

# CA MICS® Resource Management

## Tape Analyzer Option Guide

Release 12.9



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# Chapter 1: OVERVIEW

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This chapter provides an overview of the CA MICS Tape Analyzer Option (TAP), which provides IT management information for both tape management systems and virtual tape subsystems in two separate components:

- o Tape Library Management (TLM)
- o Virtual Tape Subsystems (VTS)

One or both of these components can be used, based on the needs at your data center. Both components process raw data and build database files that can be used to analyze and manage specific technologies.

This section contains the following topics:

- [1.1 TLM Component](#) (see page 9)
- [1.2 VTS Component](#) (see page 14)
- [1.3 Reports](#) (see page 21)

## 1.1 TLM Component

This section introduces the Tape Library Management (TLM) component of the CA MICS Tape Analyzer Option. The TLM component provides IT management information for tape volume and tape data set ownership and usage.

Tape management system information is gathered by the TMCC collector job. This information is subsequently processed by the TLM component, which executes as step DAY091 of the CA MICS daily update job. The processed data is organized into the TLM component database files.

The following sections provide more information about the TLM component:

- 1 - Capabilities
- 2 - Features
- 3 - Files
- 4 - Prerequisites

### 1.1.1 Capabilities

The TLM component provides data integration and reporting capabilities that aid in the analysis and reporting of tape library managed volumes and data sets in these areas:

- o Tape Data Set Management

The TLM component files provide the basis for tape data set analysis. For example, frequency of access, cartridge utilization, and a variety of other access and usage patterns can be analyzed to determine if tape is the appropriate storage medium.

- o Cost Accounting

The TLM component data set file supports chargeback for tape data set media occupancy. An account routine exit is provided for customized assignment of site-specific account codes to individual tape data sets. A standard interface to the CA MICS Accounting and Chargeback Option permits tape data set accounting using megabyte/hours as the basic chargeback resource element.

- o Capacity Planning

The TLM component database files can be used to analyze scratch tape volume availability, percent cartridge utilization, and other volume and data set related metrics that can serve as the basis for tape library capacity management.

- o Performance Management

Many of the data elements captured in the TLM component files contain values that are important to performance management. For example, tape mount duration is a critical component of job turnaround time. Therefore, small, frequently used data sets are easier to access from DASD than from tape.

- o Management Reporting and Service Policy Creation

Information extracted directly from the TLM component database files can be grouped and summarized to create useful tape library management-level reports. Reports or one-page management summaries that compare actual performance against proposed service level objectives allow the creation of policies that are rational and

achievable. Once policies are established, reports can be created to track actual performance against objectives.

- o Security

Information in the database supports tracking and reporting on tape data set encryption status, necessary to ensure compliance with policies that keep critical data safe. Tape volume categorization can be used to ensure that specific data sets reside on volume groups used for off-site storage and disaster planning.

For more information on the TLM component files, see Chapter 2, Usage Guidelines.

## 1.1.2 Features

Major features of the TLM component are discussed below:

- o TMCC Collector

The TMCC Collector, provided with the TLM component and described in Appendix C, collects the tape data set and tape volume data processed by the TLM component.

The TMCC Collector accesses tape management system catalogs and builds a raw data file that is subsequently processed by the TLM component daily update step. The TMCC collector maintains a control data set that permits it to accurately determine megabyte/hour occupancy for individual tape data sets.

All tape management systems share common characteristics and similar measurements. The common format of the TMCC raw data file allows a single set of TLM component database files to be populated, regardless of the tape management system providing the data. This permits ease of transition when migrating from one tape management system to another.

### o General Product Functionality and Flexibility

#### User Exits

-----

A wide range of standard user exits support tailoring of individual database file content. User exits are described in section 10.1, TLM User Exits.

#### VOLGROUP Definition Routine

-----

A tape volume grouping (VOLGP RTE) routine supports the categorization and grouping of volumes by site-defined criteria using data element Volume Group (VOLGROUP). The VOLGROUP data element is a summarization key for the TLM component data files. Coding of this routine is discussed section 7.1.3.2, TLM VOLGROUP Definition Routine (VOLGP RTE).

#### Organizational Ownership

-----

An account code specification routine (TLMACCT) supports the definition of TLM component account codes, typically used to describe the organizational structure.

An account code derivation routine (TLMACRT) assigns values to each defined account code for individual tape data set records based on user-specified criteria. Both the TLMACCT and TLMACRT routines are described in section 7.1.2, TLM Component Complex Level Parameters.

#### Scalability and Recoverability

-----

The TLM component supports standard CA MICS scalability and recovery options such as multiple work files, internal step restart, and incremental update.

#### Database Tailoring

-----

Standard and TLM component specific database tailoring features support customization of database content to meet specific data center requirements.

#### Data Dictionary

-----

A data dictionary, found in Appendix B, describes the content, meaning, and raw data source for each data element in the TLM component database files.

#### Data Transformation

-----

Encoded values in tape library catalogs are transformed into easy-to-understand data elements, adding value to database file content.

#### Protection Against Duplicate Data

-----

Duplicate data is automatically detected and eliminated during daily processing.

#### o Interface Capabilities

CA MICS database files are summarized in the same manner across all products. Information from the TLM component files can be easily combined with other component files to compare and correlate tape data set and volume activity with workload and device activity created by other CA MICS components.

## 1.1.3 Files

Tape library data gathered by the TMCC collector is processed and organized into TLM component database files.

The Tape Management Catalog (TMC) Information Area contains the following database files, providing comprehensive tape data set, media usage, and overall tape library information:

- o Tape Data Set File    TMCTMD
- o Tape Volume File     TMCTMV

These files are discussed in section 5.1.2, TMC Information Area Files.

## 1.1.4 Prerequisites

The TLM component processes data collected from any of the following tape management products:

- o CA 1 (r) Tape Management at Release 5.5 or higher
- o CA TLMS (r) Tape Management at Release 5.5 or higher
- o DFSMS/MVS Removable Media Manager (RMM) supported at z/OS 1.4 or higher

## 1.2 VTS Component

This section introduces the Virtual Tape Subsystem (VTS) component of the CA MICS Tape Analyzer Option. The VTS component provides management information for virtual tape subsystem performance and capacity.

The VTS component, which executes as step DAY096 of the daily update job, processes raw performance data generated by virtual tape subsystems. The processed data is converted into the VTS component database files.

The following sections provide more information about the VTS component:

- 1 - Capabilities
- 2 - Features
- 3 - Files
- 4 - Requirements

### 1.2.1 Capabilities

The VTS component provides data integration and reporting capabilities that aid in the analysis and reporting of virtual tape subsystems in the following areas:

- o Virtual Tape Cache Management

Virtual storage subsystems use a DASD cache (buffer) as a high speed staging area where virtual tape volumes are created and accessed. Monitoring DASD cache performance is necessary to fine tune subsystem parameters and virtual tape policies to ensure optimal performance. The VTS component files provide comprehensive cache performance statistics that can be used to validate whether parameters and policies maximize cache performance.

- o Virtual Tape Volume Management

The VTS component files provide information to determine the suitability of virtual tape as a storage medium. Excessively large data sets may not be appropriate because they can dominate the limited DASD cache. With the VTS component files, a profile of virtual tape volumes, retrieval patterns, and longevity can be established and monitored.

- o Virtual Tape Performance Analysis

The VTS component database files contain key measurements that support day to day performance and throughput analysis, and bottleneck detection.

The ability of the physical tape drives and cartridges to keep pace with virtual tape access is affected by a number of factors, all of which can be measured and reported on using the VTS component database files.

- o Capacity Planning

The higher timespan VTS component database files support trending and forecasting of critical measurements such as mount times, virtual volume size, real tape cartridge usage, and tape drive contention. Monitoring these trends provides a means to take action before performance levels deteriorate.

- o Management Reporting and Policy Creation

Information in the VTS component database files can be grouped and summarized to create useful virtual tape subsystem management-level reports. Reports or one-page management summaries that compare actual performance against proposed service level objectives allow the creation of policies that are rational and achievable. Once policies are established, reports can be created to track actual performance against objectives.

### 1.2.2 Features

Major features of the VTS component are discussed below:

#### o General Product Functionality and Flexibility

##### User Exits

-----

A wide range of standard user exits support tailoring of individual database file content. User exits are described in section 10.2, VTS User Exits.

##### Scalability and Recoverability

-----

The VTS component supports standard CA MICS scalability and recovery options such as multiple work files, internal step restart, and incremental update.

##### Database Tailoring

-----

Standard and VTS component specific database tailoring features support customization of database content to meet specific data center requirements.

##### Data Dictionary

-----

A data dictionary, found in Appendix B, describes the content, meaning, and raw data source for each data element in the VTS component database files.

##### Data Transformation

-----

Encoded values in virtual tape subsystem raw data are transformed into easy-to-understand data elements, adding value to database file content.



#### Computed Data Elements

-----

Numerous VTS component computed data elements are added to the VTS component database files, providing value to the component beyond the basic metrics found in the raw data. Computed data element derivation formulas use statistically accurate techniques that avoid, where possible, problems such as representing "averages of averages" in summarized data views.

#### Protection Against Duplicate Data

-----

Duplicate data is automatically detected and eliminated during daily processing.

#### o Interface Capabilities

CA MICS database files are summarized in the same manner across all products. Information from the VTS component files can be easily combined with other component files to compare and correlate virtual tape drive and controller activity with workload and device activity monitored by other CA MICS components.

### 1.2.3 Files

#### \$HEDR 1.2.3 - Files

Virtual tape subsystem generated SMF data is processed by the VTS component and organized into information area files:

- o SMF data that is generated by IBM Virtual Tape Systems is processed and organized in the IVT information area.
- o SMF data that is generated by StorageTek Virtual Storage Manager (VSM) Systems is processed and organized in the SVT information area.
- o SMF data generated by IBM TS7700 Hydra Virtual Tape Servers is processed and organized in the HVT information area.

IBM TS7700 series virtual tape systems no longer provide SMF performance data to attached hosts. Instead the TS7700's virtual engine writes the statistical records to a database internal to the TS7700. These statistical records are available to the host through the Bulk Volume Information Retrieval (BVIR) facility. For information about using the BVIR facility to extract the performance data, see the "IBM Virtualization Engine TS7740 R1.5 and TS7720: New Virtualization Options for Mainframe Servers" guide.

A listing of the files in each of these information areas is provided below:

#### VTS Information Area Files (IVT)

- |                                             |        |
|---------------------------------------------|--------|
| o VTS Distributed Library Activity File     | IVTVDL |
| o VTS Composite Library Activity File       | IVTVCL |
| o VTS VTC Controller Detail File            | IVTVTC |
| o VTS Preference Mgmt Cache Usage File      | IVTVCU |
| o VTS Physical Drive Activity File          | IVTPTU |
| o VTS Volume Pool Statistics File           | IVTVPS |
| o VTS Tape Library Config and Activity File | IVTTCA |
| o VTS Import/Export Statistics File         | IVTIEX |

These files are described in section 5.2.2, VTS Component IVT Information Area Files.

#### SVT Information Area Files (SVT)

- |                                           |        |
|-------------------------------------------|--------|
| o StorageTek VTSS Summary File            | SVTSVS |
| o VTSS Subsystem Performance File         | SVTSSP |
| o Channel Interface Performance File      | SVTCIP |
| o Virtual Tape Volume Mount Activity File | SVTVMR |

|                                              |        |
|----------------------------------------------|--------|
| o Virtual Tape Volume Dismount Activity File | SVTVDR |
| o Virtual Tape Volume Delete Activity File   | SVTVXR |
| o Virtual Tape Volume Migrate Activity File  | SVTVGR |
| o Virtual Tape Volume Recall Activity File   | SVTVRR |
| o Virtual Tape Volume Movement File          | SVTVMV |
| o Virtual Tape Volume Scratch Status File    | SVTVSS |
| o Real Tape Drive Mount Activity File        | SVTRMR |
| o Real Tape Drive Dismount Activity File     | SVTRDR |
| o Real Tape Drive Performance File           | SVTRPR |
| o Multi-Volume Cartridge Activity File       | SVTMVC |
| o VTV - MVC Unlink Activity File             | SVTVUN |

These files are described in section 5.2.3, VTS Component SVT Information Area Files.

#### HVT Information Area Files (HVT)

|                                              |        |
|----------------------------------------------|--------|
| o Hydra Vnode Device Activity File           | HVTVDA |
| o Hydra Vnode Adapter Port Activity File     | HVTVAP |
| o Hydra Hnode Cache Activity File            | HVTHHC |
| o Hnode Cache Partition Activity File        | HVTHCP |
| o Hydra Hnode Cache Pref Grp Statistics File | HVTHPG |
| o Hydra Hnode Physical Drive Activity File   | HVTHPD |
| o Hydra Hnode G-Use Pool Activity File       | HVTHGP |
| o Hydra Hnode G-Use Pool Media Activity File | HVTHGM |
| o Hydra Hnode Activity File                  | HVTHHA |
| o Hydra Cluster Summary File                 | HVTHCA |
| o Hydra Hnode Export-Import Activity File    | HVTHEI |
| o Hnode Grid Activity File                   | HVTGRC |
| o Hnode Grid Cluster Activity File           | HVTGCC |

These files are described in section 5.2.4, VTS Component HVT Information Area Files.

### 1.2.4 Requirements

The VTS component processes SMF data generated by any of the following virtual tape subsystem products:

- o IBM Virtual Tape System (VTS) supported at all releases.
- o Sun StorageTek Virtual Storage Manager (VSM) System supported at Release 6.0 or higher.

The VTS component processes BVIR data generated from the following virtual tape subsystem product:

- o IBM Virtualization Engine TS77xx supported at all releases.

## 1.3 Reports

The CA MICS Tape Analyzer Option provides out-of-the-box reports that format and display important information useful for managing tape libraries and virtual tape subsystems. To meet the complex reporting needs of individual organizations, CA MICS provides a wide array of facilities to simplify the design, implementation, scheduled generation, and publication of user defined reports. These facilities are described below:

- o CA MICS Information Center Facility (MICF)

MICF is a panel-oriented productivity tool that supports online access to information in the CA MICS database. From defined input, selection criteria, and report options, MICF dynamically builds an inquiry program that executes in either interactive or batch mode. Depending on specifications, MICF either prints the inquiry report, displays the results on the terminal, or catalogs the results for later viewing. MICF reports provided with the product are described in sections 3.1 TLM Reports and 3.2 VTS Reports.

- o Graphic Displays

Graphic reports can be produced in color or non-color modes using the MICF facility. Line graphics are illustrated in this guide. Data used in the graphic analysis queries can be exported as CSV files for subsequent use with the CA MICS Query and Reporting Workstation. Graphic reports are described in sections 3.1 TLM Reports and 3.2 VTS Reports.

- o CA MICS Query and Reporting Workstation

The Q&R Workstation provides access and reporting facilities on PC workstations for use with CA MICS or any SAS database on the mainframe. Query, reporting, graphing, and analysis tools are provided to help meet the challenging task of enterprise management reporting in today's complex IT environment. Through the ability to create queries and distribute the results, Q&R Workstation provides a unique and effective desktop reporting tool for resource management, performance management, capacity management, and accounting and chargeback. Q&R Workstation also supports automated web publishing and desktop reporting with data collected from CA MICS and SAS databases. See the Q&R Workstation documentation for more information.

### o Exception Analysis

The CA MICS platform provides an exception interface that works with CA MICS data integration applications to provide consolidated reporting of exception conditions across systems and data sources.

An "exception" is any condition that deviates from the expected norm, or any missed objective in system performance or service. Exceptions are detected by testing daily data against user-defined thresholds. Each component has an exception value analyzer to help determine those thresholds. Each detected exception is assigned a severity level and is associated with a management area.

While the TLM and VTS components are not delivered with sample exceptions, the exception feature supports the definition of user-specified exceptions. When combined with exceptions from other CA MICS applications, automated exception threshold setting, detection, and reporting comprise a powerful diagnostic tool. The CA MICS exception interface is described in the Standard Reports Guide, Chapter 2, Exception Reports.

# Chapter 2: USAGE GUIDELINES

---

This chapter describes guidelines for the interpretation and application of the data made available by the CA MICS Tape Analyzer Option (TAP). This product is comprised of two separately deployable CA MICS components:

- o Tape Library Management (TLM) component
- o Virtual Tape Subsystems (VTS) component

The TLM component provides IT management information for tape library managed volumes and data sets. The VTS component provides IT management information for virtual tape subsystems activity and performance.

This section contains the following topics:

[2.1 TLM Component Usage Guidelines](#) (see page 23)

[2.2 VTS Component Usage Guidelines](#) (see page 34)

## 2.1 TLM Component Usage Guidelines

The TLM component updates and maintains detail and summary database files for tape data sets and tape volumes for the most commonly used z/OS tape management products.

The following sections provide guidance to assist in determining which of the database files should be used to accomplish common tape library analytic tasks. Additionally, interfaces with optional CA MICS products are discussed.

- 1 - TLM Component Database Concepts
- 2 - TLM Tape Data Set Analysis
- 3 - TLM Component Cost Accounting
- 4 - TLM Capacity Planning
- 5 - TLM Reporting Facilities
- 6 - TLM Management Reporting and Policy Creation
- 7 - TLM Security

### 2.1.1 TLM Component Database Concepts

Raw data for the TLM component is collected by the TMCC collector, described in Appendix C. The TMCC collector builds a common format raw data file from information in the targeted tape library internal database. This common format raw data file is subsequently input into the TLM component daily update DAY091 step. A best practice is to run a TMCC raw data collection once daily to provide a daily snapshot of the tape data sets and volumes managed by the library.

The TLM component provides the same database file structure and content, regardless of the tape management product used. This common database structure allows the component files to be used to satisfy similar requirements for any z/OS-based tape management system. It also minimizes disruption for sites that transition from one tape management system to another.

Tape management systems provide tools designed to support the day-to-day operational requirements of the tape library. The CA MICS database file structure and content provide a repository that can help determine if the library is being used as efficiently as possible. The database can also serve as a basis for capacity planning for tape library resources, and can meet cost accounting requirements for tape media storage.

### 2.1.2 TLM Tape Data Set Analysis

The Tape Data Set (TMCTMD) file is used to analyze tape data sets. At the DETAIL timespan, the TMCTMD file contains detailed information about each tape data set managed by the tape management system. At summarized timespans, the data set name and volser are dropped, but the summarization keys of the TMCTMD file provide enough granularity to support sophisticated tape data set analysis, even at summarized timespans.



Most data centers use a combination of traditional and virtual tape. Traditional tape satisfies requirements for a variety of uses such as backup, offsite storage, isolation of important files, and storage of very large data sets. Virtual tape reduces the problems of inefficient tape media use, contention for real tape drives, and excessive tape volume mount time.

Tape management systems manage all tape data sets, but do not identify whether a tape volume is virtual or real. Tape libraries support different tape cartridge types: high capacity to optimize storage and lower capacity to optimize speed of access. In general, tape data sets with particular characteristics are targeted for specific volser groups.

A best practice is to use the user-defined Volume Group (VOLGROUP) summarization key element as a means to add significant value to summarized TMCTMD file observations.

Section 7.1.3.2, TLM VOLGROUP Derivation Routine (VOLGP RTE), explains how to use the VOLGROUP data element to group together tape volsers with similar characteristics. For example, volsers used for virtual tape data sets could be assigned one VOLGROUP element value (for example, VIRT TAPE), while traditional tape volsers could be assigned another (for example, REAL TAPE).

Using this simple example, at summarized timespans, all data sets residing on real tape will be separated from those residing on virtual tape. Metrics such as average tape data set size can be examined to see that expectations for virtual tape versus traditional tape are being met.

Using the TMCTMD file, the analyst can probe numerous tape data related characteristics such as these:

- o Percent of data using compression
- o Average size of data sets
- o Duration between data set access
- o Location
- o Media type

Refer to section 5.1.2.1 for a comprehensive discussion of the Tape Data Set (TMCTMD) file.

### 2.1.3 TLM Component Cost Accounting

The TLM component provides a standard interface to the CA MICS Accounting and Chargeback Option. The database file used for cost accounting is the Tape Data Set (TMCTMD) file. The standard metric used for recovering the cost of tape media storage is:

TMDDURSP - Amount of Space-Time (MByte-Hours)

This value is computed for each tape data set using the following formula:

$$\text{TMDDURSP} = ((\text{TMDBLKCT} * \text{BLKSIZE}) * \text{TIME}) / 10000000$$

where:

TMDBLKCT is the data set block count

BLKSIZE is the average block size in bytes

TIME is the lesser of these values:

- o the number of hours since the data set was created
- o the number of hours since the data set was last scanned
- o the default hours if this is the first scan of the tape library (the default is 24 hours)

Accounting can be invoked at the DETAIL timespan where each TLMTLD file record represents the data set on a specific volume, or at the DAYS timespan where each TLMTLD record represents a group of tape data sets summarized by account codes (TLMACT1-TLMACTn), VOLGROUP, and storage management identifiers (STORNAME, STORSTGC, STORMGTC, STORDATC).

DAYS timespan billing is encouraged because of the potential for a very high volume of daily journal records at a typical data center, if accounting is performed at the DETAIL timespan level.

If complex accounting rates are used, it is important to ensure that the granularity of observations at the DAYS timespan level prevents tape data sets with different charging characteristics from being summarized together.

For example, the following tape data set attributes might be considered when deciding on a rate to charge for media

storage:

- o Is the tape data set compressed?
- o Is the tape data set on a virtual volume?
- o Are multiple media types available, and, if so, is one more cost effective than another?

Even if a complex billing algorithm using variable rates is desired, DAYS timespan billing can be used if one of the TLMACtN account codes is set to a unique value for each combination of data set characteristics that impact the billing rate, in combination with a TLM VOLGROUP derivation routine that assigns unique VOLGROUP element values to tape volumes with different billing characteristics.

The TLMACtN account code values are populated in the TLMACRT exit routine for each DETAIL TMCTMD file observation. Using one of the TLMACtN data elements to assign unique values reflecting tape data set characteristics that influence billing rates will result in a DAYS timespan observation for each unique TLMACtN value.

This allows accounting algorithms to select the appropriate rate for each group of tape data sets that share common characteristics.

Chapter 7 describes the parameters you must specify for a successful implementation of accounting applications. The Accounting and Chargeback Option Concepts and Overview Guide and User Guide discuss various methodologies that can be used with CA MICS TLM component billing.

## 2.1.4 TLM Capacity Planning

Capacity planning for tape library management systems is essential to ensure that acceptable levels of performance are sustained over time. The TLM component database files are useful for observing key metric value trends over time.

The Tape Volume (TMCTMV) file is ideal for trending media usage and total library capacity. Most data centers have a variety of different tape cartridge media types. Additionally, most data centers use virtual tape subsystems as well as traditional tape.

It is a best practice to use the Volume Group (VOLGROUP) data element to assign unique values to tape volumes with different characteristics. If adopted, this practice supports useful analysis of the TLM component TMCTMV file at summarized timespans.

Assigning values to the VOLGROUP data element is described in section 7.1.3.2, TLM VOLGROUP Derivation Routine (VOLGP RTE). VOLGROUP is a summarization key in both the tape data set and tape volume files. For capacity planning, it is important to use the VOLGP RTE routine to assign unique VOLGROUP data element values that identify virtual tape volumes, and additional unique values for each physical tape cartridge media type.

When implemented, this best practice ensures that the TMCTMV file will maintain data granularity levels at summarized timespans sufficient to provide tape media usage and availability information suitable for capacity planning.

### 2.1.5 TLM Reporting Facilities

A variety of tools and facilities are available for the performance analyst to use to report on the tape volumes and tape data sets maintained by the tape library system.

The primary data analysis tool provided by CA MICS is MICF. MICF is a menu-based system that operates under IBM's Interactive Systems Productivity Facility (ISPF). MICF menus behave like ISPF menus. The major features of MICF include:

- o Structured inquiry composition
- o Logical inquiry modification
- o Direct inquiry composition
- o Execution-time specifications
- o Output replay
- o Production interface
- o Facilities for expert users
- o Distributed inquiries
- o User-written reports

The TLM component provides two MICF reports: one for tape data set analysis and the other for tape volume analysis. These two reports are described in section 3.1, TLM Component Reports, with instructions on how to generate them.

The major features of MICF are described separately below.

#### STRUCTURED INQUIRY COMPOSITION

MICF provides a comprehensive, full-screen system that enables you to access data in the database and generate reports interactively in a structured prompt manner without requiring you to code the request in SAS.

MICF operates by automatically translating your panel specifications into an inquiry program that performs the required operations on the database. As you request data files, operations, and reports from the MICF panels, MICF performs numerous validation checks. It helps you to avoid problems by refusing to accept clearly invalid commands and by asking you to validate the accuracy of your inquiries if you have made changes to them. For example, if you add or delete steps from an inquiry, MICF will ask you to validate it before saving or executing it.

#### LOGICAL INQUIRY MODIFICATION

Once created, an inquiry can be stored in your private catalog, recalled, copied, deleted, or modified. You make changes to an inquiry using the same MICF panels you used to create the inquiry originally. You do not, however, need to revisit panels that do not change.

#### DIRECT INQUIRY COMPOSITION

Direct inquiry composition is a feature that allows you to create an inquiry by completing a single panel. You can select from a series of predefined report formats and graphics templates for direct, express data retrieval and presentation.

### EXECUTION-TIME SPECIFICATIONS

You can define inquiries so that key inquiry parameters are specified at the time an inquiry is executed. This facility allows you to report on varying data without changing the inquiry.

You can change the following parameters at execution time:

- o CA MICS database
- o CA MICS file cycles
- o Data selection criteria
- o Execution parameters
  - SAS execution parameters (whether to list SAS source code, output page dimensions, and so on)

### OUTPUT REPLAY

MICF allows you to save the output produced when you run an inquiry and replay it at another time. The output is saved by inquiry name, date, and time, so that the results of running an inquiry against different data can be saved and replayed at will. The CA MICS system administrator can place inquiry outputs into a shared replay catalog that can be used throughout your site. You also have access to reports and color graphics from production reporting, though access to some reports may be limited by your site's security procedures.

When you replay an inquiry output, you can either view it on your terminal or send it to a hardcopy device. If you are replaying color graphics output, you do not need to use the type of device that was specified at the time the inquiry was originally executed. You can specify the color terminal, color printer, or color plotter type to use at the time you request the replay.

## PRODUCTION INTERFACE

You can generate and catalog color graphics and printed reports with the regularly scheduled CA MICS production jobs (the daily CA MICS update). You can also control CA MICS production reporting with your site's batch scheduling facilities. MICF lets you select shared inquiries for batch execution (either with CA MICS production jobs or through your own scheduling process), with printed report and color graphics outputs being saved in a "production catalog" for later online review and printing.

Each production catalog consists of unique, user-defined printed report and color graphics datasets, so you can use your site's security facilities to limit access to sensitive reports. For example, your accounting staff may want to share a series of daily financial graphics. You can define MICF production reporting to generate and save the financial graphics during the CA MICS daily update, and you can protect the information with RACF (or another security facility).

## FACILITIES FOR EXPERT USERS

If you are thoroughly familiar with the CA MICS database and are accustomed to programming in SAS, two features that you will find particularly helpful are Direct Inquiry Composition and the ability to include SAS code in your inquiries.

Direct inquiries are designed to allow you to compose a MICF inquiry quickly on a single panel. You are limited to one report and can only perform limited data manipulation with a direct inquiry. You will find, however, that you can complete a direct inquiry panel more quickly than you can write the corresponding SAS code. In addition, because validation functions are performed automatically by MICF and automatically produce error-free SAS code, you can frequently obtain the results you need with fewer coding attempts.

Facilities that include free-form SAS code as part of their MICF inquiries are available for experienced SAS programmers. You can insert any valid SAS statement at appropriate points in the SAS code that is generated by MICF. This facility gives you both the convenience of using MICF to handle routine operations and the freedom to add special coding at just the points you want it.

### DISTRIBUTED INQUIRIES

A library of precomposed report inquiries is included with the CA MICS Tape Analyzer Option. You can tailor the output of these inquiries through execution time data selection.

In addition, you can develop customized reports for your site with a minimum of effort by modifying copies of the distributed inquiries. We have designed the distributed inquiry names for ease of use. Each name identifies the type of output (color graphics, printer graphics, or printed reports), the component, and the timespan (daily, weekly, monthly) reported.

The distributed inquiries have the following characteristics:

- o They are printed reports rather than color graphics.
- o They include the TLM information area files only.
- o They are designed to use the DETAIL or DAYS timespan.

As stated above, you can customize MICF inquiries and thereby extend the range and utility of the CA MICS Tape Analyzer Option reporting function.

### USER-WRITTEN REPORTS

MICF inquiry execution and output processing includes a capability to support user-written reports. With this feature, you can consolidate on-demand reporting under MICF. For example, you can define a MICF inquiry that has two steps. The first step allocates the CA MICS file to be analyzed (tells MICF which file or files you want to process) and the second step refers to a file containing the SAS source statements that create your report. With this facility, you can add existing reporting routines to your MICF catalog so that the Information Systems staff only needs to go to a single location to initiate routine reporting.



## 2.1.6 TLM Management Reporting and Policy Creation

Tape is an important data storage media for a variety of data, but not all data is appropriate for tape storage. Within the tape media storage area, some data is more suitable for virtual tape storage than traditional.

The Tape Data Set (TMCTMD) file contains a wealth of information regarding the characteristics (both usage related and intrinsic) of each tape data set managed by the library. The TLM component adds additional information, such as "last use" buckets, that add value to the data already kept by tape library management systems.

Tape data set usage characteristics can be determined using the TMCTMD file. From these usage characteristics, realistic policies can be created to maximize the effective use of tape media. Management level reports can be created to monitor compliance with policy.

The MICF facility, described in the previous section, provides automation features that support the creation, automatic generation, and publication of custom reports.

## 2.1.7 TLM Security

It is increasingly important to secure critical data using data encryption. Tape management systems record the encryption status of each tape data set.

