC

CYCLES Statements

Each FILE statement has a corresponding required CYCLES statement that specifies the number of cycles of data to keep for the file in each timespan if the file has been activated for that particular timespan (through its FILE statement).

If a file has been activated as a whole, but if it has been deactivated for a particular timespan, the database cycle retention value is zero, regardless of its CYCLES statement value.

COMPRESS Statement

The optional COMPRESS statement defines whether a file is eligible to be compressed when the compression facility is activated.

COMPRESS statements apply to FILE statements; only one COMPRESS statement is permitted per file.

If you code a COMPRESS statement, first review the default statement provided in RMFGENIN. If the default COMPRESS statement is coded with a comment stating that the file should not be compressed, DO NOT change the specification. Doing so will inhibit the performance of your CA MICS system.

If you deactivate a file, review its COMPRESS statement, if present, and ensure that compression is set to NO for the deactivated timespan.

7.3 Unit Level Parameters

Unit level parameters control the processing of the CA MICS Hardware and SCP Analyzer within each database unit. These parameters are stored in the prefix.MICS.PARMS library associated with each database unit you define. The parameters are incorporated into the CA MICS system by the parameter generation processor. Note that you must run the generation process for these options to take effect.

Figure 7-1 identifies the only system code generation process for the CA MICS Hardware and SCP Analyzer, its PARMS member input, and the output MACROs (a member can contain the definition of more than one SAS MACRO) and FORMATs that they generate. The output libraries are at the database unit level (prefix) unless noted otherwise.

The input PARMS member that must be completed prior to RMFPGEN execution is the Product Options Definition (RMFOPS). The Physical Hardware PARMS member (RMFPHYDE) used to assign values to the Physical Hardware (HARPHY) file data elements is optional.

System Code Generator	MICS.PARMS Input Member	USER.SOURCE Output Members and SAS MACRO Names	MUOLIB Output SAS FORMATs
RMFPGEN	RMFOPS	#RMFMSTR _TRACEX _TRACE	
RMFPGEN	RMFPHYDE	RMFPHYVS	\$RMFPHY

The sections that follow show you how to specify the operational parameters that control how input data is processed by the CA MICS Hardware and SCP Analyzer. The names in parentheses are the member names within the prefix.MICS.PARMS data set that contain the parameters described in the section.

- 1 - Processing Options (RMFOPS)
- 2 - Database Space Modeling (DBMODEL)

- 3 - INPUTRDR and INPUTRMF PARMs Members
- 4 - Physical Hardware Data Element Assignment (RMFPHYDE)

7.3.1 Processing Options (RMFOPS)

This section shows you how to specify the operational statements that control CA MICS Hardware and SCP Analyzer processing.

Operational statements are stored in the prefix.MICS.PARMS cccOPS member, where ccc is the component identifier, and are incorporated into the CA MICS system by running the prefix.MICS.CNTL(cccPGEN) job.

```
*****
*
* NOTE: CHANGES to prefix.MICS.PARMS(cccOPS) members *
* REQUIRE EXECUTION of prefix.MICS.CNTL(cccPGEN) *
* to take effect. *
*
* In addition, any change to parameters that *
* impact the DAILY operational job JCL such as, *
*
* o changing RESTART NO to RESTART YES, *
*
* o WORK parameter changes when RESTART NO is in *
* effect, *
*
* o Specifying TAPEfff (if this product supports *
* a DETAIL level TAPE option), *
*
* o or changes to prefix.MICS.PARMS(INPUTccc), *
*
* will require regeneration of the DAILY job by *
* executing prefix.MICS.CNTL(JCLGEN) or by *
* specifying DAILY in prefix.MICS.PARMS(JCLGENU) *
* and executing prefix.MICS.CNTL(JCLGENU). *
*
* Refer to the checklist (if provided) for updating *
* cccOPS parameters and running required generation *
* jobs. *
*****
```

You must include at least one OPTIONS statement that provide additional control information for the analyzer. There are also additional optional statements supported that provide the means to customize the analyzer's behavior to meet your data center requirements.

Required Statement

OPTIONS statements

Optional Statements

WORK, MULTWORK, and NOMULT statements
Internal Step Restart statements
Incremental Update statements

The worksheet in Figure 7-2 helps you collect the data needed to complete prefix.MICS.PARMS(RMFOPS). As with most CA MICS PARMS members, the parameters are free-form, but positional. Comments are coded by beginning the statement with an asterisk (*). Blank statements are allowed.

The following sections explain each of the option statements specified in prefix.MICS.PARMS(RMFOPS).

- 1 - OPTIONS Statements
- 2 - WORK, MULTWORK, and NOMULT Statements
- 3 - Internal Step Restart Statements
- 4 - Incremental Update Statements

7.3.1.1 OPTIONS Statements

You have the choice of specifying an `OPTIONS ???? statement` that applies to all system data processed, an `OPTIONS statement` for specific systems, or a combination of both.

The `OPTIONS` statement is used to control the SMF type 76 subtype 1 Trace Activity records processing. These records contain data about the range of values that selected MVS control block fields took on during the entire RMF interval, called the sample set, as well as for each subset of the interval. They are used to populate the RMF Trace Activity (SCPTRC) File.

You should code an `OPTIONS ???? statement` that reflects the choice appropriate for the majority of systems processed by the unit's daily update job. Then code explicit `OPTIONS statements` for systems whose requirements are different.

The systems that you explicitly code statements for are checked against the SYSIDs listed in `prefix.MICS.PARMS(SYSID)`, so do not specify an `OPTIONS statement` for a system that has not been defined in the `SYSID` parameter.

- o Generic `OPTIONS ???? statement`

A single RMF trace option is usually appropriate for most systems processed by the analyzer at a customer site. To reduce administrator effort, use the `OPTIONS ???? statement` to reflect this choice, rather than coding explicit `OPTIONS statements` for each `ORGSYSID` that provides input to the analyzer.

If no `OPTIONS ???? statement` is coded, the default trace option for any system not defined in an explicit `OPTIONS statement` is `NONE`.

- o Explicit `OPTIONS statements`

Explicit `OPTIONS statements` are optional. Instead of `????`, they specify an `ORGSYSID` value. Explicit `OPTIONS statements` are used to override the parameter settings specified with the `OPTIONS ???? statement` for specific systems.

The `OPTIONS` statement has the following format:

```
OPTIONS ????/orgsysid trace-option
```

????/orgsysid = the first parameter specified in the generic OPTIONS ???? statement is the generic identifier (????). ???? indicates the trace option coded is to be used for all systems unless overridden with an explicit OPTIONS statement.

In explicit OPTIONS statements, the first parameter is the original system identifier (ORGSYSID). ORGSYSID refers to the four-byte character field that identifies the system identifier found in each SMF record processed by the analyzer. ORGSYSID is explained in the section on completing the SYSID member of prefix.MICS.PARMS.

RMF Trace Option = provides three choices for processing SMF type 76 subtype 1 Trace Activity records:

NONE - Do not include RMF trace data (the cycles of the SCPTRC file will be empty).

INTVL - Include interval RMF trace data.

SET - Include interval and sample set RMF trace data. This choice requires more database DASD space than the INTVL choice.

Sample OPTIONS statements:

```
OPTIONS ???? NONE
OPTIONS PD90 INTVL
OPTIONS SYSW SET
```

7.3.1.2 WORK, MULTWORK, and NOMULT Statements

WORK

This statement is optional. It enables sites experiencing either SAS WORK space allocation problems or out of work space conditions during DAYnnn or INCRnnn (where nnn is the job step number), daily or incremental update processing, to allocate multiple WORK files.

You can allocate multiple WORK files for use during the daily and/or incremental update job step. The maximum number of WORK files you can allocate varies by product. These additional work files are used in conjunction with the single work data set allocated by default using the JCLDEF parameters WORKUNIT and WORKSPACE.

Because the individual space allocation requirement for each WORK file is typically much smaller, it is more likely to be satisfied.

To take advantage of multiple WORK files support, edit prefix.MICS.PARMS(cccOPS) and insert a WORK statement as shown below:

```
WORK n data_set_allocation_parameters
```

where n is the number of WORK data sets

NOTE: The default is three (3).

The maximum is nine (9).

data_set_allocation_parameters is one or more data set allocation parameters (for example, STORCLAS or SPACE) separated by spaces.

You can also specify the WORK parameter as the following:

```
WORK n XXX pppp ssss
```

where:

n is the number of WORK data sets

XXX is TRK or CYL

pppp is the primary allocation

ssss is the secondary allocation

Note: When allocating any number of SAS WORK data sets, be aware that one additional SAS WORK data set is automatically allocated to facilitate sorting. For example, if you allocate six SAS WORK data sets, you will actually get seven.

If you omit the `data_set_allocation_parameters` or the `WORK` parameter, the work data sets are allocated according to the values you specified for the `WORKUNIT` and `WORKSPACE` parameters in `prefix.MICS.PARMS(JCLDEF)`. Use the `data_set_allocation_parameters` to override this default, either to alter the space allocation or to use System Managed Storage (SMS) parameters to control data set placement and characteristics.

Note: If you allocate insufficient space for the WORK data sets, `DAYnnn` and/or `INCRnnn` processing will fail and can only be restarted from the beginning.

Note: If internal step restart is active, you can override the WORK data set allocation parameters at execution-time using the `//PARMOVRD` facility. For more information about execution-time override of dynamic data set allocation parameters, see the PIOM, section 2.3.6.

Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the `WORK` keyword on the continuation line.

WORK accepts the engine/host options documented in the SAS Companion for the z/OS environment, including `STORCLAS`, `UNIT`, `SPACE`, `BLKSIZE`, `DATACLAS`, `MGMTCLAS`, and `VOLSER`.

Important! Do not specify the `DISP` parameter.

Example 1:

```
WORK n STORCLAS=MICSTEMP SPACE=(XXX,(pppp,ssss),RLSE)
```

where:

- `n` - is the number of WORK data sets.
- `STORCLAS` - specifies a storage class for a new data set.
The name can have up to 8 characters.
- `SPACE` - specifies how much disk space to provide for a new data set being allocated.
- `XXX` - is TRK or CYL.
- `pppp` - is the primary allocation.
- `ssss` - is the secondary allocation.

RLSE - specifies that free-space should be released when the data set is closed.

Example 2:

```
WORK n XXX pppp ssss
```

where:

n - is the number of WORK data sets.
XXX - is TRK or CYL.
pppp - is the primary allocation.
ssss - is the secondary allocation.

Example 3 (multiple lines):

```
WORK n STORCLAS=MICSTEMP UNIT=SYSDA  
WORK SPACE=(xxxx,(pppp,ssss),,,ROUND))
```

where:

n - is the number of WORK data sets.
STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.
UNIT - specifies the generic unit for a new data set.
The name can have up to eight characters.
SPACE - specifies how much disk space to provide for a new data set being allocated.
XXX - is TRK or CYL.
pppp - is the primary allocation.
ssss - is the secondary allocation.

Note: Since there is some performance impact when using multiple WORK files, you should specify the minimum number of WORK data sets to meet your work space requirements. As a start, try incrementing the number gradually beginning from the default.

WORK Considerations

How Much Space Should You Allocate?

o First Time Implementation of Multiple Work Files

If this is the first time you are implementing multiple work files for this product in this unit, review prefix.MICS.PARMS(JCLDEF) and find the WORKSPACE

parameter. It will resemble this sample statement:

```
WORKSPACE      TRK 500 250
```

The value shows the current SAS WORK space allocation for the unit as a single data set. It also serves as the default value used in the unit's DAYnnn daily update (and/or INCRnnn incremental update) step unless you provide a WORK parameter.

To achieve the equivalent work space allocation of WORKSPACE TRK 500 250 using multiple WORK data sets that will collectively share the work space requirements of the daily and/or incremental update step, you could code either one of these:

```
WORK 2 SPACE=(TRK,(250,125))
```

```
WORK 5 SPACE=(TRK,(100,50))
```

To determine the total work space, multiply the number of WORK files (n) by the primary (pppp) and secondary (ssss) values specified.

Note: To simplify the example, only the SPACE parameter is shown above. You can follow either with data set allocation parameters like UNIT or STORCLAS as required for your site.

o Adjusting Allocation for Existing Multiple WORK Files

If you have previously implemented multiple WORK file support for this product in this unit, and you want to change either the number of WORK files or the space allocations, examine prefix.MICS.PARMS(cccOPS) and find the existing WORK statement.

- If the existing WORK statement only specifies the number of WORK files but does not contain space allocation information as shown below:

```
WORK 5
```

Then each of the multiple WORK files is allocated using the values from the WORKSPACE parameter of prefix.MICS.PARMS(JCLDEF), as described earlier under First Time Implementation of Multiple Work Files.

To increase workspace, you can increase the number of

WORK files (for example, change WORK 5 to WORK 6,7,8, or 9), increase the space allocation in the WORKSPACE parameter, or do both.

To decrease workspace, you can decrease the number of WORK files (for example, change WORK 5 to WORK 4,3,2, or 1), decrease the space allocation in the WORKSPACE parameter, or do both.

You can also elect to explicitly specify the multiple WORK file space allocation by adding the space allocation values directly to the WORK statement. This will remove the link to the prefix.MICS.PARMS(JCLDEF) WORKSPACE parameter for multiple WORK file space allocation. This is recommended as it serves to clearly document, in one place, how multiple WORK files are allocated.

- If the existing WORK statement does include space allocation as shown in the examples below:

```
WORK 5 TRK 200 100
```

or

```
WORK 5 SPACE=(TRK,(200,100)) STORCLAS=MICSTEMP
```

Simply change the values to meet your needs.

If you need more work space, you can increase the number of WORK files (for example, change WORK 5 to WORK 6,7,8, or 9), increase the space allocation (for example, change TRK 200 100 to TRK 250 120), or do both.

To decrease work space, you can decrease the number of WORK files (for example, change WORK 5 to WORK 4,3,2, or 1), decrease the space allocation (for example, change TRK 200 100 to TRK 150 80), or do both.

Note: If internal step restart is NOT active (RESTART NO) and you change the WORK parameter, you must:

- o Run cccPGEN
- o Run JCLGENU for DAILY (to regenerate DAILY) and, if incremental update is enabled, INCRccc

When internal step restart is active, (RESTART YES), then, when you change WORK and run cccPGEN, changes take effect

immediately. There is no need to run JCLGENU.

SASWORK

This statement is optional.

The WORK DD statement in the CA MICS procedures allocates a temporary data set where SAS keeps its temporary data files and other items that SAS uses during processing of the current job.

By default, the space allocated is defined in the member prefix.MICS.PARMS(JCLDEF) with the WORKSPACE and WORKUNIT parameters, then generated into all the JCL procedures for a given unit.

With the SASWORK statement you have the option to override this unit-wide definition to specify the space allocation individually for the current step.

The format of the SASWORK statement is:

SASWORK data_set_allocation_parameters

where data_set_allocation_parameters is one or more data set allocation parameters (for example, STORCLAS or SPACE) separated by spaces.

You can also specify the SASWORK parameter as the following:

SASWORK XXX pppp ssss

where:

XXX is TRK or CYL
pppp is the primary allocation
ssss is the secondary allocation

If you omit the data_set_allocation_parameters or the SASWORK statement, the WORK data set is allocated according to the values you specified for the WORKUNIT and WORKSPACE parameters in prefix.MICS.PARMS(JCLDEF). Use the data_set_allocation_parameters to override this default, either to alter the space allocation or to use System Managed Storage (SMS) parameters to control data set placement and characteristics.

Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the SASWORK keyword on the continuation line.

Example:

```
SASWORK STORCLAS=MICSTEMP SPACE=(XXX,(pppp,ssss))
```

where:

STORCLAS	- specifies a storage class for a new data set. The name can have up to 8 characters.
SPACE	- specifies how much disk space to provide for a new data set being allocated.
XXX	- is TRK or CYL.
pppp	- is the primary allocation.
ssss	- is the secondary allocation.

Note: If you change the SASWORK parameter, you must:

- o Run cccPGEN
- o Run JCLGENU for DAILY (to regenerate DAILY) and, if incremental update is enabled, INCRccc

```
MULTWORK|NOMULT fff fff ... fff  
-----
```

Since multiple work files usage impacts performance, this product provides these optional parameters so you can restrict multiple work files usage to only those files having excessive space requirements.