The following data element indicates the encryption status of each tape data set in the Tape Data Set (TLMTLD) file:

- o Tape Encryption Key Index (TMDKEYIX)

This data element can be examined to ensure compliance with security requirements.

## 2.2 VTS Component Usage Guidelines

The VTS component creates and maintains detail and summary information about virtual tape subsystem configuration, activity, and performance.

The following sections help you determine which of the database files should be used to perform various virtual tape subsystem analytic tasks. Additionally, interfaces with optional CA MICS components are discussed.

- 1 - VTS Component Database Concepts
- 2 - Virtual Tape Performance Analysis
- 3 - Virtual Tape Capacity Planning
- 4 - Virtual Tape Reporting Facilities
- 5 - VTS Management Reporting and Policy Creation

### 2.2.1 VTS Component Database Concepts

The VTS component processes SMF data generated by the following virtual tape systems:

- o IBM Virtual Tape System (VTS)
- o Sun StorageTek Virtual Storage Manager (VSM) System

For the specific releases of these systems supported, refer to 1.2.4, VTS Requirements.

While these virtual tape systems provide similar functionality, the architectural implementation and SMF performance data generated by each system is very different. The VTS component creates and maintain two sets of database files in two different VTS component information areas: the IBM Virtual Tape Subsystem information area for IBM VTS systems, and the SVT StorageTek VSM Virtual Tape Subsystem information area for StorageTek. The two information areas and their files are discussed in section 5.2, VTS Component Files.

### 2.2.2 Virtual Tape Performance Analysis

Virtual tape subsystems are, in large part, self-managed. The common characteristics of any virtual tape subsystem are as follows:

- o A DASD cache (buffer) where virtual tape volumes are created and accessed by workloads running on the z/OS host.
- o Internal software that is similar to traditional tape controllers and tape drives so that the z/OS host appears to be dealing with real tape devices.
- o Actual physical tape drives and physical tape cartridges that back the DASD cache and achieve high cartridge utilization by stacking the virtual volumes created in the DASD cache.

The DASD cache is a key resource affecting the performance of all virtual tape systems. Virtual tape subsystems manage the DASD cache to meet the following goals:

- o Ensure there is sufficient free space in the cache to accommodate the creation of new virtual tape volumes.
- o Ensure there is sufficient free space in the cache to accommodate the loading of existing volumes from the stacked real tape cartridges to satisfy mount requests.
- o Maximize the cache hit percentage by implementing strategies to keep those volumes in cache that are most likely to be accessed in the near future.

The self-managed nature of virtual tape subsystem cache requires minimal oversight when the user-specified installation parameters and virtual tape policies maximize performance. If the parameters and policies chosen are not optimal, however, the system may not perform efficiently.

The VTS component database files provide a wealth of information regarding virtual tape subsystem performance. Reporting on performance metrics allows a data center to monitor the impact of different parameter and policy choices and select those that maximize performance and throughput.

Because the subsystem architecture and SMF performance data for IBM and Sun StorageTek virtual tape systems are different, the discussion of virtual tape system performance analysis is divided into the following subsections:

- 1 - IBM VTS Virtual Tape Performance
- 2 - STK VSM Virtual Tape Performance
- 3 - IBM TS7700 Hydra Virtual Tape Performance

### 2.2.2.1 IBM VTS Virtual Tape Performance

IBM VTS employs a number of strategies to ensure that the VTS-managed DASD cache maintains a sufficient percentage of free space to support the creation of new virtual tape volumes and to accommodate the loading and access of existing volumes from the stacked tape cartridges that serve as the real media repository for virtual tape volumes and data sets.

Refer to IBM VTS documentation for specific measurement thresholds that indicate performance degradation. For example, there may be a specific IBM VTS guideline that specifies that, on an hourly basis, the average time to satisfy virtual volume mount requests should not exceed 30 seconds.

Vendor-suggested guidelines can be compared to actual performance using the VTS component files as follows:

#### o VTS Distributed Library Activity (IVTVDL) file

The IVTVDL file provides overall VTS-level performance data for each distributed VTS. The type of distributed VTS is identified with the VTS Type (IVTTYPE) data element, and includes STANDALONE, UI, and SECONDARY. This file provides the following statistics:

- Physical tape drive and physical mount statistics
- Physical cartridge utilization statistics
- Virtual tape drive and virtual mount statistics
- Virtual volume statistics
- Overall cache utilization statistics
- Throttling and data compression statistics
- z/OS host read and write data blocksize statistics
- Overall cache and physical volume capacity and usage

o VTS Composite Library Activity (IVTVCL) file

The IVTVCL file provides VTS performance data for the COMPOSITE VTS in a peer-to-peer configuration. This file provides the following statistics:

- Virtual tape drive and virtual mount statistics
- Virtual volume statistics
- z/OS host data compression statistics
- z/OS host read and write data blocksize statistics

o VTS VTC Controller Detail (IVTVTC) file

The IVTVTC file provides information for each virtual tape controller used by the COMPOSITE VTS in a peer-to-peer configuration. For each virtual tape controller, this file provides the following statistics:

- Virtual tape drive and virtual mount statistics
- Virtual volume statistics
- Virtual volume copy statistics
- z/OS host data compression statistics
- Virtual controller management settings

o VTS Cache Usage Preference Level (IVTCU) file

The IVTCU file provides information for each cache preference level used by the VTS. Cache preference levels are used to separate virtual volumes into groups with different management objectives. For each preference level, data element Cache Usage Preference Level ID (IVTCUPL), the file provides:

- Virtual volume migration activity
- Virtual volume age-in-cache statistics
- Cache hit mount statistics
- Cache miss mount statistics
- Fast ready mount statistics

### o VTS Physical Drive Activity (IVTPTU) file

The IVTPTU file provides information for each individual tape drive type (up to 2) used by a VTS in an IBM self-managed tape library. For each device type, data element Physical Tape Drive Device Class (IVTDCI), the file provides:

- Physical tape drive and physical mount statistics
- Data volumes written to primary and secondary pools

### o VTS Volume Pool Statistics (IVTVPS) file

The IVTVPS file provides information on physical cartridges at the volume pool level. For each Volume Pool Identifier (IVTVPN), the file provides:

- Volume pool cartridge media types
- Counts of scratch and active volumes by media type
- Information about volumes borrowed from other pools
- Cartridge use percentage buckets
- Ages of logical volumes on cartridges
- Volume pool management policy settings

### o VTS Tape Library Config and Activity (IVTTCA) file

The IVTTCA file provides information about the physical tape drives and mount activity in the self-managed tape library used by the VTS. The file provides:

- Physical tape drive configuration information
- Physical tape drive activity statistics by category: Mounts, Demounts, Ejects, Audits, and Inserts

### o VTS Import/Export Statistics (IVTIEX) file

The IVTIEX file provides information about physical cartridges imported and exported from the self-managed tape library. The file provides:

- Counts of physical cartridges imported and exported
- Counts of logical volumes on the physical cartridges
- Data volume involved in the imports and exports

### 2.2.2.2 STK VSM Virtual Tape Performance

StorageTek Virtual Storage Manager (VSM) stores the virtual tape volumes (VTVs) on the disk buffer of the Virtual Tape Storage Subsystem (VTSS). Based on storage class assignments, VSM may keep VTVs in the disk buffer to allow for quick mount on recall, or migrate (stack) them onto multivolume cartridges (MVCs). VSM ensures that there is sufficient space in the disk buffer to accommodate the demand for VTV storage.

Refer to StorageTek documentation for specific measurement thresholds that indicate performance degradation. Key performance considerations may include:

- o Frequency of recall mounts
- o Batch delay time incurred on recalls
- o Premature migration and deletions from disk buffer
- o I/O link saturation
- o Disk buffer usage fluctuation
- o Recalls within 24 hours of VTV creation
- o Duration between creation and migration

Vendor-suggested guidelines can be compared to actual performance using the VTS component files as follows:

- o Subsystem Performance (SVTSSP) file
  - Disk buffer statistics
  - Percent free and used statistics
- o Channel Interface Performance (SVTCIP) file
  - I/O link utilization
  - Link busy
  - Balanced I/O
- o Virtual Tape Volume Mount Activity (SVTVMR) file
  - Batch delay time incurred on recalls
  - Disk buffer hit percentage
  - Disk buffer miss percentage
  - Frequency of recall mounts
  - Scratch tape mount time distribution
  - Specific tape mount time distribution

- o Virtual Tape Volume Migrate Activity (SVTVGR) file
  - Duration between creation and migration
  - TOD migration management
- o Virtual Tape Volume Recall Activity (SVTVRR) file
  - Recalls within 24 hours of creation
- o Virtual Tape Volume Delete Activity (SVTVXR) file
  - Disk buffer VTV residency
- o Real Tape Drive Mount Activity (SVTRMR) file
  - Real Tape drive mount performance
- o Real Tape Drive Mount Activity (SVTRMR) file
  - Real Tape drive mount performance
- o Real Tape Drive Performance (SVTRPR) files
  - Real Tape drive utilization
- o StorageTek VTSS Summary (SVTSVS) file
  - Trending VTSS usage statistics

### 2.2.3 Virtual Tape Capacity Planning

Capacity planning for virtual tape systems primarily involves understanding the current workload, the trending of key utilization and performance metrics, and understanding future workload requirements. Understanding the current workload can be accomplished by trending certain key metrics, available from both the IBM VTS and StorageTek VSM systems:

- o Average numbers of virtual and physical mounts, by category

Understanding the daily patterns and long-term patterns of virtual volume access is critical in making decisions about workload shifting and activating new workloads that use virtual tape.



- o Average virtual tape mount time

Increases in the average virtual tape mount time can indicate the need for additional DASD cache, an examination of policies that govern which virtual volumes stay in cache longer relative to others, insufficient physical drives, and other reasons.

- o Cache misses

Virtual tape requests that cannot be satisfied in the DASD cache involve the recall of volumes from a physical cartridge. This seriously prolongs the time required to satisfy the z/OS host workload request.

- o Average virtual volume size

Virtual tape is generally not suitable for extremely large data sets. Too many excessively large data sets can dominate the DASD cache. Average virtual volume size should be monitored over time to ensure that users of virtual tape are using the facility appropriately.

## 2.2.4 Virtual Tape Reporting Facilities

A variety of tools and facilities are available for the performance analyst to use to report on virtual tape system activity and performance.

The primary data analysis tool provided by CA MICS is MICF. MICF is a menu-based system that operates under IBM's Interactive Systems Productivity Facility (ISPF). MICF menus behave like ISPF menus. The major features of MICF include:

- o Structured inquiry composition
- o Logical inquiry modification
- o Direct inquiry composition
- o Execution-time specifications
- o Output replay
- o Production interface
- o Facilities for expert users
- o Distributed inquiries
- o User-written reports

The VTS component provides fourteen MICF reports: six for IBM VTS and eight for StorageTek VSM systems. These reports are described in section 3.2, VTS Component Reports, with instructions on how to generate them.

The major features of MICF are described separately below.

### STRUCTURED INQUIRY COMPOSITION

MICF provides a comprehensive, full-screen system that enables you to access data in the database and generate reports interactively in a structured prompt manner without requiring you to code the request in SAS.

MICF operates by automatically translating your panel specifications into an inquiry program that performs the required operations on the database. As you request data files, operations, and reports from the MICF panels, MICF performs numerous validation checks. It helps you to avoid problems by refusing to accept clearly invalid commands and by asking you to validate the accuracy of your inquiries if you have made changes to them. For example, if you add or delete steps from an inquiry, MICF will ask you to validate it before saving or executing it.

### LOGICAL INQUIRY MODIFICATION

Once created, an inquiry can be stored in your private catalog, recalled, copied, deleted, or modified. You make changes to an inquiry using the same MICF panels as you used to create the inquiry originally. You do not, however, need to revisit panels that do not change.

### DIRECT INQUIRY COMPOSITION

Direct inquiry composition is a feature that allows you to create an inquiry by completing a single panel. You can select from a series of predefined report formats and graphics templates for direct, express data retrieval and presentation.

#### EXECUTION-TIME SPECIFICATIONS

You can define inquiries so that key inquiry parameters are specified at the time an inquiry is executed. This facility allows you to report on varying data without changing the inquiry.

You can change the following parameters at execution time:

- o CA MICS database
- o CA MICS file cycles
- o Data selection criteria
- o Execution parameters
  - SAS execution parameters (whether to list SAS source code, output page dimensions, and son on)

#### OUTPUT REPLAY

MICF allows you to save the output produced when you run an inquiry and replay it at another time. The output is saved by inquiry name, date, and time, so that the results of running an inquiry against different data can be saved and replayed at will. The CA MICS system administrator can place inquiry outputs into a shared replay catalog that can be used throughout your site. You also have access to reports and color graphics from production reporting, though access to some reports may be limited by your site's security procedures.

When you replay an inquiry output, you can either view it on your terminal or send it to a hardcopy device. If you are replaying color graphics output, you do not need to use the type of device that was specified at the time the inquiry was originally executed. You can specify the color terminal, color printer, or color plotter type to use at the time you request the replay.

### PRODUCTION INTERFACE

You can generate and catalog color graphics and printed reports with the regularly scheduled CA MICS production jobs (the daily CA MICS update). You can also control CA MICS production reporting with your site's batch scheduling facilities. MICF lets you select shared inquiries for batch execution (either with CA MICS production jobs or through your own scheduling process), with printed report and color graphics outputs being saved in a "production catalog" for later online review and printing.

Each production catalog consists of unique, user-defined printed report and color graphics datasets, so you can use your site's security facilities to limit access to sensitive reports. For example, your accounting staff may want to share a series of daily financial graphics. You can define MICF production reporting to generate and save the financial graphics during the CA MICS daily update, and you can protect the information with RACF (or another security facility).

### FACILITIES FOR EXPERT USERS

If you are thoroughly familiar with the CA MICS database and are accustomed to programming in SAS, two features that you will find particularly helpful are Direct Inquiry Composition and the ability to include SAS code in your inquiries.

Direct inquiries are designed to allow you to compose a MICF inquiry quickly on a single panel. You are limited to one report and can only perform limited data manipulation with a direct inquiry. You will find, however, that you can complete a direct inquiry panel more quickly than you can write the corresponding SAS code. In addition, because validation functions are performed automatically by MICF and automatically produce error-free SAS code, you can frequently obtain the results you need with fewer coding attempts.

Facilities that include free-form SAS code as part of their MICF inquiries are available for experienced SAS programmers. You can insert any valid SAS statement at appropriate points in the SAS code that is generated by MICF. This facility gives you both the convenience of using MICF to handle routine operations and the freedom to add special coding at just the points you want it.

#### DISTRIBUTED INQUIRIES

A library of precomposed report inquiries is included with the CA MICS Tape Analyzer Option. You can tailor the output of these inquiries through execution time data selection.

In addition, you can develop customized reports for your site with a minimum of effort by modifying copies of the distributed inquiries. We have designed the distributed inquiry names for ease of use. Each name identifies the type of output (color graphics, printer graphics, or printed reports), the component, and the timespan (daily, weekly, monthly) reported.

The distributed inquiries have the following characteristics:

- o They are printed reports rather than color graphics.
- o They include the VTS information area files only.
- o They are designed to use the DETAIL or DAYS timespan.

As stated above, you can customize MICF inquiries and thereby extend the range and utility of the CA MICS Tape Analyzer Option reporting function.

#### USER-WRITTEN REPORTS

MICF inquiry execution and output processing includes a capability to support user-written reports. With this feature, you can consolidate on-demand reporting under MICF. For example, you can define a MICF inquiry that has two steps. The first step allocates the CA MICS file to be analyzed (tells MICF which file or files you want to process) and the second step refers to a file containing the SAS source statements that create your report. With this facility, you can add existing reporting routines to your MICF catalog so that the Information Systems staff only needs to go to a single location to initiate routine reporting.

### 2.2.5 VTS Management Reporting and Policy Creation

Information in the VTS component database files can be grouped and summarized to create useful virtual tape subsystem management-level reports. Reports or one-page management summaries that compare actual performance to proposed service level objectives allow the creation of policies that are rational and achievable. Once policies are established, reports can be created to track actual performance against objectives.

# Chapter 3: REPORTS

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This chapter documents the reports available with the CA MICS Tape Analyzer Option (TAP), which provides IT management information for both tape management systems and virtual tape subsystems in two separate components:

- o Tape Library Management (TLM)
- o Virtual Tape Subsystems (VTS)

One or both of these components can be used, based on data center requirements. Both components provide reports useful for monitoring and analyzing the technologies supported.

The following sections provide information about the reports provided by each component:

- 1 - TLM Component Reports
- 2 - VTS Component Reports

This section contains the following topics:

[3.1 TLM Component Reports](#) (see page 47)

[3.2 VTS Component Reports](#) (see page 59)

## 3.1 TLM Component Reports

The Tape Library Management (TLM) reports are generated by inquiries accessed using the CA MICS Information Center Facility (MICF), which is part of the CA MICS Workstation Facility (MWF).

The MICF inquiries distributed with the component produce meaningful reports from the CA MICS database files. These distributed inquiries can be copied and modified using the Database Inquiries option on the MICF main menu. The MICF facility also provides the flexibility to code and save user-designed reports.

Reports for the TLM component are distributed as MICF inquiries and are listed in Figure 3-1.

All of the TLM inquiries generate line-printer reports. Samples of each report are presented in the following sections.

The reports are generated from the DAYS timespan files.

#### User Modification

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The MICF inquiries provide a user exit in the independent source step that can be used to perform more data element modification or record selection from the CA MICS database. To invoke this exit, the shared inquiry must first be copied into the private MICF catalog, then selected for modification. Finally, the SAS statements must be coded in the SELECT macro, bracketed by the %MACRO and %MEND statements, which are provided.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS files. The macro can be used to delete observations from the data as it is processed. For example, for a published study, you can change the actual VTS Library Sequence Numbers (IVTVLS) and VTS Composite Library ID (IVTCMPID) values that appear in the report. The following code would accomplish this requirement:

```
%MACRO SELECT;
  IF IVTVLS = 'PROD01' THEN IVTVLS = 'VTS001' ;
  IF IVTCMPID = 'PRDC01' THEN IVTCMPID = 'CMP001' ;
  ... additional remapping statements ...
%MEND SELECT;
```

Use this macro to exclude systems from the report, for example, exclude all test systems:

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

**IMPORTANT!** All SAS statements must be coded in accordance with the syntax of the SAS Macro Language, as described in the SAS guides. No validity checking is done on the defined code. If the user code contains syntax errors or the logic produces syntax errors, the inquiry is either terminated



abnormally or produces unpredictable results.

#### Inquiry Naming Conventions

-----

The TLM component MICF inquiry names follow the form cccptn, where:

ccc =           The three-character product identifier (TAP).

p =            The type of report: C (color graphic), L (list), or P (printer).

t =            The technology reported on is T for Tape Library Management.

n =            A character that differentiates this inquiry from others.

For example, an inquiry named TAPLTB would be interpreted as follows:

|                                   |                              |           |
|-----------------------------------|------------------------------|-----------|
| TAPLTB                            |                              |           |
| ---  += the second list inquiry   |                              |           |
|                                   |                              |           |
| += for Tape Library Management    |                              |           |
|                                   |                              |           |
| += a list inquiry                 |                              |           |
|                                   |                              |           |
| += a Tape Analyzer Option inquiry |                              |           |
| +-----+-----+-----+               |                              |           |
| Report Class                      | Report Name                  | Report ID |
| +-----+-----+-----+               |                              |           |
| Storage                           | Tape Data Set Summary Report | TAPLTA    |
|                                   | Tape Volume Summary Report   | TAPLTB    |
| +-----+-----+-----+               |                              |           |

Figure 3-1. MICF Distributed Inquiries for Tape Library Management

These MICF inquiries for the TLM component are accessed through the MICF Inquiries panel of the CA MICS Workstation Facility (MWF).

The first subsection below explains the layout and user-modifiable fields in the MICF displays for the TLM reports. The next sections discuss each of the TLM reports:

- 1 - TLM MICF Inquiry Specification Panels
- 2 - Tape Data Set Summary Report (TAPLTA)
- 3 - Tape Volume Summary Report (TAPLTB)

### 3.1.1 TLM MICF Inquiry Specification Panels

The rules for filling in fields on the panels are identical for all Tape Library Management reports.

A sample inquiry specification panel for inquiry TAPLTA is shown below. Explanations for field choices follow.

```
+-----+
| ----- CA MICS Tape Library Management Inquiry ----- |
| Command ==>                                           |
|                                                       |
| Composing Inquiry: TAPLTA - Tape Data Set Summary Report |
| Database ==> _                                         |
| Cycle(s) ==> __ - __                                   |
| Timespan ==> DAYS__ (DAYS)                             |
| Data Selection:                                         |
|               dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy |
| Date Ranges  ==> __ __ __ - __ __ __ - __ __ __ - __ __ __ |
| Tape Library Id (TAPELIB) ==> _____              |
| Volume Group (VOLGROUP)  ==> _____              |
|               _____                                |
|               _____                                |
+-----+
```

Composing Inquiry: - Required. No default. The report ID and report title.

Database - Required. No default. Up to six database unit IDs can be specified (the IDs of the CA MICS database units from which files are read). Duplicates are not allowed. 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. The cycle of the specified timespan of the CA MICS files that are used as input to the analysis. A range of cycles can be specified. The fields can contain any numeric value between 0 and 99. If a single cycle is required (such as cycle 01), it must be specified in the first entry field, and the second field must be blank. Leading zeros are not required and are inserted automatically if a single-digit number is entered (for example, 7 becomes 07). If a cycle range is specified, it can be specified in either ascending or descending order (for example, 01-05 or 05-01).

Timespan - DAYS is the only timespan supported.

Date Ranges - 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 the higher range can be specified before the lower range. For example, a valid date range specification is specifying date range 1 as 01 JAN 09 - 31 DEC 09 and specifying date range 2 as 01 JAN 08 - 31 DEC 08. 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.

Tape Library (TAPELIB) - Optional. No default. A one to four character value identifying a specific tape management system. Up to six tape management system IDs can be specified. If coded, the observations that are selected for reporting are limited to those that match the specified system IDs.

Volume Group (VOLGROUP) - Optional. No default. A one to sixteen character value identifying a specific volume group. Up to four volume groups can be specified. If coded, the observations that are selected for reporting are limited to those that match the specified volume groups.

### 3.1.2 Tape Data Set Summary Report (TAPLTA)

The CA MICS Tape Data Set Summary Report displays a summary of tape data set information, by volume group (VOLGROUP) for each tape library system selected.

The report provides average tape data set size and total estimated storage size for each storage group. Also provided are the average and maximum ages (since creation) of data sets within each volume group.

The remainder of the report provides interesting information about data set usage. For each volume group, the report lists the number of tape data sets that have been accessed on some date subsequent to the creation date. This number is expressed as a percentage of the total number of data sets.

It is interesting to see that in many tape libraries, a large number of tape data sets are never accessed after creation. In addition, the ages of many of these data sets number in the decades. This type of age and usage analysis can be used to identify tape data sets that should be deleted, to return volumes to the scratch pool, to reduce volumes managed, and to reduce expenditures for additional scratch tapes.

The report heading includes the following general information:

| Report Label       | Example                              |
|--------------------|--------------------------------------|
| -----              | -----                                |
| report title       | CA MICS Tape Data Set Summary Report |
| report granularity | Data Summarized by Day               |
| Inquiry            | TAPLTA                               |
| Run Date           | 10SEPyy                              |
| Tape Library Name  | CA1P                                 |
| Tape Library Type  | CA-1                                 |
| Report Start       | 09SEPyy:10:24                        |
| Report End         | 10SEPyy:10:24                        |

The data elements used to populate the heading data are:

|                    |                                       |
|--------------------|---------------------------------------|
| Report title       | MICF generated                        |
| Report granularity | MICF generated                        |
| Inquiry            | MICF generated                        |
| Run Date           | MICF generated                        |
| Tape Library Name  | TAPELIB - Tape Library Identifier     |
| Tape Library Type  | TLMPROD - Tape Management System Name |
| Report Start       | MICF generated                        |

Report End MICF generated

The first line of the report body shows the date of the data presented in the report. The remainder of the report body reports on the following measurements from left to right:

## Volume Group

o Volume Group - VOLGROUP

### Tape Data Set Overall Statistics:

- o Data Set Segments - TMDSEGS
- o Data Set Count - TMDDSNCT
- o Average Segments per Dataset - TMDAVSEGS
- o Average Data Set Size (MB) - TMDAVSZM
- o Approx. Data Set Size (MB) - TMDDSSZM

Note: TMDDSSZM is divided by 1000 to report in GB.

- o Average Data Set Age (Days) - TMDAVAGE
- o Maximum Data Set Age (Days) - TMDMXAGE

Note: Both age fields are manipulated to show the age in a YY DDD format on the report.

Tape Data Sets Accessed on Date Subsequent to Creation Date:

- o Count of Datasets with Last Usage Date - TMDLUSCT
- o Percent of data sets w/last Usage Date - Computed

$$\text{TMDLUSCT} / \text{TMDDSNCT} * 100$$

- o Days Since Last Use - TMDLUSE
- o Maximum Days Since Last Use - TMDMXLUS

Note: Both age fields are manipulated to show the age in a YY DDD format on the report.

At the bottom of the report, a TOTALS line shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

Report data is generated from the DAYS timespan of the Tape Data Set (TMCTMD) file.

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 TAPLTA, whose Catalog Group is STORAGE
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.1.1, TLM MICF Inquiry Specification Panels, for information about modifiable panel fields.

#### Tape Data Set Summary Report (TAPLTA) Report Sample

-----  
The following report sample shows summary tape data set statistics for a site that has used the volume group (VOLGROUP) data element to classify tape data in three categories:

Media Type 1: Large tape data sets on real cartridges  
Media Type 2: Smaller tape data sets on real cartridges  
Virtual Tape: Data sets stored in the virtual tape system

The report displays overall characteristics of the data, and can be used to track compliance with the management goals associated with each tape media type.

In this sample, it is clear that virtual tape is widely used for smaller data sets with lower average retention periods. It is interesting to note that less than 1% of virtual tape data is accessed on a date subsequent to creation. An argument could be made to set the default retention time for virtual tape data sets to a lower value since such a small number of virtual tape data sets are re-accessed subsequent to their creation.

Inquiry : TAPLTA  
 Run Date: 11Julyy  
 Tape Library Name: TLB1  
 Tape Library Type: RMM

Tape Data Set Summary Report  
 Information Summarized by Day

Page 001  
 Report Start: 02JULyy:14:05  
 Report End : 03JULyy:14:05

Day: 03JULyy

| Volume Group | -----Tape Data Set Overall Statistics----- |                |                   |                    |                      |                       | -----Tape Data Sets Accessed on Date----- |                         |                 |                             |                             |
|--------------|--------------------------------------------|----------------|-------------------|--------------------|----------------------|-----------------------|-------------------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|
|              | Data Set Segments                          | Data Set Count | Avg Segs per DSet | Avg DSet Size (MB) | Est Storage Size(GB) | Avg DSet Age YY / DDD | Max DSet Age YY / DDD                     | Subseqnt Accessed Count | Subsq Accss Pct | Avg Dur Last Accss YY / DDD | Max Dur Last Accss YY / DDD |
| Media Type 1 | 32                                         | 24             | 1.33              | 655.8              | 15.74                | 6 / 308               | 10 / 38                                   | 4                       | 16.7%           | 5 / 117                     | 5 / 352                     |
| Media Type 2 | 10054                                      | 9526           | 1.06              | 322.1              | 3068.20              | 9 / 169               | 21 / 73                                   | 1029                    | 10.8%           | 9 / 275                     | 21 / 66                     |
| Virtual Tape | 700801                                     | 682001         | 1.03              | 110.6              | 75396.78             | 0 / 195               | 11 / 299                                  | 3286                    | 0.5%            | 1 / 353                     | 9 / 307                     |
| TOTALS       | 710887                                     | 691551         | 1.03              | 113.5              | 78480.72             | 0 / 240               | 21 / 73                                   | 4319                    | 0.6%            | 3 / 301                     | 21 / 66                     |

Figure 3-2. Tape Data Set Summary Report

### 3.1.3 Tape Volume Summary Report (TAPLTB)

The CA MICS Tape Volume Summary Report displays tape volume information, by volume group (VOLGROUP), for each tape library system selected.

The primary purpose is to report on overall tape volume usage and availability for each volume group. Counts are provided for total, used, and available (scratch) volumes. The available scratch tapes are shown as a percentage of the total, providing a metric value that can be monitored against targeted goals.

The report also provides useful information on the active or used volumes in each volume group, including the number of files, average files per volume, average storage used on each volume, and total storage across all used volumes. The average age of used volumes is also reported. This value can be useful in determining optimal tape retention settings. Finally, a graphic shows the number of used volumes as a percentage of total volumes in each volume group. As the chart value approaches 100%, the number of available scratch tapes approaches 0.

The report heading includes the following general information:

| Report Label       | Example                              |
|--------------------|--------------------------------------|
| -----              | -----                                |
| report title       | CA MICS Tape Data Set Summary Report |
| report granularity | Data Summarized by Day               |
| Inquiry            | TAPLTA                               |
| Run Date           | 10SEPyy                              |
| Tape Library Name  | CA1P                                 |
| Tape Library Type  | CA-1                                 |
| Report Start       | 09SEPyy:10:24                        |
| Report End         | 10SEPyy:10:24                        |

The data elements used to populate the heading data are:

|                    |                                       |
|--------------------|---------------------------------------|
| Report title       | MICF generated                        |
| Report granularity | MICF generated                        |
| Inquiry            | MICF generated                        |
| Run Date           | MICF generated                        |
| Tape Library Name  | TAPELIB - Tape Library Identifier     |
| Tape Library Type  | TLMPROD - Tape Management System Name |
| Report Start       | MICF generated                        |
| Report End         | MICF generated                        |



The first line of the report body shows the date of the data presented in the report. The remainder of the report body reports on the following measurements from left to right:

Volume Group

o Volume Group - VOLGROUP

Overall Tape Volume Statistics:

o Total Volume Count - TMVVOLT  
o Non-Scratch Volume Count - TMVVOLN  
o Scratch Volume Count - TMVVOLS  
o Percent of Scratch Volumes - TMVPCVSC

Active (Used) Volume Statistics:

o Total Files on Non-Scratch Volumes - TMVFILES  
o Average Files on Non-Scratch Volumes - TMVAVFIL  
o Average Non-Scratch Volume Usage(M) - TMVAVUSM  
o Average Non-Scratch Volume Usage(G) - TMVTUSEG  
o Average Days Since Last Use - TMVAVLUS

Note: The age field is manipulated to show the value in a YY DDD format on the report.

Percent Volumes Used:

o Percent of Non-Scratch Volumes - TMVPCVNS

A graphic shows the active volumes as a percentage of the total tapes in the volume group.

At the bottom of the report, a TOTALS line shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

Report data is generated from the DAYS timespan of the Tape Data Set (TMCTMD) file.

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 TAPLTB, whose Catalog Group is STORAGE
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.1.1, TLM MICF Inquiry Specification Panels, for information about modifiable panel fields.

#### Tape Volume Scratch Availability Report (TAPLTB) Rpt Sample

-----

The following report sample shows summary tape volume statistics for a site that has used the volume group (VOLGROUP) data element to classify tape data in three categories:

Media Type 1: Large tape data sets on real cartridges

Media Type 2: Smaller tape data sets on real cartridges

Virtual Tape: Data sets stored in the virtual tape system

Virtual tape is used as the primary tape storage media. The scratch tape availability (17.6%) looks reasonable given the average age of virtual tape volumes (280 days). It is interesting to note that there are no scratch tapes available for Media Type 1. At this site, it may be that these are tape volumes imported from outside the tape library, therefore there is no need or expectation for requests to create volumes in this volume group.

|                                    |                  |                                    |                    |              |                                           |                            |                             |                                |                                  |                           |
|------------------------------------|------------------|------------------------------------|--------------------|--------------|-------------------------------------------|----------------------------|-----------------------------|--------------------------------|----------------------------------|---------------------------|
| Inquiry : TAPLTB                   |                  | CA MICS Tape Volume Summary Report |                    |              |                                           |                            |                             |                                | Page 001                         |                           |
| Run Date: 11JULyy                  |                  | Information Summarized by Day      |                    |              |                                           |                            |                             |                                |                                  |                           |
| Tape Library Name: TLB1            |                  |                                    |                    |              |                                           |                            |                             |                                | Report Start: 02JULyy:14:05      |                           |
| Tape Library Type: RMM             |                  |                                    |                    |              |                                           |                            |                             |                                | Report End : 03JULyy:14:05       |                           |
| -----                              |                  |                                    |                    |              |                                           |                            |                             |                                |                                  |                           |
| Day: 03JULyy                       |                  |                                    |                    |              |                                           |                            |                             |                                |                                  |                           |
| --Overall Tape Volume Statistics-- |                  |                                    |                    |              | -----Active (Used) Volume Statistics----- |                            |                             |                                | --Percent Volumes Used--         |                           |
| Volume Group                       | Total<br>Volumes | Active<br>Volumes                  | Scratch<br>Volumes | Pct<br>Scrch | File<br>Count                             | Avg<br>Files<br>per<br>Vol | Avg<br>Vol<br>Storg<br>(MB) | Est<br>Storage<br>Size<br>(GB) | Avg<br>Volume<br>Age<br>YY / DDD |                           |
| Media Type 1                       | 27               | 27                                 | 0                  | 0.0%         | 32                                        | 1.2                        | 583                         | 16                             | 6 / 189                          | 0----25----50----75---100 |
| Media Type 2                       | 3555             | 3261                               | 294                | 8.3%         | 10031                                     | 3.1                        | 941                         | 3068                           | 8 / 245                          | *****                     |
| Virtual Tape                       | 49998            | 41211                              | 8787               | 17.6%        | 681409                                    | 16.5                       | 1829                        | 75389                          | 0 / 280                          | *****                     |
| TOTALS                             | 53580            | 44499                              | 9081               | 16.9%        | 691472                                    | 12.9                       | 1707                        | 78473                          | 1 / 128                          | 0---25----50---75---100   |
| -----                              |                  |                                    |                    |              |                                           |                            |                             |                                |                                  |                           |

Figure 3-3. Tape Volume Summary Report

## 3.2 VTS Component Reports

The Virtual Tape System (VTS) reports are generated by inquiries accessed using the CA MICS Information Center Facility (MICF), which is part of the CA MICS Workstation Facility (MWF).

The MICF inquiries distributed with the component produce meaningful reports from the CA MICS database files. These distributed inquiries can be copied and modified using the Database Inquiries option on the MICF main menu. The MICF facility also provides the flexibility to code and save user-designed reports.

The following sections provide information about the inquiries and associated reports provided for the virtual tape systems supported by the VTS component:

- 1 - IBM VTS MICF Inquiries
- 2 - StorageTek VSM MICF Inquiries
- 3 - IBM Hydra MICF Inquiries

### 3.2.1 IBM VTS MICF Inquiries

Reports for IBM VTS virtual tape systems are distributed as MICF inquiries and are listed in Figure 3-4.

All of the IBM VTS inquiries generate line-printer reports. Samples of each report are presented in the following sections.

All reports can be produced at multiple summarization levels. Dates and titles are adjusted appropriately based on the timespan and summarization level chosen for the execution. After data has been collected for a time period, this summarization capability can be used to "drill down" to a specific time frame.

For example, production trend reporting can be done at the WEEKS timespan level for the most recent 26 weeks. If the report from last week's data shows erratic behavior at the weekly level, the same report can be used to drill down to the DAYS and DAYS BY HOUR level, to determine the specific interval where the abnormal behavior occurred.

### User Modification

-----

The MICF inquiries provide a user exit in the independent source step that can be used to perform more data element modification or record selection from the CA MICS database. To invoke this exit, the shared inquiry must first be copied into the private MICF catalog, then selected for modification. Finally, the SAS statements must be coded in the SELECT macro, bracketed by the %MACRO and %MEND statements, which are provided.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS files. The macro can be used to delete observations from the data as it is processed. For example, for a published study, you can change the actual VTS Library Sequence Numbers (IVTVLS) and VTS Composite Library ID (IVTCMPID) values that appear in the report. The following code would accomplish this requirement:

```
%MACRO SELECT;
  IF IVTVLS  = 'PROD01' THEN IVTVLS  ='VTS001' ;
  IF IVTCMPID = 'PRDC01' THEN IVTCMPID ='CMP001' ;
  ... additional remapping statements ...
%MEND  SELECT;
```

Use this macro to exclude systems from the report, for example, exclude all test systems:

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

**IMPORTANT!** All SAS statements must be coded in accordance with the syntax of the SAS Macro Language, as described in the SAS guides. No validity checking is done on the defined code. If the user code contains syntax errors or the logic produces syntax errors, the inquiry is either terminated abnormally or produces unpredictable results.

### Inquiry Naming Conventions

-----

The VTS component MICF inquiry names follow the form cccptn, where:

ccc =       The three-character product identifier (TAP).

p =        The type of report: C (color graphic), L (list),  
            or P (printer).

t =        The technology reported on: V (IBM VTS) or S  
            (StorageTek VSM).

n =        A character that differentiates this inquiry  
            from others.

For example, an inquiry named TAPLVC would be interpreted  
as follows:

```

TAPLVC
---||+= the third list inquiry
|  |
|  ||+= for IBM VTS
|  |
|  ||+= a list inquiry
|  |
|  ||+= a Tape Analyzer Option inquiry

```

| Report Class | Report Name                          | Report ID |
|--------------|--------------------------------------|-----------|
| Perform      | IBM VTS Performance Overview         | TAPLVA    |
|              | IBM VTS DASD Cache Analysis          | TAPLVB    |
|              | IBM VTS Physical Tape Drive Analysis | TAPLVC    |
|              | IBM VTS Virtual Tape Drive Analysis  | TAPLVD    |
|              | IBM VTS Virtual Tape Mount Analysis  | TAPLVE    |
|              | IBM VTS Cartridge Use Distribution   | TAPLVF    |

Figure 3-4. MICF Distributed Inquiries for IBM VTS

These MICF inquiries for IBM VTS are accessed through the  
MICF Inquiries panel of the CA MICS Workstation Facility  
(MWF).

The first subsection below explains the layout and user-  
modifiable fields in the MICF displays for IBM VTS inquiries.  
The next sections discuss each of the MICF inquiries for IBM  
VTS virtual tape systems:

- 1 - IBM VTS MICF Inquiry General Information
- 2 - IBM VTS Performance Overview (TAPLVA)
- 3 - IBM VTS DASD Cache Analysis (TAPLVB)
- 4 - IBM VTS Physical Tape Drive Analysis (TAPLVC)
- 5 - IBM VTS Virtual Tape Drive Analysis (TAPLVD)
- 6 - IBM VTS Virtual Tape Mount Analysis (TAPLVE)
- 7 - IBM VTS Cartridge Use Distribution (TAPLVF)

### 3.2.1.1 IBM VTS MICF Inquiry General Information

All IBM VTS MICF inquiries use similar inquiry specification panels. In addition, the report headings have similar content. The specification panels and report headings are described in the following sections:

- 1 - IBM VTS MICF Inquiry Specification Panels
- 2 - IBM VTS Report Headers

#### 3.2.1.1.1 IBM VTS MICF Inquiry Specification Panels

The rules for filling in fields on the panels are identical for all IBM VTS reports, with the following exceptions:

- o The "Composing Inquiry" line is different for each report. It gives the report ID (for example, TAPLVA) and the report title (for example, IBM VTS Performance Overview Report).
- o The "VTS Type" selection choices vary, depending on the inquiry. For each inquiry, the acceptable choices for that VTS type are listed.

A sample inquiry specification panel for inquiry TAPLVA is shown below. Explanations for field choices follow.

```
+-----+
| ----- MICS IBM VTS Inquiry ----- |
| Command ==>                          |
|                                         |
| Composing Inquiry: TAPLVA - IBM VTS Performance Overview Report |
| Database ==> _                         |
| Cycle(s) ==> _ - _                     |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
| Report by hour (DETAIL, DAYS, WEEKS only) ==> _ (Y/N) |
| Generate report for each value of ZONE ==> _ (Y/N) |
|                                         |
| Data Selection:                        |
|                                         |
|   dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy   |
| Date Ranges ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Hour ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Zone ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| VTS Type - ALL (default), COMPOSITE, or STANDALONE |
| (IVTTYPE) ==>                                     |
| VTS ID                                           |
| (IVTVLS) ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
|-----+

```

Composing Inquiry: - Required. No default. The report ID and report title.

Database - Required. No default. Up to six database unit IDs can be specified (the IDs of the CA MICS database units from which files are read). Duplicates are not allowed. 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. The cycle of the specified timespan of the CA MICS files that are used as input to the analysis. A range of cycles can be specified. The fields can contain any numeric value between 0 and 99. If a single cycle is required (such as cycle 01), it must be specified in the first entry field, and the second field must be blank. Leading zeros are not required and are inserted automatically if a single-digit number is entered (for example, 7 becomes 07). If a cycle range is specified, it can be specified in either ascending or descending order (for example, 01-05 or 05-01).

Timespan - Required. Default varies by report. The timespan of the CA MICS files that are used as input to the analysis. Required input files must be available at the specified timespan.

Report by hour - Required. Defaults to N. At the DAYS and WEEKS timespans, reports can be produced at an hourly, daily, or weekly level. If you specify Y (Yes), the data is summarized and displayed by hour, and separate reports are produced for each day or week. If you specify N (No), the data is summarized by day or week, and a single report listing all days or weeks is produced.

Generate a report for each value of Zone - Required. Defaults to N. Reports for each zone can be generated when requested if you specify Y (Yes). The nature and resource requirements of processing often change from one zone to another (for example, prime shift online demands versus production batch requirements at non-prime shift periods). Zone reporting gives you the ability to display separate reports for each observed zone. If you specify N (No), the data is summarized to the appropriate level and displayed on a single report.

Date Ranges - 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 the higher range can be specified before the lower range. For example, a valid date range specification is specifying date range 1 as 01 JAN 09 - 31 DEC 09 and specifying date range 2 as 01 JAN 08 - 31 DEC 08. 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. 0 to 23. Up to three hour ranges. 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. The hour ranges should not overlap, but the higher range can be specified before the lower range. For example, a valid hour range specification is 18 - 23 and 09 - 17. 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 any specified hour range.

Zone - Optional. No default. A one-character value from 1 to 9. Up to nine zone values can be specified. An input observation is selected if its zone value is equal to any of the specified values.

Sysid - Optional. No default. A one to four character value. Up to six SYSIDs can be specified. An input observation is selected if its SYSID value is equal to any of the specified values.

VTS Type (IVTTYPE) - Optional. Default is ALL. The specific VTS type to report on. Valid values are ALL, STANDALONE, COMPOSITE, UI, or SECONDARY. The specific types that can be selected vary by report and are listed on the specification panel for each report. If a VTS type is specified, the observations that are selected for reporting are limited to those that match that type. The default value ALL means that all VTS types are selected for reporting.

VTS ID (IVTVLS) - Optional. No default. A one to five character value identifying specific VTSs to report on. Specify up to six VTS Library Sequence Numbers (IVTVLS) to report on. If specific VTS IDs are specified, observations selected for reporting are limited to those that match the specification.



### 3.2.1.1.2 IBM VTS Report Headers

The report headings for all IBM VTS reports are similar and consist of general information plus customized information, based on the VTS type reported on. The headings and content are as follows:

#### o General VTS and report information

All IBM VTS report headings include the following general information:

| Report Label       | Example                             |
|--------------------|-------------------------------------|
| -----              | -----                               |
| report title       | CA MICS IBM VTS DASD Cache Analysis |
| report granularity | Data Presented by Hour within DAY   |
| Inquiry            | TAPLVB                              |
| Run Date           | 10SEPyy                             |
| VTS Library ID     | VTS001                              |
| Library Type       | STANDALONE                          |
| Report Start       | 08SEPyyyy                           |
| Report End         | 10SEPyyyy                           |
| Timespan           | DAYS                                |
| F/C 4001 Status    | Enabled                             |

Note: The IBM function code F/C 4001 Status (Enabled or Disabled) changes the measurements available in the raw data used to build the CA MICS IVT information area files. The F/C 4001 status determines whether or not some metrics are available for reporting.

The data elements used to populate the heading data are:

|                    |                                      |
|--------------------|--------------------------------------|
| Report title       | MICF generated                       |
| Report granularity | MICF generated                       |
| Inquiry            | MICF generated                       |
| Run Date           | MICF generated                       |
| VTS Library ID     | IVTVLS - VTS Library Sequence Number |
| Library Type       | IVTTYPE - VTS Type                   |
| Report Start       | MICF generated                       |
| Report End         | MICF generated                       |
| Timespan           | MICF generated                       |
| F/C 4001 Status    | IVT4001 - F/C 4001 Indicator         |

#### o Customized information based on VTS type

The VTS types fall into two categories: composite and distributed. The VTS types that fall into each of these categories are as follows:

Composite category - COMPOSITE

Distributed category - STANDALONE, UI, and SECONDARY

In the general heading information presented above, one of the values is Library Type. The rest of the header information is customized for that type.

- For the distributed category (VTS types STANDALONE, UI, and SECONDARY) the additional heading information includes:

| Report Label       | Example  |
|--------------------|----------|
| -----              | -----    |
| Composite ID       | VTCC01   |
| Library Make-Model | 3584-L22 |
| Lib Maint Level    | 534.33   |
| VTS Cache Size     | 1728 GB  |
| VTS Maint Level    | 7414.00  |

The data elements used to populate the distributed VTS category heading data are:

|                     |                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------|
| Composite ID        | IVTCMPID - Composite Library Association                                                    |
| Library Make-Model: | IVTLTYPE - System-Managed Tape Library Type<br>IVTLMODL - System-Managed Tape Library Model |
| Lib Maint Level:    | VDLLVLM - Library Manager Version and Release                                               |
| VTS Cache Size:     | VDLAVCSZ - Avg VTC Cache Size (GB)                                                          |
| VTS Maint Level:    | VDLLVTS - VTS Code Modification and Fix Level                                               |

- For the composite category (VTS type COMPOSITE) the additional heading information includes:

| Report Label          | Example       |
|-----------------------|---------------|
| -----                 | -----         |
| UI/SEC IDs            | VTS001/VTS001 |
| VTC Preferred I/O     | NONE          |
| VTC Preferred Mast    | VTS0          |
| VTC Maintenance Level | 7414.00       |
| Copy Mode Setting     | Immediate     |

The data elements used to populate the composite VTS category heading data are:

|                        |                                                  |
|------------------------|--------------------------------------------------|
| UI/SEC IDs:            | VCLUIID - UI IVTVLS ID                           |
|                        | VCLSECID - SECONDARY IVTVLS ID                   |
| VTC Preferred I/O:     | VCLPIO - Composite VTC<br>Preferred I/O VTS      |
| VTC Preferred Mast:    | VCLPMST - Composite VTC<br>Preferred Master VTS  |
| VTC Maintenance Level: | VCLLVTC - VTC Code Modification<br>and Fix Level |
| Copy Mode Setting:     | VCLOPCPY - Operation Copy Mode                   |

The first column of each report indicates the time period represented by each line of the report and is dynamically changed based on the report granularity. For example, if the report is by-hour-within-day, the first column heading will be HOUR, and each line of the report will list the hour value reported (for example, 0, 1, 2, and so on). If the report is by-day-within-month, however, the first column heading will be DAY, and each line of the report will list the day value reported (for example, 01-Mo, 02-Tu, 03-We, and so on).

### 3.2.1.2 IBM VTS Performance Overview (TAPLVA)

The CA MICS IBM VTS Performance Overview Report provides a consolidated view of important VTS metrics. While each of the other IBM VTS reports focuses on a particular area of the VTS (such as the physical tape drives, cache, or virtual mounts) this overview report provides a consolidated set of critical performance metrics that quantify the performance, throughput, and constraining factors such as throttling.

Of particular interest are the percentage of VTS DASD cache virtual volume mount misses, and non-zero throttle percentages and values. Cache misses and throttling degrade the optimal performance of the virtual tape subsystem.

The report uses both the distributed and composite VTS headers, based on the VTS type reported. These headers and their content is described in section 3.2.1.1.2.

The report body reports on the following measurements from left to right:

Interval count:

o Number of Recording Intervals - INTERVLS

Virtual Mounts (virtual mount counts, by type, scratch and specific, with a further breakdown of specific mounts by hits and misses. The percentage of cache misses is also provided):

|                                                        |            |
|--------------------------------------------------------|------------|
| o Total Virtual Mounts                                 | - fffTVM   |
| o Virtual Fast-Ready (Scratch) Mounts                  | - fffVFRM  |
| o Total Virtual Specific Mounts                        | - fffVSPM  |
| o Specific Cache-Hit Mounts                            | - fffVCHM  |
| o Specific Cache-Miss Mounts                           | - fffVRM   |
| o Percent of specific mounts that were<br>cache misses | - fffPCVMS |

Data Transferred (data moved in and out of the VTS DASD cache):

|                                           |            |
|-------------------------------------------|------------|
| o Channel blocks written to cache (1000s) | - fffNUMBS |
| o Estimated Avg channel block blocksize   | - fffAVBSZ |
| o GB Data Read from VTS DASD Cache        | - fffDRVV  |
| o GB Data Written to VTS DASD Cache       | - fffDWV   |

Note: fffNUMBS is divided by 1000 for reporting. fffDRVV and fffDWV are divided by 1024 to convert MB to GB for reporting.

Channel MB/Sec (minimum, average, and maximum MB data per second passing through z/OS host channels to/from the VTS DASD cache):

- o Minimum Channel MB per second - fffMNPSC
- o Average Channel MB per second - fffPSCH
- o Maximum Channel MB per second - fffMNPSC

Compress Ratios (data compression ratios for data written to cache and data written to physical tape (backstore)):

- o Compression ratio writes to VTS DASD Cache - fffAVHAR
- o Compression ratio writes to Physical Tape - VDLAVBSR

Note: For a COMPOSITE VTS, the backstore compression ratio reported is the maximum found for either the UI or SECONDARY VTS in the same time interval.

For the UI and SECONDARY VTSs in a peer-to-peer configuration, the compression ratio for writes to the VTS DASD cache is not available.

Throttle Values (write overrun throttle percent and throttle value, and overall throttle value):

- o Write overrun throttle percentage - VDLAVWRO
- o Write overrun throttle value - VDLAVWOT
- o Overall total throttle value - VDLAVTOT

Note: For a COMPOSITE VTS, all three throttle values reported are the maximum found from either the UI or SECONDARY VTS in the same time interval.

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

Report data for VTS type COMPOSITE is generated from the VTS Composite Library Activity (IVTVCL) file. Report data for VTS types UI, SECONDARY, and STANDALONE is generated from the VTS Distributed Library Activity (IVTVDL) file.

The throttle values and backstore compression ratio value reported for the COMPOSITE VTS are determined, during report code processing, by selecting the maximum value found in either the UI or SECONDARY VTS for the same time period.

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 TAPLVA, IBM VTS Performance Overview Report, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.1.1.1, IBM VTS MICF Inquiry Specification Panels, for information about modifiable panel fields.

#### IBM VTS Performance Overview (TAPLVA) Report Sample

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The following report sample provides a performance overview for a day by hour. The VTS reported is a peer-to-peer configuration. The three report pages show the Composite VTS statistics followed by statistics for the User Interface (UI) and Secondary VTSs.

The report shows a highly active and somewhat constrained virtual tape system. The average number of cache misses for the day is 23%, with a high of 68% at 2:00 PM.

In addition, write overrun throttling is occurring during most hours of the day. Write overrun throttling results in degraded z/OS workload performance because the VTS slows down each write I/O to the DASD cache as it tries to free up additional cache space.

Inquiry : TAPLVA CA MICS IBM VTS Performance Overview Report Page 002  
 Run Date: 02APRyy Data Presented by Hour within Day

VTS Library ID: K9200 VTC Preferred I/O : NONE Copy Mode Setting : Mixed Report Start: 31MARyy:00:00  
 Library Type : PtP-COMPOSITE VTC Preferred Mast: VTS0 VTC Maint Level : 7414.00 Report End : 31MARyy:23:00  
 UI/SEC IDs : K9229/K9230 F/C 4001 Status : Enabled Timespan : DAYS

Day: 31MAYyy

| ----- Virtual Mounts ----- |      |       |        | ----- Data Transferred ----- |       |      |         | -Channel MB/Sec- |       |       | -Compress-- |       | Throttle Values |       |       |      |     |
|----------------------------|------|-------|--------|------------------------------|-------|------|---------|------------------|-------|-------|-------------|-------|-----------------|-------|-------|------|-----|
| Numb                       |      |       |        | Cache                        | Cache | Pct  | 1000's  | Avg              | GB    | GB    |             |       |                 |       |       |      |     |
| HOUR                       | Intv | Total | Scrtch | Spcfic                       | Hits  | Miss | Written | (Est)            | Read  | Write | Min         | Avg   | Max             | Cache | BkStr | Pct  | Avg |
|                            |      |       |        |                              |       |      |         |                  |       |       |             |       |                 |       |       |      |     |
| 0                          | 1    | 735   | 323    | 412                          | 371   | 41   | 10%     | 9597.99          | 24000 | 264.8 | 270.7       | 152.3 | 152.3           | 152.3 | 2.83  | 0.96 | 17% |
| 1                          | 1    | 995   | 430    | 565                          | 478   | 87   | 15%     | 11768.7          | 24000 | 309.7 | 321.7       | 179.6 | 179.6           | 179.6 | 4.31  | 0.96 | 6%  |
| 2                          | 1    | 1293  | 472    | 821                          | 700   | 121  | 15%     | 14154.8          | 25000 | 386.4 | 402.5       | 224.4 | 224.4           | 224.4 | 3.93  | 0.96 | 14% |
| 3                          | 1    | 557   | 235    | 322                          | 253   | 69   | 21%     | 12486.4          | 26000 | 164.3 | 295.7       | 130.9 | 130.9           | 130.9 | 2.86  | 0.96 | 16% |
| 4                          | 1    | 666   | 162    | 504                          | 453   | 51   | 10%     | 5657.33          | 24000 | 400.2 | 135.0       | 152.2 | 152.2           | 152.2 | 2.29  | 0.96 | 7%  |
| 5                          | 1    | 806   | 172    | 634                          | 565   | 69   | 11%     | 8082.00          | 25000 | 384.3 | 208.3       | 168.6 | 168.6           | 168.6 | 2.59  | 0.96 | 15% |
| 6                          | 1    | 458   | 109    | 349                          | 314   | 35   | 10%     | 7870.23          | 29000 | 334.6 | 233.3       | 161.5 | 161.5           | 161.5 | 2.39  | 0.96 | 10% |
| 7                          | 1    | 492   | 102    | 390                          | 332   | 58   | 15%     | 6867.42          | 32000 | 322.6 | 222.7       | 155.1 | 155.1           | 155.1 | 2.73  | 0.96 | 7%  |
| 8                          | 1    | 604   | 180    | 424                          | 319   | 105  | 25%     | 8877.53          | 31000 | 384.6 | 286.1       | 190.8 | 190.8           | 190.8 | 2.66  | 0.96 | 15% |
| 9                          | 1    | 315   | 106    | 209                          | 160   | 49   | 23%     | 6464.37          | 33000 | 202.9 | 204.4       | 115.8 | 115.8           | 115.8 | 2.67  | 0.96 | 11% |
| 10                         | 1    | 163   | 77     | 86                           | 79    | 7    | 8%      | 5428.42          | 29000 | 168.9 | 166.0       | 95.3  | 95.3            | 95.3  | 2.63  | 0.96 | 1%  |
| 11                         | 1    | 113   | 51     | 62                           | 54    | 8    | 13%     | 5890.89          | 22000 | 223.0 | 141.5       | 103.7 | 103.7           | 103.7 | 3.64  | 0.96 | 0%  |
| 12                         | 1    | 162   | 85     | 77                           | 68    | 9    | 12%     | 8381.00          | 24000 | 295.0 | 243.1       | 153.1 | 153.1           | 153.1 | 4.45  | 0.96 | 0%  |
| 13                         | 1    | 253   | 91     | 162                          | 131   | 31   | 19%     | 5816.76          | 10000 | 197.5 | 65.0        | 74.7  | 74.7            | 74.7  | 2.54  | 0.96 | 0%  |
| 14                         | 1    | 290   | 59     | 231                          | 74    | 157  | 68%     | 1810.21          | 21000 | 205.8 | 43.0        | 70.8  | 70.8            | 70.8  | 2.16  | 0.96 | 0%  |
| 15                         | 1    | 718   | 314    | 404                          | 261   | 143  | 35%     | 6699.79          | 22000 | 290.7 | 164.2       | 129.4 | 129.4           | 129.4 | 4.08  | 0.96 | 0%  |
| 16                         | 1    | 902   | 536    | 366                          | 240   | 126  | 34%     | 14310.8          | 24000 | 361.7 | 349.5       | 202.3 | 202.3           | 202.3 | 2.97  | 0.96 | 23% |
| 17                         | 1    | 812   | 444    | 368                          | 237   | 131  | 36%     | 23932.3          | 25000 | 246.6 | 493.0       | 210.4 | 210.4           | 210.4 | 2.65  | 0.96 | 68% |
| 18                         | 1    | 842   | 432    | 410                          | 267   | 143  | 35%     | 24222.4          | 25000 | 270.5 | 473.1       | 211.5 | 211.5           | 211.5 | 2.77  | 0.96 | 44% |
| 19                         | 1    | 1061  | 524    | 537                          | 397   | 140  | 26%     | 21968.4          | 24000 | 470.8 | 430.6       | 256.4 | 256.4           | 256.4 | 2.93  | 0.96 | 40% |
| 20                         | 1    | 947   | 441    | 506                          | 359   | 147  | 29%     | 19027.1          | 25000 | 402.7 | 447.6       | 241.9 | 241.9           | 241.9 | 2.95  | 0.96 | 31% |
| 21                         | 1    | 951   | 429    | 522                          | 373   | 149  | 29%     | 12136.8          | 25000 | 596.2 | 345.1       | 267.8 | 267.8           | 267.8 | 3.75  | 0.96 | 20% |
| 22                         | 1    | 689   | 293    | 396                          | 279   | 117  | 30%     | 10418.9          | 24000 | 399.3 | 294.7       | 197.4 | 197.4           | 197.4 | 3.63  | 0.96 | 10% |
| Tots                       | 23   | 14824 | 6067   | 8757                         | 6764  | 1993 | 23%     | 251871           | 25000 | 7283  | 6237        | 70.8  | 184.6           | 267.8 | 3.12  | 0.96 | 15% |