Note: You can only use one of these optional parameters with the WORK statement, NOT both.

The MULTWORK parameter restricts the use of multiple WORK files to ONLY those listed after the MULTWORK keyword.

```
MULTWORK fff fff ... fff
```

where fff is the unique three character identifier

If you need multiple lines, repeat the MULTWORK on the continuation line.

The NOMULT parameter forces the use of multiple WORK files for all files EXCEPT those specified after the NOMULT keyword.

NOMULT fff fff ... fff

where fff is the unique three character identifier

If you need multiple lines, repeat the NOMULT on the continuation line.

The default is:

MULTWORK DVA ARD CVA

if neither MULTWORK nor NOMULT parameters are specified.

```
*****
*
* Note: If you decide to use a MULTWORK statement to
*       force multiple work file support for additional
*       high volume files, you should add a MULTWORK
*       statement that begins:
*
*       MULTWORK DVA ARD CVA fff fff ...
*
*       where each fff is an additional file you want
*       to process using multiple work files. If you
*       simply code:
*
*       MULTWORK fff fff ...
*
*       then the high volume DVA, ARD, and CVA files will
*       be excluded from multiple work file processing,
*       and you will probably encounter out-of-space
*       conditions during execution of the DAY020 step.
*
*****
```

The following files are eligible for multiple WORK support:

HAR Hardware Utilization Information Area Files

CCU	Cache Control Unit Activity File
CFP	CF Configuration and Activity File
CFR	CF Request File
CPU	CPU Activity File
CVA	Cache Volume Activity File

CVE	Temporary file containing DASD info from HARDVA
DVA	Device Activity File
IPU	Individual Processor Activity File
LPC	PR/SM LPAR Config/Activity File
PCA	Physical Channel Activity File
RSV	Hardware Reserve Activity File
VPA	PR/SM Logical Proc Activity File

SCP MVS System Control Program Information Area Files

ARD	Address Space Activity File
ENQ	Resource Enqueue Activity File
IOC	I/O Queuing Configuration File
KRN	USS Kernel Activity File
LCA	Logical Channel/CU Activity File
PAG	Paging Activity File
PSD	Page Data Set Activity File
SRC	Real Storage/CPU/SRM Activity File
TRC	RMF Trace Activity File
VSM	Virtual Storage System Usage File
VSU	Virtual Storage Private Usage File

WLM MVS Workload Management Information Area Files

SEA	Service Class
_EA	Report Class
SEC	Service Class Resource Consumption
_EC	Report Class Resource Consumption
SED	Service Class General Exec Delay
_ED	Report Class General Exec Delay
SDS	Service Class Subsystem Delay States
_EW	Report Class Subsystem Delay States
SVC	Service Client

The following section discusses changing the WORK option:

- 1 - Change the Number of WORK Files

7.3.1.2.1 Change the Number of WORK Files

To change the number of work files used in the CA MICS Hardware and SCP Analyzer processing in DAY020, follow the checklist provided below for each unit:

```
*****
*                                     *
*          CHANGE NUMBER OF WORK FILES          *
*                                     *
*****
```

- ___ 1. Update the WORK statement in prefix.MICS.PARMS(cccOPS), where (ccc) is the component identifier, to specify the number of work data sets required. Below is an example:

```
WORK n STORCLAS=MICSTEMP SPACE=(XXX,(pppp,ssss))
```

where:

n	- is the number of WORK data sets.
STORCLAS	- specifies a storage class for a new data set. The name can have up to eight characters.
SPACE	- specifies how much disk space to provide for a new data set being allocated.
XXX	- is TRK or CYL.
pppp	- is the primary allocation.
ssss	- is the secondary allocation.

You should specify the minimum number of WORK data sets to meet your work space requirements. As a start, try incrementing the number gradually beginning from the default.

- ___ 2. If this is the first time you are implementing multiple work files for this product, then continue with Step 2. If you are just changing the number currently in use, or simply the space definitions, then proceed to Step 3 of this checklist.

Browse sharedprefix.MICS.PROTOLIB(DYcccnnn) and sharedprefix.MICS.PROTOLIB(cccINCR), where (nnn) is the job step number and (ccc) is the product ID for this product, checking for the presence of the WORK symbolic on the EXEC statement to determine if you have previously modified this product to increase the

allocation of SAS WORK space.

- ___ 2a. If you find a WORK symbolic, simply divide the primary and secondary allocation values from the WORK symbolic by the number of work files specified above (value of n on the WORK statement coded in Step 1).

Coding the resulting values will yield the same aggregate space allocation you have been using with a single WORK file. To double your available WORK space, carry out the division, double the results and use the values in the WORK definition above.

- ___ 2b. If you did not find a WORK symbolic in PROTOLIB, examine prefix.MICS.PARMS(JCLDEF) for each CA MICS unit containing this product. Find the WORKSPACE keyword. The space allocation specified is used for a single SAS WORK file. Perform the same division as described in the previous paragraph to determine the quantity that will yield equivalent total allocation with multiple WORK files. Then adjust the values upward to meet your needs.

- ___ 3. Submit the job in prefix.MICS.CNTL(cccPGEN).

- ___ 4. If you specified RESTART YES in the product's cccOPS, you are done. Otherwise, you must do Steps 5, 6, and 7.

- ___ 5. Edit prefix.MICS.PARMS(JCLGENU) so that it contains a single line that reads:

DAILY

or, if incremental update is enabled for this product in this unit database, specify:

DAILY INCRccc

where ccc is the product ID.

- ___ 6. Submit the job in prefix.MICS.CNTL(JCLGENU). Ensure that there are no error messages in MICSLOG or SYSTSPRT, that the MICSLOG contains the normal termination message, BAS10999I, and that the job completes with a condition code of zero.

- ___ 7. The following operational job(s) have changed:

DAILY

INCRccc (if incremental update is enabled)

If your site has implemented the operational CA MICS processes in a scheduling product, the JCL may have to be refreshed in that product. See the scheduling product's administrator for the exact processes involved in updating that product's representation of the CA MICS jobs.

7.3.1.3 Internal Step Restart Statements

RESTART YES/NO

This statement is optional. Specify this to activate internal step restart for this product's DAILY and/or INCRccc database update job steps:

RESTART YES

If you do not specify or enable the RESTART parameter, then this option defaults to the following and internal step restart is disabled:

RESTART NO

```
*****
*                                                                 *
* Note: Changing the RESTART parameter (either from NO        *
*       to YES or from YES to NO) requires regeneration      *
*       of the DAILY operational job by executing            *
*       prefix.MICS.CNTL(JCLGEN) or by specifying            *
*       DAILY in prefix.MICS.PARMS(JCLGEN) and                *
*       executing prefix.MICS.CNTL(JCLGEN).                    *
*                                                                 *
*       If incremental update is active for this product,    *
*       you must also regenerate the INCRccc job.             *
*                                                                 *
*****
```

Internal step restart can significantly reduce time and resource usage to recover from daily and/or incremental update processing failures. CA MICS uses a checkpoint/restart technique.

- o When internal step restart is activated, the database update job step "checkpoints" (or saves) intermediate results (work file contents) and the operational environment at the end of each processing phase.
- o Then, if required, the database update step can resume execution at the beginning of the processing phase in which the failure occurred.
- o Restart is accomplished by restoring the operational

environment from the last checkpoint, bypassing completed processing phases, and resuming execution using intermediate results (work files) from the last checkpoint.

Note: When you activate internal step restart (RESTART YES), the following optional restart parameters are enabled. These parameters have no effect if restart is disabled (RESTART NO). For more details, see the individual parameter descriptions later in this section.

- o RESTARTCKPT data_set_allocation_parameters
- o RESTARTWORK data_set_allocation_parameters
- o DYNAMWAIT minutes

Processing Phases:

This product employs two database update processing phases followed by the two common roll-up phases.

Phase	Description

FORMAT	Read raw input data, convert to SAS format, and output to intermediate work files.
DBUPDATE	Sort intermediate work file contents, eliminate duplicate input data, prepare for DETAIL cycle creation, merge data across optional multiple work files, enhance data content, and create the new DETAIL cycle.
DYSUM	Summarize DETAIL data to create new DAYS cycles and to update current week-to-date and month-to-date cycles.
DYAGE	Cutover new database cycles to production and "age" existing cycles.

RESTART Considerations

- o Overhead

Enabling internal step restart adds some overhead to the database update job step -- the cost of taking checkpoints and managing saved materials. Since this overhead is relatively constant and independent of input data volume, you may find that costs outweigh potential savings when input data volume is low, for example in a test unit. For high volume, production units, internal step restart support overhead should be a minor portion of total resource usage.

o Cataloged Work Files

When internal step restart is enabled, the SAS work data set, internal step restart control data set, and multiple work file data sets are allocated and cataloged with permanent dataset names so they will be retained for use in restart if the step abends. These data sets are deleted when the step completes successfully.

Prior to enabling internal step restart support, these data sets were probably allocated on system "scratch" space with a temporary, system assigned data set names. If your installation standards do not allow "permanent" data sets on DASD volumes used for temporary work space, you may need to use the WORK, RESTARTCKPT, and RESTARTWORK parameters to direct the internal step restart data sets to a generic unit or storage class that allows cataloged data sets.

o Dynamic Allocation

When internal step restart is active, dynamic allocation is employed for the work data sets. If your installation restricts dynamic allocation of large, cataloged data sets, you may need to use the WORK, RESTARTCKPT, and RESTARTWORK parameters to direct work data set allocation to a generic unit or storage class where dynamic allocation is allowed.

o Data Set Names

The SAS work data set, internal step restart control data set, and multiple work file data sets are allocated and cataloged according to the standard CA MICS unit database data set name conventions. The default DDNAME and data set names are:

- o SAS work data set,
//cccXWORK DD DSN=prefix.MICS.cccXWORK,.....

- o Internal step restart control data set,
//cccXCKPT DD DSN=prefix.MICS.cccXCKPT,.....
- o Multiple work file data sets,
//WORKnn DD DSN=prefix.MICS.cccWRKnn,.....

Since these data sets conform to the same data set name conventions as your existing CA MICS data sets, there should be few, if any, data set name related allocation issues. However, it is possible to override the data set names if required. Please contact CA MICS Product Support for assistance if you must alter data set names.

RESTARTCKPT

This statement is optional. Specify the following to override default data set allocation parameters for the internal step restart checkpoint data set:

RESTARTCKPT data_set_allocation_parameters

Note: RESTARTCKPT is ignored when you specify RESTART NO.

The internal step restart checkpoint data set (or cccXCKPT data set) contains processing status, control, and SAS environmental information for internal step restart processing checkpoints. This includes a copy of the SAS WORK format and macro catalogs, current macro variable values, and a description of work files that may be needed to restart DAYnnn processing.

By default, the cccXCKPT data set is allocated according to the values you specified for the WORKUNIT and WORKSPACE parameters in prefix.MICS.PARMS(JCLDEF). Specify RESTARTCKPT to override this default, either to alter the space allocation or to use System Managed Storage (SMS) parameters to control data set placement and characteristics.

Note: If you allocate insufficient space for the cccXCKPT data set, DAYnnn processing will fail and can only be restarted from the beginning.

Note: You can override the RESTARTCKPT data set allocation parameters at execution-time using the //PARMOVRD facility. For more information about execution-time override of dynamic

data set allocation parameters, see the PIOM, section 2.3.6.

Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the RESTARTCKPT keyword on the continuation line.

RESTARTCKPT accepts the engine/host options documented in the SAS Companion for the z/OS Environment, including STORCLAS, UNIT, SPACE, BLKSIZE, DATACLAS, MGMTCLAS, and VOLSER.

Important! DO NOT SPECIFY THE DISP PARAMETER.

Example 1:

```
RESTARTCKPT STORCLAS=MICSTEMP SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for a new data set being allocated, where:

xxxx is TRK, CYL, or blklen
pp is the primary allocation
ss is the secondary allocation

and ROUND specifies that the allocated space be "rounded" to a cylinder boundary when the unit specified was a block length. ROUND is ignored with the TRK or CYL options.

Example 2 (multiple lines):

```
RESTARTCKPT STORCLAS=MICSTEMP UNIT=SYSDA  
RESTARTCKPT SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

UNIT - specifies the generic unit for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for a new data set being allocated.

RESTARTWORK

This statement is optional. Specify the following to override default data set allocation parameters for the internal step restart WORK data set:

RESTARTWORK data_set_allocation_parameters

Note: RESTARTWORK is ignored when you specify RESTART NO.

The internal step restart WORK data set (or cccXWORK data set) contains the intermediate work files that are not enabled to multiple work file support, including those files you may have specified on the optional NOMULT statement.

By default, the cccXWORK data set is allocated according to the values you specified for the WORKUNIT and WORKSPACE parameters in prefix.MICS.PARMS(JCLDEF). Specify RESTARTWORK to override this default, either to alter the space allocation or to use System Managed Storage (SMS) parameters to control data set placement and characteristics.

Note: If you allocate insufficient space for the cccXWORK data set, DAYnnn processing will fail and can only be restarted from the beginning.

Note: You can override the RESTARTWORK data set allocation parameters at execution-time using the //PARMOVRD facility. For more information about execution-time override of dynamic data set allocation parameters, see the PIOM, section 2.3.6.

Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the RESTARTWORK keyword on the continuation line.

RESTARTWORK accepts the engine/host options documented in "SAS Companion for the z/OS Environment", including STORCLAS, UNIT, SPACE, BLKSIZE, DATACLAS, MGMTCLAS, and VOLSER.

Important! DO NOT SPECIFY THE DISP PARAMETER.

Example 1:

RESTARTWORK STORCLAS=MICSTEMP SPACE=(xxxx,(pp,ss),,,ROUND)

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for
a new data set being allocated, where:

xxxx is TRK, CYL, or blklen
pp is the primary allocation
ss is the secondary allocation

and ROUND specifies that the allocated space be
"rounded" to a cylinder boundary when the unit
specified was a block length. ROUND is ignored
with the TRK or CYL options.

Example 2 (multiple lines):

```
RESTARTWORK STORCLAS=MICSTEMP UNIT=SYSDA
RESTARTWORK SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

UNIT - specifies the generic unit for a new data set.
The name can have up to 8 characters.

SPACE - specifies how much disk space to provide for
a new data set being allocated.

The following section discusses enabling this option:

- 1 - Enable Internal Step Restart

7.3.1.3.1 Enable Internal Step Restart

To enable the internal step restart in the CA MICS Hardware and SCP Analyzer, follow the checklist provided below.

```
*****
*                                     *
*          ENABLE INTERNAL STEP RESTART          *
*                                     *
*****
```

- ___ 1. Edit prefix.MICS.PARMS(cccOPS), where (ccc) is the component identifier, and specify:

RESTART YES

For additional information on related topic, review the documentation for this product on WORK, RESTARTWORK, and RESTARTCKPT parameters to override default data set allocation parameters.

- ___ 2. Submit the job in prefix.MICS.CNTL(cccPGEN).
- ___ 3. Edit prefix.MICS.PARMS(JCLGENU) so that it contains a single line that reads:

DAILY

or, if incremental update is enabled for this product in this unit database, specify:

DAILY INCRccc

where ccc is the product ID.

- ___ 4. Submit the job in prefix.MICS.CNTL(JCLGENU). Ensure that there are no error messages in MICSLOG or SYSTSPRT, that the MICSLOG contains the normal termination message, BAS10999I, and that the job completes with a condition code of zero.

- ___ 5. The following operational job(s) have changed:

DAILY

INCRccc (if incremental update is enabled)

If your site has implemented the operational CA MICS

processes in a scheduling product, the JCL may have to be refreshed in that product. See the scheduling product's administrator for the exact processes involved in updating that product's representation of the CA MICS jobs.

7.3.1.4 Incremental Update Statements

INCRUPDATE

This statement is optional. Specify this to enable incremental update for this product:

INCRUPDATE YES

If you do not specify or enable the INCRUPDATE parameter, then this option defaults to this and incremental update is disabled:

INCRUPDATE NO

```
*****
*
* Note: Changing the INCRUPDATE parameter (either from NO
*       to YES or from YES to NO) requires regeneration
*       of the DAILY operational job by executing
*       prefix.MICS.CNTL(JCLGEN) or by specifying
*       DAILY in prefix.MICS.PARMS(JCLGEN) and
*       executing prefix.MICS.CNTL(JCLGEN).
*
*       If you specify INCRUPDATE YES, you must also
*       generate the INCRccc, cccIUALC, and cccIUGDG jobs
*       (where ccc is the 3 character product ID).
*       Depending on the options you select, you may also
*       need to execute the cccIUALC and/or cccIUGDG
*       jobs.
*
*****
```

Incremental update can significantly reduce time and resource usage in the DAILY job by letting you split out a major portion of daily database update processing into multiple, smaller, incremental updates executed throughout the day.

- o Standard CA MICS database update processing involves (1) reading and processing raw input data to generate DETAIL and DAYS level CA MICS database files, followed by (2) summarization of DETAIL/DAYS level data to update week-to-date and month-to-date database files.
- o When you activate incremental update:
 - You can execute the first-stage processing (raw data input to create DETAIL/DAYS files) multiple times

throughout the day, each time processing a subset of the total day's input data.

- Then, during the final update of the day (in the DAILY job), the incremental DETAIL/DAYS files are "rolled-up" to the database DETAIL and DAYS timespans, and then summarized to update the week-to-date and month-to-date files.
- o Incremental update is independent of your internal step restart or DBSPLIT specifications. You have the option to perform incremental updates with or without internal step restart support.
- o Incremental update is activated and operates independently by product. The incremental update job for this product, INCRccc (where ccc is the product ID), can execute concurrently with the incremental update job for another product in the same unit database.
- o The CA MICS database remains available for reporting and analysis during INCRccc job execution.