## 3.2 VTS Component Reports

|                              |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
|------------------------------|---|---------------------------------------------|--------|--------|-------|--------------------------|------|---------|--------|-----------------------------|-------|------|------|----------|-------------|------|------|-----|-----|----|
| Inquiry : TAPLVA             |   | CA MICS IBM VTS Performance Overview Report |        |        |       |                          |      |         |        |                             |       |      |      | Page 002 |             |      |      |     |     |    |
| Run Date: 02APRyy            |   | Data Presented by Hour within Day           |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| VTS Library ID: K9229        |   | Library Make-Model: 3584-L22                |        |        |       | Lib Maint Level: 534.33  |      |         |        | Report Start: 31MARyy:00:00 |       |      |      |          |             |      |      |     |     |    |
| Library Type : PtP-UI        |   | VTS Cache Size : 1728 GB                    |        |        |       | VTS Maint Level: 7414.00 |      |         |        | Report End : 31MARyy:23:00  |       |      |      |          |             |      |      |     |     |    |
| Composite ID : K9200         |   | F/C 4001 Status : Enabled                   |        |        |       |                          |      |         |        | Timespan : DAYS             |       |      |      |          |             |      |      |     |     |    |
| -----                        |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| Day: 31MAYyy                 |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| -----                        |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| ----- Virtual Mounts -----   |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| ----- Data Transferred ----- |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| ----- Channel MB/Sec-----    |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| -----Compress--              |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| Throttle Values              |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| Numb                         |   |                                             |        |        | Cache | Cache                    | Pct  | 1000's  | Avg    | GB                          | GB    |      |      |          | Ratios      |      | Avg  |     |     |    |
| HOUR Intv                    |   | Total                                       | Scrtch | Spfcic | Hits  | Miss                     | Miss | Ch Blks | BSize  | Cache                       | Cache |      |      |          | Cache BkStr |      | Wrt  | Wrt | Avg |    |
|                              |   |                                             |        |        |       |                          |      | Written | (Est)  | Read                        | Write |      |      |          |             |      | Pct  | Val | Tot |    |
|                              |   |                                             |        |        |       |                          |      |         |        |                             |       | Min  | Avg  | Max      |             |      |      | Val | Val |    |
|                              |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |
| 0                            | 1 | 737                                         | 489    | 248    | 223   | 25                       | 10%  | 6197.62 | 10000  | 36.0                        | 54.9  | 25.9 | 25.9 | 25.9     | n/a         | 0.95 | 17%  | 118 | 20  |    |
| 1                            | 1 | 997                                         | 697    | 300    | 247   | 53                       | 18%  | 4555.16 | 8000   | 40.8                        | 27.7  | 19.5 | 19.5 | 19.5     | n/a         | 0.95 | 4%   | 56  | 2   |    |
| 2                            | 1 | 1300                                        | 885    | 415    | 349   | 66                       | 16%  | 6534.91 | 9000   | 37.6                        | 44.6  | 23.4 | 23.4 | 23.4     | n/a         | 0.95 | 14%  | 90  | 12  |    |
| 3                            | 1 | 564                                         | 411    | 153    | 111   | 42                       | 27%  | 3909.93 | 12000  | 28.0                        | 40.2  | 19.4 | 19.4 | 19.4     | n/a         | 0.95 | 13%  | 119 | 15  |    |
| 4                            | 1 | 669                                         | 432    | 237    | 209   | 28                       | 12%  | 2630.00 | 13000  | 56.2                        | 29.0  | 24.2 | 24.2 | 24.2     | n/a         | 0.95 | 7%   | 70  | 5   |    |
| 5                            | 1 | 815                                         | 484    | 331    | 279   | 52                       | 16%  | 3471.86 | 14000  | 82.1                        | 40.0  | 34.7 | 34.7 | 34.7     | n/a         | 0.95 | 10%  | 88  | 9   |    |
| 6                            | 1 | 465                                         | 281    | 184    | 156   | 28                       | 15%  | 2884.17 | 13000  | 77.1                        | 32.2  | 31.1 | 31.1 | 31.1     | n/a         | 0.95 | 10%  | 48  | 5   |    |
| 7                            | 1 | 495                                         | 283    | 212    | 164   | 48                       | 23%  | 3180.23 | 11000  | 64.9                        | 30.8  | 27.2 | 27.2 | 27.2     | n/a         | 0.95 | 6%   | 80  | 5   |    |
| 8                            | 1 | 606                                         | 385    | 221    | 165   | 56                       | 25%  | 4921.94 | 15000  | 72.0                        | 66.9  | 39.5 | 39.5 | 39.5     | n/a         | 0.95 | 15%  | 100 | 15  |    |
| 9                            | 1 | 316                                         | 202    | 114    | 89    | 25                       | 22%  | 3726.05 | 15000  | 36.7                        | 47.8  | 24.0 | 24.0 | 24.0     | n/a         | 0.95 | 5%   | 66  | 3   |    |
| 10                           | 1 | 162                                         | 109    | 53     | 49    | 4                        | 8%   | 3356.84 | 10000  | 31.3                        | 31.5  | 17.9 | 17.9 | 17.9     | n/a         | 0.95 | 1%   | 7   | 0   |    |
| 11                           | 1 | 114                                         | 79     | 35     | 28    | 7                        | 20%  | 2936.40 | 10000  | 45.9                        | 22.3  | 19.4 | 19.4 | 19.4     | n/a         | 0.95 | 0%   | 4   | 0   |    |
| 12                           | 1 | 162                                         | 116    | 46     | 40    | 6                        | 13%  | 1839.08 | 12000  | 32.6                        | 17.7  | 14.3 | 14.3 | 14.3     | n/a         | 0.95 | 0%   | 0   | 0   |    |
| 13                           | 1 | 256                                         | 156    | 100    | 84    | 16                       | 16%  | 3416.38 | 7000   | 46.5                        | 17.5  | 18.2 | 18.2 | 18.2     | n/a         | 0.95 | 0%   | 0   | 0   |    |
| 14                           | 1 | 290                                         | 157    | 133    | 31    | 102                      | 77%  | 935.95  | 7000   | 40.8                        | 6.1   | 13.4 | 13.4 | 13.4     | n/a         | 0.95 | 0%   | 0   | 0   |    |
| 15                           | 1 | 720                                         | 510    | 210    | 127   | 83                       | 40%  | 3483.47 | 6000   | 48.3                        | 17.6  | 18.8 | 18.8 | 18.8     | n/a         | 0.95 | 0%   | 0   | 0   |    |
| 16                           | 1 | 907                                         | 721    | 186    | 124   | 62                       | 33%  | 11387.0 | 9000   | 64.0                        | 82.2  | 41.6 | 41.6 | 41.6     | n/a         | 0.95 | 23%  | 110 | 25  |    |
| 17                           | 1 | 817                                         | 617    | 200    | 134   | 66                       | 33%  | 9818.39 | 10000  | 43.3                        | 82.6  | 35.8 | 35.8 | 35.8     | n/a         | 0.95 | 56%  | 122 | 69  |    |
| 18                           | 1 | 853                                         | 626    | 227    | 150   | 77                       | 34%  | 12722.5 | 8000   | 43.0                        | 85.0  | 36.4 | 36.4 | 36.4     | n/a         | 0.95 | 41%  | 118 | 49  |    |
| 19                           | 1 | 1064                                        | 795    | 269    | 191   | 78                       | 29%  | 12077.6 | 9000   | 40.8                        | 85.6  | 36.0 | 36.0 | 36.0     | n/a         | 0.95 | 35%  | 125 | 44  |    |
| 20                           | 1 | 957                                         | 687    | 270    | 165   | 105                      | 39%  | 8426.56 | 10000  | 49.3                        | 70.7  | 34.1 | 34.1 | 34.1     | n/a         | 0.95 | 31%  | 135 | 43  |    |
| 21                           | 1 | 958                                         | 688    | 270    | 185   | 85                       | 31%  | 5507.64 | 8000   | 44.4                        | 36.6  | 28.7 | 28.7 | 28.7     | n/a         | 0.95 | 14%  | 82  | 11  |    |
| 22                           | 1 | 701                                         | 500    | 201    | 128   | 73                       | 36%  | 5048.19 | 10000  | 51.3                        | 36.0  | 24.8 | 24.8 | 24.8     | n/a         | 0.95 | 3%   | 28  | 0   |    |
| Tots                         |   | 23                                          | 14925  | 10310  | 4615  | 3428                     | 1187 | 26%     | 122968 | 10000                       | 1133  | 1006 | 13.4 | 28.9     | 41.6        | n/a  | 0.95 | 13% | 68  | 14 |
| -----                        |   |                                             |        |        |       |                          |      |         |        |                             |       |      |      |          |             |      |      |     |     |    |



|                              |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
|------------------------------|----|---------------------------------------------|-------|--------------------------|------|-----------------------------|-----|---------|-------|-------|------|-------|------|-------|----------|------|-----|-----|----|-----|--|-----|--|
| Inquiry : TAPLVA             |    | CA MICS IBM VTS Performance Overview Report |       |                          |      |                             |     |         |       |       |      |       |      |       | Page 002 |      |     |     |    |     |  |     |  |
| Run Date: 02APRyy            |    | Data Presented by Hour within Day           |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| VTS Library ID: K9230        |    | Library Make-Model: 3584-L22                |       | Lib Maint Level: 534.33  |      | Report Start: 31MARyy:00:00 |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| Library Type : PtP-SECONDARY |    | VTS Cache Size : 1728 GB                    |       | VTS Maint Level: 7414.00 |      | Report End : 31MARyy:23:00  |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| Composite ID : K9200         |    | F/C 4001 Status : Enabled                   |       |                          |      | Timespan : DAYS             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| -----                        |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| Day: 31MAYyy                 |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| -----                        |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| ----- Virtual Mounts -----   |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| ----- Data Transferred ----- |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| ----- Channel MB/Sec-----    |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| ----- Compress-- Ratios      |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| Throttle Values              |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| Numb                         |    | Cache                                       |       | Cache                    |      | Pct                         |     | 1000's  |       | Avg   |      | GB    |      | GB    |          |      |     | Wrt |    | Avg |  | Avg |  |
| HOUR Intv                    |    | Hits                                        |       | Miss                     |      | Miss                        |     | Ch Blks |       | BSize |      | Cache |      | Cache |          |      |     | Pct |    | Wrt |  | Tot |  |
|                              |    | Total                                       |       | Scrcht                   |      | Spcfic                      |     | Written |       | (Est) |      | Read  |      | Write |          |      |     | Val |    | Val |  |     |  |
|                              |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |
| 0                            | 1  | 783                                         | 596   | 187                      | 149  | 38                          | 20% | 5344.43 | 12000 | 32.4  | 52.9 | 24.3  | 24.3 | 24.3  | n/a      | 0.96 | 14% | 126 | 17 |     |  |     |  |
| 1                            | 1  | 878                                         | 665   | 213                      | 171  | 42                          | 20% | 5336.95 | 9000  | 32.6  | 37.2 | 19.9  | 19.9 | 19.9  | n/a      | 0.96 | 6%  | 78  | 5  |     |  |     |  |
| 2                            | 1  | 1241                                        | 857   | 384                      | 323  | 61                          | 16% | 10451.3 | 8000  | 43.9  | 67.4 | 31.6  | 31.6 | 31.6  | n/a      | 0.96 | 10% | 97  | 10 |     |  |     |  |
| 3                            | 1  | 793                                         | 539   | 254                      | 202  | 52                          | 20% | 6298.51 | 11000 | 22.4  | 56.5 | 22.4  | 22.4 | 22.4  | n/a      | 0.96 | 16% | 107 | 17 |     |  |     |  |
| 4                            | 1  | 632                                         | 383   | 249                      | 211  | 38                          | 15% | 4025.96 | 11000 | 64.4  | 37.6 | 29.0  | 29.0 | 29.0  | n/a      | 0.96 | 3%  | 27  | 0  |     |  |     |  |
| 5                            | 1  | 813                                         | 497   | 316                      | 260  | 56                          | 18% | 3624.19 | 12000 | 65.4  | 36.6 | 29.0  | 29.0 | 29.0  | n/a      | 0.96 | 15% | 87  | 13 |     |  |     |  |
| 6                            | 1  | 502                                         | 322   | 180                      | 154  | 26                          | 14% | 4391.89 | 15000 | 69.4  | 54.2 | 35.2  | 35.2 | 35.2  | n/a      | 0.96 | 10% | 47  | 4  |     |  |     |  |
| 7                            | 1  | 473                                         | 299   | 174                      | 151  | 23                          | 13% | 4943.93 | 14000 | 61.4  | 62.4 | 35.2  | 35.2 | 35.2  | n/a      | 0.96 | 7%  | 70  | 5  |     |  |     |  |
| 8                            | 1  | 618                                         | 402   | 216                      | 163  | 53                          | 25% | 3953.12 | 11000 | 73.0  | 38.3 | 31.7  | 31.7 | 31.7  | n/a      | 0.96 | 9%  | 60  | 5  |     |  |     |  |
| 9                            | 1  | 389                                         | 265   | 124                      | 87   | 37                          | 30% | 2665.91 | 15000 | 40.4  | 33.6 | 21.1  | 21.1 | 21.1  | n/a      | 0.96 | 11% | 113 | 13 |     |  |     |  |
| 10                           | 1  | 177                                         | 138   | 39                       | 27   | 12                          | 31% | 2776.55 | 12000 | 22.2  | 27.5 | 14.1  | 14.1 | 14.1  | n/a      | 0.96 | 1%  | 16  | 0  |     |  |     |  |
| 11                           | 1  | 109                                         | 85    | 24                       | 23   | 1                           | 4%  | 3120.59 | 8000  | 36.6  | 22.1 | 16.7  | 16.7 | 16.7  | n/a      | 0.96 | 0%  | 4   | 0  |     |  |     |  |
| 12                           | 1  | 180                                         | 142   | 38                       | 32   | 6                           | 16% | 4494.83 | 8000  | 42.3  | 25.9 | 19.4  | 19.4 | 19.4  | n/a      | 0.96 | 0%  | 0   | 0  |     |  |     |  |
| 13                           | 1  | 204                                         | 159   | 45                       | 39   | 6                           | 13% | 3481.19 | 5000  | 27.9  | 12.3 | 11.4  | 11.4 | 11.4  | n/a      | 0.96 | 0%  | 0   | 0  |     |  |     |  |
| 14                           | 1  | 307                                         | 205   | 102                      | 33   | 69                          | 68% | 1185.96 | 18000 | 47.8  | 17.5 | 18.6  | 18.6 | 18.6  | n/a      | 0.96 | 0%  | 0   | 0  |     |  |     |  |
| 15                           | 1  | 514                                         | 378   | 136                      | 65   | 71                          | 52% | 2008.53 | 9000  | 36.5  | 15.2 | 14.7  | 14.7 | 14.7  | n/a      | 0.96 | 0%  | 0   | 0  |     |  |     |  |
| 16                           | 1  | 894                                         | 684   | 210                      | 145  | 65                          | 31% | 8738.10 | 9000  | 61.5  | 58.4 | 34.1  | 34.1 | 34.1  | n/a      | 0.96 | 5%  | 54  | 3  |     |  |     |  |
| 17                           | 1  | 947                                         | 755   | 192                      | 124  | 68                          | 35% | 10299.0 | 11000 | 54.2  | 91.7 | 41.5  | 41.5 | 41.5  | n/a      | 0.96 | 68% | 119 | 81 |     |  |     |  |
| 18                           | 1  | 776                                         | 600   | 176                      | 101  | 75                          | 43% | 9893.41 | 9000  | 55.4  | 71.5 | 36.1  | 36.1 | 36.1  | n/a      | 0.96 | 44% | 125 | 55 |     |  |     |  |
| 19                           | 1  | 823                                         | 650   | 173                      | 103  | 70                          | 40% | 10817.9 | 8000  | 56.8  | 71.4 | 36.5  | 36.5 | 36.5  | n/a      | 0.96 | 40% | 110 | 44 |     |  |     |  |
| 20                           | 1  | 1121                                        | 796   | 325                      | 226  | 99                          | 30% | 9530.00 | 9000  | 65.3  | 68.9 | 38.2  | 38.2 | 38.2  | n/a      | 0.96 | 23% | 139 | 32 |     |  |     |  |
| 21                           | 1  | 962                                         | 720   | 242                      | 163  | 79                          | 33% | 7405.04 | 10000 | 72.7  | 63.3 | 38.7  | 38.7 | 38.7  | n/a      | 0.96 | 20% | 86  | 18 |     |  |     |  |
| 22                           | 1  | 852                                         | 603   | 249                      | 161  | 88                          | 35% | 4585.70 | 11000 | 63.0  | 41.0 | 29.6  | 29.6 | 29.6  | n/a      | 0.96 | 10% | 71  | 7  |     |  |     |  |
| Tots                         | 23 | 14988                                       | 10740 | 4248                     | 3113 | 1135                        | 27% | 129373  | 10000 | 1147  | 1063 | 11.4  | 30.2 | 41.5  | n/a      | 0.96 | 14% | 67  | 14 |     |  |     |  |
| -----                        |    |                                             |       |                          |      |                             |     |         |       |       |      |       |      |       |          |      |     |     |    |     |  |     |  |

Figure 3-5. IBM VTS Performance Overview

### 3.2.1.3 IBM VTS DASD Cache Analysis (TAPLVB)

The CA MICS IBM VTS DASD Cache Analysis Report displays important VTS DASD cache usage information at an overall VTS summary level. If IBM function code FC/4001 is enabled and the VTS Cache Usage Preference Level (IVTVCU) file is active, the summary information is broken down and reported at the individual cache usage preference level.

The report provides an excellent view of the DASD cache utilization, including the average number of virtual volumes resident, their average size, and total data volume. Several different views of volume age are listed (how long volumes stay in cache), and the quantity of mounts and average response times are shown by category (total, scratch, cache hits, and misses).

When FC/4001 is enabled and the IVTVCU file is active, this report provides data useful for evaluating the effectiveness of preference level setting. Using preference levels for virtual volumes supports the automation of separating virtual volumes into two groups: those that should remain in cache as long as possible, and those that should be removed from cache as soon as possible.

The report uses the distributed VTS header described in section 3.2.1.1.2. Additionally, just above the report body on the left, the Report Level is listed as either Cache Summary or Cache Preference Level n.

The report body reports on the following measurements from left to right:

Interval count and general cache volume information:

- o Number of Recording Intervals - fffAVVIC
- o Avg Virtual Volumes in Cache - fffAVVIC
- o Avg Virtual Volume Size (MB) - fffAVVSZ
- o Avg Data Resident in Cache (GB) - fffAVDRC

Average age of the virtual volumes in cache:

- o 4 HR Rolling Avg Virt Vol Age - fffVA4
- o 48 HR Rolling Avg Virt Vol Age - fffVA48
- o 35 Day Rolling Avg Virt Vol Age - fffVA35

Total virtual mounts and average mount time:

- o Total Virtual Mounts - fffTVM

- o Avg Virtual Mount Time - fffAVVMT

Mount counts and mount counts by category:

- o Virtual Fast-Ready Mounts - fffVFRM
- o Avg Virtual Fast-Ready Mount Time - fffAVFMT
- o Virtual Cache-Hit Mounts - fffVCHM
- o Avg Virtual Cache-Hit Mount Time - fffAVHMT
- o Virtual Recall Mounts - fffVRM
- o Avg Virtual Recall Mount Time - fffAVRMT

where fff can be either VDL or VCU

At the bottom of the report, a line shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

Report data for summary cache statistics is generated from the VTS Distributed Library Activity (IVTVDL) file. Report data at the Cache Preference Level is generated from the VTS Cache Usage Preference Level (IVTCU) file.

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 TAPLVB, IBM VTS DASD Cache Analysis Report, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.1.1.1, IBM VTS MICF Inquiry Specification Panels, for information about modifiable panel fields.

IBM VTS DASD Cache Analysis (TAPLVB) Report Sample

-----  
The first page of the following report sample shows summary DASD cache statistics for the User Interface (UI) VTS of a peer-to-peer configuration. The site has taken advantage of advanced cache management, so virtual volumes are stored and managed in the cache at one of two preference levels.

### 3.2 VTS Component Reports

The second and third pages show the breakdown of statistics for the virtual volumes in cache at each of the two preference levels.

This report sample shows a finely tuned system where the average size of preference level 0 volumes ("get out fast") is very large compared to preference level 1 ("stay as long as possible").

Note that the average time in cache for preference level 0 is much less than that for preference level 1.

|                                                                                   |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
|-----------------------------------------------------------------------------------|--|--|--------------------------------------------|--|--|--|--------------------------|--|--|----------|-----------------------------|--|--|--|
| Inquiry : TAPLVB                                                                  |  |  | CA MICS IBM VTS DASD Cache Analysis Report |  |  |  |                          |  |  | Page 002 |                             |  |  |  |
| Run Date: 02APRyy                                                                 |  |  | Data Presented by Hour within Day          |  |  |  |                          |  |  |          |                             |  |  |  |
| VTS Library ID: K9229                                                             |  |  | Library Make-Model: 3584-L22               |  |  |  | Lib Maint Level: 534.33  |  |  |          | Report Start: 31MAYyy:00:00 |  |  |  |
| Library Type : PtP-UI                                                             |  |  | VTS Cache Size : 1728 GB                   |  |  |  | VTS Maint Level: 7414.00 |  |  |          | Report End : 31MAYyy:23:00  |  |  |  |
| Composite ID : K9200                                                              |  |  | F/C 4001 Status : Enabled                  |  |  |  |                          |  |  |          | Timespan : DAYS             |  |  |  |
| -----                                                                             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| Day: 31MAYyy                                                                      |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| Report Level: Cache Summary                                                       |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| -----                                                                             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| --Avg Volume Age--                                                                |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| --- ALL ---                                                                       |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| -----MOUNTS BY CATEGORY-----                                                      |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| Cache Mounts                                                                      |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| -Fast Ready- Cache Hits- -Cache Miss-                                             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| Avg Avg Avg                                                                       |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| Total MM:SS Total MM:SS Total MM:SS Total MM:SS                                   |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| -----                                                                             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 0 1 5544 392 2122 17:40 17:07 18:00 737 0:04 489 0:02 223 0:02 25 3:38            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 1 1 5699 387 2156 17:04 17:11 18:00 997 0:05 697 0:02 247 0:02 53 2:34            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 2 1 5784 387 2187 17:28 17:06 18:00 1300 0:10 885 0:02 349 0:16 66 4:23           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 3 1 5857 387 2215 18:22 16:54 18:00 564 0:08 411 0:02 111 0:02 42 2:48            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 4 1 5975 388 2261 16:38 16:54 18:00 669 0:04 432 0:02 209 0:02 28 2:10            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 5 1 6225 379 2301 14:48 16:58 18:00 815 0:05 484 0:02 279 0:02 52 2:04            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 6 1 6381 384 2393 13:01 16:57 18:00 465 0:07 281 0:02 156 0:02 28 3:28            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 7 1 6504 388 2465 13:00 16:57 18:00 495 0:10 283 0:02 164 0:02 48 3:07            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 8 1 6606 394 2540 17:26 16:55 18:00 606 0:17 385 0:02 165 0:02 56 5:54            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 9 1 6660 397 2582 20:19 17:18 18:00 316 0:11 202 0:02 89 0:02 25 4:06             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 10 1 6546 406 2596 23:13 17:16 18:00 162 0:02 109 0:02 49 0:02 4 2:26             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 11 1 6514 413 2624 24:18 17:28 18:00 114 0:06 79 0:02 28 0:02 7 3:00              |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 12 1 6467 417 2631 24:12 17:29 18:00 162 0:04 116 0:02 40 0:02 6 3:08             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 13 1 6497 419 2660 25:37 17:32 18:00 256 0:06 156 0:02 84 0:02 16 3:08            |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 14 1 6623 416 2691 26:00 17:31 18:00 290 0:38 157 0:02 31 0:02 102 3:32           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 15 1 5203 386 1963 19:39 17:34 18:00 720 0:15 510 0:02 127 0:04 83 4:12           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 16 1 5450 376 2001 19:24 17:30 18:00 907 0:13 721 0:03 124 0:04 62 5:33           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 17 1 5659 376 2080 17:47 17:27 18:00 817 0:16 617 0:02 134 0:02 66 5:58           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 18 1 5742 379 2126 17:33 17:33 18:00 853 0:16 626 0:02 150 0:04 77 5:26           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 19 1 5855 382 2183 15:58 17:31 18:00 1064 0:14 795 0:04 191 0:04 78 5:30          |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 20 1 5906 385 2221 14:28 17:12 18:00 957 0:13 687 0:02 165 0:02 105 3:46          |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 21 1 6110 380 2269 14:30 17:02 18:00 958 0:14 688 0:02 185 0:02 85 4:48           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| 22 1 6181 380 2296 13:02 16:32 18:00 701 0:14 500 0:02 128 0:02 73 4:13           |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| -----                                                                             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| Tots 23 6086 391 2329 18:19 17:13 18:00 14925 0:11 10310 0:02 3428 0:04 1187 4:12 |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |
| -----                                                                             |  |  |                                            |  |  |  |                          |  |  |          |                             |  |  |  |

Inquiry : TAPLVB  
Run Date: 02APRyy

CA MICS IBM VTS DASD Cache Analysis Report  
Data Presented by Hour within Day

Page 004

VTS Library ID: K9229      Library Make-Model: 3584-L22      Lib Maint Level: 534.33      Report Start: 31MAYyy:00:00  
Library Type : PtP-UI      VTS Cache Size : 1728 GB      VTS Maint Level: 7414.00      Report End : 31MAYyy:23:00  
Composite ID : K9200      F/C 4001 Status : Enabled      Timespan : DAYS

Day: 31MAYyy

Report Level: Cache Preference Level-0

|       |       | Avg     |      |       | --Avg Volume Age-- |       |       | --- ALL ---  |      | -----MOUNTS BY CATEGORY----- |             |              |         |
|-------|-------|---------|------|-------|--------------------|-------|-------|--------------|------|------------------------------|-------------|--------------|---------|
|       |       | Avg     | Vol  | Cache |                    |       |       | Cache Mounts |      | -Fast Ready-                 | Cache Hits- | -Cache Miss- |         |
| HOURL | Numb  | Vols in | Size | Data  | 4-HR               | 48-HR | 35-DY | Total        | Avg  | Total                        | Avg         | Total        |         |
| Intv  | Cache | (MB)    | (GB) | HH:MM | HH:MM              | HH:MM |       | MM:SS        |      | MM:SS                        | MM:SS       | MM:SS        |         |
| 0     | 1     | 145     | 1229 | 174   | 17:20              | 8:15  | 6:40  | 9            | 1:29 | 5                            | 0:01        | 0            | 3:19    |
| 1     | 1     | 151     | 1222 | 180   | 1:57               | 8:13  | 6:40  | 12           | 0:42 | 8                            | 0:01        | 0            | 4 2:04  |
| 2     | 1     | 155     | 1222 | 185   | 0:23               | 8:11  | 6:40  | 42           | 0:19 | 26                           | 0:02        | 13           | 3 2:45  |
| 3     | 1     | 160     | 1253 | 196   | 0:37               | 8:08  | 6:40  | 48           | 0:04 | 33                           | 0:01        | 14           | 1 2:12  |
| 4     | 1     | 158     | 1263 | 195   | 0:51               | 8:08  | 6:40  | 11           | 0:01 | 8                            | 0:01        | 3            | 0 0:00  |
| 5     | 1     | 159     | 1205 | 187   | 1:08               | 8:09  | 6:40  | 6            | 0:11 | 5                            | 0:01        | 0            | 1 1:01  |
| 6     | 1     | 160     | 1196 | 187   | 1:18               | 8:10  | 6:40  | 3            | 0:01 | 3                            | 0:01        | 0            | 0 0:00  |
| 7     | 1     | 161     | 1189 | 187   | 1:52               | 8:09  | 6:40  | 2            | 1:02 | 1                            | 0:01        | 0            | 1 2:03  |
| 8     | 1     | 167     | 1195 | 195   | 0:49               | 8:15  | 6:40  | 29           | 2:03 | 14                           | 0:01        | 0            | 15 3:56 |
| 9     | 1     | 172     | 1179 | 198   | 0:13               | 7:14  | 6:40  | 4            | 1:54 | 2                            | 0:01        | 0            | 2 3:47  |
| 10    | 1     | 172     | 1179 | 198   | 0:05               | 7:29  | 6:40  | 0            | 0:00 | 0                            | 0:00        | 0            | 0 0:00  |
| 11    | 1     | 173     | 1176 | 199   | 0:05               | 7:53  | 6:40  | 3            | 0:01 | 3                            | 0:01        | 0            | 0 0:00  |
| 12    | 1     | 175     | 1169 | 200   | 0:07               | 8:02  | 6:40  | 0            | 0:00 | 0                            | 0:00        | 0            | 0 0:00  |
| 13    | 1     | 175     | 1169 | 200   | 0:00               | 8:11  | 6:40  | 0            | 0:00 | 0                            | 0:00        | 0            | 0 0:00  |
| 14    | 1     | 175     | 1169 | 200   | 0:00               | 8:17  | 6:40  | 0            | 0:00 | 0                            | 0:00        | 0            | 0 0:00  |
| 15    | 1     | 85      | 1183 | 98    | 30:08              | 10:15 | 6:40  | 0            | 0:00 | 0                            | 0:00        | 0            | 0 0:00  |
| 16    | 1     | 87      | 1206 | 103   | 29:48              | 10:20 | 6:40  | 25           | 0:19 | 23                           | 0:02        | 0            | 2 3:36  |
| 17    | 1     | 87      | 1210 | 103   | 22:39              | 10:40 | 6:40  | 24           | 0:08 | 22                           | 0:01        | 0            | 2 1:29  |
| 18    | 1     | 94      | 1213 | 111   | 18:55              | 10:50 | 6:40  | 54           | 0:01 | 40                           | 0:01        | 12           | 2 0:01  |
| 19    | 1     | 95      | 1184 | 110   | 1:00               | 10:29 | 6:40  | 42           | 0:03 | 38                           | 0:01        | 3            | 1 1:08  |
| 20    | 1     | 98      | 1111 | 106   | 0:48               | 10:16 | 6:40  | 25           | 0:18 | 20                           | 0:01        | 1            | 4 1:47  |
| 21    | 1     | 92      | 1135 | 102   | 0:54               | 10:17 | 6:40  | 4            | 0:01 | 2                            | 0:01        | 2            | 0 0:00  |
| 22    | 1     | 90      | 1133 | 100   | 0:18               | 10:17 | 6:40  | 3            | 0:30 | 2                            | 0:01        | 0            | 1 1:29  |
| Tots  | 23    | 139     | 1191 | 161   | 5:42               | 8:53  | 6:40  | 346          | 0:23 | 255                          | 0:01        | 48           | 43 2:50 |

### 3.2 VTS Component Reports

|                                        |  |  |                                            |  |  |                          |  |  |                             |  |  |  |  |  |
|----------------------------------------|--|--|--------------------------------------------|--|--|--------------------------|--|--|-----------------------------|--|--|--|--|--|
| Inquiry : TAPLVB                       |  |  | CA MICS IBM VTS DASD Cache Analysis Report |  |  |                          |  |  |                             |  |  |  |  |  |
| Run Date: 02APRyy                      |  |  | Data Presented by Hour within Day          |  |  |                          |  |  | Page 006                    |  |  |  |  |  |
| VTS Library ID: K9229                  |  |  | Library Make-Model: 3584-L22               |  |  | Lib Maint Level: 534.33  |  |  | Report Start: 31MAYyy:00:00 |  |  |  |  |  |
| Library Type : PtP-UI                  |  |  | VTS Cache Size : 1728 GB                   |  |  | VTS Maint Level: 7414.00 |  |  | Report End : 31MAYyy:23:00  |  |  |  |  |  |
| Composite ID : K9200                   |  |  | F/C 4001 Status : Enabled                  |  |  |                          |  |  | Timespan : DAYS             |  |  |  |  |  |
| -----                                  |  |  |                                            |  |  |                          |  |  |                             |  |  |  |  |  |
| Report Level: Cache Preference Level-1 |  |  |                                            |  |  | Day: 31MAYyy             |  |  |                             |  |  |  |  |  |
| -----                                  |  |  |                                            |  |  |                          |  |  |                             |  |  |  |  |  |
| --Avg Volume Age--                     |  |  |                                            |  |  |                          |  |  |                             |  |  |  |  |  |
| --- ALL ---                            |  |  |                                            |  |  |                          |  |  |                             |  |  |  |  |  |
| -----MOUNTS BY CATEGORY-----           |  |  |                                            |  |  |                          |  |  |                             |  |  |  |  |  |
| Avg                                    |  |  | Avg                                        |  |  | Avg                      |  |  | Avg                         |  |  |  |  |  |
| Vols in                                |  |  | Cache                                      |  |  | Cache                    |  |  | Cache                       |  |  |  |  |  |
| Cache                                  |  |  | (MB)                                       |  |  | (GB)                     |  |  | Hits-                       |  |  |  |  |  |
| HOUR                                   |  |  | Numb                                       |  |  | Intv                     |  |  | Total                       |  |  |  |  |  |
| Intv                                   |  |  | Cache                                      |  |  | MM:SS                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
| Total                                  |  |  | MM:SS                                      |  |  | Total                    |  |  | MM:SS                       |  |  |  |  |  |
|                                        |  |  |                                            |  |  |                          |  |  |                             |  |  |  |  |  |

### 3.2.1.4 IBM VTS Physical Tape Drive Analysis TAPLVC)

The CA MICS IBM VTS Physical Tape Drive Analysis Report displays physical tape drive and tape mount statistics for the real tape drives attached to the VTS, including cartridge mount statistics broken down by type, such as those for recall (due to a virtual volume DASD cache miss) or reclamation (because the reclamation threshold has been met).

The report uses the header for IBM VTS distributed libraries, described in section 3.2.1.1.2

The report body reports on the following measurements from left to right:

Interval count and general tape drive information:

- o Number of Recording Intervals - INTERVLS
- o Number of Installed Physical Tape Device - VDLPGDI
- o Avg Physical Drives Available - VDLAVPDA

Minimum, average, and maximum number of concurrently mounted physical drives:

- o Min Physical Drives Concur Mounted - VDLNMPDM
- o Avg Physical Drives Concur Mounted - VDLAVPCM
- o Max Physical Drives Concur Mounted - VDLMPXPCM

Tape mount counts, total and by category:

- o Total Physical Mounts - VDLTPM
- o Physical Stage (Recall) Mounts - VDLPGTG
- o Physical Migrate (Copy) Mounts - VDLPMIG
- o Physical Reclaim Mounts - VDLPPRC
- o Physical Secure Data Erase Mounts - VDLPSDE

\* Note that secure data erase mount counts are only available if IBM F/C 4001 is enabled.

Robotic accessor counts:

- o Accessor A Mounts - VDLACMA
- o Accessor B Mounts - VDLACMB

\* Note that the accessor mount counts can exceed the total VTS mounts because non-VTS (that is, native) mounts are included

Minimum, average, and maximum mount times (mm:ss)

- o Min Physical Mount Time - VDLMPMT
- o Avg Physical Mount Time - VDLAVPMT
- o Max Physical Mount Time - VDLMPMT

Number of virtual volumes pre-migrated (copied) and the amount of data transferred to and from physical cartridges:

- o Virtual Volumes Copied to Physical - VDLPCPY
- o Data Read from Physical Media (MB) - VDLPDR
- o Data Written to Physical Media (MB) - VDLPDW

\* Note that data read from physical media is only available if IBM F/C 4001 is disabled.

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

All report data is generated from the VTS Distributed Library Activity (IVTVDL) file.

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 TAPLVC, IBM VTS Physical Tape Drive Activity, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.1.1.1, IBM VTS MICF Inquiry Specification Panels, for information about modifiable panel fields.

#### IBM VTS Physical Tape Drive Analysis (TAPLVC) Report Sample

-----  
The following report sample shows the physical drive activity for a day by hour. Displayed are the User Interface (UI) and Secondary VTSs that participate in a peer-to-peer configuration.

For these two VTSs, the minimum number of physical drives concurrently mounted are consistently approaching the number



available, except for the hours 10:00 AM through 2:00 PM.  
 Most of the mounts for cartridge reclamation, however, are occurring from hours 2:00 AM through 10:00 AM. To maximize drives available for z/OS workloads, it may be better if the reclamation mounts were occurring during the low utilization hours of 10:00 AM through 2:00 PM.

|                              |  |         |                                             |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |
|------------------------------|--|---------|---------------------------------------------|-------------|----|-------------------------|----------------------------|-----|----------------------------|----|---|-------------|---|-------------------|------|------|---------|---------------------|---------|
| Inquiry : TAPLVC             |  |         | IBM VTS Physical Tape Drive Analysis Report |             |    |                         |                            |     |                            |    |   |             |   | Page 001          |      |      |         |                     |         |
| Run Date: 020CTyy            |  |         | Data Presented by Hour within Day           |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |
| VTS Library ID: K9230        |  |         | Library Make-Model: 3584-L22                |             |    | Lib Maint Level: 534.13 |                            |     | Report Start: 29SEPy:00:00 |    |   |             |   |                   |      |      |         |                     |         |
| Library Type : PtP-SECONDARY |  |         | VTS Cache Size : 1728 GB                    |             |    | VTS Maint Level: 749.05 |                            |     | Report End : 29SEPy:24:00  |    |   |             |   |                   |      |      |         |                     |         |
| Composite ID : K9200         |  |         | F/C 4001 Status : Enabled                   |             |    |                         |                            |     | Timespan : DAYS            |    |   |             |   |                   |      |      |         |                     |         |
| -----                        |  |         |                                             |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |
| Day: 29SEPy                  |  |         |                                             |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |
| -----                        |  |         |                                             |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |
|                              |  | -Tape-- |                                             | Concurrent  |    |                         | -----VTS Mount Counts----- |     |                            |    |   | Accssr Mnts |   | ---Mount Times--- |      |      | Virtual | -Cartridge MB Data- |         |
|                              |  | Drives  |                                             | Mounts      |    |                         |                            |     |                            |    |   | VTS+Native  |   | Min Avg Max       |      |      | Volumes | Transferred         |         |
| HOUR                         |  | Numb    |                                             | Min Avg Max |    |                         | Total Recal Copy Reclm SDE |     |                            |    |   | *A* *B*     |   | MM:SS MM:SS MM:SS |      |      | Pre-mig | Read Written        |         |
|                              |  | Intv    |                                             |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |
|                              |  | Ins Avl |                                             |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |
| 0                            |  | 1       | 12 12                                       | 10          | 11 | 12                      | 36                         | 31  | 5                          | 0  | 0 | 36          | 0 | 0:22              | 0:26 | 0:35 | 300     | n/a                 | 135508  |
| 1                            |  | 1       | 12 12                                       | 9           | 11 | 12                      | 33                         | 26  | 7                          | 0  | 0 | 33          | 0 | 0:21              | 0:25 | 0:38 | 369     | n/a                 | 124638  |
| 2                            |  | 1       | 12 12                                       | 10          | 11 | 12                      | 43                         | 26  | 11                         | 6  | 0 | 43          | 0 | 0:21              | 0:26 | 0:39 | 559     | n/a                 | 99471   |
| 3                            |  | 1       | 12 12                                       | 12          | 12 | 12                      | 42                         | 28  | 9                          | 5  | 0 | 42          | 0 | 0:23              | 0:28 | 0:47 | 287     | n/a                 | 133107  |
| 4                            |  | 1       | 12 12                                       | 12          | 12 | 12                      | 46                         | 30  | 9                          | 7  | 0 | 56          | 0 | 0:22              | 0:26 | 0:36 | 134     | n/a                 | 44168   |
| 5                            |  | 1       | 12 12                                       | 12          | 12 | 12                      | 32                         | 21  | 8                          | 3  | 0 | 32          | 0 | 0:21              | 0:26 | 0:36 | 193     | n/a                 | 38378   |
| 6                            |  | 1       | 12 12                                       | 11          | 11 | 12                      | 25                         | 15  | 6                          | 4  | 0 | 37          | 0 | 0:22              | 0:26 | 0:38 | 190     | n/a                 | 91743   |
| 7                            |  | 1       | 12 12                                       | 12          | 12 | 12                      | 31                         | 22  | 6                          | 3  | 0 | 31          | 0 | 0:23              | 0:27 | 0:32 | 111     | n/a                 | 61634   |
| 8                            |  | 1       | 12 12                                       | 12          | 12 | 12                      | 76                         | 57  | 12                         | 7  | 0 | 77          | 0 | 0:21              | 0:29 | 0:49 | 157     | n/a                 | 62119   |
| 9                            |  | 1       | 12 12                                       | 11          | 11 | 12                      | 52                         | 46  | 4                          | 2  | 0 | 51          | 0 | 0:22              | 0:26 | 0:43 | 84      | n/a                 | 19312   |
| 10                           |  | 1       | 12 12                                       | 6           | 10 | 12                      | 25                         | 19  | 3                          | 3  | 0 | 25          | 0 | 0:23              | 0:26 | 0:39 | 85      | n/a                 | 22047   |
| 11                           |  | 1       | 12 12                                       | 6           | 6  | 6                       | 3                          | 0   | 2                          | 1  | 0 | 2           | 0 | 0:22              | 0:22 | 0:23 | 22      | n/a                 | 1424    |
| 12                           |  | 1       | 12 12                                       | 3           | 3  | 3                       | 1                          | 0   | 1                          | 0  | 0 | 1           | 0 | 0:24              | 0:24 | 0:24 | 38      | n/a                 | 12049   |
| 13                           |  | 1       | 12 12                                       | 1           | 2  | 4                       | 4                          | 2   | 2                          | 0  | 0 | 4           | 0 | 0:21              | 0:23 | 0:26 | 11      | n/a                 | 3470    |
| 14                           |  | 1       | 12 12                                       | 4           | 8  | 12                      | 41                         | 39  | 2                          | 0  | 0 | 43          | 0 | 0:20              | 0:24 | 0:33 | 29      | n/a                 | 4815    |
| 15                           |  | 1       | 12 12                                       | 12          | 12 | 12                      | 44                         | 42  | 2                          | 0  | 0 | 45          | 0 | 0:20              | 0:24 | 0:31 | 51      | n/a                 | 5930    |
| 16                           |  | 1       | 12 12                                       | 10          | 10 | 12                      | 45                         | 35  | 10                         | 0  | 0 | 44          | 0 | 0:21              | 0:25 | 0:46 | 407     | n/a                 | 60376   |
| 17                           |  | 1       | 12 12                                       | 10          | 11 | 12                      | 42                         | 37  | 5                          | 0  | 0 | 42          | 0 | 0:22              | 0:26 | 0:35 | 662     | n/a                 | 237166  |
| 18                           |  | 1       | 12 12                                       | 12          | 12 | 12                      | 48                         | 42  | 6                          | 0  | 0 | 48          | 0 | 0:22              | 0:32 | 4:06 | 421     | n/a                 | 172615  |
| 19                           |  | 1       | 12 12                                       | 12          | 12 | 12                      | 33                         | 25  | 8                          | 0  | 0 | 33          | 0 | 0:22              | 0:25 | 0:34 | 385     | n/a                 | 164659  |
| 20                           |  | 1       | 12 12                                       | 12          | 12 | 12                      | 37                         | 30  | 7                          | 0  | 0 | 37          | 0 | 0:20              | 0:27 | 0:42 | 508     | n/a                 | 104061  |
| 21                           |  | 1       | 12 12                                       | 11          | 11 | 12                      | 40                         | 32  | 6                          | 2  | 0 | 40          | 0 | 0:21              | 0:25 | 0:35 | 371     | n/a                 | 141658  |
| 22                           |  | 1       | 12 12                                       | 12          | 12 | 12                      | 36                         | 26  | 7                          | 3  | 0 | 36          | 0 | 0:21              | 0:29 | 0:45 | 275     | n/a                 | 98418   |
| 23                           |  | 1       | 12 12                                       | 12          | 12 | 12                      | 39                         | 28  | 9                          | 2  | 0 | 39          | 0 | 0:22              | 0:26 | 0:40 | 196     | n/a                 | 112572  |
| Tots                         |  | 24      | 12 12                                       | 1           | 10 | 12                      | 854                        | 659 | 147                        | 48 | 0 | 877         | 0 | 0:20              | 0:27 | 4:06 | 5845    | n/a                 | 1951338 |
| -----                        |  |         |                                             |             |    |                         |                            |     |                            |    |   |             |   |                   |      |      |         |                     |         |

## 3.2 VTS Component Reports

| Inquiry : TAPLVC      |              |                   | IBM VTS Physical Tape Drive Analysis Report |                      |     |                         |                            |       |                            |       |     |                           |     |                   | Page 001 |       |                               |                     |         |
|-----------------------|--------------|-------------------|---------------------------------------------|----------------------|-----|-------------------------|----------------------------|-------|----------------------------|-------|-----|---------------------------|-----|-------------------|----------|-------|-------------------------------|---------------------|---------|
| Run Date: 020CTyy     |              |                   | Data Presented by Hour within Day           |                      |     |                         |                            |       |                            |       |     |                           |     |                   |          |       |                               |                     |         |
| VTS Library ID: K9229 |              |                   | Library Make-Model: 3584-L22                |                      |     | Lib Maint Level: 534.13 |                            |       | Report Start: 29SEPy:00:00 |       |     |                           |     |                   |          |       |                               |                     |         |
| Library Type : PtP-UI |              |                   | VTS Cache Size : 1728 GB                    |                      |     | VTS Maint Level: 749.05 |                            |       | Report End : 29SEPy:24:00  |       |     |                           |     |                   |          |       |                               |                     |         |
| Composite ID : K9200  |              |                   | F/C 4001 Status : Enabled                   |                      |     |                         |                            |       | Timespan : DAYS            |       |     |                           |     |                   |          |       |                               |                     |         |
| -----                 |              |                   |                                             |                      |     |                         |                            |       |                            |       |     |                           |     |                   |          |       |                               |                     |         |
| Day: 29SEPy           |              |                   |                                             |                      |     |                         |                            |       |                            |       |     |                           |     |                   |          |       |                               |                     |         |
| -----                 |              |                   |                                             |                      |     |                         |                            |       |                            |       |     |                           |     |                   |          |       |                               |                     |         |
| HOUR                  | Numb<br>Intv | -Tape--<br>Drives |                                             | Concurrent<br>Mounts |     |                         | -----VTS Mount Counts----- |       |                            |       |     | Accssr Mnts<br>VTS+Native |     | ---Mount Times--- |          |       | Virtual<br>Volumes<br>Pre-mig | -Cartridge MB Data- |         |
|                       |              | Ins               | Avl                                         | Min                  | Avg | Max                     | Total                      | Recal | Copy                       | Reclm | SDE | *A*                       | *B* | MM:SS             | MM:SS    | MM:SS |                               | Read                | Written |
| 0                     | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 34                         | 26    | 8                          | 0     | 0   | 34                        | 0   | 0:21              | 0:27     | 1:02  | 268                           | n/a                 | 126058  |
| 1                     | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 28                         | 25    | 3                          | 0     | 0   | 28                        | 0   | 0:22              | 0:26     | 0:34  | 355                           | n/a                 | 113131  |
| 2                     | 1            | 12                | 12                                          | 9                    | 11  | 12                      | 47                         | 28    | 16                         | 3     | 0   | 47                        | 0   | 0:23              | 0:31     | 0:50  | 613                           | n/a                 | 115091  |
| 3                     | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 34                         | 24    | 5                          | 5     | 0   | 44                        | 0   | 0:22              | 0:37     | 4:16  | 218                           | n/a                 | 111682  |
| 4                     | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 25                         | 19    | 2                          | 4     | 0   | 25                        | 0   | 0:22              | 0:33     | 2:15  | 151                           | n/a                 | 42245   |
| 5                     | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 26                         | 18    | 5                          | 3     | 0   | 30                        | 0   | 0:21              | 0:28     | 0:45  | 177                           | n/a                 | 42795   |
| 6                     | 1            | 12                | 12                                          | 11                   | 11  | 12                      | 24                         | 15    | 5                          | 4     | 0   | 24                        | 0   | 0:22              | 0:27     | 0:34  | 188                           | n/a                 | 102321  |
| 7                     | 1            | 12                | 12                                          | 10                   | 11  | 12                      | 40                         | 31    | 6                          | 3     | 0   | 40                        | 0   | 0:23              | 0:29     | 0:39  | 131                           | n/a                 | 60123   |
| 8                     | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 56                         | 46    | 6                          | 4     | 0   | 56                        | 0   | 0:24              | 0:32     | 1:22  | 161                           | n/a                 | 45376   |
| 9                     | 1            | 12                | 12                                          | 10                   | 11  | 12                      | 40                         | 33    | 3                          | 4     | 0   | 40                        | 0   | 0:23              | 0:29     | 1:04  | 53                            | n/a                 | 20753   |
| 10                    | 1            | 12                | 12                                          | 9                    | 9   | 11                      | 18                         | 14    | 4                          | 0     | 0   | 18                        | 0   | 0:21              | 0:25     | 0:31  | 61                            | n/a                 | 15345   |
| 11                    | 1            | 12                | 12                                          | 8                    | 8   | 8                       | 4                          | 0     | 3                          | 1     | 0   | 4                         | 0   | 0:23              | 0:27     | 0:33  | 37                            | n/a                 | 2947    |
| 12                    | 1            | 12                | 12                                          | 2                    | 2   | 3                       | 4                          | 1     | 3                          | 0     | 0   | 4                         | 0   | 0:24              | 0:25     | 0:26  | 37                            | n/a                 | 11272   |
| 13                    | 1            | 12                | 12                                          | 3                    | 3   | 5                       | 6                          | 4     | 2                          | 0     | 0   | 6                         | 0   | 0:21              | 0:24     | 0:26  | 13                            | n/a                 | 4733    |
| 14                    | 1            | 12                | 12                                          | 1                    | 10  | 12                      | 55                         | 53    | 2                          | 0     | 0   | 59                        | 0   | 0:20              | 0:32     | 5:02  | 20                            | n/a                 | 2007    |
| 15                    | 1            | 12                | 12                                          | 9                    | 11  | 12                      | 47                         | 43    | 4                          | 0     | 0   | 47                        | 0   | 0:21              | 0:27     | 0:39  | 187                           | n/a                 | 20132   |
| 16                    | 1            | 12                | 12                                          | 11                   | 11  | 12                      | 55                         | 44    | 11                         | 0     | 0   | 55                        | 0   | 0:21              | 0:29     | 0:50  | 447                           | n/a                 | 92645   |
| 17                    | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 43                         | 38    | 5                          | 0     | 0   | 44                        | 0   | 0:23              | 0:34     | 1:20  | 567                           | n/a                 | 229907  |
| 18                    | 1            | 12                | 12                                          | 11                   | 11  | 12                      | 43                         | 36    | 7                          | 0     | 0   | 43                        | 0   | 0:22              | 0:30     | 1:14  | 411                           | n/a                 | 173674  |
| 19                    | 1            | 12                | 12                                          | 11                   | 11  | 12                      | 35                         | 25    | 10                         | 0     | 0   | 34                        | 0   | 0:21              | 0:26     | 0:46  | 460                           | n/a                 | 139604  |
| 20                    | 1            | 12                | 12                                          | 7                    | 10  | 12                      | 31                         | 20    | 11                         | 0     | 0   | 31                        | 0   | 0:21              | 0:31     | 1:07  | 441                           | n/a                 | 121025  |
| 21                    | 1            | 12                | 12                                          | 12                   | 12  | 12                      | 34                         | 33    | 1                          | 0     | 0   | 34                        | 0   | 0:22              | 0:28     | 0:42  | 358                           | n/a                 | 127840  |
| 22                    | 1            | 12                | 12                                          | 11                   | 11  | 12                      | 41                         | 34    | 7                          | 0     | 0   | 41                        | 0   | 0:21              | 0:28     | 0:56  | 248                           | n/a                 | 104660  |
| 23                    | 1            | 12                | 12                                          | 10                   | 11  | 12                      | 42                         | 35    | 7                          | 0     | 0   | 42                        | 0   | 0:22              | 0:26     | 0:35  | 214                           | n/a                 | 115835  |
| Tots                  | 24           | 12                | 12                                          | 1                    | 10  | 12                      | 812                        | 645   | 136                        | 31    | 0   | 830                       | 0   | 0:20              | 0:29     | 5:02  | 5816                          | n/a                 | 1941201 |
| -----                 |              |                   |                                             |                      |     |                         |                            |       |                            |       |     |                           |     |                   |          |       |                               |                     |         |

Figure 3-7. IBM VTS Physical Tape Drive Analysis

### 3.2.1.5 IBM VTS Virtual Tape Drive Analysis (TAPLVD)

The CA MICS IBM VTS Virtual Tape Drive Analysis Report displays statistics for the virtual tape drives assigned to the VTS. The report provides mount durations, counts of mounts by type (scratch vs. specific), and concurrent mount information. A graphic shows the maximum concurrent mounts as a percent of those available. At a glance the graphic shows if peak z/OS workload activity is approaching the limit of available virtual tape drives.

Of particular interest are the concurrent mount statistics (minimum, average, and maximum). Time periods where the number of drives concurrently mounted are consistently at or near the available count indicate periods where z/OS workloads may experience delays waiting for a tape mount.

The report uses both the distributed and composite VTS headers, based on the VTS type reported. These headers and their content are described in section 3.2.1.1.2.

The report body reports on the following measurements from left to right:

Interval count and average number of configured virtual drives:

- o Number of Recording Intervals - INTERVLS
- o Avg Virtual Drives Concur Mounted - fffAVVCM

Durations of virtual tape mounts; total, minimum, average, and maximum:

- o Total Virtual Mount Duration  
computed in report code: fffTVM \* fffAVVMD
- o Min Virtual Mount Duration - fffMMVMD
- o Avg Virtual Mount Duration - fffAVVMD
- o Max Virtual Mount Duration - fffMXVMD

Virtual tape mount counts; total and by category, followed by the percent of mounts that were specific (non-scratch):

- o Virtual mounts by category
  - Total Virtual Mounts - fffTVM
  - Virtual Fast-Ready Mounts - fffVFRM
  - Total Virtual Specific Mounts - fffVSPM
  - Percent of mounts that were specific  
computed in report code: fffVSPM/fffTVM\*100

Minimum, average, and maximum number of concurrently mounted virtual drives:

- o Min Virtual Drives Concur Mounted - fffMNVCM
- o Min Virtual Drives Concur Mounted - fffAVVCM
- o Min Virtual Drives Concur Mounted - fffMXVCM

Finally, a graph shows the maximum concurrently mounted drives as a percentage of the configured (available) virtual drives.

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

Report data for VTS type COMPOSITE is generated from the VTS Composite Library Activity (IVTVCL) file. Report data for VTS types UI, SECONDARY, and STANDALONE is generated from the VTS Distributed Library Activity (IVTVDL) file.

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 TAPLVD, IBM VTS Virtual Tape Drive Analysis, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.1.1.1, IBM VTS MICF Inquiry Specification Panels, for information about modifiable panel fields.

#### IBM VTS Virtual Tape Drive Analysis (TAPLVD) Report Sample

-----

The following report sample shows the virtual tape drive activity for a day by hour. The VTS reported is a peer-to-peer configuration. The three report pages show the Composite VTS statistics followed by statistics for the User Interface (UI) and Secondary VTSs.

The graphical representation of the percentage of available virtual drives concurrently mounted clearly shows that the early hours (00:00 AM through 3:00 AM) and the late hours

(16:00 PM through 22:00 PM) are the times when z/OS workloads  
are most heavily requesting virtual tapes.

|                                                                                             |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
|---------------------------------------------------------------------------------------------|----|------|--------------------------------------------|-----------|-------|-------|----------|---------------------------|---------|--------|------------|--------|----------------------------|-----|-----------------------|-------|---|---|---|---|
| Inquiry : TAPLVD                                                                            |    |      | IBM VTS Virtual Tape Drive Analysis Report |           |       |       |          |                           |         |        |            |        | Page 001                   |     |                       |       |   |   |   |   |
| Run Date: 020CTyy                                                                           |    |      | Data Presented by Hour within Day          |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
| VTS Library ID: K9200                                                                       |    |      | VTC Preferred I/O : NONE                   |           |       |       |          | Copy Mode Setting: Mixed  |         |        |            |        | Report Start: 29SEPy:00:00 |     |                       |       |   |   |   |   |
| Library Type : Ptp-COMPOSITE                                                                |    |      | VTC Preferred Mast: VTS0                   |           |       |       |          | VTC Maint Level : 7414.00 |         |        |            |        | Report End : 29SEPy:24:00  |     |                       |       |   |   |   |   |
| UI/SEC IDs : K9229/K9230                                                                    |    |      | F/C 4001 Status : Enabled                  |           |       |       |          |                           |         |        |            |        | Timespan : DAYS            |     |                       |       |   |   |   |   |
| -----                                                                                       |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
| Day: 29SEPy                                                                                 |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
| -----                                                                                       |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
| ---Virtual Mount Durations--- --Total Virtual Mounts--- -----Maximum Concurrent Mounts----- |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
|                                                                                             |    | Vir  |                                            |           |       |       |          |                           |         |        | Concurrent |        |                            |     | Percent of Configured |       |   |   |   |   |
|                                                                                             |    | Numb | Drv                                        | Total     | Min   | Avg   | Max      |                           |         |        |            | Mounts |                            |     |                       |       |   |   |   |   |
|                                                                                             |    | Intv | Cfg                                        | HH:MM:SS  | MM:SS | MM:SS | HH:MM:SS | Total                     | Scratch | Spclfc | Pct        | Spclfc | Min                        | Avg | Max                   | 2     | 4 | 6 | 8 | 1 |
|                                                                                             |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       | 0     |   |   |   | 0 |
| -----                                                                                       |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
| 0                                                                                           | 1  | 128  |                                            | 49:17:02  | 0:03  | 5:22  | 1:11:22  | 551                       | 239     | 312    | 57%        |        | 20                         | 48  | 86                    | ***** |   |   |   |   |
| 1                                                                                           | 1  | 128  |                                            | 53:28:13  | 0:04  | 4:17  | 1:19:29  | 749                       | 345     | 404    | 54%        |        | 24                         | 54  | 90                    | ***** |   |   |   |   |
| 2                                                                                           | 1  | 128  |                                            | 72:34:12  | 0:03  | 2:57  | 1:31:16  | 1476                      | 592     | 884    | 60%        |        | 24                         | 76  | 123                   | ***** |   |   |   |   |
| 3                                                                                           | 1  | 128  |                                            | 41:02:10  | 0:04  | 6:35  | 1:40:22  | 374                       | 168     | 206    | 55%        |        | 19                         | 46  | 82                    | ***** |   |   |   |   |
| 4                                                                                           | 1  | 128  |                                            | 34:45:00  | 0:01  | 5:00  | 2:09:07  | 417                       | 153     | 264    | 63%        |        | 13                         | 34  | 58                    | ***** |   |   |   |   |
| 5                                                                                           | 1  | 128  |                                            | 20:22:00  | 0:02  | 2:10  | 2:05:39  | 564                       | 206     | 358    | 63%        |        | 11                         | 26  | 58                    | ***** |   |   |   |   |
| 6                                                                                           | 1  | 128  |                                            | 35:00:40  | 0:01  | 3:04  | 2:50:11  | 685                       | 119     | 566    | 83%        |        | 7                          | 18  | 37                    | ***** |   |   |   |   |
| 7                                                                                           | 1  | 128  |                                            | 31:57:00  | 0:01  | 2:42  | 2:43:36  | 710                       | 149     | 561    | 79%        |        | 11                         | 23  | 47                    | ***** |   |   |   |   |
| 8                                                                                           | 1  | 128  |                                            | 18:12:20  | 0:01  | 1:53  | 1:01:34  | 580                       | 148     | 432    | 74%        |        | 6                          | 20  | 42                    | ***** |   |   |   |   |
| 9                                                                                           | 1  | 128  |                                            | 15:23:39  | 0:01  | 3:23  | 1:29:18  | 273                       | 55      | 218    | 80%        |        | 7                          | 18  | 40                    | ***** |   |   |   |   |
| 10                                                                                          | 1  | 128  |                                            | 11:26:12  | 0:02  | 4:42  | 1:03:20  | 146                       | 65      | 81     | 55%        |        | 7                          | 15  | 28                    | ***** |   |   |   |   |
| 11                                                                                          | 1  | 128  |                                            | 5:18:36   | 0:03  | 11:48 | 0:31:09  | 27                        | 5       | 22     | 81%        |        | 1                          | 4   | 9                     | ***   |   |   |   |   |
| 12                                                                                          | 1  | 128  |                                            | 1:40:30   | 0:11  | 2:14  | 0:23:11  | 45                        | 23      | 22     | 49%        |        | 0                          | 5   | 14                    | ****  |   |   |   |   |
| 13                                                                                          | 1  | 128  |                                            | 2:10:50   | 0:05  | 2:37  | 0:16:41  | 50                        | 26      | 24     | 48%        |        | 1                          | 6   | 15                    | ****  |   |   |   |   |
| 14                                                                                          | 1  | 128  |                                            | 5:49:27   | 0:01  | 1:27  | 0:08:36  | 241                       | 16      | 225    | 93%        |        | 3                          | 8   | 16                    | ****  |   |   |   |   |
| 15                                                                                          | 1  | 128  |                                            | 9:03:16   | 0:01  | 0:58  | 0:12:56  | 562                       | 267     | 295    | 52%        |        | 8                          | 20  | 47                    | ***** |   |   |   |   |
| 16                                                                                          | 1  | 128  |                                            | 32:02:48  | 0:01  | 2:32  | 0:59:30  | 759                       | 507     | 252    | 33%        |        | 9                          | 58  | 126                   | ***** |   |   |   |   |
| 17                                                                                          | 1  | 128  |                                            | 65:09:48  | 0:04  | 5:39  | 1:06:55  | 692                       | 472     | 220    | 32%        |        | 17                         | 58  | 110                   | ***** |   |   |   |   |
| 18                                                                                          | 1  | 128  |                                            | 28:50:42  | 0:01  | 2:42  | 1:03:56  | 641                       | 359     | 282    | 44%        |        | 8                          | 28  | 66                    | ***** |   |   |   |   |
| 19                                                                                          | 1  | 128  |                                            | 47:58:12  | 0:02  | 2:42  | 1:21:50  | 1066                      | 503     | 563    | 53%        |        | 11                         | 52  | 112                   | ***** |   |   |   |   |
| 20                                                                                          | 1  | 128  |                                            | 42:50:24  | 0:03  | 2:48  | 1:25:42  | 918                       | 395     | 523    | 57%        |        | 16                         | 52  | 100                   | ***** |   |   |   |   |
| 21                                                                                          | 1  | 128  |                                            | 68:36:14  | 0:03  | 4:59  | 2:13:58  | 826                       | 370     | 456    | 55%        |        | 15                         | 59  | 111                   | ***** |   |   |   |   |
| 22                                                                                          | 1  | 128  |                                            | 30:55:40  | 0:01  | 3:10  | 1:12:38  | 586                       | 215     | 371    | 63%        |        | 10                         | 37  | 72                    | ***** |   |   |   |   |
| 23                                                                                          | 1  | 128  |                                            | 32:05:14  | 0:03  | 3:43  | 1:41:24  | 518                       | 181     | 337    | 65%        |        | 9                          | 29  | 59                    | ***** |   |   |   |   |
| -----                                                                                       |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |
| Tots                                                                                        | 24 | 128  |                                            | 756:00:09 | 0:01  | 3:22  | 2:50:11  | 13456                     | 5578    | 7878   | 59%        |        | 0                          | 33  | 126                   |       |   |   |   |   |
| -----                                                                                       |    |      |                                            |           |       |       |          |                           |         |        |            |        |                            |     |                       |       |   |   |   |   |