```
*****
*                                                                 *
* Note: CA MICS is a highly configurable system                  *
*       supporting up to 36 unit databases, each of which       *
*       can be configured and updated independently.            *
*       Incremental update is just one of the options you       *
*       can use to configure your CA MICS complex.              *
*                                                                 *
*       All efforts should be made to employ CA MICS           *
*       configuration capabilities to minimize issues            *
*       prior to activating incremental update. For             *
*       example:                                                 *
*                                                                 *
*       o Splitting work to multiple units is an                *
*       effective way to enable parallel database                *
*       update processing                                         *
*                                                                 *
*       o Adjusting account code definitions to ensure          *
*       adequate data granularity while minimizing               *
*       total database space and processing time                 *
*                                                                 *
*       o Tailoring the database to drop measurements           *
*       and metrics of lesser value to your                      *
*       data center, thereby reducing database update           *
*       processing and resource consumption                      *
*                                                                 *
```

```

*           While incremental update is intended to reduce      *
*           DAILY job elapsed time, total resource usage of    *
*           the combined INCRccc and DAILY jobs steps can      *
*           increase due to the additional processing           *
*           required to maintain the incremental update         *
*           "to-date" files and for roll-up to the unit        *
*           database. The increased total resource usage        *
*           will be more noticeable with small data volumes,    *
*           where processing code compile time is a greater     *
*           percentage of total processing cost.                *
*                                                                *
*****

```

Note: When you activate incremental update (INCRUPDATE YES), the following optional incremental update parameters are enabled. These parameters have no effect if incremental update is disabled (INCRUPDATE NO). For more details, see the individual parameter descriptions later in this section.

- o INCRDB PERM/TAPE/DYNAM
- o INCRDETAIL data_set_allocation_parameters
- o INCRDAYS data_set_allocation_parameters
- o INCRCKPT data_set_allocation_parameters
- o INCRSPLIT USE/IGNORE data_set_allocation_parameters

Incremental update processing reads and processes raw measurement data to create and maintain DETAIL and DAYS level "to-date" files for the current day.

- o These incremental update database files are maintained on unique z/OS data sets, independent of the standard CA MICS database files, and independent of any other product's incremental update database files. There is one data set each for DETAIL and DAYS level "to-date" data and a single incremental update checkpoint data set for this product in this unit.
- o The incremental update DETAIL and DAYS files can be permanent DASD data sets, or they can be allocated dynamically as needed and deleted after DAILY job processing completes. Optionally, you can keep the incremental update DETAIL and DAYS files on tape, with the data being loaded onto temporary DASD space as needed for incremental update or DAILY job processing. See the INCRDB PERM/TAPE/DYNAM option for more

information.

After activating incremental update, you will use three incremental update facility jobs found in prefix.MICS.CNTL (Note that ccc is the product ID):

- o cccIUALC

You execute this job to allocate and initialize the incremental update checkpoint file, and optionally the incremental update DETAIL and DAYS database files. cccIUALC is generally executed just ONE time.

- o cccIUGDG

You execute this job to add generation data group (GDG) index definitions to your system catalog in support of the INCRDB TAPE option. cccIUGDG is generally executed just ONE time.

- o INCRccc

This is the job you execute for each incremental update. You will integrate this job into your database update procedures for execution one or more times per day to process portions of the total day's measurement data.

Note: The DAILY job is run once at the end of the day. It will perform the final incremental update for the day's data, and then roll-up the incremental DETAIL/DAYS files to the database DETAIL and DAYS timespans and update the week-to-date and month-to-date files.

INCRUPDATE Considerations

- o Overhead

Incremental update is intended to reduce DAILY job resource consumption and elapsed time by offloading a major portion of database update processing to one or more executions of the INCRccc job. In meeting this objective, incremental update adds processing in the INCRccc and DAILY jobs to accumulate data from each incremental update execution into the composite "to-date" DETAIL and DAYS incremental update files, and also adds processing in the DAILY job to copy the incremental update files to the unit database DETAIL and DAYS

timespans. The amount of this overhead and the savings in the DAILY job are site-dependent, and will vary based on input data volume and on the number of times INCRccc is executed each day.

In addition, activating incremental update will cause additional compile-based CPU time to be consumed in the DAYnnn DAILY job step. The increase in compile time is due to additional code included for each file structure in support of the feature. This increase should be static based on the scope of the CA MICS data integration product in terms of files. This compile-time increase does not imply an increase in elapsed or execution time. Incremental update allows I/O bound, intensive processing (raw data inputting, initial CA MICS transformation, etc.) to be distributed outside of the DAILY job. I/O processing is the largest contributor to elapsed time in large volume applications. Thus, the expected overall impact is a decrease in the actual runtime of the DAYnnn job step.

- o Increased "Prime Time" Workload

By offloading work from the DAILY job to one or more INCRccc executions throughout the day, you are potentially moving system workload and DASD work space usage from the "off-hours," (when the DAILY job is normally executed) to periods of the day where your system resources are in highest demand. You should schedule INCRccc executions carefully to avoid adverse impact to batch or online workloads. For example, if your site's "prime shift" is 8:00 AM to 5:00 PM, you might choose to schedule incremental updates for 7:00 AM (just before "prime shift") and 6:00 PM (just after "prime shift"), with the DAILY job executing just after midnight.

- o Increased DASD Usage

The DASD space required for the incremental update DETAIL and DAYS database files is in addition to the DASD space already reserved for the CA MICS database. By default, the incremental update database files are permanently allocated, making this DASD space unavailable for other applications. In general, you can assume that the incremental update database files will require space equivalent to two cycles of this product's DETAIL and DAYS timespan files.

Alternatively, the incremental update database files can

be allocated in the first incremental update of the day and deleted by the DAILY job (see the INCRDB DYNAM option later in this section). This approach reduces the amount of time that the DASD space is dedicated to incremental update, and lets the amount of DASD space consumed increase through the day as you execute each incremental update.

A third option is to store the incremental update database files on tape (see the INCRDB TAPE option). With this approach, the DASD space is required just for the time that each incremental update or DAILY job step is executing. Note that while this alternative reduces the "permanent" DASD space requirement, the total amount of DASD space required while the incremental update or DAILY jobs are executing is unchanged. In addition, the TAPE option adds processing to copy the incremental update files to tape, and to reload the files from tape to disk.

Note: The incremental update checkpoint file is always a permanently allocated disk data set. This is a small data set and should not be an issue.

- o Operational Complexity

Incremental update expands your measurement data management and job scheduling issues. You must ensure that each incremental update and the DAILY job processes your measurement data chronologically; that is, each job must see data that is newer than the data processed by the prior job. By incrementally updating the database, you have more opportunities to miss a log file, or to process a log out of order.

- o Interval End Effects

Each incremental update processes a subset of the day's measurement data, taking advantage of early availability of some of the day's data, for example, when a measurement log fills and switches to a new volume. This can cause a problem if the measurement log split occurs while the data source is logging records for the end of a measurement interval, thus splitting the data for a single measurement interval across two log files. When an incremental update processes the first log file, the checkpoint high end timestamp is set to indicate that this split measurement interval has been processed. Then, when the rest of the measurement interval's data is

encountered in a later update, it can be dropped as duplicate data (because data for this measurement interval end timestamp has already been processed).

Appropriate scheduling of log dumps and incremental updates can avoid this problem. For example, if you plan to run incremental updates at 7:00 AM and 6:00 PM, you could force a log dump in the middle of the measurement interval just prior to the scheduled incremental update executions. This is an extension of the procedure you may already be using for end-of-day measurement log processing. The objective is to ensure that all records for each monitor interval are processed in the same incremental update.

- o Dynamic Allocation

When you activate incremental update and specify TAPE or DYNAM for the INCRDB parameter, dynamic allocation is employed for the incremental update database files. If your site restricts dynamic allocation of large, cataloged data sets, you must use the INCRDETAIL and INCRDAYS parameters to direct incremental update data set allocation to a generic unit or storage class where dynamic allocation is allowed.

- o Data Set Names

The incremental update database files are allocated and cataloged according to standard CA MICS unit database data set name conventions. The DDNAME and default data set names are (where ccc is the product ID):

- o Incremental update checkpoint file,
//IUCKPT DD DSN=prefix.MICS.ccc.IUCKPT,.....
- o Incremental update DETAIL
//IUDETAIL DD DSN=prefix.MICS.ccc.IUDETAIL,.....
- o Incremental update DAYS
//IUDAYS DD DSN=prefix.MICS.ccc.IUDAYS,....

Since these data sets conform to the same data set name conventions as your existing CA MICS data sets, there should be few, if any, data-set-name-related allocation issues. However, it is possible to override the data set names if required. Contact Technical Support at <http://ca.com/support> for assistance if you must change data set names.

INCRDB

This statement is optional. The default is this:

INCRDB PERM

Note: INCRDB is ignored when you specify INCRUPDATE NO.

Specify this statement or take the default, to keep the incremental update database DETAIL and DAYS files on permanently allocated DASD data sets:

INCRDB PERM

Execute the prefix.MICS.CNTL(cccIUALC) job to allocate the incremental update database files.

```
*****
*
* Note: The incremental update checkpoint file is always *
*       a permanently allocated DASD data set.           *
*
*****
```

Specify this to offload the incremental update DETAIL and DAYS files to tape between incremental update executions:

INCRDB TAPE #gdgs UNIT=name

With the TAPE option, the incremental update DETAIL and DAYS DASD data sets are dynamically allocated at the beginning of the incremental update job or DAILY job step, and then are deleted after the job step completes.

- o The first incremental update job of the day allocates and initializes the incremental update database files. At the end of the job, the DETAIL and DAYS files are copied to a new (+1) generation of the incremental update tape data sets. Then the DASD files are deleted.
- o Subsequent incremental update jobs restore the DASD incremental update database files from the current, (0) generation, incremental update tape data sets before processing the input measurement data. At the end of

the job, the DETAIL and DAYS files are copied to a new (+1) generation of the incremental update tape data sets. Then the DASD files are deleted.

- o The DAILY job step also restores the DASD incremental update database files from the (0) generation tape files before processing the input data, but does NOT copy the incremental update database files to tape. Thus, the DAILY job actually creates a new, null (+1) generation.
- o Use the #gdgs parameter to specify the maximum number of incremental update tape generations. The minimum is 2 and the maximum is 99, with a default of 5.
Set the number of generations equal to or greater than the number of incremental updates, including the DAILY job you plan to execute each day. This facilitates restart and recovery if you encounter problems requiring you to reprocess portions of the daily measurement data.
- o Use the optional UNIT=name parameter to specify a tape unit name for the incremental update database output tapes. The default is to use the same tape unit as the input tapes.
- o A special index must be created in your system catalog for each of the incremental update tape data set generation data groups. The prefix.MICS.CNTL(cccIUGDG) job will generate the statements to create the incremental update GDG index definitions.
 - Before each index is built, it is deleted. These DLTX (or DELETE) statements causes an error message if no entry exists. This is done so that you can change the number of entries without having to delete each of the index entries.
 - DLTX and BLDG (or DELETE and DEFINE) fail if there is a cataloged data set with the same index. IDCAMS (or IEHPROGM) issues a message and gives a return code of 8. This issue is not a problem for non-GDG entries or if the GDG already has the desired number of entries.
 - If you want to change the number of entries kept in a GDG with cataloged data sets, do the following:
 1. Uncatalog any existing entries in the GDG.
 2. Delete the index with a DLTX (or DELETE).

3. Create the index with a BLDG (or DEFINE).
 4. Catalog any entries that are uncataloged in step 1.
- o The incremental update tape data set names are as follows, where ccc is the product ID:
 - Incremental update tape DETAIL file
tapeprefix.MICS.ccc.IUXTAPE.GnnnnV00
 - Incremental update tape DAYS file
tapeprefix.MICS.ccc.IUDTAPE.GnnnnV00

```
*****
*
* Note: The INCRDETAIL and INCRDAYS parameters are
*       required when you specify INCRDB TAPE.
*
*****
```

Specify this parameter to allocate dynamically the incremental update DETAIL and DAYS DASD data sets in the first incremental update of the day, and then delete these data sets at the end of the DAILY job step:

INCRDB DYNAM

- o With this option, no space is used for the incremental update database files during the time between the end of the DAILY job step and the beginning of the next day's first incremental update.
- o With this approach, you can set the data set allocation parameters so that the incremental update DETAIL and DAYS data sets start out with a minimum allocation and then grow through secondary allocations as more space is required for subsequent incremental updates. For example, enough space for one incremental update.

```
*****
*
* Note: The INCRDETAIL and INCRDAYS parameters are
*       required when you specify INCRDB DYNAM.
*
*****
```

INCRDETAIL

This statement is required if you specify either of these:

INCRDB TAPE**INCRDB DYNAM**

Otherwise, this statement is optional. There is no default.

Specify this to define data set allocation parameters for the incremental update DETAIL data set (IUDETAIL):

INCRDETAIL data_set_allocation_parameters

Note: INCRDETAIL is ignored when you specify INCRUPDATE NO.

The incremental update DETAIL data set (IUDETAIL) contains the current incremental update detail-level database files, and the DETAIL "to-date" data for the current daily update cycle. You should allocate DASD space equivalent to two cycles of this product's DETAIL timespan data.

If you specified INCRDB PERM (the default), your INCRDETAIL parameter specifications are used in generating the cccIUALC job (where ccc is the product ID).

- o You will execute the cccIUALC job to allocate and initialize the incremental update database and checkpoint files.
- o Omit the INCRDETAIL parameter if you prefer to specify data set allocation parameters directly in the generated prefix.MICS.CNTL(cccIUALC) job.

If you specified INCRDB TAPE or INCRDB DYNAM, your INCRDETAIL parameter specifications are used in incremental update DETAIL data set dynamic allocation during incremental update or DAILY job step execution.

- o The INCRDETAIL parameter is required for the TAPE or DYNAM option.
- o Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the INCRDETAIL keyword on the continuation line.

- o INCRDETAIL accepts the engine/host options documented in the SAS Companion for the z/OS Environment, including STORCLAS, UNIT, SPACE, BLKSIZE, DATACLAS, MGMTCLAS, and VOLSER.

Important! DO NOT SPECIFY THE DISP PARAMETER.

- o You can override the INCRDETAIL data set allocation parameters at execution-time using the //PARMOVRD facility. For more information about execution-time override of dynamic data set allocation parameters, see the PIOM, section 2.3.6.

Example 1:

```
INCRDETAIL STORCLAS=MICSTEMP SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for a new data set being allocated, where:

xxxx is TRK, CYL, or blklen
pp is the primary allocation
ss is the secondary allocation

and ROUND specifies that the allocated space be "rounded" to a cylinder boundary when the unit specified was a block length. ROUND is ignored with the TRK or CYL options.