### 3.2 VTS Component Reports

|                                                                                             |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
|---------------------------------------------------------------------------------------------|--|--|--------------------------------------------|--|--|--|-------------------------|--|--|--|----------------------------|--|----------|--|--|
| Inquiry : TAPLVD                                                                            |  |  | IBM VTS Virtual Tape Drive Analysis Report |  |  |  |                         |  |  |  |                            |  | Page 001 |  |  |
| Run Date: 020CTyy                                                                           |  |  | Data Presented by Hour within Day          |  |  |  |                         |  |  |  |                            |  |          |  |  |
| VTS Library ID: K9229                                                                       |  |  | Library Make-Model: 3584-L22               |  |  |  | Lib Maint Level: 534.13 |  |  |  | Report Start: 29SEPy:00:00 |  |          |  |  |
| Library Type : PtP-UI                                                                       |  |  | VTS Cache Size : 1728 GB                   |  |  |  | VTS Maint Level: 749.05 |  |  |  | Report End : 29SEPy:24:00  |  |          |  |  |
| Composite ID : K9200                                                                        |  |  | F/C 4001 Status : Enabled                  |  |  |  |                         |  |  |  | Timespan : DAYS            |  |          |  |  |
| -----                                                                                       |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| Day: 29SEPy                                                                                 |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| -----                                                                                       |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| ---Virtual Mount Durations--- --Total Virtual Mounts--- -----Maximum Concurrent Mounts----- |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| Percent of Configured                                                                       |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 1                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
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| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
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| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
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| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
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| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |
| 0                                                                                           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |          |  |  |

|                                                                                             |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
|---------------------------------------------------------------------------------------------|----|------|-----------|--------------------------------------------|-------|----------|-------|-------------------------|------|-----|-------------|----------------------------|-----|-------|---|---|---|
| Inquiry : TAPLVD                                                                            |    |      |           | IBM VTS Virtual Tape Drive Analysis Report |       |          |       |                         |      |     |             | Page 001                   |     |       |   |   |   |
| Run Date: 020CTyy                                                                           |    |      |           | Data Presented by Hour within Day          |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| VTS Library ID: K9230                                                                       |    |      |           | Library Make-Model: 3584-L22               |       |          |       | Lib Maint Level: 534.13 |      |     |             | Report Start: 29SEPy:00:00 |     |       |   |   |   |
| Library Type : PtP-SECONDARY                                                                |    |      |           | VTS Cache Size : 1728 GB                   |       |          |       | VTS Maint Level: 749.05 |      |     |             | Report End : 29SEPy:24:00  |     |       |   |   |   |
| Composite ID : K9200                                                                        |    |      |           | F/C 4001 Status : Enabled                  |       |          |       |                         |      |     |             | Timespan : DAYS            |     |       |   |   |   |
| -----                                                                                       |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| Day: 29SEPy                                                                                 |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| -----                                                                                       |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| ---Virtual Mount Durations--- --Total Virtual Mounts--- -----Maximum Concurrent Mounts----- |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| Percent of Configured                                                                       |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
|                                                                                             |    | Vir  |           |                                            |       |          |       |                         |      |     | Concurrent  |                            |     |       |   |   |   |
|                                                                                             |    | Numb | Total     | Min                                        | Avg   | Max      |       |                         | Pct  |     | Mounts      |                            |     |       |   |   |   |
|                                                                                             |    | Drv  | HH:MM:SS  | MM:SS                                      | MM:SS | HH:MM:SS |       |                         | Spfc |     | Min Avg Max |                            |     |       |   |   |   |
|                                                                                             |    | Cfg  |           |                                            |       |          |       |                         | Spfc |     |             |                            |     |       |   |   |   |
| HOUR                                                                                        |    | Intv |           |                                            |       |          | Total | Scrтч                   |      |     |             |                            | 2   | 4     | 6 | 8 | 1 |
|                                                                                             |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| -----                                                                                       |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| 0                                                                                           | 1  | 128  | 30:16:40  | 0:03                                       | 3:20  | 0:59:18  | 545   | 399                     | 146  | 27% | 24          | 44                         | 59  | ***** |   |   | 0 |
| 1                                                                                           | 1  | 128  | 57:36:39  | 0:02                                       | 4:17  | 1:23:57  | 807   | 600                     | 207  | 26% | 32          | 50                         | 77  | ***** |   |   | 0 |
| 2                                                                                           | 1  | 128  | 70:24:24  | 0:02                                       | 2:59  | 1:29:22  | 1416  | 1074                    | 342  | 24% | 38          | 69                         | 93  | ***** |   |   | 0 |
| 3                                                                                           | 1  | 128  | 49:29:10  | 0:02                                       | 5:50  | 1:37:30  | 509   | 387                     | 122  | 24% | 30          | 51                         | 74  | ***** |   |   | 0 |
| 4                                                                                           | 1  | 128  | 27:38:04  | 0:02                                       | 4:26  | 2:09:03  | 374   | 247                     | 127  | 34% | 25          | 32                         | 38  | ***** |   |   | 0 |
| 5                                                                                           | 1  | 128  | 25:35:50  | 0:03                                       | 3:14  | 2:04:40  | 475   | 342                     | 133  | 28% | 16          | 24                         | 45  | ***** |   |   | 0 |
| 6                                                                                           | 1  | 128  | 31:54:44  | 0:02                                       | 2:34  | 2:50:00  | 746   | 458                     | 288  | 39% | 13          | 22                         | 35  | ***** |   |   | 0 |
| 7                                                                                           | 1  | 128  | 27:01:10  | 0:02                                       | 2:22  | 3:31:52  | 685   | 436                     | 249  | 36% | 10          | 18                         | 30  | ***** |   |   | 0 |
| 8                                                                                           | 1  | 128  | 15:48:18  | 0:02                                       | 1:27  | 0:58:50  | 654   | 414                     | 240  | 37% | 9           | 18                         | 33  | ***** |   |   | 0 |
| 9                                                                                           | 1  | 128  | 13:43:20  | 0:02                                       | 3:20  | 1:27:57  | 247   | 150                     | 97   | 39% | 9           | 13                         | 19  | ***** |   |   | 0 |
| 10                                                                                          | 1  | 128  | 12:57:36  | 0:02                                       | 3:12  | 1:08:46  | 243   | 154                     | 89   | 37% | 6           | 13                         | 19  | ***** |   |   | 0 |
| 11                                                                                          | 1  | 128  | 5:23:57   | 0:03                                       | 10:27 | 1:28:20  | 31    | 20                      | 11   | 35% | 4           | 8                          | 14  | ***** |   |   | 0 |
| 12                                                                                          | 1  | 128  | 6:44:48   | 0:04                                       | 8:48  | 2:34:18  | 46    | 39                      | 7    | 15% | 4           | 5                          | 7   | ***** |   |   | 0 |
| 13                                                                                          | 1  | 128  | 1:45:55   | 0:04                                       | 2:35  | 0:16:39  | 41    | 38                      | 3    | 7%  | 4           | 5                          | 10  | ***** |   |   | 0 |
| 14                                                                                          | 1  | 128  | 9:51:05   | 0:02                                       | 2:53  | 3:53:33  | 205   | 120                     | 85   | 41% | 4           | 5                          | 10  | ***** |   |   | 0 |
| 15                                                                                          | 1  | 128  | 10:32:56  | 0:03                                       | 1:41  | 3:26:25  | 376   | 299                     | 77   | 20% | 4           | 7                          | 27  | ***** |   |   | 0 |
| 16                                                                                          | 1  | 128  | 20:43:06  | 0:02                                       | 1:33  | 0:59:06  | 802   | 670                     | 132  | 16% | 5           | 28                         | 115 | ***** |   |   | 0 |
| 17                                                                                          | 1  | 128  | 62:54:49  | 0:03                                       | 4:53  | 1:17:57  | 773   | 674                     | 99   | 13% | 25          | 60                         | 111 | ***** |   |   | 0 |
| 18                                                                                          | 1  | 128  | 33:22:40  | 0:03                                       | 2:40  | 1:42:37  | 751   | 596                     | 155  | 21% | 16          | 30                         | 65  | ***** |   |   | 0 |
| 19                                                                                          | 1  | 128  | 42:53:13  | 0:03                                       | 3:01  | 1:21:17  | 853   | 641                     | 212  | 25% | 24          | 44                         | 108 | ***** |   |   | 0 |
| 20                                                                                          | 1  | 128  | 45:35:37  | 0:01                                       | 2:31  | 1:25:19  | 1087  | 722                     | 365  | 34% | 28          | 45                         | 76  | ***** |   |   | 0 |
| 21                                                                                          | 1  | 128  | 60:13:10  | 0:03                                       | 4:26  | 1:43:05  | 815   | 613                     | 202  | 25% | 22          | 58                         | 86  | ***** |   |   | 0 |
| 22                                                                                          | 1  | 128  | 35:23:20  | 0:01                                       | 3:16  | 2:13:25  | 650   | 476                     | 174  | 27% | 24          | 37                         | 67  | ***** |   |   | 0 |
| 23                                                                                          | 1  | 128  | 34:19:45  | 0:02                                       | 3:51  | 1:41:15  | 535   | 384                     | 151  | 28% | 16          | 27                         | 43  | ***** |   |   | 0 |
| -----                                                                                       |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |
| Tots                                                                                        | 24 | 128  | 732:10:16 | 0:01                                       | 3:13  | 3:53:33  | 13666 | 9953                    | 3713 | 27% | 4           | 30                         | 115 |       |   |   |   |
| -----                                                                                       |    |      |           |                                            |       |          |       |                         |      |     |             |                            |     |       |   |   |   |

### 3.2.1.6 IBM VTS Virtual Tape Mount Analysis (TAPLVE)

The CA MICS IBM VTS Virtual Tape Mount Analysis Report displays statistics for the virtual tape mounts satisfied by the VTS. The report provides the total number of virtual tape mounts with three sets of statistics for each mount type; scratch (fast-ready), cache hit, and cache miss (recall). The final two report columns show the percent of specific virtual mount requests that were cache misses, both as a number and a graphic. At a glance, this graphic shows periods where excessive cache misses occur. Cache misses result in degraded virtual tape performance.

The report uses both the distributed and composite VTS headers, based on the VTS type reported. These headers and their content are described in section 3.2.1.1.2.

The report body reports on the following measurements from left to right:

Interval count and total number of virtual mounts:

- o Number of Recording Intervals - INTERVLS
- o Total Virtual Mounts - fffTVM

Virtual scratch (fast-ready) mount statistics:

- o Virtual Fast-Ready Mounts - fffVFRM
- o Min Virtual Fast-Ready Mount Time - fffMNFRT
- o Avg Virtual Fast-Ready Mount Time - fffAVFMT
- o Max Virtual Fast-Ready Mount Time - fffMXFRT

Virtual cache hit mount statistics:

- o Virtual Cache-Hit Mounts - fffVCHM
- o Min Virtual Cache-Hit Mount Time - fffMNCMT
- o Avg Virtual Cache-Hit Mount Time - fffAVHMT
- o Max Virtual Cache-Hit Mount Time - fffMXCHT

Virtual cache miss (recall) mount statistics:

- o Virtual Recall Mounts - fffVRM
- o Min Virtual Recall Mount Time - fffMNRMT
- o Avg Virtual Recall Mount Time - fffAVRMT
- o Max Virtual Recall Mount Time - fffMXRMT

Percentage of specific mounts that were cache misses, resulting in the recall of a virtual tape from a physical cartridge. This value is displayed as both a percentage and



a graphic:

o Pct Virtual Specific Mount Cache Misses - fffPCVMS

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages as appropriate for the detailed data in each column.

Report data for VTS type COMPOSITE is generated from the VTS Composite Library Activity (IVTVCL) file. Report data for VTS types UI, SECONDARY, and STANDALONE is generated from the VTS Distributed Library Activity (IVTVDL) file.

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 TAPLVE, IBM VTS Virtual Tape Mount Analysis Report, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.1.1.1, IBM VTS MICF Inquiry Specification Panels, for information about modifiable panel fields.

IBM VTS Virtual Tape Mount Analysis (TAPLVE) Report Sample

-----  
The following report sample shows the virtual tape mount activity for a day by hour. The VTS reported is a peer-to-peer configuration. The three report pages show the Composite VTS statistics followed by statistics for the User Interface (UI) and Secondary VTSs.

It is interesting that immediately following the low utilization hours of 11:00 AM to 12:00 noon, the percentage of specific mount requests that result in DASD cache misses increases dramatically. By 2:00 PM, both the peak workload and peak percent misses is reached. The time required to satisfy a mount that requires a recall is significantly longer than a mount satisfied in cache.

This report sample provides data that should encourage an examination of the z/OS workloads using virtual tape that

## 3.2 VTS Component Reports

launch after noon. An effort should be made to increase the probability that the virtual volumes requested are found in the cache.

|                                                                                                                  |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------|--|--|--------------------------------------------|--|--|--|---------------------------|--|--|--|----------------------------|--|--|--|----------|--|--|--|--|
| Inquiry : TAPLVE                                                                                                 |  |  | IBM VTS Virtual Tape Mount Analysis Report |  |  |  |                           |  |  |  |                            |  |  |  | Page 001 |  |  |  |  |
| Run Date: 020CTyy                                                                                                |  |  | Data Presented by Hour within Day          |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| VTS Library ID: K9200                                                                                            |  |  | VTC Preferred I/O : NONE                   |  |  |  | Copy Mode Setting : Mixed |  |  |  | Report Start: 29SEPy:00:00 |  |  |  |          |  |  |  |  |
| Library Type : PtP-COMPOSITE                                                                                     |  |  | VTC Preferred Mast: VTS0                   |  |  |  | VTC Maint Level : 7414.00 |  |  |  | Report End : 29SEPy:24:00  |  |  |  |          |  |  |  |  |
| UI/SEC IDs : K9229/K9230                                                                                         |  |  | F/C 4001 Status : Enabled                  |  |  |  |                           |  |  |  | Timespan : DAYS            |  |  |  |          |  |  |  |  |
| -----                                                                                                            |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| Day: 29SEPy                                                                                                      |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| -----                                                                                                            |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| ---Scratch Mounts--- -----Cache Hit----- -----Cache Miss----- -----Percent Cache Misses-----                     |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| (Fast Ready) (Recalls/Stage)                                                                                     |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 1                                                                                                                |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| Numb Total Scr Min Avg Max Hit Min Avg Max Miss Min Avg Max Pct 2 4 6 8 0                                        |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| HOUR Intv Mounts Total M:SS M:SS MM:SS Total M:SS MM:SS MM:SS Total MM:SS MM:SS MM:SS Miss 0---0---0---0---0---0 |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| -----                                                                                                            |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 0 1 551 239 0:01 0:02 0:08 258 0:01 0:02 0:06 54 0:46 2:25 5:20 17% *****                                        |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 1 1 749 345 0:01 0:02 0:06 353 0:01 0:03 1:30 51 0:22 2:38 6:15 13% ***                                          |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 2 1 1476 592 0:01 0:04 0:11 831 0:01 0:03 1:32 53 0:56 3:07 6:04 6% **                                           |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 3 1 374 168 0:01 0:03 0:10 160 0:01 0:02 1:31 46 1:32 2:39 7:37 22% *****                                        |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 4 1 417 153 0:01 0:02 0:05 212 0:01 0:02 0:36 52 0:01 2:31 5:53 20% *****                                        |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 5 1 564 206 0:01 0:02 0:05 327 0:01 0:02 1:42 31 0:06 2:01 4:23 9% **                                            |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 6 1 685 119 0:01 0:02 0:06 527 0:01 0:02 0:06 39 0:15 2:00 6:42 7% **                                            |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 7 1 710 149 0:01 0:02 0:06 485 0:01 0:02 0:05 76 0:05 2:32 5:35 14% ****                                         |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 8 1 580 148 0:01 0:02 0:07 327 0:01 0:02 0:15 105 0:24 3:04 9:26 24% *****                                       |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 9 1 273 55 0:01 0:02 0:04 140 0:01 0:02 0:04 78 1:26 3:11 7:12 36% *****                                         |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 10 1 146 65 0:01 0:02 0:04 54 0:01 0:02 0:03 27 0:51 2:35 5:11 33% *****                                         |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 11 1 27 5 0:01 0:02 0:03 21 0:01 0:01 0:03 1 3:03 3:03 3:03 5% *                                                 |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 12 1 45 23 0:01 0:01 0:03 21 0:01 0:01 0:03 1 3:03 3:03 3:03 5% *                                                |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 13 1 50 26 0:01 0:01 0:03 18 0:01 0:02 0:03 6 0:53 1:22 2:07 25% *****                                           |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 14 1 241 16 0:01 0:01 0:04 55 0:01 0:02 0:03 170 0:02 1:17 6:22 76% *****                                        |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 15 1 562 267 0:01 0:03 0:08 182 0:01 0:03 0:38 113 0:03 1:21 5:16 38% *****                                      |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 16 1 759 507 0:01 0:05 0:19 166 0:01 0:03 1:33 86 0:03 2:23 5:14 34% *****                                       |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 17 1 692 472 0:01 0:04 0:11 139 0:01 0:03 0:10 81 0:07 2:59 8:58 37% *****                                       |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 18 1 641 359 0:01 0:03 0:10 215 0:01 0:03 0:16 67 0:58 2:38 5:12 24% *****                                       |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 19 1 1066 503 0:01 0:03 0:19 512 0:01 0:02 0:36 51 0:46 2:05 4:58 9% **                                          |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 20 1 918 395 0:01 0:03 1:01 481 0:01 0:03 1:13 42 0:48 2:00 6:19 8% **                                           |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 21 1 826 370 0:01 0:03 0:07 394 0:01 0:03 1:30 62 0:10 2:14 4:19 14% ****                                        |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 22 1 586 215 0:01 0:02 0:24 308 0:01 0:02 0:38 63 0:27 2:23 5:11 17% ****                                        |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| 23 1 518 181 0:01 0:02 0:06 268 0:01 0:02 1:30 69 0:44 1:58 4:37 20% *****                                       |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| -----                                                                                                            |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| Tots 24 13456 5578 0:01 0:03 1:01 6454 0:01 0:02 1:42 1424 0:01 2:18 9:26 18%                                    |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |
| -----                                                                                                            |  |  |                                            |  |  |  |                           |  |  |  |                            |  |  |  |          |  |  |  |  |

Inquiry : TAPLVE  
Run Date: 020CTyy

IBM VTS Virtual Tape Mount Analysis Report  
Data Presented by Hour within Day

Page 001

VTS Library ID: K9229  
Library Type : PtP-UI  
Composite ID : K9200

Library Make-Model: 3584-L22  
VTS Cache Size : 1728 GB  
F/C 4001 Status : Enabled

Lib Maint Level: 534.13  
VTS Maint Level: 749.05

Report Start: 29SEPy:00:00  
Report End : 29SEPy:24:00  
Timespan : DAYS

Day: 29SEPy

|       |        | ----Scratch Mounts---- |      |      |       | -----Cache Hit----- |       |      |       | -----Cache Miss----- |       |       |       | -----Percent Cache Misses----- |      |       |   |   |   |
|-------|--------|------------------------|------|------|-------|---------------------|-------|------|-------|----------------------|-------|-------|-------|--------------------------------|------|-------|---|---|---|
|       |        | (Fast Ready)           |      |      |       |                     |       |      |       | (Recalls/Stage)      |       |       |       |                                |      |       |   |   |   |
| HOURL | Numb   | Total                  | Scr  | Min  | Avg   | Max                 | Hit   | Min  | Avg   | Max                  | Miss  | Min   | Avg   | Max                            | Pct  | 2     | 4 | 6 | 8 |
| Intv  | Mounts | Total                  | M:SS | M:SS | MM:SS | MM:SS               | Total | M:SS | MM:SS | MM:SS                | Total | MM:SS | MM:SS | MM:SS                          | Miss | 0     | 0 | 0 | 0 |
| 0     | 1      | 562                    | 394  | 0:01 | 0:01  | 0:05                | 141   | 0:01 | 0:01  | 0:04                 | 27    | 0:02  | 2:18  | 5:17                           | 16%  | ****  |   |   |   |
| 1     | 1      | 748                    | 535  | 0:01 | 0:01  | 0:03                | 181   | 0:01 | 0:01  | 0:04                 | 32    | 0:01  | 2:09  | 6:15                           | 15%  | ****  |   |   |   |
| 2     | 1      | 1479                   | 961  | 0:01 | 0:01  | 0:07                | 474   | 0:01 | 0:01  | 1:10                 | 44    | 0:01  | 1:42  | 5:59                           | 8%   | **    |   |   |   |
| 3     | 1      | 383                    | 267  | 0:01 | 0:01  | 0:06                | 93    | 0:01 | 0:02  | 1:29                 | 23    | 0:02  | 2:49  | 7:36                           | 20%  | ***** |   |   |   |
| 4     | 1      | 423                    | 297  | 0:01 | 0:01  | 0:03                | 100   | 0:01 | 0:01  | 0:02                 | 26    | 0:01  | 2:11  | 4:26                           | 21%  | ***** |   |   |   |
| 5     | 1      | 573                    | 384  | 0:01 | 0:01  | 0:03                | 170   | 0:01 | 0:01  | 1:28                 | 19    | 0:03  | 1:49  | 4:22                           | 10%  | ***   |   |   |   |
| 6     | 1      | 689                    | 384  | 0:01 | 0:01  | 0:03                | 256   | 0:01 | 0:01  | 0:03                 | 49    | 0:01  | 0:56  | 6:40                           | 16%  | ****  |   |   |   |
| 7     | 1      | 715                    | 408  | 0:01 | 0:01  | 0:03                | 252   | 0:01 | 0:01  | 0:03                 | 55    | 0:01  | 1:32  | 4:26                           | 18%  | ***** |   |   |   |
| 8     | 1      | 580                    | 359  | 0:01 | 0:01  | 0:04                | 162   | 0:01 | 0:01  | 0:14                 | 59    | 0:01  | 2:42  | 9:25                           | 27%  | ***** |   |   |   |
| 9     | 1      | 274                    | 179  | 0:01 | 0:01  | 0:02                | 59    | 0:01 | 0:01  | 0:03                 | 36    | 1:25  | 3:21  | 7:11                           | 38%  | ***** |   |   |   |
| 10    | 1      | 145                    | 100  | 0:01 | 0:01  | 0:03                | 30    | 0:01 | 0:01  | 0:02                 | 15    | 0:01  | 2:39  | 5:10                           | 33%  | ***** |   |   |   |
| 11    | 1      | 27                     | 15   | 0:01 | 0:01  | 0:02                | 6     | 0:01 | 0:01  | 0:02                 | 6     | 0:01  | 0:31  | 3:02                           | 50%  | ***** |   |   |   |
| 12    | 1      | 45                     | 30   | 0:01 | 0:01  | 0:02                | 14    | 0:01 | 0:01  | 0:02                 | 1     | 3:01  | 3:01  | 3:01                           | 7%   | **    |   |   |   |
| 13    | 1      | 50                     | 29   | 0:01 | 0:01  | 0:01                | 17    | 0:01 | 0:01  | 0:02                 | 4     | 0:53  | 1:11  | 1:30                           | 19%  | ***** |   |   |   |
| 14    | 1      | 242                    | 115  | 0:01 | 0:01  | 0:02                | 17    | 0:01 | 0:01  | 0:02                 | 110   | 0:01  | 1:07  | 6:21                           | 87%  | ***** |   |   |   |
| 15    | 1      | 558                    | 371  | 0:01 | 0:01  | 0:05                | 111   | 0:01 | 0:01  | 0:04                 | 76    | 0:01  | 1:06  | 5:14                           | 41%  | ***** |   |   |   |
| 16    | 1      | 773                    | 618  | 0:01 | 0:02  | 0:10                | 103   | 0:01 | 0:02  | 1:30                 | 52    | 0:01  | 1:50  | 5:14                           | 34%  | ***** |   |   |   |
| 17    | 1      | 695                    | 585  | 0:01 | 0:01  | 0:05                | 66    | 0:01 | 0:01  | 0:05                 | 44    | 0:01  | 3:06  | 8:57                           | 40%  | ***** |   |   |   |
| 18    | 1      | 745                    | 589  | 0:01 | 0:01  | 0:06                | 112   | 0:01 | 0:01  | 0:16                 | 44    | 0:01  | 2:25  | 6:16                           | 28%  | ***** |   |   |   |
| 19    | 1      | 1072                   | 831  | 0:01 | 0:01  | 0:08                | 216   | 0:01 | 0:01  | 0:07                 | 25    | 0:01  | 2:00  | 4:57                           | 10%  | ***   |   |   |   |
| 20    | 1      | 936                    | 658  | 0:01 | 0:01  | 0:58                | 244   | 0:01 | 0:02  | 1:12                 | 34    | 0:01  | 1:25  | 6:18                           | 12%  | ***   |   |   |   |
| 21    | 1      | 832                    | 590  | 0:01 | 0:01  | 1:29                | 195   | 0:01 | 0:01  | 0:03                 | 47    | 0:01  | 1:28  | 4:05                           | 19%  | ***** |   |   |   |
| 22    | 1      | 597                    | 374  | 0:01 | 0:01  | 0:22                | 164   | 0:01 | 0:01  | 0:37                 | 59    | 0:01  | 1:22  | 5:11                           | 26%  | ***** |   |   |   |
| 23    | 1      | 521                    | 332  | 0:01 | 0:01  | 0:04                | 148   | 0:01 | 0:01  | 0:51                 | 41    | 0:01  | 1:40  | 4:03                           | 22%  | ***** |   |   |   |
| Tots  | 24     | 13664                  | 9405 | 0:01 | 0:01  | 1:29                | 3331  | 0:01 | 0:01  | 1:30                 | 928   | 0:01  | 1:49  | 9:25                           | 22%  |       |   |   |   |

|                                |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
|--------------------------------|--|--|--------------------------------------------|--|--|--|-------------------------|--|--|--|----------------------------|--|--|--|----------|--|--|
| Inquiry : TAPLVE               |  |  | IBM VTS Virtual Tape Mount Analysis Report |  |  |  |                         |  |  |  |                            |  |  |  | Page 001 |  |  |
| Run Date: 020CTyy              |  |  | Data Presented by Hour within Day          |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| VTS Library ID: K9230          |  |  | Library Make-Model: 3584-L22               |  |  |  | Lib Maint Level: 534.13 |  |  |  | Report Start: 29SEPy:00:00 |  |  |  |          |  |  |
| Library Type : PtP-SECONDARY   |  |  | VTS Cache Size : 1728 GB                   |  |  |  | VTS Maint Level: 749.05 |  |  |  | Report End : 29SEPy:24:00  |  |  |  |          |  |  |
| Composite ID : K9200           |  |  | F/C 4001 Status : Enabled                  |  |  |  |                         |  |  |  | Timespan : DAYS            |  |  |  |          |  |  |
| -----                          |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| Day: 29SEPy                    |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| -----                          |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| -----Scratch Mounts-----       |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| (Fast Ready)                   |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| -----Cache Hit-----            |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| -----Cache Miss-----           |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| (Recalls/Stage)                |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
| -----Percent Cache Misses----- |  |  |                                            |  |  |  |                         |  |  |  |                            |  |  |  |          |  |  |
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Figure 3-9. IBM VTS Virtual Tape Mount Analysis

### 3.2.1.7 IBM VTS Cartridge Use Distribution(TAPLVF)

The CA MICS IBM VTS Cartridge Use Distribution Report shows the count of physical cartridges in each of 20 ranges. The ranges (that is, 0 to 5, 5 to 10, 10 to 15, and so on) represent the percent of active virtual volume data. For example, a value of 3 under the <=05 heading indicates that three cartridges had 5 percent or less active data. The report also displays the total number of active cartridges and the reclamation threshold, if available.