Example 2 (multiple lines):

```
INCRDETAIL STORCLAS=MICSTEMP UNIT=SYSDA  
INCRDETAIL SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

UNIT - specifies the generic unit for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for

a new data set being allocated.

INCRDAYS

This statement is required if you specify either of these:

INCRDB TAPE

INCRDB DYNAM

Otherwise, this statement is optional. There is no default.

Specify this to define data set allocation parameters for the incremental update DAYS data set (IUDAYS):

INCRDAYS data_set_allocation_parameters

Note: INCRDAYS is ignored when you specify INCRUPDATE NO.

The incremental update DAYS data set (IUDAYS) contains the current incremental update days-level database files, and the DAYS "to-date" data for the current daily update cycle. You should allocate DASD space equivalent to two cycles of this product's DAYS timespan data.

If you specified INCRDB PERM (the default), your INCRDAYS parameter specifications are used in generating the cccIUALC job (where ccc is the product ID).

- o You will execute the cccIUALC job to allocate and initialize the incremental update database and checkpoint files.
- o Omit the INCRDAYS parameter if you prefer to specify data set allocation parameters directly in the generated prefix.MICS.CNTL(cccIUALC) job.

If you specified INCRDB TAPE or INCRDB DYNAM, your INCRDAYS parameter specifications are used in incremental update DAYS data set dynamic allocation during incremental update or DAILY job step execution.

- o The INCRDAYS parameter is required for the TAPE or DYNAM option.

- o Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the INCRDAYS keyword on the continuation line.
- o INCRDAYS accepts the engine/host options documented in the SAS Companion for the z/OS Environment, including STORCLAS, UNIT, SPACE, BLKSIZE, DATACLAS, MGMTCLAS, and VOLSER.

Important! DO NOT SPECIFY THE DISP PARAMETER.

- o You can override the INCRDAYS data set allocation parameters at execution-time using the //PARMOVRD facility. For more information about execution-time override of dynamic data set allocation parameters, see the PIOM, Section 2.3.6.

Example 1:

```
INCRDAYS      STORCLAS=MICSTEMP SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for a new data set being allocated, where:

xxxx is TRK, CYL, or blklen
pp is the primary allocation
ss is the secondary allocation

and ROUND specifies that the allocated space be "rounded" to a cylinder boundary when the unit specified was a block length. ROUND is ignored with the TRK or CYL options.

Example 2 (multiple lines):

```
INCRDAYS      STORCLAS=MICSTEMP UNIT=SYSDA  
INCRDAYS      SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

UNIT - specifies the generic unit for a new data set.
 The name can have up to eight characters.

SPACE - specifies how much disk space to provide for
 a new data set being allocated.

INCRCKPT

This statement is optional. Specify this to override default data set allocation parameters for the incremental update checkpoint data set:

INCRCKPT data_set_allocation_parameters

Note: INCRCKPT is ignored when you specify INCRUPDATE NO.

The incremental update checkpoint data set tracks incremental update job status and the data that has been processed during the current daily update cycle. The incremental update checkpoint is used to detect and block the input of duplicate data during incremental update processing. This data set will be exactly the same size as prefix.MICS.CHECKPT.DATA (the unit checkpoint data set), usually 20K to 200K depending on the prefix.MICS.PARMS(SITE) CKPTCNT parameter (100-9999).

Your INCRCKPT parameter specifications are used in generating the cccIUALC job (where ccc is the product ID).

- o You will execute the cccIUALC job to allocate and initialize the incremental update checkpoint file. If you specified INCRDB PERM, then the cccIUALC job will also allocate the incremental update DETAIL and DAYS database files.
- o By default the incremental update checkpoint data set is allocated as SPACE=(TRK,(5,2)) using the value you specified for the prefix.MICS.PARMS(JCLDEF) DASDUNIT parameter.
- o Omit the INCRCKPT parameter if you prefer to override data set allocation parameters directly in the generated prefix.MICS.CNTL(cccIUALC) job.

Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the INCRCKPT keyword on the continuation line.

INCRCKPT accepts the engine/host options documented in the SAS Companion for the MVS Environment, including STORCLAS, UNIT, SPACE, BLKSIZE, DATACLAS, MGMTCLAS, and VOLSER.

Important! DO NOT SPECIFY THE DISP PARAMETER.

Example 1:

```
INCRCKPT    STORCLAS=MICSTEMP SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for
a new data set being allocated, where:

xxxx is TRK, CYL, or blklen

pp is the primary allocation

ss is the secondary allocation

and ROUND specifies that the allocated space be
"rounded" to a cylinder boundary when the unit
specified was a block length. ROUND is ignored
with the TRK or CYL options.

Example 2 (multiple lines):

```
INCRCKPT    STORCLAS=MICSTEMP UNIT=SYSDA  
INCRCKPT    SPACE=(xxxx,(pp,ss),,,ROUND)
```

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

UNIT - specifies the generic unit for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for
 a new data set being allocated.

INCRSPLIT

This statement is optional and defaults to this:

INCRSPLIT IGNORE

Specify the following if you want the incremental update job for this product to get input measurement data from the output of the SPLITSMF job. The optional `data_set_allocation_parameters` are used by the SPLITSMF job when creating the measurement data file for this product.

INCRSPLIT USE `data_set_allocation_parameters`

Note: INCRSPLIT is ignored when you specify INCRUPDATE NO.

This option would be used when multiple products in a single unit database are enabled to incremental update. The SPLITSMF job performs the same function for incremental update jobs as the DAILY job DAYSMF step performs for the DAYnnn database update steps.

- o The SPLITSMF job dynamically allocates, catalogs, and populates `prefix.MICS.ccc.IUSPLTDS` data sets for each product in the unit database for which you specified both the INCRUPDATE YES and INCRSPLIT USE parameters. These data sets are then deleted after processing by the appropriate INCRccc job.
- o Specify data set allocation parameters, separated by blanks, according to SAS LIBNAME statement syntax. If you need multiple lines, repeat the INCRSPLIT keyword on each continuation line.
- o INCRSPLIT accepts the engine/host options documented in the SAS Companion for the MVS Environment, including STORCLAS, UNIT, SPACE, BLKSIZE, DATACLAS, MGMTCLAS, and VOLSER.

Important! DO NOT SPECIFY THE DISP PARAMETER.

Specify the following or accept the default if you want the

incremental update jobs for this product to get their input measurement data from the data sets specified in the INPUTccc (or INPUTSMF) member of prefix.MICS.PARMS:

INCRSPLIT IGNORE

When you specify INCRSPLIT IGNORE, this product will NOT participate in SPLITSMF job processing.

Example 1:

INCRSPLIT USE STORCLAS=MICSTEMP SPACE=(xxxx,(pp,ss),,,ROUND)

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for a new data set being allocated, where:

xxxx is TRK, CYL, or blklen
pp is the primary allocation
ss is the secondary allocation

and ROUND specifies that the allocated space be "rounded" to a cylinder boundary when the unit specified was a block length. ROUND is ignored with the TRK or CYL options.

Example 2 (multiple lines):

INCRSPLIT USE STORCLAS=MICSTEMP UNIT=SYSDA
INCRSPLIT SPACE=(xxxx,(pp,ss),,,ROUND)

where:

STORCLAS - specifies a storage class for a new data set.
The name can have up to eight characters.

UNIT - specifies the generic unit for a new data set.
The name can have up to eight characters.

SPACE - specifies how much disk space to provide for a new data set being allocated.

DYNAMWAIT

This statement is optional. Specify the following:

DYNAMWAIT minutes

to override the default amount of time, in minutes, the DAILY and/or INCRccc job will wait for an unavailable data set.

Note: This optional parameter is not normally specified.
The system default is adequate for most data centers.

Internal Step Restart and Incremental Update facilities use z/OS dynamic allocation services to create new data sets and to access existing data sets. Data set naming conventions and internal program structure are designed to minimize data set contention. However, if data set allocation does fail because another batch job or online user is already using a data set, DAILY and/or INCRccc processing will wait 15 seconds and then try the allocation again. By default, the allocation will be attempted every 15 seconds for up to 15 minutes. After 15 minutes, the DAILY or INCRccc job will abort.

If data set contention in your data center does cause frequent DAILY or INCRccc job failures, and you are unable to resolve the contention through scheduling changes, you may want to use the DYNAMWAIT parameter to increase the maximum number of minutes the DAILY and/or INCRccc jobs will wait for the data set to become available.

On the other hand, if your data center standards require that the DAILY and/or INCRccc jobs fail immediately if required data sets are unavailable, specify the following:

DYNAMWAIT 0

Note: You can override the DYNAMWAIT parameter at execution-time using the //PARMOVRD facility. For more information about execution-time override of dynamic data set allocation parameters, see the PIOM, section 2.3.6.

The following section discusses enabling this option:

1 - Implement Incremental Update

7.3.1.4.1 Implement Incremental Update

To implement incremental update in the CA MICS Hardware and SCP Analyzer, follow the checklist provided below.

```
*****
*                                                    *
*              IMPLEMENT INCREMENTAL UPDATE          *
*                                                    *
*****
```

- ___ 1. Edit prefix.MICS.PARMS(cccOPS), where (ccc) is the component identifier:
 - o Specify the following:


```
INCRUPDATE YES
```
 - o If you want to store the incremental update database files on tape between incremental updates, specify this:


```
INCRDB TAPE #gdgs
```
 - o If you want to allocate the incremental update database files during the first incremental update of the day and delete these data sets at the end of the DAILY job step, specify this:


```
INCRDB DYNAM
```
 - o If you specified INCRDB TAPE or INCRDB DYNAM, then you must also specify this:


```
INCRDETAIL data_set_allocation_parameters
INCRDAYS    data_set_allocation_parameters
```
 - o If you want the incremental update job for this product to get input measurement data from the output of the SPLITSMF job, specify this:


```
INCRSPLIT USE data_set_allocation_parameters
```
 - o For additional information on related topic, review the documentation for this product on INCRCKPT, INCRDETAIL, INCRDAYS, or INCRSPLIT parameters to override default data set allocation parameters.

- ___ 2. Submit the job in prefix.MICS.CNTL(cccPGEN).
- ___ 3. Edit prefix.MICS.PARMS(JCLGENU) so that it contains two or more lines reading:

DAILY
INCRccc cccIUALC cccIUGDG
- ___ 4. Submit the job in prefix.MICS.CNTL(JCLGENU). Ensure that there are no error messages in MICSLOG or SYSTSPRT, that the MICSLOG contains the normal termination message, BAS10999I, and that the job completes with a condition code of zero.
- ___ 5. Edit the job in prefix.MICS.CNTL(cccIUALC).
 - o Inspect and/or specify data set allocation parameters for the incremental update database and checkpoint files. If you specified INCRDB TAPE or INCRDB DYNAM, the cccIUALC job will only allocate the incremental update checkpoint data set.
 - o Submit the job. Ensure that there are no error messages in MICSLOG or SASLOG, and that the job completes with a condition code of zero.
- ___ 6. If you specified INCRDB TAPE, submit the job in prefix.MICS.CNTL(cccIUGDG) to define generation group indexes for the incremental update DETAIL and DAYS tape data sets. Examine SASLOG, MICSLOG, and SYSPRINT to verify that the generation group indexes were correctly defined.

Note: You may see error messages for the DLTX (or DELETE) statements. This is not a problem. cccIUGDG deletes each index prior to defining it, and an error message is issued if the index does not yet exist (e.g., if this is the first time you ran the cccIUGDG job).

- ___ 7. The following operational job(s) have changed:

DAILY INCRccc

If your site has implemented the operational CA MICS processes in a scheduling product, the JCL may have to be refreshed in that product. See the scheduling product's administrator for the exact processes

involved in updating that product's representation of the CA MICS jobs.

- 8. Implement operational procedures for gathering input measurement data and executing incremental updates (INCRccc) during the day.

You may also need to modify operational procedures for the DAILY job to ensure that processing is limited to input measurement data that has not been input to one of the day's incremental update executions.

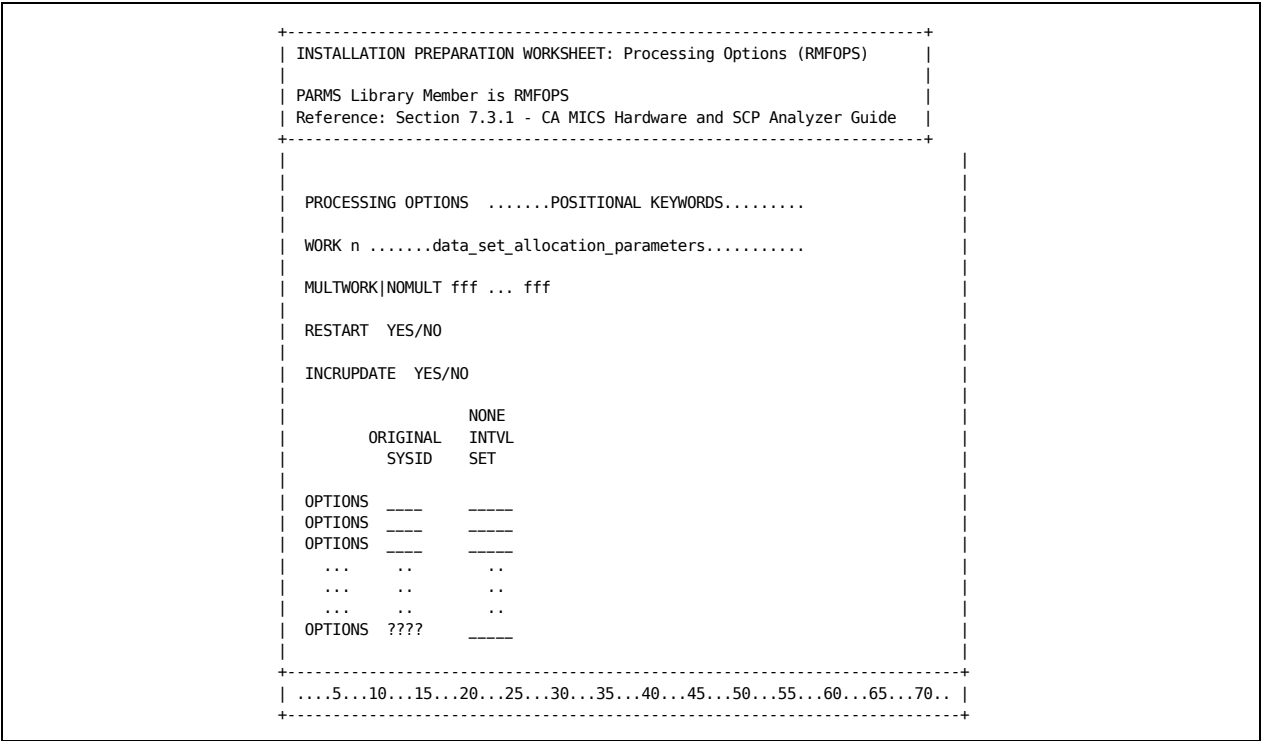


Figure 7-2. Processing Options (RMFOPS)

7.3.2 Database Space Modeling (DBMODEL)

This section describes the information required to define the Analyzer to the Database Space Modeling Facility. Specifically, the user must provide values for the cycle (data retention) definitions. The special considerations for defining the FILE input statements to the Database Space Modeling facility are discussed.

Section 2.3.4 of the PIOM, Database Space Modeling Facility, explains how these values are used in estimating the DASD requirements of the database, and how the user can input these values to the modeling facility.

This section covers the following topics:

- 1 - Data Retention Specifications (FILE Statements)
- 2 - DBMODEL Input Statements

7.3.2.1 Data Retention Specifications (FILE Statement)

The unit level prefix.MICS.PARM(DBMODEL) data retention specifications tell the CA MICS database how many cycles of each file, in each supported timespan, to save both online and in archive mode for each database unit. Figures 7-3a and 7-3b are the worksheets for collecting this information.

For each file, the worksheet lists the default cycle retention period in parentheses for each timespan (DETAIL, DAYS, WEEKS, MONTHS, YEARS, and the TABLES area).

If '00' shows as the retention value for the timespan, the file is not supported in that timespan. See the RMFGENIN FILE statement discussion in Section 7.2 for more information about files that are not supported in the DETAIL timespan.

You must specify a cycle retention limit greater than zero if a file has been defined in its RMFGENIN FILE statement to be active in the timespan. Likewise, you must specify a cycle retention limit of 0 if a file has been defined in its RMFGENIN FILE statement to be inactive in the timespan.

Note that a file is turned on or off in a particular timespan on a complex-wide level through the RMFGENIN FILE statement definitions; you customize the cycle retention values on a unit level basis through the prefix.MICS.PARM(DBMODEL) parameter.

EXAMPLE

The prefix.MICS.PARMS(DBMODEL) FILE statement below illustrates how to enter the information for a file whose RMFGENIN FILE statement specifies that the file is inactive in the YEARS timespan and TABLES data area.

```
FILE RMF HARCPU 01 33 09 06 00 00 053 024
```

Note: The archive definitions have no impact on the size of the database and can be specified whether or not the weekly and/or monthly archive history files have actually been activated.

+-----+ INSTALLATION PREPARATION WORKSHEET: Database Data Retention Definitions +-----+									
PARMS Library Member is DBMODEL									
Reference: Section 7.3.2.1, CA MICS Hardware and SCP Analyzer Guide									
+-----+ File Online Database Retention Archive Cut-Off Name DAYS WEEKS MONTHS YEARS TABLES WEEKS MONTHS Name __ () __ () __ () __ () __ () __ () __ () __ () +-----+									
HARCCU	__ (01)	__ (08)	__ (04)	__ (06)	__ (0)	00 (00)	__ (027)	__ (024)	
HARCFA	__ (01)	__ (10)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCFC	__ (01)	__ (10)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCFD	__ (01)	__ (10)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCFH	__ (01)	__ (10)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCFP	__ (01)	__ (10)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCFR	__ (01)	__ (10)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCFs	__ (01)	__ (10)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCME	__ (10)	__ (30)	__ (53)	__ (12)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCML	__ (10)	__ (30)	__ (53)	__ (12)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCMT	__ (10)	__ (30)	__ (53)	__ (12)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCMX	01 (01)	00 (00)	00 (00)	00 (00)	0 (0)	00 (00)	000 (000)	000 (000)	
HARCPU	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCRA	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCRF	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCRK	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCRP	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARCVA	__ (01)	__ (08)	__ (04)	__ (06)	__ (0)	00 (00)	__ (027)	__ (024)	
HARDTA	00 (00)	__ (01)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARDVA	__ (01)	__ (08)	__ (04)	__ (00)	__ (0)	00 (00)	__ (027)	__ (000)	
HARELS	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARERS	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARFDC	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARFDP	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARIPU	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARLPC	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARPCA	__ (01)	__ (15)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARPHY	00 (00)	__ (01)	__ (01)	__ (01)	__ (0)	00 (00)	__ (000)	__ (000)	
HARRRA	__ (01)	__ (08)	__ (04)	__ (06)	__ (0)	00 (00)	__ (027)	__ (024)	
HARRSV	__ (02)	__ (00)	__ (00)	__ (00)	__ (0)	00 (00)	__ (000)	__ (000)	
HARSGA	00 (00)	__ (01)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARVPA	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
HARXPS	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
SCPARD	__ (02)	__ (00)	__ (00)	__ (00)	__ (0)	00 (00)	__ (000)	__ (000)	
SCPENQ	__ (01)	__ (08)	__ (04)	__ (00)	__ (0)	00 (00)	__ (027)	__ (000)	
SCPIOC	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
SCPIOP	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
SCPKRN	__ (08)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
SCPLCA	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
SCPLCU	00 (00)	__ (15)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (000)	
SCPPAG	__ (01)	__ (33)	__ (09)	__ (06)	__ (0)	00 (00)	__ (053)	__ (024)	
+-----+									

Figure 7-3a. Data Retention Specifications Worksheet (Part 1 of 2)

+-----+ INSTALLATION PREPARATION WORKSHEET: Database Data Retention Definitions +-----+									
PARMS Library Member is DBMODEL									
Reference: Section 7.3.2.1, CA MICS Hardware and SCP Analyzer Guide									
+-----+									
Online Database Retention Archive Cut-Off									
File	DETAIL	DAYS	WEEKS	MONTHS	YEARS	TABLES	WEEKS	MONTHS	
Name	__()	__()	__()	__()	__()	__()	__()	__()	
+-----+									
SCPPSD	__(01)	__(08)	__(04)	__(00)	__(0)	00(00)	__(027)	__(000)	
SCPSRC	__(02)	__(00)	__(00)	__(00)	__(0)	00(00)	__(000)	__(000)	
SCPSRD	__(08)	__(00)	__(00)	__(00)	__(0)	00(00)	__(000)	__(000)	
SCPSRS	__(08)	__(33)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
SCPSWP	__(01)	__(33)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
SCPTRC	__(02)	__(00)	__(00)	__(00)	__(0)	00(00)	__(000)	__(000)	
SCPVSM	__(07)	__(30)	__(06)	__(06)	__(0)	00(00)	__(053)	__(024)	
SCPVSU	__(07)	__(30)	__(06)	__(06)	__(0)	00(00)	__(053)	__(024)	
SCPXCA	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
SCPXCM	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
SCPXCY	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLM_EA	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLM_EC	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLM_ED	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLM_EM	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLM_EW	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLMRGP	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLMSEI	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLMSEJ	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLMSEA	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLMSEC	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLMSED	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLMSEM	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
WLM SVC	__(01)	__(10)	__(09)	__(06)	__(0)	00(00)	__(053)	__(024)	
+-----+									

Figure 7-3b. Data Retention Specifications Worksheet (Part 2 of 2)

7.3.2.2 DBMODEL Input Statements

The DBMODEL member of prefix.MICS.PARMS provides the input to the Database Space Modeling Facility.

Using the information collected on the worksheet in Figures 7-3a and 7-3b, code and update the DBMODEL member. To actually perform the space modeling, submit the jobs as described in Section 2.3.4.2 of the PIOM.

7.3.3 INPUTRDR and INPUTRMF PARMs Members

The prefix.MICS.PARMS members INPUTRDR and INPUTccc are used to specify the input data for the Data Integration Application component step.

To determine whether INPUTccc or INPUTRDR or both are used, review the DAYSMF, SMFRECORDING, and SMFDRCTR specifications in prefix.MICS.PARMS(JCLDEF). Consider the following table and comments for the row:

ROW	PARAMETER IN JCLDEF	INPUTRDR WHERE USED	INPUTccc WHERE USED
---	-----	-----	-----
1	DAYSMF OFF	Not Used	Each Comp Step
2	DAYSMF FILE(S) ...	DAYSMF Step	Not Used
3	Only 1 SMF Comp	Comp Step	Not Used
4	SMFDIRECTOR	Not Used	Comp Step
5	DAYSMF EXCLUDE ccc	Not Used	Comp ccc Step
6	SMFRECORDING ccc	It depends	Comp ccc Step

Row 1: When DAYSMF OFF is specified in JCLDEF, then the prefix.MICS.PARMS(INPUTccc) member is used for each component step.

Row 2: When DAYSMF FILES PERMANENT or TEMPORARY is specified in JCLDEF, the prefix.MICS.PARMS(INPUTRDR) member is used in DAYSMF.

Row 3: If there is only one SMF recording component in this unit, DAYSMF will not be generated and the component step with SMF input data will use the prefix.MICS.PARMS(INPUTRDR) member.

Row 5: If the use of DAYSMF EXCLUDE ccc results in only one component remaining as DAYSMF eligible, DAYSMF will automatically be deactivated, and row 1 applies.

Row 6: Some components accept data from both SMF and non-SMF sources, such as CIC and VCA. In this case, the component may optionally input data from the INPUTRDR member, but will always include the INPUTccc member. Refer to the component's guide.

For details on the DAYSMF parameters, see PIOM section 2.3.3.2.1, JCL Option Definitions (JCLDEF).

For details on deactivating DAYSMF, see PIOM section 5.10, Removing the DAYSMF Step from the DAILY Job.

The following sections describe how to specify the input data set JCL definitions.

- 1 - INPUTRDR PARMS Member JCL Definition
- 2 - INPUTRMF PARMS Member JCL Definition

7.3.3.1 INPUTRDR PARMS Member JCL Definition

The INPUTRDR member of prefix.MICS.PARMS defines the DD statements that specify the SMF input data for all products in the units that use SMF data. The INPUTSMF DD statements are used by the DAYSMF step, which reads and splits the SMF data into separate files, one for each CA MICS product.

The INPUTRDR member defines the input SMF data sets when DAYSMF FILES PERMANENT or TEMPORARY is specified in the prefix.MICS.PARMS(JCLDEF) member.

An INPUTSMF DD statement is required for each SMF data source. A worksheet for preparing the INPUTRDR member is provided below. If you change the contents of the INPUTRDR member, you must regenerate the CA MICS DAILY job using either JCLGENU or JCLGEN in prefix.MICS.CNTL.

For example, if you want to read your SMF data from a data set named SMF.DAILY.DATA, you would change the INPUTRDR member to contain the name of the SMF data set as follows:

```
//INPUTSMF DD DISP=SHR,DSN=SMF.DAILY.DATA
```

If there is only one SMF recording component in this unit, DAYSMF will not be generated and the component step with SMF input data will use the prefix.MICS.PARMS(INPUTRDR) member directly.

If DAYSMF has been deactivated by the DAYSMF OFF statement specified in the prefix.MICS.PARMS(JCLDEF) member, then each component step will read its input from their corresponding prefix.MICS.PARMS(INPUTccc) member.

<pre>+-----+ INSTALLATION PREPARATION WORKSHEET: SMF Input DD Statements PARMs Library Member is INPUTRDR +-----+ This definition is required to specify the DD statement for SMF data which will be read by the DAILY CA MICS job. //@ //@ WARNING: ALWAYS MAKE CHANGES IN PARMs(INPUTRDR) AND NOT //@ &CNTL(DAILY) . //@ CHANGES MADE TO &CNTL(DAILY) //@ WILL BE GONE WHEN DAILY REGENERATED BY JCLGEN. //@ //INPUTSMF DD DISP=SHR,DCB=BUFNO=3,DSN=_____ // DD DISP=SHR,DCB=BUFNO=3,DSN=_____ +-----+</pre>

Figure 7-5. INPUTRDR JCL Definition Worksheet

7.3.3.2 INPUTRMF PARMS Member JCL Definition

The INPUTRMF member of prefix.MICS.PARMS contains the DD statements to specify the input data for the CA MICS Hardware and SCP Analyzer. The //INPUTSMF DD and, optionally, the //SMFDRCTR DD statements are used by the DAY020 step of the DAILY job.

The INPUTRMF member contains the input SMF data sets when ANY of the following JCLDEF options is used:

- o DAYSMF OFF is specified
- o SMFDRCTR/SMFDIRECTOR RMF is specified
- o DAYSMF EXCLUDE RMF is specified

A //INPUTSMF DD statement is required for each SMF data source.

A //SMFDRCTR DD statement is only required when CA SMF Director split indices are used.

A worksheet for preparing the INPUTRMF member is provided below in Figure 7-6.

If you change the contents of the INPUTRMF member, you must regenerate the CA MICS DAILY job using either JCLGENU or JCLGEN in prefix.MICS.CNTL.

NOTE: If your site has CA SMF Director installed, you can use it to extract specific SMF record types and subtypes at SMF dump time. For more details on this product feature see section 6.9, CA MICS and CA SMF Director Interface, of this guide.

<pre>+-----+ INSTALLATION PREPARATION WORKSHEET: INPUTRMF JCL Definitions PARMs Library Member is INPUTRMF +-----+ This definition is required to specify the DD statement for data that will be read by the DAILY CA MICS job. //@ //@ WARNING: ALWAYS MAKE CHANGES IN PARMs(INPUTRMF) AND NOT //@ &CNTL(DAILY). //@ CHANGES MADE TO &CNTL(DAILY) //@ WILL BE GONE WHEN DAILY REGENERATED BY JCLGEN. //@ //INPUTSMF DD DISP=SHR,DCB=BUFNO=5,DSN=_____ // DD DISP=SHR,DCB=BUFNO=5,DSN=_____ //@ //SMFDRCTR DD DISP=SHR,DCB=BUFNO=5,DSN=_____ // DD DISP=SHR,DCB=BUFNO=5,DSN=_____ +-----+</pre>

Figure 7-6. INPUTRMF JCL Definition Worksheet

7.3.4 Physical Hardware Data Element Assignment (RMFPHYDE)

This section shows you how to assign values to Physical Hardware (HARPHY) file data elements through RMFPHYDE parameters.

This facility is intended for assignment of power consumption ratings to mainframe hardware, enabling the calculation of hardware power use and cost. While pre-supplied power related HARPHY data elements are delivered in RMFGENIN for that purpose, this facility is designed to be customer extensible via the addition of any desired hardware related data elements. Additionally, the _USRSPHY user exit is provided to perform any desired calculations.

Generation of the RMFPHYDE parm member is optional. If RMFPHYDE is present in prefix.MICS.PARMS during execution of RMFPGEN, the \$RMFPHY format will be created. The \$RMFPHY format is subsequently used during DAY020 daily processing to assign values to HARPHY data elements as specified in RMFPHYDE.

Physical Hardware Data Element Assignment Processing Steps

```

----- .----- .
|          | .   DETAIL .
| RMFPHYCP | <--|.    .|
|          | | ----- |
----- |   HARDVA |
      |   HARIPU |
      v           .
/         -----
/         |
| RMFPHYDU |
|          |
-----
      |
      v
-----
|-Update   |
| RMFPHYDU |
|          |
|-Copy to  |
| RMFPHYDE |
-----
| qwerty  |

```

1. Run RMFPHYCP. Creates prefix.MICS.PARMS member RMFPHYDU. RMFPHYDU contains one Key ID statement (CPC, DEV, or LDV) for each physical CPC or device, or logical device group.

2. Update RMFPHYDU. Insert Data Element Assignment statements after Key ID statements to assign specific Data Element values.

The DEFAULT statement may be used to indicate that

----- v /----- / RMFPHYDE ----- v -----		follow-on Data Element Assignment statements apply globally.
----- v ----- RMFPGEN . MUOLIB . --> . ----- ----- \$RMFPHY ----- v -----		Once updates are complete, copy or rename RMFPHYDU to RMFPHYDE.
----- v ----- RMFPGEN . MUOLIB . --> . ----- ----- \$RMFPHY ----- v -----		3. Run RMFPGEN. RMFPGEN creates the \$RMFPHY format used to assign values for data elements specified in RMFPHYDE.
----- v ----- DAY020 . DAYS . --> . ----- ----- HARPHY _USRSPHY . -----		4. Daily processing. DAY020 uses the \$RMFPHY format to obtain values for each physical CPC or device, or logical device group that had a Data Element Assignment statement, either explicit or via a DEFAULT assignment statement. If any computed or accumulated HARPHY data elements are required, code must be placed in the _USRSPHY user exit.

Optional Statements

CPC, DEV and LDV Key ID statements
DEFAULT statement
Data Element Assignment statement

Comments are coded by beginning the statement with an
asterisk (*). Blank statements are allowed.

The following sections explain each of the statements
specified in prefix.MICS.PARMS(RMFPHYDE) and the utility used
to create them.

1 - Physical Hardware Create Parms (RMFPHYCP) Utility

- 2 - CPC, DEV, and LDV Key ID Statements
- 3 - DEFAULT Statement
- 4 - Data Element Assignment Statement

7.3.4.1 Physical Hardware Create Parms (RMFPHYCP) Utility

The Physical Hardware Create Parms (RMFPHYCP) Utility creates parm member RMFPHYDU in your prefix.MICS.PARMS library. This parm member can then be modified to provide values to be assigned during the creation of the Physical Hardware (HARPHY) file. The generated RMFPHYDU parm member will contain CPC, DEV, and LDV Key ID statements representing hardware found in the Individual Processor Activity (HARIPU) and Device Activity (HARDVA) files.

Note: Customers who install CA MICS for the first time must execute a daily processing update in order to populate the HARIPU and HARDVA files before executing the RMFPHYCP utility.