Over time, the virtual volumes written to physical cartridges expire or become invalid (that is, a z/OS job added records to a virtual tape data set making the original copy invalid). An essential function of a VTS system is to reclaim the wasted tape media used by these expired or invalid virtual tape volumes by copying the valid volumes from a fragmented cartridge to a non-fragmented cartridge.

The report uses the header for IBM VTS distributed libraries, described in section 3.2.1.1.2

The report body includes the following measurements:

The report body reports on the following measurements from left to right:

Interval count and number of active cartridges containing the indicated percentage of active data:

```
o Number of Recording Intervals - INTERVLS
o Avg Vols With 0% to 5% Active Data - VDLAVA00
o Avg Vols With > 5% to 10% Active Data - VDLAVA05
o Avg Vols With > 10% to 15% Active Data - VDLAVA10
o Avg Vols With > 15% to 20% Active Data - VDLAVA15
o Avg Vols With > 20% to 25% Active Data - VDLAVA20
o Avg Vols With > 25% to 30% Active Data - VDLAVA25
o Avg Vols With > 30% to 35% Active Data - VDLAVA30
o Avg Vols With > 35% to 40% Active Data - VDLAVA35
o Avg Vols With > 40% to 45% Active Data - VDLAVA40
o Avg Vols With > 45% to 50% Active Data - VDLAVA45
o Avg Vols With > 50% to 55% Active Data - VDLAVA50
o Avg Vols With > 55% to 60% Active Data - VDLAVA55
o Avg Vols With > 60% to 65% Active Data - VDLAVA60
o Avg Vols With > 65% to 70% Active Data - VDLAVA65
o Avg Vols With > 70% to 75% Active Data - VDLAVA70
o Avg Vols With > 75% to 80% Active Data - VDLAVA75
o Avg Vols With > 80% to 85% Active Data - VDLAVA80
o Avg Vols With > 85% to 90% Active Data - VDLAVA85
```

- o Avg Vols With > 90% to 95% Active Data - VDLAVA85
- o Avg Vols With > 95% to 100% Active Data - VDLAVA85

Average number of active tape cartridges and the reclamation threshold percentage:

- o Avg Total Volumes with Active Data - VDLAVAT0
- o Avg Reclaim Threshold Percentage - VDLAVTPC

Note: The reclamation threshold percentage is only available if IBM Function Code F/C 4001 is disabled. The value can be inferred, however, by examining the distribution counts. A significant drop-off in the count of active cartridges will appear under the distribution range that includes the reclamation threshold value.

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

All report data is generated from the VTS Distributed Library Activity (IVTVDL) file.

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 TAPLVF, IBM VTS Cartridge Utilization Analysis Report, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.1.1.1, IBM VTS MICF Inquiry Specification Panels, for information about modifiable panel fields.

IBM VTS Cartridge Utilization Analysis (TAPLVF) Report Sample

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The following report sample shows the active physical cartridge utilization distribution for a day by hour. The report first shows the utilization distribution for a standalone VTS. The following two pages show the distribution for the active cartridges belonging to the User Interface (UI) and Secondary VTSs that participate in a

peer-to-peer configuration.

Because the IBM Function Code FC/4001 is enabled, the actual reclamation threshold value is not available in the raw data. From an examination of the report data, however, you can assume that the threshold is somewhere around 20% and 25% because the number of tapes in that range, (<=25), drops dramatically from the number in the range 25% to 30% (<=30).

|                                                                                       |              |                                           |      |      |      |      |                          |      |      |      |      |                             |      |      |      |      |          |      |      |      |       |                        |                    |
|---------------------------------------------------------------------------------------|--------------|-------------------------------------------|------|------|------|------|--------------------------|------|------|------|------|-----------------------------|------|------|------|------|----------|------|------|------|-------|------------------------|--------------------|
| Inquiry : TAPLVF                                                                      |              | IBM VTS Cartridge Use Distribution Report |      |      |      |      |                          |      |      |      |      |                             |      |      |      |      | Page 002 |      |      |      |       |                        |                    |
| Run Date: 020CTyy                                                                     |              | Data Presented by Hour within Day         |      |      |      |      |                          |      |      |      |      |                             |      |      |      |      |          |      |      |      |       |                        |                    |
| VTS Library ID: 71846                                                                 |              | Library Make-Model: 3494-L10              |      |      |      |      | Lib Maint Level: 534.01  |      |      |      |      | Report Start: 29SEPyy:00:00 |      |      |      |      |          |      |      |      |       |                        |                    |
| Library Type : STANDALONE                                                             |              | VTS Cache Size : 864 GB                   |      |      |      |      | VTS Maint Level: 7414.00 |      |      |      |      | Report End : 29SEPyy:24:00  |      |      |      |      |          |      |      |      |       |                        |                    |
| Composite ID : n/a                                                                    |              | F/C 4001 Status : Disabled                |      |      |      |      |                          |      |      |      |      | Timespan : DAYS             |      |      |      |      |          |      |      |      |       |                        |                    |
| -----                                                                                 |              |                                           |      |      |      |      |                          |      |      |      |      |                             |      |      |      |      |          |      |      |      |       |                        |                    |
| Day: 28MARyy                                                                          |              |                                           |      |      |      |      |                          |      |      |      |      |                             |      |      |      |      |          |      |      |      |       |                        |                    |
| +----- Number of Cartridges Containing the Indicated Percentage of Active Data -----+ |              |                                           |      |      |      |      |                          |      |      |      |      |                             |      |      |      |      |          |      |      |      |       |                        |                    |
| HOUR                                                                                  | Numb<br>Intv | <=05                                      | <=10 | <=15 | <=20 | <=25 | <=30                     | <=35 | <=40 | <=45 | <=50 | <=55                        | <=60 | <=65 | <=70 | <=75 | <=80     | <=85 | <=90 | <=95 | <=100 | Avg<br>Active<br>Carts | Reclaim<br>Thrsh % |
| 0                                                                                     | 1            | 0                                         | 1    | 1    | 2    | 16   | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 70    | 1140                   | 25.00 %            |
| 1                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 13   | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 71    | 1135                   | 25.00 %            |
| 2                                                                                     | 1            | 0                                         | 0    | 0    | 2    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 73    | 1134                   | 25.00 %            |
| 3                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 73    | 1133                   | 25.00 %            |
| 4                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 74    | 1134                   | 25.00 %            |
| 5                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 74    | 1134                   | 25.00 %            |
| 6                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 74    | 1134                   | 25.00 %            |
| 7                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 74    | 1134                   | 25.00 %            |
| 8                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 75    | 1135                   | 25.00 %            |
| 9                                                                                     | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 75    | 1135                   | 25.00 %            |
| 10                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 75    | 1135                   | 25.00 %            |
| 11                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 76    | 1136                   | 25.00 %            |
| 12                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 76    | 1136                   | 25.00 %            |
| 13                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 77    | 1137                   | 25.00 %            |
| 14                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 77    | 1137                   | 25.00 %            |
| 15                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 78    | 1138                   | 25.00 %            |
| 16                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 78    | 1138                   | 25.00 %            |
| 17                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 211  | 149  | 113  | 62   | 56                          | 32   | 29   | 14   | 18   | 16       | 16   | 14   | 9    | 78    | 1138                   | 25.00 %            |
| 18                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 11   | 311                      | 212  | 148  | 116  | 60   | 63                          | 33   | 32   | 13   | 17   | 17       | 13   | 8    | 11   | 70    | 1136                   | 25.00 %            |
| 19                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 212  | 148  | 116  | 60   | 63                          | 33   | 32   | 13   | 17   | 17       | 13   | 8    | 12   | 72    | 1137                   | 25.00 %            |
| 20                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 212  | 148  | 116  | 60   | 63                          | 33   | 32   | 13   | 17   | 17       | 13   | 8    | 12   | 72    | 1137                   | 25.00 %            |
| 21                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 212  | 148  | 116  | 60   | 63                          | 33   | 32   | 13   | 17   | 17       | 13   | 8    | 12   | 75    | 1140                   | 25.00 %            |
| 22                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 212  | 148  | 116  | 60   | 63                          | 33   | 32   | 13   | 17   | 17       | 13   | 8    | 12   | 76    | 1141                   | 25.00 %            |
| 23                                                                                    | 1            | 0                                         | 0    | 0    | 1    | 9    | 311                      | 212  | 148  | 116  | 60   | 63                          | 33   | 32   | 13   | 17   | 17       | 13   | 8    | 12   | 79    | 1144                   | 25.00 %            |
| Avg                                                                                   | 1            | 0                                         | 0    | 0    | 1    | 10   | 311                      | 211  | 149  | 114  | 62   | 58                          | 32   | 30   | 14   | 18   | 16       | 15   | 13   | 10   | 75    | 1137                   | 25.00 %            |
| -----                                                                                 |              |                                           |      |      |      |      |                          |      |      |      |      |                             |      |      |      |      |          |      |      |      |       |                        |                    |

### 3.2 VTS Component Reports

|                                                                                       |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
|---------------------------------------------------------------------------------------|------|-------------------------------------------|------|------|------|------|------|------|------|------|------|-------------------------|------|------|------|----------------------------|------|------|------|----------|-------|-------|----------|
| Inquiry : TAPLVF                                                                      |      | IBM VTS Cartridge Use Distribution Report |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      | Page 001 |       |       |          |
| Run Date: 020CTyy                                                                     |      | Data Presented by Hour within Day         |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| VTS Library ID: K9230                                                                 |      | Library Make-Model: 3584-L22              |      |      |      |      |      |      |      |      |      | Lib Maint Level: 534.13 |      |      |      | Report Start: 29SEPy:00:00 |      |      |      |          |       |       |          |
| Library Type : PtP-SECONDARY                                                          |      | VTS Cache Size : 1728 GB                  |      |      |      |      |      |      |      |      |      | VTS Maint Level: 749.05 |      |      |      | Report End : 29SEPy:24:00  |      |      |      |          |       |       |          |
| Composite ID : K9200                                                                  |      | F/C 4001 Status : Enabled                 |      |      |      |      |      |      |      |      |      |                         |      |      |      | Timespan : DAYS            |      |      |      |          |       |       |          |
| -----                                                                                 |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| Day: 29SEPy                                                                           |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| +----- Number of Cartridges Containing the Indicated Percentage of Active Data -----+ |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| +-----+ Avg                                                                           |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| Reclaim                                                                               |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| Thresh %                                                                              |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| -----                                                                                 |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| HOURL                                                                                 | Numb | <=05                                      | <=10 | <=15 | <=20 | <=25 | <=30 | <=35 | <=40 | <=45 | <=50 | <=55                    | <=60 | <=65 | <=70 | <=75                       | <=80 | <=85 | <=90 | <=95     | <=100 | Avg   | Reclaim  |
|                                                                                       | Intv |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       | Carts | Thresh % |
|                                                                                       |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| 0                                                                                     | 1    | 0                                         | 0    | 0    | 0    | 0    | 5    | 18   | 237  | 172  | 113  | 73                      | 56   | 50   | 47   | 40                         | 23   | 9    | 23   | 20       | 33    | 919   | n/a      |
| 1                                                                                     | 1    | 0                                         | 0    | 0    | 0    | 0    | 5    | 18   | 237  | 172  | 113  | 73                      | 56   | 50   | 47   | 40                         | 23   | 9    | 23   | 20       | 33    | 919   | n/a      |
| 2                                                                                     | 1    | 0                                         | 1    | 2    | 0    | 2    | 1    | 20   | 237  | 170  | 114  | 75                      | 55   | 49   | 48   | 40                         | 21   | 12   | 20   | 23       | 29    | 919   | n/a      |
| 3                                                                                     | 1    | 0                                         | 1    | 2    | 0    | 1    | 1    | 19   | 237  | 170  | 114  | 75                      | 55   | 49   | 48   | 40                         | 21   | 12   | 20   | 23       | 30    | 918   | n/a      |
| 4                                                                                     | 1    | 0                                         | 1    | 0    | 3    | 0    | 1    | 17   | 237  | 170  | 114  | 75                      | 55   | 49   | 48   | 40                         | 21   | 12   | 20   | 23       | 30    | 916   | n/a      |
| 5                                                                                     | 1    | 1                                         | 2    | 0    | 0    | 1    | 0    | 18   | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 27    | 918   | n/a      |
| 6                                                                                     | 1    | 1                                         | 0    | 1    | 0    | 1    | 2    | 14   | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 27    | 915   | n/a      |
| 7                                                                                     | 1    | 2                                         | 0    | 1    | 0    | 0    | 0    | 14   | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 28    | 914   | n/a      |
| 8                                                                                     | 1    | 0                                         | 0    | 0    | 0    | 3    | 1    | 10   | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 28    | 911   | n/a      |
| 9                                                                                     | 1    | 1                                         | 1    | 0    | 1    | 0    | 0    | 10   | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 29    | 911   | n/a      |
| 10                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 1    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 30    | 909   | n/a      |
| 11                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 30    | 908   | n/a      |
| 12                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 30    | 908   | n/a      |
| 13                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 30    | 908   | n/a      |
| 14                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 30    | 908   | n/a      |
| 15                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 30    | 908   | n/a      |
| 16                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 30    | 908   | n/a      |
| 17                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 31    | 909   | n/a      |
| 18                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 32    | 910   | n/a      |
| 19                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 32    | 910   | n/a      |
| 20                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0    | 0    | 9    | 239  | 171  | 112  | 74                      | 55   | 49   | 51   | 38                         | 19   | 14   | 21   | 26       | 33    | 911   | n/a      |
| 21                                                                                    | 1    | 0                                         | 0    | 0    | 1    | 2    | 0    | 10   | 238  | 171  | 114  | 72                      | 58   | 53   | 46   | 37                         | 17   | 16   | 18   | 26       | 32    | 911   | n/a      |
| 22                                                                                    | 1    | 1                                         | 0    | 0    | 0    | 1    | 0    | 9    | 238  | 171  | 114  | 72                      | 58   | 53   | 46   | 37                         | 17   | 16   | 18   | 26       | 34    | 911   | n/a      |
| 23                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 1    | 0    | 8    | 238  | 171  | 114  | 72                      | 58   | 53   | 46   | 37                         | 17   | 16   | 18   | 26       | 34    | 909   | n/a      |
| -----                                                                                 |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |
| Avg                                                                                   | 1    | 0                                         | 0    | 0    | 0    | 1    | 1    | 12   | 238  | 171  | 113  | 74                      | 55   | 50   | 50   | 38                         | 19   | 14   | 21   | 25       | 31    | 912   | n/a      |
| -----                                                                                 |      |                                           |      |      |      |      |      |      |      |      |      |                         |      |      |      |                            |      |      |      |          |       |       |          |



|                                                                                       |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |       |              |                 |
|---------------------------------------------------------------------------------------|------|-------------------------------------------|------|------|------|-------------------------|------|------|------|----------------------------|------|------|------|------|------|------|------|------|------|----------|-------|--------------|-----------------|
| Inquiry : TAPLVF                                                                      |      | IBM VTS Cartridge Use Distribution Report |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      | Page 001 |       |              |                 |
| Run Date: 020CTyy                                                                     |      | Data Presented by Hour within Day         |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| VTS Library ID: K9229                                                                 |      | Library Make-Model: 3584-L22              |      |      |      | Lib Maint Level: 534.13 |      |      |      | Report Start: 29SEPy:00:00 |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| Library Type : PtP-UI                                                                 |      | VTS Cache Size : 1728 GB                  |      |      |      | VTS Maint Level: 749.05 |      |      |      | Report End : 29SEPy:24:00  |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| Composite ID : K9200                                                                  |      | F/C 4001 Status : Enabled                 |      |      |      |                         |      |      |      | Timespan : DAYS            |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| -----                                                                                 |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| Day: 29SEPy                                                                           |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| +----- Number of Cartridges Containing the Indicated Percentage of Active Data -----+ |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| Numb                                                                                  |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      | Avg      |       |              |                 |
| HOUR                                                                                  | Intv | <=05                                      | <=10 | <=15 | <=20 | <=25                    | <=30 | <=35 | <=40 | <=45                       | <=50 | <=55 | <=60 | <=65 | <=70 | <=75 | <=80 | <=85 | <=90 | <=95     | <=100 | Active Carts | Reclaim Thrsh % |
| 0                                                                                     | 1    | 1                                         | 0    | 2    | 0    | 0                       | 1    | 16   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 29    | 930          | n/a             |
| 1                                                                                     | 1    | 1                                         | 0    | 2    | 0    | 0                       | 1    | 16   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 30    | 931          | n/a             |
| 2                                                                                     | 1    | 1                                         | 0    | 2    | 0    | 0                       | 2    | 14   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 31    | 931          | n/a             |
| 3                                                                                     | 1    | 1                                         | 1    | 0    | 0    | 1                       | 1    | 13   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 32    | 930          | n/a             |
| 4                                                                                     | 1    | 0                                         | 1    | 2    | 0    | 1                       | 0    | 11   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 32    | 928          | n/a             |
| 5                                                                                     | 1    | 1                                         | 0    | 1    | 1    | 1                       | 1    | 8    | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 33    | 927          | n/a             |
| 6                                                                                     | 1    | 1                                         | 1    | 0    | 2    | 0                       | 0    | 7    | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 34    | 926          | n/a             |
| 7                                                                                     | 1    | 0                                         | 1    | 2    | 0    | 1                       | 0    | 5    | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 35    | 925          | n/a             |
| 8                                                                                     | 1    | 1                                         | 0    | 1    | 0    | 2                       | 0    | 5    | 246  | 165                        | 114  | 80   | 66   | 54   | 39   | 26   | 19   | 23   | 22   | 29       | 33    | 925          | n/a             |
| 9                                                                                     | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 7    | 250  | 161                        | 119  | 76   | 66   | 56   | 34   | 28   | 22   | 21   | 21   | 28       | 32    | 921          | n/a             |
| 10                                                                                    | 1    | 0                                         | 0    | 1    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 30    | 921          | n/a             |
| 11                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 31    | 921          | n/a             |
| 12                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32    | 922          | n/a             |
| 13                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32    | 922          | n/a             |
| 14                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32    | 922          | n/a             |
| 15                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32    | 922          | n/a             |
| 16                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32    | 922          | n/a             |
| 17                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 33    | 923          | n/a             |
| 18                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 33    | 923          | n/a             |
| 19                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 33    | 923          | n/a             |
| 20                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34    | 924          | n/a             |
| 21                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34    | 924          | n/a             |
| 22                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34    | 924          | n/a             |
| 23                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34    | 924          | n/a             |
| -----                                                                                 |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |       |              |                 |
| Avg                                                                                   | 1    | 0                                         | 0    | 1    | 0    | 0                       | 0    | 8    | 248  | 164                        | 119  | 76   | 66   | 55   | 36   | 28   | 20   | 21   | 23   | 28       | 32    | 925          | n/a             |
| -----                                                                                 |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |       |              |                 |

Figure 3-10. IBM VTS Cartridge Use Distribution

### 3.2.2 StorageTek VSM MICF Inquiries

The MICF inquiries for StorageTek VSM virtual tape systems distributed with the VTS component are listed in Figure 3-11.

All of the StorageTek VSM inquiries generate line-printer reports. Samples of each report are presented in the following sections.

Most reports can be produced at multiple summarization levels. Dates and titles are adjusted appropriately based on the timespan and summarization level chosen for the execution. After data has been collected for a time period, this summarization capability can be used to "drill down" to a specific time frame.

For example, production trend reporting can be done at the WEEKS timespan level for the most recent 26 weeks. If the report from last week's data showed erratic behavior at the weekly level, the same report can be used to drill down to the DAYS and DAYS by HOUR level, to determine the specific interval where the abnormal behavior occurred.

#### User Modification

-----

The MICF inquiries provide a user exit in the independent source step that can be used to perform more data element modification or record selection from the CA MICS database. To invoke this exit, the shared inquiry must first be copied into the private MICF catalog, then selected for modification. Finally, the SAS statements must be coded in the SELECT macro, bracketed by the %MACRO and %MEND statements, which are provided.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS files. The macro can be used to delete observations from the data as it is processed. For example, for a published study, you can change the actual VTS Library Sequence Numbers (IVTVLS) and VTS Composite Library ID (IVTCMPID) values that appear in the report. The following code would accomplish this requirement:

```
%MACRO SELECT;
  IF IVTVLS = 'PROD01' THEN IVTVLS = 'VTS001' ;
  IF IVTCMPID = 'PRDC01' THEN IVTCMPID = 'CMP001' ;
  ... additional remapping statements ...
%MEND SELECT;
```

Use this macro to exclude systems from the report, for example, exclude all test systems:

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

IMPORTANT! All SAS statements must be coded in accordance with the syntax of the SAS Macro Language, as described in the SAS guides. No validity checking is done on the defined code. If the user code contains syntax errors or the logic produces syntax errors, the inquiry is either terminated abnormally or produces unpredictable results.

#### Inquiry Naming Conventions

-----

The VTS component MICF inquiry names follow the form cccptn, where:

|       |                                                                    |
|-------|--------------------------------------------------------------------|
| ccc = | The three-character product identifier (TAP).                      |
| p =   | The type of report: C (color graphic), L (list), or P (printer).   |
| t =   | The technology reported on: V for IBM VTS or S for StorageTek VSM. |
| n =   | A character that differentiates this inquiry from others.          |

For example, an inquiry named TAPLSA would be interpreted as follows:

```

TAPLSA
---||+= the first list inquiry
|  ||
|  ||+= for StorageTek VSM
|  ||
|  ||+= a list inquiry
|  ||
|  ||+= a Tape Analyzer Option inquiry

```

| Report Class | Report Name                                  | Report ID |
|--------------|----------------------------------------------|-----------|
| Perform      | StorageTek VSM Virtual Tape Mount Report     | TAPLSA    |
|              | StorageTek VSM Disk Buffer Usage Chart       | TAPPSB    |
|              | StorageTek VSM VTSS System Capacity Summary  | TAPLSC    |
|              | StorageTek VSM VTD Usage Summary             | TAPLSD    |
|              | StorageTek VSM RTD Usage Summary             | TAPLSE    |
|              | StorageTek VSM VTD Mount Time Distribution   | TAPPSF    |
|              | StorageTek VSM RTD Mount Time Distribution   | TAPPSG    |
|              | StorageTek VSM Recalled VTV Age Distribution | TAPLSH    |

Figure 3-11. MICF Distributed Inquiries for StorageTek VSM

These MICF inquiries for StorageTek VSM are accessed through the MICF Inquiries panel of the CA MICS Workstation Facility (MWF).

Each of the MICF inquiries for StorageTek VSM is discussed in the following sections:

- 1 - StorageTek VSM MICF Inquiry Specification Panels
- 2 - STK VSM Virtual Tape Mount Report (TAPLSA)
- 3 - STK VSM Disk Buffer Usage Chart (TAPPSB)
- 4 - STK VSM VTSS System Capacity Summary (TAPLSC)
- 5 - STK VSM VTD Usage Summary (TAPLSD)
- 6 - STK VSM RTD Usage Summary (TAPLSE)
- 7 - STK VSM VTD Mount Time Distribution (TAPPSF)
- 8 - STK VSM RTD Mount Time Distribution (TAPPSG)
- 9 - STK VSM Age Distribution of Recalled VTV (TAPLSH)

### 3.2.2.1 StorageTek VSM MICF Inquiry Specification Panels

The MICF layout and rules for populating field choices are identical for most StorageTek VSM reports with the following exception:

- o The "Composing Inquiry" line is different for each report. It identifies the inquiry name (for example, TAPLVA), and the report title (for example, STK VSM Virtual Tape Mount Report).
- o Not all reporting options are available for each inquiry.

A sample inquiry specification panel for inquiry TAPLSA is shown below. Explanations for field choices follow.

```
+-----+
|----- CA MICS StorageTek VSM Inquiry -----|
| Command ==>                                |
| Composing Inquiry: TAPLSA - STK VSM Virtual Tape Mount Report |
| Database ==> _                               |
| Cycle(s) ==> _ - _                           |
| Timespan ==> _____ (DAYS/WEEKS/MONTHS) |
| Report by hour if Timespan is Days or Weeks ==> _ (Y/N) |
| Generate report for each value of ZONE ==> _ (Y/N) |
| Data Selection:                               |
|          dd mmm yy  dd mmm yy  dd mmm yy  dd mmm yy |
| Date Ranges ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Hour ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Zone ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Sysid ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| VTSS ID (VTSSID) ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
+-----+
```

Database - Required. No default. Up to six database unit IDs can be specified (the IDs of the CA MICS database units from which files are read). Duplicates are not allowed. 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. The cycle of the specified timespan of the CA MICS files that are used as input to the analysis. A range of cycles can be specified. The fields can contain any numeric value between 0 and 99. If a single cycle is required (such as cycle 01), it must be specified in the first entry field, and the second field must be blank. Leading zeros are not required and are inserted automatically if a single-digit number is entered (for example, 7 becomes 07). If a cycle range is specified, it can be specified in either ascending or descending order (for example, 01-05 or 05-01).

Timespan - Required. Default varies by report. The timespan of the CA MICS files that are used as input to the analysis. Required input files must be available at the specified timespan.

Report by hour... - Required. Defaults to Y. At the DAYS and WEEKS timespans, reports can be produced at an hourly, daily, or weekly level. If you specify Y (Yes), the data is summarized and displayed by hour, and separate reports are produced for each day or week. If you specify N (No), the data is summarized by day or week, and a single report listing all days or weeks is produced. Note that this option is only available for a subset of the StorageTek inquiries.

Generate a report for each value of Zone - Required. Defaults to N. Reports for each zone can be generated when requested if you specify Y (Yes). The nature and resource requirements of processing often change from one zone to another (for example, prime shift online demands compared to production batch requirements at non-prime shift periods). Zone reporting gives you the ability to display separate reports for each observed zone.

If you specify N (No), the data is summarized to the appropriate level and displayed on a single report. Note that this option is only available for a subset of the StorageTek inquiries.

Generate color graphic plots - Required. Defaults to N (No).

Specify Y (Yes) if you want to generate color graphics plots. SAS/GRAPH software is a prerequisite for color graphics. When set to No standard SAS plots and graphs will be produced (non-color, line formats).

Note that this option is only available for a subset of the StorageTek inquiries.

Date Ranges - 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 the higher range can be specified before the lower range. For example, a valid date range specification is specifying date range 1 as 01 JAN 09 - 31 DEC 09 and specifying date range 2 as 01 JAN 08 - 31 DEC 08. 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. 0 to 23. Up to three hour ranges. 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. The hour ranges should not overlap, but the higher range can be specified before the lower range. For example, a valid hour range specification is 18 - 23 and 09 - 17. 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 any specified hour range.

Zone - Optional. No default. A one-character value from 1 to 9. Up to nine zone values can be specified. An input observation is selected if its zone value is equal to any of the specified values.

Sysid - Optional. No default. A one to four character value. Up to six SYSIDs can be specified. An input observation is selected if its SYSID value is equal to any of the specified values.

VTSS ID (VTSSID) - Optional. Default is ALL. A one to eight character value. Specify up to 4 VTSSIDs. An input observation is selected if its VTSSID values are equal to any of the specified values.

### 3.2.2.2 STK VSM Virtual Tape Mount Report (TAPLSA)

The CA MICS StorageTek VSM Virtual Tape Mount Report is created from measurements in the Virtual Tape Volume Mount Activity (SVTVMR) file. The report displays the number of scratch and specific mounts requested by the systems attached to the StorageTek VSM. Most importantly, the report displays the buffer hit percentage for specific mounts and the delay in satisfying the mount when a VTV has to be recalled from a physical cartridge.

The report body displays the following measurements:

- o Total virtual mounts (VMRCOUNT)
- o Total virtual scratch Mounts (VMRSMT)
- o Total virtual specific Mounts (VMREXT)
- o Percentage of mounts that were specific (VMRPCEXT)
- o Total time to satisfy virtual mounts (VMRMTM)
- o Minimum time to satisfy a virtual mount (VMRMNMTM)
- o Average time to satisfy a virtual mount (VMRAVMTM)
- o Maximum time to satisfy a virtual mount (VMRMXMTM)

Metrics for specific virtual mounts contain statistics on those that were still found in the disk buffer (buffer hit) and those that needed to be recalled from real tape (buffer miss):

- o Total specific mounts still found in the disk buffer (derived during report generation, VMREXT-VMRMRC)
- o Minimum mount time of buffer hit specific mounts (VMRMNHTM)
- o Average mount time of buffer hit specific mounts (VMRAVHTM)
- o Maximum mount time of buffer hit specific mounts (VMRMXHTM)
- o Total specific mounts not found in the disk buffer (VMRMRC)
- o Total mount time of specific mounts requiring recall (VMRXTM)
- o Minimum mount time of buffer miss specific mounts (VMRMNXTM)
- o Average mount time of buffer miss specific mounts (VMRAVXTM)
- o Maximum mount time of buffer miss specific mounts (VMRMXXTM)
- o Percentage of specific mounts requiring recall (VMRPCMIS)



**USAGE CONSIDERATIONS:**

Virtual tape volumes that are resident in the disk buffer can be mounted practically instantaneously. This provides the maximum serviceability to the production jobs with no delay. When virtual tape volumes are not resident in the disk buffer, the volume must be recalled from real tape to the disk buffer. The delay here may be significant. The tape robot needs to retrieve the cartridge containing the virtual volume, mount it in a drive, and copy all the data back to the disk buffer before the virtual mount is satisfied. Robot arm contention, drive contention, and amount of data to copy back to the disk buffer are all delay factors.