The RMFPHYCP utility can be run in any unit that has the HARPHY file activated and where data element assignments are required. RMFPHYCP does not create the RMFPHYDE member used by RMFPGEN, but instead creates the RMFPHYDU PARM member, leaving an existing RMFPHYDE production member unmodified. Once RMFPHYDU is updated, it can be copied or renamed to RMFPHYDE and RMFPGEN can be run. RMFPGEN creates the \$RMFPHY format in the unit level MUOLIB. \$RMFPHY is subsequently used by the DAY020 daily processing to assign values to HARPHY data elements.

The first time RMFPHYCP is run in a given unit, the RMFPHYDU parm member will be created exclusively from the HARDVA and HARIPU files, comprised of only CPC, DEV, and LDV statements. Any subsequent customer updates to add Data Element Assignment are then made and RMFPHYDU is copied or renamed to RMFPHYDE in prefix.MICS.PARMS.

Subsequent runs of the RMFPHYCP utility to discover any new physical CPCs or devices, or logical device groups, will create a new RMFPHYDU prefix.MICS.PARMS member. However, when an existing RMFPHYDE member is found in prefix.MICS.PARMS, its information will be retained (including any customer updates) and any new CPC, DEV, and LDV statements for physical CPCs or devices, or logical device groups not represented in the existing RMFPHYDE parms member will be added to create the new RMFPHYDU prefix.MICS.PARMS member.

Note: Executing RMFPHYCP will overlay the existing RMFPHYDU member in prefix.MICS.PARMS. Be sure to copy or rename RMFPHYDU to RMFPHYDE prior to re-running RMFPHYCP.

To execute the Physical Hardware Create Parm (RMFPHYCP) Utility, invoke CA MICS Administrator Utilities (MWF;5;4) and select option 9:

```
----- CA MICS Administrator Utilities -----  
Option ==>  
  
1 - Compression Candidacy Report  
2 - Compression Recommendation Reports  
3 - Component ESSENTIAL and DERIVED Options Report  
4 - Database Modification Report  
5 - Database Health Check Utility  
6 - Space Utilization and Reporting  
7 - Inactive Data Elements Report  
8 - SAS Format/Informat Print Utility  
9 - Physical Hardware Parm Creation  
T - Tutorial  
X - Exit
```


7.3.4.2 CPC, DEV, and LDV Key ID Statements

CPC, DEV, and LDV Key ID statements identify the specific physical hardware CPC or device, or logical device group present in the HARPHY file. Customer supplied Data Element Assignment statements are added following the CPC, DEV, or LDV statement and apply to the HARPHY observation matching the preceeding CPC, DEV, or LDV statement's key variables.

CPC, DEV, and LDV statements are not intended to be customer coded. We also recommend that these statements not be modified. They contain a composite key whose composition varies depending on Key ID statement type.

- o CPC statement

Identifies a physical CPC, identified by:
PHYSERNB, PHYPLANT, and PHYMODEL.

- o DEV statement

Identifies a physical device, identified by:
PHYSERNB, PHYMANUF, PHYPLANT, PHYDTP, and PHYMODEL.

- o LDV statement

Identifies a logical device group, identified by:
PHYLDSID, PHYLDCLS, and PHYLDTYP.

The CPC statement has the following format:

CPC physernb phyplant phymodel

physernb = the value input from HARIPU data element
 CPCSEQNB for the physical CPC.

phyplant = the value input from HARIPU data element
 CPCPLANT for the physical CPC.

phymodel = the value input from HARIPU data element
 CPCMMID for the physical CPC.

Sample CPC statement:

```
*PHY PHYSICAL      PH PHY
*CLS SERIAL NUMBER PL MODEL
```

```
*-----  
CPC 00000000000AE100 02 E26
```

The DEV statement has the following format:

DEV physernb phymanuf phyplant phydtyp phymodel

physernb = the value input from HARDVA data element
 CTLUSERN for the physical device.

phymanuf = the value input from HARDVA data element
 CTLUMANU for the physical device.

phyplant = the value input from HARDVA data element
 CTLUPLNT for the physical device.

phydtyp = the value input from HARDVA data element
 DEVPTYP for the physical device.

phymodel = the value input from HARDVA data element
 DEVPDMOD for the physical device.

Sample DEV statements:

```
*PHY PHYSICAL   PHY PH PHY   PHY  
*CLS SERIAL NUM  MAN PL DEVTYP MOD  
*-----  
DEV 000001340870 IBM 13 003590 B11  
DEV 100000002084 EMC 07 002107 900
```

The LDV statement has the following format:

LDV phylsid phylcls phyltyp

phylsid = the value input from HARDVA data element
 SYSID for the logical device group.

phylcls = the value input from HARDVA data element
 DEVCLASS for the logical device group.

phyltyp = the value input from HARDVA data element
 DEVTYPE for the logical device group.

Sample LDV statements:

```
*PHY SYS  LOGICAL  LOG
*CLS ID    DEVCLASS DEVTYP
*-----
LDV CA31  COMMGEAR TP
LDV CA31  CTC      CTC
```

7.3.4.3 DEFAULT Statement

The DEFAULT statement is used to specify default Data Element Assignment statements for those HARPHY observation that do not have a specific value assigned for a given CPC, DEV, or LDV key.

For example, each physical device corresponding to a DEV statement may have an unique power consumption value, but the rate the utility charges for a kilowatt hour may be constant. Thus, each DEV statement would have an unique assignment for power consumption, but a default would be used for the assignment of the rate the utility company charges.

```
DEFAULT
  PHYKWHUS = 100  PHYKWHRT = .12
DEV key1
  PHYKWHUS = 120
DEV key2
  PHYKWHUS = 140
DEV key3
  PHYKWHUS = 160
DEV key4
DEV key5
DEV key6
DEV key7
```

In this example, for HARPHY type DEV observations matching keys 1-7, HARPHY data element PHYKWHRT would be assigned a value of .12. For observations matching keys 4-7, PHYKWHUS would be assigned a value of 100, for keys 1-3, PHYKWHUS would be assigned 120, 140 and 160, respectively.

Only one DEFAULT assignment is allowed for a given Data Element. The last one encountered will take effect.

The DEFAULT statement has the following format:

```
DEFAULT
```

Sample DEFAULT statement:

```
DEFAULT
```

7.3.4.4 Data Element Assignment Statements

Data Element Assignment statements are used to assign a customer defined value to a Data Element defined in the HARPHY file for a given Physical CPC, Physical Device, or Logical Device Group.

Data Element Assignment statements follow:

- the CPC, DEV, or LDV Key ID statement representing the Physical CPC, Physical Device, or Logical Device Group they apply to, or,
- a DEFAULT statement

in the RMFPHYDE prefix.MICS.PARMS member.

Data Element Assignment statements have the following format:

dataelem = value

dataelem = the name of the data element - must be
 defined in RMFGENIN for file HARPHY

value = the value to be assigned to the data
 element - for numeric data elements,
 value must be a valid SAS numeric value.

Sample Data Element Assignment statements:

PHYKWHUS = 100 PHYKWHRT = .12

or

PHYKWHUS = 100

PHYKWHRT = .12

Chapter 8: INSTALLATION

After specifying the parameters documented in Chapter 7 of this guide, you can install the CA MICS Hardware and SCP Analyzer using the checklists in Section 3.8 of the PIOM.

Chapter 9: PROCESSING

Creating and maintaining a large data base system such as CA MICS requires a closely monitored approach to the periodic updating processes. The CA MICS Data Base, just like any other information data base (such as inventory control or personnel), requires a systematic, monitored update process.

It is vital to the system's effectiveness that the data base be updated daily to build the required daily, week-to-date, month-to-date, and year-to-date files accurately. This chapter discusses operational considerations for the MVS Hardware and SCP Analyzer to assist in daily operation of this product.

This section contains the following topics:

[9.1 Processing Overview](#) (see page 1130)

[9.2 Daily Update Processing Flow](#) (see page 1132)

9.1 Processing Overview

The Hardware and SCP Analyzer makes use of the standard database update and summarization facilities of CA MICS to maintain its data in the online and offline databases. RMF data is supplied to CA MICS in the DAY020 step of the DAILY database update job.

The daily update step:

- o Reads and formats the raw data
- o Maintains data integrity by eliminating duplicate data
- o Adds new cycles to the DETAIL timespan
- o Summarizes activity by hour for DAYS timespan
- o Adds new cycles to the DAYS timespan
- o Updates the week-to-date and month-to-date cycles

A more detailed description of DAY020 processing is presented in the next section.

Weekly processing is performed by the WEEK020 and WEEK300 steps. The WEEK020 step splits the week-to-date files into a new week-to-date and a new weekly '01' cycle. The WEEK300 step creates the weekly offline database files.

Monthly processing is performed by the MONTH020 and MONTH300 steps. The MONTH020 step splits the month-to-date files into a new month-to-date and a new monthly '01' cycle. The MONTH300 step creates the monthly offline database files.

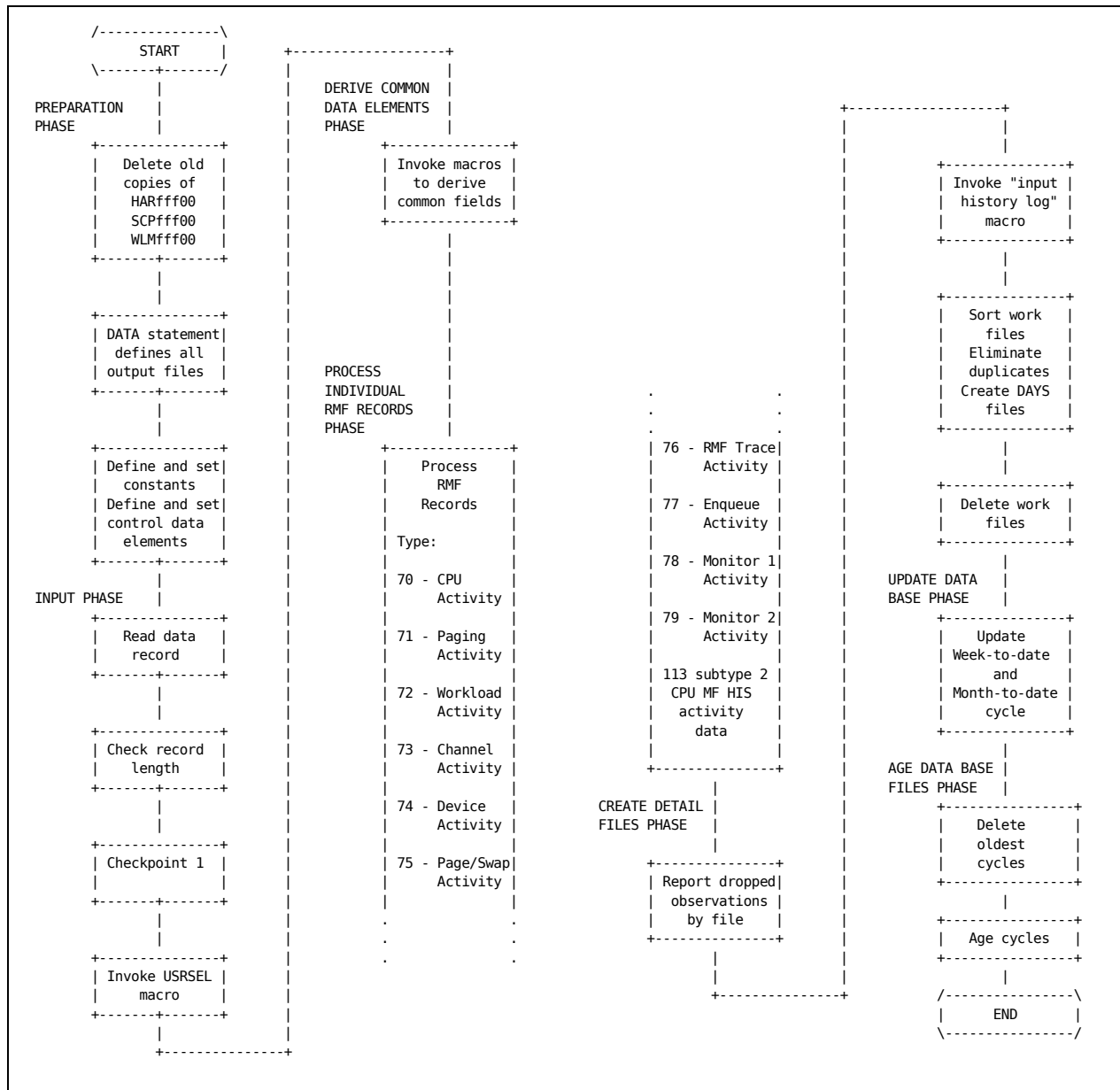


Figure 9-1 Processing Flow Diagram

9.2 Daily Update Processing Flow

The DAY020 step of the DAILY job processes RMF information. Step DAY020 consists of the following phases:

- 1 - Preparation Phase
- 2 - Input Phase
- 3 - Derive Common Data Elements Phase
- 4 - Process Individual RMF Records Phase
- 5 - Create Detail Files Phase
- 6 - Update Data Base Phase
- 7 - Age Data Base Files Phase

9.2.1 Preparation Phase

During the Preparation Phase, the Hardware and SCP Analyzer defines all of the output files with a DATA statement. Constants are defined and set to their initial values along with internal control data elements, data elements and formats.

9.2.2 Input Phase

The Input Phase reads data records from the file defined by the INPUTSMF dd statement. It checks for a VSAM input file and adjusts its internal pointers accordingly. The record length is checked to verify that the record is of the proper format. The record type is checked and non-RMF records are ignored. The user exit USRSEL is executed if defined.

During the input phase, the checkpoint file is checked to prevent data which has already been input to CA MICS from being input to CA MICS a second time.

9.2.3 Derive Common Data Elements Phase

The Derive Common Data Elements Phase reads the STARTTS and DURATION data elements and computes the ENDTS. It then executes macros to generate common data elements such as SYSID, CPUMODEL, etc.

9.2.4 Process Individual RMF Records Phase

The Process Individual RMF Records phase extracts the data elements from the RMF type 70 (subtypes 1 and 2), 71, 72 (subtype 3 and 5), 73, 74 (subtypes 1, 2, 3, 4, 5, 7, and 8), 75, 76, 77, 78 (subtypes 2 and 3), 79 (subtypes 2, 3, and 6), and Hardware capacity, reporting, and statistics (type 113 subtype 2) records. Other records are ignored.

9.2.5 Create Detail Files Phase

The Create Detail Files Phase reports the number of observations dropped by user request for each RMF file. It then executes the Input History Log exit (USRIHL) if it has been defined. The work files that have been created are sorted and duplicate entries are dropped. The DAYS.HARfff00, DAYS.SCPfff00, and DAYS.WLMfff00 data files are created during this sort process. The WORK.HARfff00, WORK.SCPfff00, and WORK.WLMfff00 files are then deleted.

9.2.6 Update Data Base Phase

The Update Data Base Phase updates the week-to-date and month-to-date cycles of each file as necessary.

9.2.7 Age Data Base Files Phase

The Age Data Base Files Phase deletes the oldest cycles of the DETAIL and DAYS cycles and replaces them with the next oldest cycle and so forth until the new interim cycle (00) becomes the current cycle (01). This phase also replaces the existing week-to-date and month-to-date cycles (00) with the updated cycles (W0 and M0 respectively).

Chapter 10: MODIFICATION

The CA MICS Hardware and SCP Analyzer is tailored primarily through the use of options and parameters, file and data element tailoring, and exits. This chapter describes the exits that are available during the DAILY update processing.

Tailoring the Hardware and SCP Analyzer is important. If you are using all the defaults shipped with the product, you are probably wasting DASD space. To ensure efficient space utilization, tailoring is required.

The following section is provided:

- 1 - Standard User Exits

This section contains the following topics:

[10.1 Standard User Exits](#) (see page 1136)

10.1 Standard User Exits

A number of user exit points are defined within CA MICS. Each of these points corresponds to a position in the CA MICS logic where user modification:

- o Is likely to occur, based on our experience
- o Is unlikely to compromise CA MICS database and operational integrity
- o Is relatively easy to document and understand

Using the CA MICS exit facilities to modify CA MICS logic is the safest method of system modification. If you follow the material in this section, you can perform a substantial amount of system customization without causing any undue ramifications when you apply standard vendor maintenance to the product.

Before implementing an exit, the system administrator should determine whether the required modification can be accomplished by means of parameter modification or file tailoring. If an exit must be used, be sure to see Chapter 9 of this guide for details on where the exit is called during the DAILY processing. Full details of CA MICS exit processing are described in the System Modification Guide, Section 4.3, User Exit Facilities.

The following sections identify the user exits available for the Hardware and SCP Analyzer processing, provide a general overview of the product's processing logic, and describe in detail each of the user exits.

- 1 - Available User Exits
- 2 - General Exits
- 3 - Output Exits

10.1.1 Available User Exits

There are two types of user exits that you can use to modify CA MICS logic: general exits and product exits.

GENERAL EXITS

The general exits are used by all installed products. They allow the insertion of user exit routines that extend CA MICS logic.

PRODUCT EXITS

Product exits apply only to the product for which they are provided. They are classified as to their purpose and are comprised of input, output, parameter-related, and special exits.

The input exits are used during the input phase of the product update process.

The output exits are used when records are being written to the CA MICS Database.

The parameter-related exits are also user exits, but are defined as part of the standard CA MICS installation process and are normally associated with other parameters or options. For example, the Account Code Routine is a user exit routine for entering the values for account codes that were defined in a separate but related installation.

Special exits are those that are classified as neither input, output, nor parameter-related. The calculation of a user-defined variable is an example of a type of special exit.

There are no input, parameter-related, or special exits in the Hardware and SCP Analyzer. The user exits for the Hardware and SCP Analyzer are identified below:

General Exits

USRIHL - Input History Log Exit
USRSEL - Input Record Selection Exit

Product Output Exits

USRS_EA - Report Class File Exit
USRS_EC - Report Class Resource Consumption File Exit

USRS_ED - Report Class General Execution Delay File Exit
USRS_EM - Report Class Response Time File Exit
USRS_EW - Report Class Subsystem Delay States File Exit
USRSARD - Address Space Activity File Exit
USRSCFA - CF Channel Path File Exit
USRSCFC - CF Connectivity File Exit
USRSCFD - CF Duplexing Activity File Exit
USRSCFP - CF Configuration and Activity File Exit
USRSCFR - CF Request File Exit
USRSCFS - CF Structure File Exit
USRSCME - CPU Measurement Facility Engine File Exit
USRSCML - CPU Measurement Facility LPAR File Exit
USRSCMT - CPU Measurement Facility EngType File Exit
USRSCPU - CPU Activity File Exit
USRSCRA - Crypto Accelerator Activity File Exit
USRSCRF - ICSF Services Activity File Exit
USRSCRK - Crypto PKCS11 Coprocessor Activity File Exit
USRSCRP - Crypto CCA Coprocessor Activity File Exit
USRSDTA - Device Type Activity File Exit
USRSDVA - Device Activity File Exit
USRSELS - ESS Link Statistics File Exit
USRSENG - Resource Enqueue Activity File Exit
USRSERS - ESS Rank Statistics File Exit
USRSFDC - FICON Director Connector File Exit
USRSFDP - FICON Director Port Activity File Exit
USRSIOC - I/O Queuing Configuration File Exit
USRSIOP - I/O Processor Activity File Exit
USRSIPU - Individual Processor Activity File Exit
USRSKRN - USS Kernel Activity File Exit
USRSLCA - Logical Channel/CU Activity File Exit
USRSLCU - Logical Control Unit Activity File Exit
USRSLPC - PR/SM Logical Partition Activity File Exit
USRSPAG - Paging Activity File Exit
USRSPCA - Physical Channel Activity File Exit
USRSPHY - Physical Hardware File Exit
USRSPSD - Page Data Set Activity File Exit
USRSRGP - Resource Group File Exit
USRSRRA - RAID Rank Activity File Exit
USRSRSV - Hardware Reserve Activity File Exit
USRSSDE - Service Definition File Exit
USRSSDS - Service Class Subsystem Delay States File Exit
USRSSSEA - Service Class File Exit
USRSSSEC - Service Class Resource Consumption File Exit
USRSSSED - Service Class General Execution Delay File Exit
USRSSSEM - Service Class Response Time File Exit
USRSSGA - Storage Group Activity File Exit
USRSSRC - Real Storage/CPU/SRM Activity File Exit
USRSSRD - Serialization Delay Details File Exit
USRSSRS - Serialization Delay System File Exit

USRSSVC - Service Client File Exit
USRSSWP - Swapping Activity File Exit
USRSTRC - Trace Activity File Exit
USRSVPA - PR/SM Logical Processor Activity File Exit
USRSVSM - Virtual Storage System Usage File Exit
USRSVSU - Virtual Storage Private Usage File Exit
USRSXCA - XCF Path Activity File Exit
USRSXCM - XCF Member Activity File Exit
USRSXCY - XCF System Activity File Exit
USRSXPS - ESS Extent Pool Statistics File Exit
USRXDVA - Detail Device Activity File Exit

10.1.2 General Exits

General exits are invoked for all products. They are presented here to identify the special uses available for the Hardware and SCP Analyzer.

Each exit description includes the name and title, a description of its purpose, and when it is invoked. It also shows which data elements are available and any special considerations.

```
+-----+
| U S R S E L   | - File Processing Selection Exit
+-----+
```

DESCRIPTION: USRSEL allows access to each record processed by any product. It can be used to alter input data formats or to select or exclude specific records.

INVOCATION: This exit gains control after a detail input record has been read and before the record formats have been defined.

ACCOUNTING INTERFACE: No interface is provided.

USES: This exit may be used to delete records before processing or to alter the data, such as SMF SYSID.

ELEMENTS AVAILABLE:

ROUTINE - The name of the routine that invoked this exit. To use this exit in the Hardware and SCP Analyzer, test for:

```
ROUTINE = 'DYRMFFMT'
SMFRTYPE - the record type of the input record
ORGSYSID - the original SYSID from the SMF record
ENDTS    - the time when the record was written to SMF
```

CODING RESTRICTIONS: For coding restrictions, refer to the System Modification Guide, Section 4.3.2.1.

SPECIAL NOTES: Because this exit is used by all products, the source code is located in member #BASEXIT of the appropriate source libraries.

SAMPLE USER EXIT: This exit will set all SYSIDs of TEST to SYS1 for all RMF records.

MACRO _USRSEL

```
/******  
/* Convert SYSIDs of TEST to SYS1.*  
/******  
IF ROUTINE='DYRMFFMT' AND ORGSYSID='TEST'  
THEN ORGSYSID='SYS1';  
%
```

```
+-----+  
| U S R I H L | - Examine Input History Log  
+-----+
```

DESCRIPTION: USRIHL permits inspection of the DETAIL timespan checkpoint file immediately following processing of all input records in the format routine.

INVOCATION: This exit is referenced in code that passes the DETAIL timespan checkpoint file. This code reads the checkpoint file as an integrity check on that file and, in the process, allows the user to inspect the file's contents.

ACCOUNTING INTERFACE: No interface is provided.

USES: This exit is normally not of use to the Hardware and SCP Analyzer.

ELEMENTS AVAILABLE: All elements in the ADMIHL file.

CODING RESTRICTIONS: For coding restrictions, refer to the System Modification Guide, Section 4.3.2.1.

SPECIAL NOTES: Because this exit is used by all products, the source code is located in member #BASEXIT of the appropriate source libraries.

10.1.3 Output Exits

This section provides a description of the Hardware and SCP Analyzer standard user exits that are invoked during the daily update processing flow.

```
+-----+
| U S R S f f f | - File Selection Exits
+-----+
```

DESCRIPTION:

The USRSfff exits provide the ability to modify or select observations immediately prior to output. The files available (fff) are:

HAR	(fff)	SCP	(fff)	WLM	(fff)
	CCU				SDE
	CFC		ARD		RGP
	CFD		ENQ		SVC
	CFH		IOC		SDS
	CFP		IOP		_EW
	CFR		KRN		SEA
	CFS		LCA		_EA
	CPU		LCU		SEC
	CRA		PAG		_EC
	CRF		PSD		SEM
	CRP		SRC		_EM
	CVA		SWP		SED
	DTA		TRC		_ED
	DVA		VSM		
	ELS		VSU		
	ERS		XCA		
	FDC		XCM		
	FDP		XCY		
	IPU				
	LPC				
	PCA				
	PHY				
	RRA				
	RSV				
	SGA				
	VPA				
	XPS				

INVOCATION:

These exits are invoked immediately before output of the file.

ACCOUNTING INTERFACE:

No interface is provided.

USES:

The exit allows elements to be modified and observations to be excluded from the output file. To exclude an observation, set SKIP_REC to 1.

ELEMENTS AVAILABLE:

All elements in the file are available.

CODING RESTRICTIONS:

This exit must not issue the RETURN or DELETE statements, nor use a subsetting IF, since its invocation assumes the entire DATA step will be executed.

For more information, see System Modification Guide, section 4.3.2.2.

SPECIAL NOTES:

1. The USRSDVA and USRXDVA exits are both invoked during the initial output to the HARDVA Device Activity file. The USRSDVA follows the same conventions as all other raw data input exits, and any record subsetting affects not only the DETAIL, but all higher timespan files as well.

The USRXDVA exit, however, only affects the DETAIL timespan HARDVA file. You may restrict DETAIL HARDVA timespan reporting to only include specific devices or device types without any effect on higher HARDVA timespan files.

2. The USRSCVA and USRSDVA user exits can be employed at either the detail and/or days levels. The internal variable ROUTINE indicates the timespan on which the exit is operating:
 - At DETAIL level, ROUTINE has the DYRMFFMT value.
 - At DAYS level, ROUTINE has the #fffDSUM value, where fff is the file identifier (CVA or DVA).

USER EXIT SAMPLES:

EXIT: USRSDVA Device Activity File Exit

This exit for the HARDVA file illustrates the ability to execute different code depending on which timespan it operates on.

```
MACRO _USRSDVA
  SELECT(ROUTINE);
  WHEN('DYRMFFMT') /* SAS code for DETAIL */
  WHEN('#DVADSUM') /* SAS code for DAYS */
  OTHERWISE;
END;
%
```

This exit for the HARDVA file will only process Type 74 Device Activity records for DASD or tape, and only those that have activity during the RMF interval.

```
MACRO _USRSDVA
  /*****/
  /* Process only DASD or Tape. */
  /* Do not process if no activity. */
  /*****/
  IF NOT (DEVCLASS='DASD' OR DEVCLASS='TAPE') OR
  (DVACNN=0 AND DVASSC=0) THEN SKIP_REC=ONE;
%
```

This exit for the HARDVA file will always set VOLSER to blanks for tape devices.

```
MACRO _USRSDVA
  /*****/
  /* Set VOLSER to blanks if Tape. */
  /*****/
  IF DEVCLASS='TAPE' THEN VOLSER=' ';
%
```


Appendix A: MESSAGES

Messages

This appendix lists all messages generated by the CA MICS Hardware and SCP Analyzer. Some messages are generated during the processing of the control statements, while others are caused by various conditions in the data found during the processing. The messages are listed in ascending numerical sequence and include the full text of the message, the type, the reason for the message, appropriate user action, and applicable references to documentation.

These type codes categorize the following messages:

Information	A note that documents a CA MICS option or potentially important feature in the data.
Warning	A condition is present in either the data or the control statements that does not affect CA MICS Hardware and SCP Analyzer operation, but that might lead to unexpected results.
Error	A problem with a control statement that will prevent a successful run of the product has been encountered. Execution is stopped after all control statements are processed.

The message text often includes references to information that is contained in a control statement or the values of permanent or temporary variables that were created during CA MICS processing. In the description below, the message text contains a word beginning with a percent sign (%), which indicates that a value will be substituted into the text at execution time. For example, message RMF00104 reads as follows:

```
SHORT RECORD DROPPED:
SYSID: %SYSID   ORGSYSID: %ORGSYSID
END TIME STAMP: %ENDTSCH
RECORD TYPE: %SMFRTYPE
```

A possible version of the printed message in the MICSLOG might be:

```
SHORT RECORD DROPPED:
SYSID: SYS1   ORGSYSID: SYS1
END TIME STAMP: 10SEP90:15:00:00.00
RECORD TYPE: 78
```

```
+-----+
| RMF00101 |
+-----+
```

```
TEXT:   Unknown RMF version found in input data.
        CA MICS will continue processing this data as
        though it was from %RMFLEVEL.
        RMF version encountered in data:   %RMFVER
        CA MICS highest known RMF version: %RMFLEVEL
```

```
TYPE:   Warning
```

```
REASON: Data from an unknown version of RMF has been
        read. It will be processed as though it came
        from the latest known version.
```

```
ACTION: Contact CA Technical Support.
```

```
REFERENCES: None
```

```
+-----+
| RMF00102 |
+-----+
```

```
TEXT:   Unexpected swap placement sections found in type
        71 paging activity record:
```

SYSID: %SYSID ORGSYSID: %ORGSYSID End time
stamp: %ENDTSCH

TYPE: Information

REASON: A swap placement section for an undefined swap
reason was encountered in DAY020.

ACTION: Contact CA Technical Support.

REFERENCES: None

```
+-----+  
| RMF00103 |  
+-----+
```

TEXT: %WRK_FILE user exit dropped %WRK_SKIP obs.

TYPE: Information

REASON: The user-defined exit USRSfff caused several
records to be dropped from the fff file.

ACTION: None.

REFERENCES: None

```
+-----+  
| RMF00104 |  
+-----+
```

TEXT: Short record dropped:
type=%SMFRTYPE/%RCDSUBTP, SYSID=%SYSID,
ORGSYSID=%ORGSYSID, time stamp=%ENDTSCH.
%MSGTEXT

TYPE: Warning

REASON: An error in writing the RMF records has caused a
short record. It will be ignored and processing
will continue.

ACTION: If this is a one-time occurrence, it is not a
matter of great concern. If it happens
repeatedly, investigate for the possible
corruption of your SMF records.

REFERENCES: None

```
+-----+  
| RMF00106 |  
+-----+
```

TEXT: Obsolete RMF version found in input data.
 CA MICS will not process records prior to the
 lowest RMF version supported.
 RMF version encountered in data: %RMFVER
 Lowest supported RMF version: %RMFMNLVL

TYPE: Information

REASON: Data from an obsolete version of RMF has been
 read. The data will be dropped.

ACTION: Remove the obsolete RMF records from the DAILY
 processing.

REFERENCES: None

```
+-----+  
| RMF00108 |  
+-----+
```

TEXT: A truncated, malformatted or non-RMF record has
 been detected in the input file before initial
 checkpoint processing. MICSLOG messages showing
 counts of records read, processed, and deleted
 will be incorrect. RMF00109W messages will
 follow for each bad record.

TYPE: Warning

REASON: CA MICS must be able to read the SYSID and
 timestamp of each RMF input record in order to
 begin checkpoint processing. CA MICS determined
 that an input record was either from a non-RMF
 source, or was too short to contain the SYSID or
 timestamp.

 This message is issued only for the first bad
 record detected. Message RMF00109W is issued for
 each bad record.

ACTION: Investigate source of damaged or non-RMF records.

REFERENCES: None

```
+-----+  
| RMF00109 |  
+-----+
```

TEXT: Invalid record count: %WEIRDREC
Input file relative rcd number: %_N_ %MSGTEXT

TYPE: Warning

REASON: CA MICS issues this message each time it
encounters a record that is from a non-RMF source
or is too short to contain a SYSID or timestamp.
Also, see message RMF00108W.

ACTION: Investigate the source of the damaged or non-RMF
records.

REFERENCES: None

```
+-----+  
| RMF00111 |  
+-----+
```

TEXT: There are %MSGVAR Coupling Facility Cache Data
Sections than expected in a spanned 74_4 record.
Potential data corruption in HARCFH file for:
SYSPLEX: %SYSPLEX SYSNAME: %SYSNAME
SYSID: %SYSID CFYSYSNM: %CFYSYSNM
CFYCFNM: %CFYCFNM ENDTS: %ENDTSCH

TYPE: Warning

REASON: This message is issued if there is a mismatch
(%MSGVAR can take the values "more" or "less")
between the actual number of cache data sections
available in a continuation type 74 subtype 4
Coupling Facility record, and the total number of
sections expected for all cache structures
belonging to the original record.

The data will be processed but there is a
potential corruption in the HARCFH file for all
observations identified by the key sequence
reported in the message.

ACTION: Contact CA Technical Support.

REFERENCES: None

```
+-----+  
| RMF00112 |  
+-----+
```

TEXT: Some unsupported spanned SMF %SMFRTYPE subtype
%RCDSUBTP records were found in the input data.

TYPE: Warning

REASON: This message is issued if there are broken
records in the input data for which support has
not yet been validated. These are records that
required continuation records because the raw
data would not fit in a single 32 KB record. The
data will be processed as if they were standard
(not spanned) records.

ACTION: Contact CA Technical Support.

REFERENCES: None

```
+-----+  
| RMF00113 |  
+-----+
```

TEXT: Some SMF type 113 Hardware Instrumentation
Record(s) discarded because there are no suspend
record(s) available to perform delta processing

SYSID	Record Count	(normally one record per logical processor assigned to LPAR)
-----	-----	

TYPE: Warning

REASON: This message appears if any SMF type 113 interval
records are encountered that required delta
processing, but there was no HARCMX suspend file
record available. The records are discarded.

This message should only be seen if SMF type 113
records for a particular LPAR are input into a
DAILY update DAY020 step for the first time, and
the first record encountered for a LPAR processor
was a HISINTYP='INTER' or 'LAST' record, meaning

that delta processing was required to determine the true interval values.

The HARCXM file maintains suspend records to allow delta processing to span DAILY update runs. If this message appears, and the SMF type 113 data does not contain data from new LPARS, investigate the situation.

ACTION: Contact CA Technical Support.

REFERENCES: None

```
+-----+
| RMF00114 |
+-----+
```

TEXT: %BSYS %BCOUNT

TYPE: Warning

REASON: This message provides SYSID values and record counts for message RMF00113.

ACTION: Refer to message RMF00113.

REFERENCES: None

```
+-----+
| RMF00115 |
+-----+
```

TEXT: Some SMF type 113 Hardware Instrumentation Record(s) discarded because delta processing of counter fields yielded negative values

	Record
SYSID	Count
-----	-----

TYPE: Warning

REASON: This message appears if the normal delta processing (which subtracts the counter value of the previous interval record from the current interval record counter value), resulted in a negative value.

There is no way to determine if the problem was due to a raw data field overflow, or because an IPU was varied offline, then online again. The true interval value cannot be determined, so the IPU level record is discarded.

To find more details about the first 50 records deleted, search for the text string "RMF00115" in the DAY020 SASLOG.

ACTION: If this message is seen frequently, contact CA Technical Support.

REFERENCES: None

```
+-----+  
| RMF00116 |  
+-----+
```

TEXT: %BSYS %BCOUNT

TYPE: Warning

REASON: This message provides SYSID values and record counts for message RMF00115.

ACTION: Refer to message RMF00115.

REFERENCES: None

```
+-----+  
| RMF00125 |  
+-----+
```

TEXT: A HARPHY DAYS timespan setting of 'Y' was detected and is not allowed. HARPHY DAYS timespan has been set to 'E'.

TYPE: Warning

REASON: The HARPHY DAYS timespan setting must be 'E' in order to invoke the #PHYDSUM routine. The HARPHY DAYS timespan setting is set to 'E' by RMFCGEN and processing continues.

ACTION: None.

REFERENCES: None


```
+-----+  
| RMF00126 |  
+-----+
```

TEXT: DETAIL timespan is not supported for HARPHY and
 has been turned off.

TYPE: Warning

REASON: The HARPHY file does not support the DETAIL
 timespan.

ACTION: None.

REFERENCES: None

```
+-----+  
| RMF00130 |  
+-----+
```

TEXT: RMFCGEN file dependency check beginning.

TYPE: Information

REASON: RMFCGEN is starting to check file dependencies.

ACTION: None.

REFERENCES: None

\$SCOL

```
+-----+  
| RMF00131 |  
+-----+
```

TEXT: RMFCGEN file dependency check successful.

TYPE: Information

REASON: The Analyzer's file dependencies were met.

ACTION: None.

REFERENCES: None

```
+-----+
```

```
| RMF00132 |
+-----+
```

TEXT: RMFCGEN file dependency not met:
 %FD_FIL1 has been deactivated.
 %FD_FIL2 is active but needs %FD_FIL1 also
 active.
 You must either activate %FD_FIL1 or
 deactivate %FD_FIL2 before rerunning RMFCGEN.

TYPE: Error

REASON: In tailoring RMFCGENIN, a file was deactivated
 that is required for a file that is active.

ACTION: Either reactivate the required file or deactivate
 the dependent file in RMFCGENIN; then rerun
 RMFCGEN.

REFERENCES: SMG, Section 6.2.2

```
+-----+
| RMF00133 |
+-----+
```

TEXT: RMFCGEN file dependency check error(s).

TYPE: Error

REASON: File dependencies were not met.

ACTION: Review the MICSLOG and correct the errors
 reported. Rerun RMFCGEN.

REFERENCES: None

\$SCOL

```
+-----+
| RMF00134 |
+-----+
```

TEXT: RMFCGEN file dependency not met:
 %FD_FIL3 have been deactivated.
 %FD_FIL2 is active but needs %FD_FIL4 also
 active.
 You must either activate %FD_FIL4, or
 deactivate %FD_FIL2 before rerunning RMFCGEN.

TYPE: Error

REASON: In tailoring RMFGENIN, several files were deactivated, but at least one of them is required for a file that is active.

ACTION: Either reactivate one of the required files or deactivate the dependent file in RMFGENIN; then rerun RMFCGEN.

REFERENCES: SMG, Section 6.2.2

```
+-----+  
| RMF00135 |  
+-----+
```

TEXT: RMFCGEN file dependency not met:
PHY is active but requires both DVA and IPU to be active, therefore, PHY has been turned off in all time spans.
RMFCGEN processing will continue.

TYPE: Warning

REASON: File dependencies were not met.

ACTION: None.

REFERENCES: None

\$SCOL

```
+-----+  
| RMF00210 |  
+-----+
```

TEXT: Reporting environment:
CPU Model: %CPUMOD
MVS Level: %MVSLEVEL
RMF Version: %RMFVER

TYPE: Information

REASON: The CPU model, MVS level, and RMF version are reported by the Hardware and SCP Analyzer.

ACTION: None.

REFERENCES: None

```
+-----+
| RMF00220 |
+-----+
```

TEXT: File %FFF is not set to ESSENTIAL ALL.
Reports might contain missing or incomplete values.

TYPE: Warning

REASON: A postprocessor report that is being run requires the use of CA MICS file %FFF, which has been defined with ESSENTIAL element options of INITIAL or ONLY. The reports might contain missing or incomplete values.

ACTION: For information on ESSENTIAL element options, see the reference listed below.

REFERENCES: PIOM, Section 2.3.1.8

\$SCOL

```
+-----+
| RMF00400 |
+-----+
```

TEXT: Validating PARMs member RMFOPS.

TYPE: Information

REASON: This message is generated at the start of the validation of prefix.MICS.PARMS(RMFOPS) during execution of RMFPGEN.

ACTION: None.

REFERENCES: Section 7.3.1

```
+-----+
| RMF00401 |
+-----+
```

TEXT: %LINE
Keyword not recognized: %KEYWORD

TYPE: Error

REASON: An invalid keyword was encountered in the line

printed with the error message.

ACTION: Correct the invalid keyword and rerun RMFPGEN.

REFERENCES: Section 7.3

```
+-----+  
| RMF00402 |  
+-----+
```

TEXT: %LINE
SYSID is not 1 to 4 chars in length.
SYSID=%KEYWORD2

TYPE: Error

REASON: The SYSID specified was greater than four
characters in length in the RMFOPS OPTIONS or
DEFAULT statement.

ACTION: Correct the invalid SYSID in
prefix.MICS.PARMS(RMFOPS) and rerun RMFPGEN.

REFERENCES: Section 7.3.1

\$SCOL

```
+-----+  
| RMF00403 |  
+-----+
```

TEXT: The maximum number of SYSIDs has been exceeded.
Contact CA Technical Support.

TYPE: Error

REASON: The number of unique SYSID specifications exceeds
the maximum allowed in the RMFOPS statements.

ACTION: Contact CA Technical Support.

REFERENCES: Section 7.3.1

```
+-----+  
| RMF00404 |  
+-----+
```

TEXT: %LINE
The trace option must be "NONE", "INTVL", or

"SET". "%VARX" is invalid.

TYPE: Error

REASON: Only the NONE, INTVL, or SET option can be specified in an RMFOPS OPTIONS statement. The character string shown in the error message was found instead.

ACTION: Correct the invalid OPTION specification in prefix.MICS.PARMS(RMFOPS) and rerun RMFPGEN.

REFERENCES: Section 7.3.1

\$SCOL

```
+-----+
| RMF00405 |
+-----+
```

TEXT: Required statement not found. Statement type=OPTIONS

TYPE: Error

REASON: The RMFOPS member of the PARMS library must contain at least one OPTIONS statement.

ACTION: Add the required OPTION statement to prefix.MICS.PARMS(RMFOPS) and rerun RMFPGEN.

REFERENCES: Section 7.3.1

```
+-----+
| RMF00406 |
+-----+
```

TEXT: Error(s) were found in RMFOPS PARMS definition. RMFPGEN aborted. Correct the error(s) and rerun RMFPGEN.

TYPE: Error

REASON: At least one error was encountered during validation of the RMFOPS member of the PARMS library.

ACTION: Correct the errors listed in other messages in the MICSLOG and rerun RMFPGEN.

REFERENCES: Section 7.3.1

\$SCOL

```
+-----+  
| RMF00407 |  
+-----+
```

TEXT: RMFOPS validation completed successfully.

TYPE: Information

REASON: This message is generated at the successful completion of the RMFOPS PARMs member validation process.

ACTION: None.

REFERENCES: Section 7.3.1

```
+-----+  
| RMF00410 |  
+-----+
```

TEXT: Validating PARMs member RMFPHYDE.

TYPE: Information

REASON: This message is generated at the start of the validation of prefix.MICS.PARMs(RMFPHYDE) during execution of RMFPGEN.

ACTION: None.

REFERENCES: Section 7.3.1

\$SCOL

```
+-----+  
| RMF00411 |  
+-----+
```

TEXT: A DEFAULT, CPC, DEV, or LDV statement must precede user data element assignment statements.
RMFPHYDE statement in error:
%ERR_STMT

TYPE: Error

REASON: This message is generated when a user data element is encountered that is not preceded by a

valid DEFAULT, CPC, DEV, or LDV statement.

ACTION: Reposition the statement in error so it follows a
DEFAULT, CPC, DEV, or LDV statement and rerun
RMFPGEN.

REFERENCES: Section 7.3.1

```
+-----+
| RMF00412 |
+-----+
```

TEXT: User data element assignment statements
must be specified in the form:
dataelem = value
RMFPHYDE statement in error:
%ERR_STMT

TYPE: Error

REASON: This message is generated when a user data
element assignment statement is incorrectly
specified.

ACTION: Correct the statement in error and rerun RMFPGEN.

REFERENCES: Section 7.3.1

\$SCOL

```
+-----+
| RMF00413 |
+-----+
```

TEXT: Data element: %NF_VAR specified on data element
assignment statement was not found in RMFGENIN
for file HARPHY.
RMFPHYDE statement in error:
%ERR_STMT

TYPE: Error

REASON: This message is generated when a user data
element assignment statement's specified data
element was not present in RMFGENIN when the last
RMFCGEN was run.

ACTION: Correct the statement in error and rerun RMFPGEN.

REFERENCES: Section 7.3.1


```
+-----+  
| RMF00414 |  
+-----+
```

TEXT: Data element: %NF_VAR specified on data element assignment statement was not assigned a numeric value.
RMFPHYDE statement in error:
%ERR_STMT

TYPE: Error

REASON: This message is generated when a user data element assignment statement's specified data element is numeric, but the value specified is not numeric.

ACTION: Correct the statement in error and rerun RMFPGEN.

REFERENCES: Section 7.3.1

\$SCOL

```
+-----+  
| RMF00417 |  
+-----+
```

TEXT: Duplicate \$RMFPHY entry found and deleted.
Duplicate key:
%START

TYPE: Warning

REASON: This message is generated when a duplicate data element assignment is found under a DEFAULT, CPC, DEV, or LDV statement. The third line of the message (%START) shows the statement, key, and data element. DEFAULT statements have no key.

Examples: DEFAULT PHYKWHUS
 CPC000000000000FBAA602HA1 PHYKWHRT

The duplicate assignment statement is ignored.

ACTION: No action is necessary because the duplicate statement is ignored. To avoid the message, you can edit prefix.MICS.PARMS(RMFPHYDE) and delete the duplicate data element assignment statement.

REFERENCES: Section 7.3.4

```
+-----+  
| RMF00418 |  
+-----+
```

TEXT: RMFPHYDE validation completed successfully.

TYPE: Information

REASON: This message is generated at the successful completion of the RMFPHYDE PARMS member validation process.

ACTION: None.

REFERENCES: Section 7.3.1

\$SCOL

```
+-----+  
| RMF00419 |  
+-----+
```

TEXT: GENERATION COMPLETED FOR \$RMFPHY FORMAT.

TYPE: Information

REASON: This message is generated at the successful creation of the \$RMFPHY Format.

ACTION: None.

REFERENCES: Section 7.3.1

```
+-----+  
| RMF00420 |  
+-----+
```

TEXT: RMFPGEN Internal error, array limit exceeded.
Contact CA Technical Support.

TYPE: Error

REASON: An internal logic error has occurred.

ACTION: Contact CA Technical Support.

REFERENCES: None

\$SCOL

```
+-----+  
| RMF00421 |  
+-----+
```

TEXT: Existing prefix.MICS.PARMS(RMFPHYDE) member found. Its data will be combined with new data detected in this run to create the new prefix.MICS.PARMS(RMFPHYDU) member.

TYPE: Information

REASON: This message is generated when an existing prefix.MICS.PARMS(RMFPHYDE) is found.

ACTION: None.

REFERENCES: None

```
+-----+  
| RMF00422 |  
+-----+
```

TEXT: prefix.MICS.PARMS(RMFPHYDU) member successfully generated.

TYPE: Information

REASON: This message is generated at the successful creation of the prefix.MICS.PARMS(RMFPHYDU) member.

ACTION: None

REFERENCES: None

\$SCOL

```
+-----+  
| RMF00510 |  
+-----+
```

TEXT: Unexpected values for workload manager response time distribution map.
SYSPLEX:%SYSPLEX SYSNAME:%SYSNAME
#: FOUND: EXPECTED:
1:%SEMRTG1:%WRK_TG1
2:%SEMRTG2:%WRK_TG2
3:%SEMRTG3:%WRK_TG3

```
4:%SEMRTG4:%WRK_TG4
5:%SEMRTG5:%WRK_TG5
6:%SEMRTG6:%WRK_TG6
7:%SEMRTG7:%WRK_TG7
8:%SEMRTG8:%WRK_TG8
9:%SEMRTG9:%WRK_TG9
10:%SEMRTG10:%WRK_TG10
11:%SEMRTG11:%WRK_TG11
12:%SEMRTG12:%WRK_TG12
13:%SEMRTG13:%WRK_TG13
%MSG510S RMF00510W messages were suppressed.
```

TYPE: Warning

REASON: The RMF type 73 subtype 2 Workload Activity record contains a set of response time percentage cut-off values used to determine counts of transactions that completed within certain percentages of the response time goal. These values are documented as a set of fixed values. This message is generated if the values found in the record do not match the expected, documented values.

ACTION: Contact CA Technical Support.

REFERENCES: None

\$SCOL

```
+-----+
| RMF99999 |
+-----+
```

TEXT: %MSGTEXT

TYPE: Information

REASON: Prints a line in the MICSLOG.

ACTION: None.

REFERENCES: None

Appendix B: Data Dictionary

The Data Dictionary is only available at your site, where it has been customized to your configuration and your product change level.

To see the Data Dictionary at your site, follow the instructions under Document Browse in the Document Access guide.