The user will be able to notice the periods of time in this report where the buffer miss counts are getting close to unacceptable limits. Monitoring this report over time will show trends that will allow the user to drill into the database at those specific times to retrieve additional information on the affected jobs.

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 TAPLSA, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows virtual tape mount metrics by hour within a week.

### 3.2 VTS Component Reports

|                                                                                       |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |      |        |         |
|---------------------------------------------------------------------------------------|------|-------------------------------------------|------|------|------|-------------------------|------|------|------|----------------------------|------|------|------|------|------|------|------|------|------|----------|------|--------|---------|
| Inquiry : TAPLVF                                                                      |      | IBM VTS Cartridge Use Distribution Report |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      | Page 001 |      |        |         |
| Run Date: 020CTyy                                                                     |      | Data Presented by Hour within Day         |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |      |        |         |
| VTS Library ID: K9229                                                                 |      | Library Make-Model: 3584-L22              |      |      |      | Lib Maint Level: 534.13 |      |      |      | Report Start: 29SEPy:00:00 |      |      |      |      |      |      |      |      |      |          |      |        |         |
| Library Type : PtP-UI                                                                 |      | VTS Cache Size : 1728 GB                  |      |      |      | VTS Maint Level: 749.05 |      |      |      | Report End : 29SEPy:24:00  |      |      |      |      |      |      |      |      |      |          |      |        |         |
| Composite ID : K9200                                                                  |      | F/C 4001 Status : Enabled                 |      |      |      |                         |      |      |      | Timespan : DAYS            |      |      |      |      |      |      |      |      |      |          |      |        |         |
| -----                                                                                 |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |      |        |         |
| Day: 29SEPy                                                                           |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |      |        |         |
| +----- Number of Cartridges Containing the Indicated Percentage of Active Data -----+ |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |      |        |         |
|                                                                                       | Numb | <-----                                    |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      | Avg      |      |        |         |
| HOUR                                                                                  | Intv | <=05                                      | <=10 | <=15 | <=20 | <=25                    | <=30 | <=35 | <=40 | <=45                       | <=50 | <=55 | <=60 | <=65 | <=70 | <=75 | <=80 | <=85 | <=90 | <=95     | =100 | Active | Reclaim |
|                                                                                       |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |      | Carts  | Thrsh % |
| 0                                                                                     | 1    | 1                                         | 0    | 2    | 0    | 0                       | 1    | 16   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 29   | 930    | n/a     |
| 1                                                                                     | 1    | 1                                         | 0    | 2    | 0    | 0                       | 1    | 16   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 30   | 931    | n/a     |
| 2                                                                                     | 1    | 1                                         | 0    | 2    | 0    | 0                       | 2    | 14   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 31   | 931    | n/a     |
| 3                                                                                     | 1    | 1                                         | 1    | 0    | 0    | 1                       | 1    | 13   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 32   | 930    | n/a     |
| 4                                                                                     | 1    | 0                                         | 1    | 2    | 0    | 1                       | 0    | 11   | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 32   | 928    | n/a     |
| 5                                                                                     | 1    | 1                                         | 0    | 1    | 1    | 1                       | 1    | 8    | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 33   | 927    | n/a     |
| 6                                                                                     | 1    | 1                                         | 1    | 0    | 2    | 0                       | 0    | 7    | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 34   | 926    | n/a     |
| 7                                                                                     | 1    | 0                                         | 1    | 2    | 0    | 1                       | 0    | 5    | 243  | 169                        | 113  | 80   | 66   | 53   | 40   | 25   | 19   | 21   | 22   | 30       | 35   | 925    | n/a     |
| 8                                                                                     | 1    | 1                                         | 0    | 1    | 0    | 2                       | 0    | 5    | 246  | 165                        | 114  | 80   | 66   | 54   | 39   | 26   | 19   | 23   | 22   | 29       | 33   | 925    | n/a     |
| 9                                                                                     | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 7    | 250  | 161                        | 119  | 76   | 66   | 56   | 34   | 28   | 22   | 21   | 21   | 28       | 32   | 921    | n/a     |
| 10                                                                                    | 1    | 0                                         | 0    | 1    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 30   | 921    | n/a     |
| 11                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 31   | 921    | n/a     |
| 12                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32   | 922    | n/a     |
| 13                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32   | 922    | n/a     |
| 14                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32   | 922    | n/a     |
| 15                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32   | 922    | n/a     |
| 16                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 32   | 922    | n/a     |
| 17                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 33   | 923    | n/a     |
| 18                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 33   | 923    | n/a     |
| 19                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 33   | 923    | n/a     |
| 20                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34   | 924    | n/a     |
| 21                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34   | 924    | n/a     |
| 22                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34   | 924    | n/a     |
| 23                                                                                    | 1    | 0                                         | 0    | 0    | 0    | 0                       | 0    | 6    | 250  | 161                        | 122  | 74   | 66   | 56   | 34   | 29   | 21   | 20   | 24   | 27       | 34   | 924    | n/a     |
| Avg                                                                                   | 1    | 0                                         | 0    | 1    | 0    | 0                       | 0    | 8    | 248  | 164                        | 119  | 76   | 66   | 55   | 36   | 28   | 20   | 21   | 23   | 28       | 32   | 925    | n/a     |
| -----                                                                                 |      |                                           |      |      |      |                         |      |      |      |                            |      |      |      |      |      |      |      |      |      |          |      |        |         |

Figure 3-12. StorageTek VSM Virtual Tape Mount Report

### 3.2.2.3 STK VSM Disk Buffer Usage Chart (TAPPSB)

The CA MICS STK VSM Disk Buffer Usage Chart is created from measurements in the Subsystem Performance Request (SVTSSP) file. The report charts the disk buffer usage in the VTSS.

The report body displays the following measurements:

- o Total Disk Buffer Capacity (GB) (SSPAVTCF)
- o Used Disk Buffer (GB) (SSPAVUCF)
- o Free Disk Buffer (GB) (SSPAVFCF)

#### USAGE CONSIDERATIONS:

If several systems are sharing the VTSS resource, consider selecting only a primary SYSID to report on. The same data is reported to all systems that are sharing the resource. Without specifying a primary SYSID to report on, the charts for all systems sharing the VTSS will look similar.

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 TAPPSB, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows the hour changes in disk buffer capacity by hour throughout the day for each SYSID/VTSSID combination.

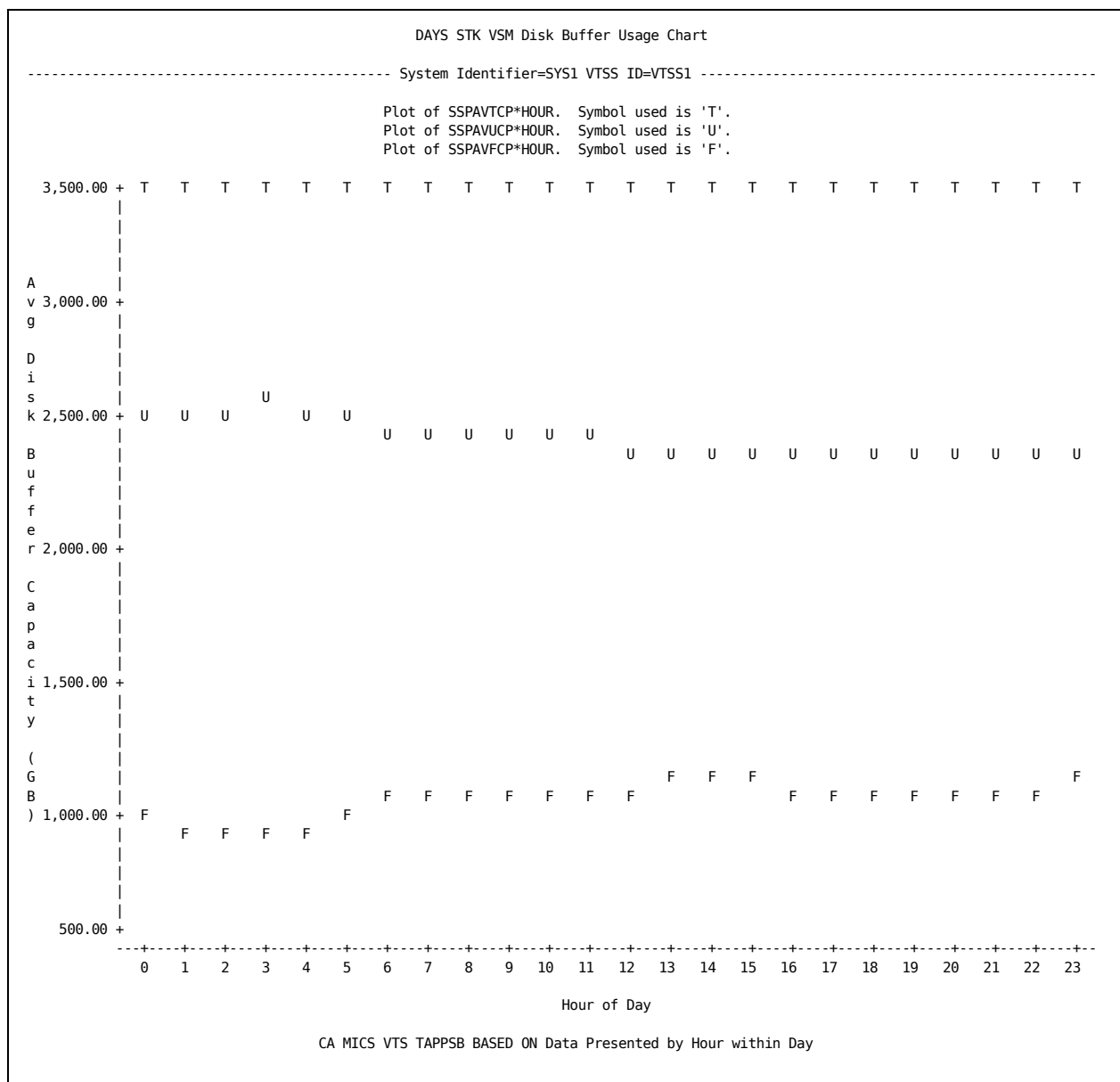


Figure 3-13. StorageTek VSM Disk Buffer Usage Chart

### 3.2.2.4 STK VSM VTSS System Capacity Summary(TAPLSC)

The CA MICS STK VSM VTSS System Capacity Summary report is created from measurements in the Subsystem Performance Request (SVTSSP) and Channel Interface Performance (SVTCIP) files. The report displays the disk buffer usage in the VTSS and the IO activity on the channel links between the VTSS and the host, and between the VTSS and the real tape drives.

The report body displays the following measurements:

- o Total disk buffer capacity (GB) (SSPAVTCP)
- o Used disk buffer (GB) (SSPAVUCP)
- o Free disk buffer (GB) (SSPAVFCP)
- o Percentage of the disk buffer used (SSPPCUCP)
- o Average number of IOs per link type, per interval, per link. Link types are HOST and RTD (real tape drives). Intervals are 15 minutes, and number of links depends on the configuration of the site's virtual tape systems. (CIPAVNIO)
- o Maximum number of IOs per link type, per interval, per link. (CIPMXNIO)
- o Average control unit busy in seconds, per link type, per interval, per link. (CIPAVCUB)
- o Maximum control unit busy in seconds, per link type, per interval, per link. Should not exceed 15 minutes, the duration of an interval. (CIPMXCUB)
- o Overall percentage control unit busy of all channels, per link type. CIPPCUB)
- o Total IOs per link type. (CIPNIO)

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 TAPLSC, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows the hourly capacity of the disk buffer and the throughput of the IO changes from the host to the VTSS and the VTSS to the real tape drives for a day.

|                           |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      |                             |             |  |  |
|---------------------------|-------|-------|-------|----------------------------------------------|----------------------|--------|--------------|-------|------|---------------------|--------|----------------|-------|--------------|------|-----------------------------|-------------|--|--|
| INQUIRY: TAPLSC           |       |       |       | CA MICS STK VSM VTSS System Capacity Summary |                      |        |              |       |      |                     |        |                |       |              |      | Page 001                    |             |  |  |
| RUN DATE: 18AUGyy         |       |       |       | Data Presented by Hour within Day            |                      |        |              |       |      |                     |        |                |       |              |      | Report Start: 27MAYyy:23:47 |             |  |  |
| VTSS Library ID:VTSS1     |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      | Report End : 29MAYyy:01:21  |             |  |  |
|                           |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      | Timespan : DAYS             |             |  |  |
| -----                     |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      |                             |             |  |  |
| Day: 28MAYyy              |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      |                             |             |  |  |
| -----                     |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      |                             |             |  |  |
| ---Disk Buffer Summary--- |       |       |       |                                              | -----Host Links----- |        |              |       |      | -----RTD Links----- |        |                |       |              |      |                             |             |  |  |
| -----Capacity-----        |       |       |       |                                              | Per Interval /       |        | Per Link---- |       |      | Totals-----         |        | Per Interval / |       | Per Link---- |      |                             | Totals----- |  |  |
| HOURL                     | Total | Used  | Free  | %                                            | Avg IO               | Max IO | Av CU        | Mx CU | %    | Total               | Avg IO | Max IO         | Av CU | Mx CU        | %    | Total                       |             |  |  |
|                           | (GB)  | (GB)  | (GB)  | Used                                         |                      |        | Busy         | Busy  | Busy | IOs                 |        |                | Busy  | Busy         | Busy | IOs                         |             |  |  |
| -----                     |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      |                             |             |  |  |
| 0                         | 3,481 | 1,855 | 1,626 | 53%                                          | 49733                | 209661 | 2:42         | 10:04 | 18%  | 4774369             | 135076 | 463031         | 3:33  | 9:43         | 24%  | 4322425                     |             |  |  |
| 1                         | 3,481 | 1,813 | 1,668 | 52%                                          | 68377                | 230851 | 3:40         | 12:15 | 24%  | 6564195             | 173268 | 443137         | 4:23  | 9:55         | 29%  | 5544577                     |             |  |  |
| 2                         | 3,481 | 1,852 | 1,629 | 53%                                          | 56681                | 199266 | 3:25         | 10:52 | 23%  | 5441341             | 140737 | 378517         | 3:24  | 7:52         | 23%  | 4503571                     |             |  |  |
| 3                         | 3,481 | 1,870 | 1,610 | 54%                                          | 66578                | 270513 | 2:55         | 9:56  | 19%  | 6391471             | 78744  | 234737         | 1:58  | 4:57         | 13%  | 2519799                     |             |  |  |
| 4                         | 3,481 | 1,835 | 1,645 | 53%                                          | 57021                | 198558 | 2:41         | 9:09  | 18%  | 5474028             | 153239 | 412134         | 4:35  | 10:55        | 31%  | 4903641                     |             |  |  |
| 5                         | 3,481 | 1,838 | 1,643 | 53%                                          | 60968                | 208075 | 3:23         | 10:52 | 23%  | 5852882             | 149002 | 365479         | 3:47  | 8:38         | 25%  | 4768063                     |             |  |  |
| 6                         | 3,481 | 1,864 | 1,617 | 54%                                          | 61570                | 235963 | 3:33         | 11:24 | 24%  | 5910763             | 196036 | 568586         | 5:50  | 12:58        | 39%  | 6273145                     |             |  |  |
| 7                         | 3,481 | 1,827 | 1,654 | 52%                                          | 63609                | 209064 | 3:24         | 11:30 | 23%  | 6106503             | 234893 | 572075         | 7:16  | 12:51        | 48%  | 7516567                     |             |  |  |
| 8                         | 3,481 | 1,794 | 1,687 | 52%                                          | 61872                | 199899 | 3:20         | 10:59 | 22%  | 5939667             | 253966 | 605433         | 7:52  | 13:25        | 52%  | 8126909                     |             |  |  |
| 9                         | 3,481 | 1,791 | 1,689 | 51%                                          | 61616                | 209684 | 2:37         | 9:08  | 17%  | 5915172             | 169352 | 472365         | 7:06  | 11:52        | 47%  | 5419251                     |             |  |  |
| 10                        | 3,481 | 1,829 | 1,652 | 53%                                          | 53602                | 213541 | 2:26         | 8:33  | 16%  | 5145797             | 132931 | 212386         | 6:08  | 11:43        | 41%  | 4253786                     |             |  |  |
| 11                        | 3,481 | 1,867 | 1,614 | 54%                                          | 47454                | 195411 | 1:43         | 6:50  | 11%  | 4555629             | 203886 | 362883         | 9:14  | 13:14        | 62%  | 6524366                     |             |  |  |
| 12                        | 3,481 | 1,816 | 1,665 | 52%                                          | 41546                | 199712 | 1:41         | 5:40  | 11%  | 3988450             | 238642 | 420800         | 9:55  | 13:47        | 66%  | 7636544                     |             |  |  |
| 13                        | 3,481 | 1,780 | 1,701 | 51%                                          | 31987                | 121239 | 2:10         | 8:20  | 14%  | 3070726             | 220149 | 414812         | 8:54  | 14:13        | 59%  | 7044759                     |             |  |  |
| 14                        | 3,481 | 1,805 | 1,676 | 52%                                          | 34643                | 136273 | 1:40         | 6:08  | 11%  | 3325719             | 192073 | 495373         | 7:59  | 14:34        | 53%  | 6146343                     |             |  |  |
| 15                        | 3,481 | 1,832 | 1,648 | 53%                                          | 35707                | 127115 | 1:30         | 5:50  | 10%  | 3427884             | 97646  | 424607         | 4:08  | 14:36        | 28%  | 3124678                     |             |  |  |
| 16                        | 3,481 | 1,863 | 1,618 | 54%                                          | 30998                | 126288 | 0:57         | 3:48  | 6%   | 2975812             | 128142 | 501556         | 5:53  | 14:40        | 39%  | 4100549                     |             |  |  |
| 17                        | 3,481 | 1,818 | 1,663 | 52%                                          | 25495                | 100602 | 1:20         | 5:20  | 9%   | 2447526             | 168482 | 406792         | 6:51  | 13:34        | 46%  | 5391410                     |             |  |  |
| 18                        | 3,481 | 1,774 | 1,707 | 51%                                          | 14242                | 60405  | 1:05         | 5:26  | 7%   | 1367222             | 205305 | 463514         | 7:46  | 14:29        | 52%  | 6569752                     |             |  |  |
| 19                        | 3,481 | 1,758 | 1,723 | 51%                                          | 9901                 | 52627  | 0:40         | 3:08  | 4%   | 950528              | 151802 | 376472         | 6:08  | 14:41        | 41%  | 4857665                     |             |  |  |
| 20                        | 3,481 | 1,739 | 1,741 | 50%                                          | 28034                | 159918 | 1:37         | 7:47  | 11%  | 2691257             | 193020 | 452482         | 6:48  | 14:50        | 45%  | 6176643                     |             |  |  |
| 21                        | 3,481 | 1,774 | 1,706 | 51%                                          | 55534                | 299780 | 2:15         | 9:08  | 15%  | 5331278             | 80151  | 278290         | 2:05  | 5:29         | 14%  | 2564826                     |             |  |  |
| 22                        | 3,481 | 1,815 | 1,666 | 52%                                          | 15786                | 58673  | 1:34         | 6:02  | 10%  | 1515494             | 67822  | 303456         | 1:42  | 6:01         | 11%  | 2170304                     |             |  |  |
| 23                        | 3,481 | 1,849 | 1,631 | 53%                                          | 55699                | 211758 | 2:22         | 8:39  | 16%  | 5347142             | 120716 | 344082         | 2:48  | 7:02         | 19%  | 3862923                     |             |  |  |
| -----                     |       |       |       |                                              |                      |        |              |       |      |                     |        |                |       |              |      |                             |             |  |  |

Figure 3-14. STK VSM VTSS System Capacity Summary

### 3.2.2.5 STK VSM VTD Usage Summary (TAPLSD)

The CA MICS STK VSM VTD Usage Summary report is created from measurements in the VTV Mount Request (SVTVMR) and VTV Dismount Request (SVTVDR) files. The report displays the usage patterns of the virtual tape drives by hour. Important information in this report is the maximum number of concurrent tape drives in use at any point in the hour.

The report body displays the following measurements derived by combining the VTV Mount file (SVTVMR) and the VTV Dismount file (SVTVDR).

- o Minimum virtual tape drives allocated concurrently
- o Average virtual tape drives allocated concurrently
- o Maximum virtual tape drives allocated concurrently
- o Number of unique virtual tape drive addresses used
- o Number of virtual tape volumes mounted during the reporting period
- o Average duration a virtual tape drive was allocated to a job
- o Maximum duration in time a virtual tape drive was allocated
- o Graphic of maximum concurrent VTD usage

#### USAGE CONSIDERATIONS:

Number of tape drives is a fixed resource. The number of virtual drives available to a system can be quite high. Still, this resource needs to be monitored and tracked. Typically several host systems will share the resources of a VTSS. If a VTSS has the capacity for 1024 virtual tape drives, and four systems are sharing the resource, each host may be allocated 256 virtual tape drives. This may seem like a lot, but during peak production tape usage, they may all be consumed. By monitoring and tracking the virtual tape drive usage patterns, the storage administrator may be able to alert production control staffs of potential periods of resource shortages in advance, allowing time for possible schedule shifts.

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 TAPLSD, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows the usage of the virtual tape drive by hour by day for each host system using the VTSS resource.

|                                |                 |                 |                                   |                         |               |                             |         |          |                                    |   |
|--------------------------------|-----------------|-----------------|-----------------------------------|-------------------------|---------------|-----------------------------|---------|----------|------------------------------------|---|
| INQUIRY: TAPLSD                |                 |                 | CA MICS STK VSM VTD Usage Summary |                         |               | Page 001                    |         |          |                                    |   |
| RUN DATE: 18AUGyy              |                 |                 | Data Presented by Hour within Day |                         |               | Report Start: 28MAYyy:00:02 |         |          |                                    |   |
| VTSS Library ID:VTSS1          |                 |                 |                                   |                         |               | Report End : 29MAYyy:01:25  |         |          |                                    |   |
|                                |                 |                 |                                   |                         |               | Timespan : DETAIL           |         |          |                                    |   |
| -----                          |                 |                 |                                   |                         |               |                             |         |          |                                    |   |
| Day: 28MAYyy                   |                 |                 |                                   |                         |               |                             |         |          |                                    |   |
| -----                          |                 |                 |                                   |                         |               |                             |         |          |                                    |   |
| -----Concurrent VTD Usage----- |                 |                 |                                   |                         |               | --VTD Occupancy Times-----  |         |          |                                    | + |
|                                | Minimum<br>VTDs | Average<br>VTDs | Maximum<br>VTDs                   | Unique VTD<br>Addresses | Total<br>VTVs |                             |         |          | Concurrent VTD Usage               |   |
| HOURL                          | Allocated       | Allocated       | Allocated                         | Used                    | Mounted       | Average                     | Maximum | Total    | 0---10---20---30---40---50---60--- |   |
| -----                          |                 |                 |                                   |                         |               |                             |         |          |                                    |   |
| 0                              | 1               | 13              | 29                                | 97                      | 164           | 0:02:45                     | 0:00:02 | 9:02:41  | *****                              |   |
| 1                              | 15              | 23              | 33                                | 101                     | 250           | 0:03:53                     | 0:00:29 | 18:31:11 | *****                              |   |
| 2                              | 23              | 29              | 42                                | 126                     | 325           | 0:04:16                     | 0:04:00 | 22:46:53 | *****                              |   |
| 3                              | 14              | 20              | 37                                | 96                      | 201           | 0:06:04                     | 0:00:00 | 15:57:44 | *****                              |   |
| 4                              | 10              | 19              | 30                                | 141                     | 362           | 0:03:22                     | 0:00:10 | 11:59:34 | *****                              |   |
| 5                              | 13              | 20              | 38                                | 113                     | 324           | 0:03:14                     | 0:00:04 | 14:50:12 | *****                              |   |
| 6                              | 20              | 27              | 38                                | 135                     | 426           | 0:02:55                     | 0:02:07 | 19:27:40 | *****                              |   |
| 7                              | 16              | 23              | 28                                | 120                     | 378           | 0:03:04                     | 0:01:15 | 16:45:52 | *****                              |   |
| 8                              | 15              | 23              | 30                                | 98                      | 387           | 0:03:30                     | 0:02:15 | 17:10:00 | *****                              |   |
| 9                              | 9               | 17              | 27                                | 108                     | 257           | 0:03:21                     | 0:02:54 | 12:27:46 | *****                              |   |
| 10                             | 11              | 18              | 23                                | 96                      | 227           | 0:03:24                     | 0:00:31 | 13:37:44 | *****                              |   |
| 11                             | 9               | 14              | 20                                | 73                      | 165           | 0:05:26                     | 0:06:50 | 10:19:57 | *****                              |   |
| 12                             | 5               | 11              | 20                                | 72                      | 168           | 0:03:15                     | 0:01:15 | 7:48:10  | *****                              |   |
| 13                             | 6               | 12              | 23                                | 89                      | 190           | 0:02:42                     | 0:00:00 | 8:36:05  | *****                              |   |
| 14                             | 8               | 13              | 17                                | 87                      | 168           | 0:03:32                     | 0:02:16 | 9:06:22  | *****                              |   |
| 15                             | 8               | 15              | 25                                | 83                      | 142           | 0:03:58                     | 0:10:01 | 11:21:06 | *****                              |   |
| 16                             | 8               | 17              | 28                                | 119                     | 235           | 0:03:29                     | 0:03:52 | 11:25:22 | *****                              |   |
| 17                             | 4               | 11              | 21                                | 85                      | 184           | 0:02:26                     | 0:00:00 | 7:20:43  | *****                              |   |
| 18                             | 3               | 8               | 24                                | 73                      | 136           | 0:02:14                     | 0:00:01 | 4:40:31  | *****                              |   |
| 19                             | 5               | 9               | 23                                | 77                      | 108           | 0:04:20                     | 0:00:13 | 5:58:47  | *****                              |   |
| 20                             | 9               | 14              | 26                                | 114                     | 222           | 0:04:26                     | 0:04:09 | 9:31:29  | *****                              |   |
| 21                             | 7               | 14              | 27                                | 95                      | 235           | 0:03:11                     | 0:06:49 | 9:15:19  | *****                              |   |
| 22                             | 2               | 8               | 24                                | 103                     | 176           | 0:01:27                     | 0:00:52 | 3:32:38  | *****                              |   |
| 23                             | 11              | 18              | 32                                | 155                     | 383           | 0:01:36                     | 0:00:02 | 8:54:09  | *****                              |   |
| -----                          |                 |                 |                                   |                         |               |                             |         |          |                                    |   |

Figure 3-15. StorageTek VSM VTD Usage Summary Report



### 3.2.2.6 STK VSM RTD Usage Summary (TAPLSE)

The CA MICS STK VSM RTD Usage Summary report is created from measurements in the Real Tape Drive Mount Activity (SVTRMR) AND Real Tape Drive Dismount Activity (SVTRDR) files. The report displays the usage patterns of the real tape drives by hour. Important information in this report is the maximum number of concurrent tape drives in use at any point in the hour.

The report body displays the following measurements derived by combining the RTD Mount file (SVTRMR) and RTD Dismount file (SVTRDR).

- o Minimum real tape drives allocated concurrently
- o Average real tape drives allocated concurrently
- o Maximum real tape drives allocated concurrently
- o Number of unique real tape drive addresses used
- o Number of real tape volumes mounted during the reporting period
- o Average duration a real tape drive was allocated
- o Maximum duration in time a real tape drive was allocated
- o Graphic of maximum concurrent RTD usage

#### USAGE CONSIDERATIONS:

Number of tape drives is a fixed resource and needs to be monitored and tracked. During production batch cycles, tape drives need to be available for recalling needed virtual tape volumes back to the disk buffer. Multivolume tape maintenance can be scheduled during off-peak production batch cycles.

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 TAPLSE, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section

### 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows the usage of the real tape drives by hour by day for each host system using the VTSS resource.

| CA MICF STK VSM RTD Usage Summary                                 |                |                     |         |         |                  |                  |                  |                              |       |       |
|-------------------------------------------------------------------|----------------|---------------------|---------|---------|------------------|------------------|------------------|------------------------------|-------|-------|
| Data Presented by Day within Month                                |                |                     |         |         |                  |                  |                  |                              |       |       |
| INQUIRY : TAPLSE                                                  |                |                     |         |         |                  |                  |                  | Page 004                     |       |       |
| RUN DATE: 05NOVYY                                                 |                |                     |         |         |                  |                  |                  | Report Start: 04FEB08:00:00  |       |       |
| VTSS Library ID:VTSS1                                             |                |                     |         |         |                  |                  |                  | Report End : 04FEB08:23:56   |       |       |
| System ID :ALL                                                    |                |                     |         |         |                  |                  |                  | Timespan : DETAIL            |       |       |
| -----                                                             |                |                     |         |         |                  |                  |                  |                              |       |       |
| Day: 04NOVYY                                                      |                |                     |         |         |                  |                  |                  |                              |       |       |
| -----RTD Occupancy Times-----Concurrent RTD Allocation-----+----- |                |                     |         |         |                  |                  |                  |                              |       |       |
| Unique RTD<br>Addresses                                           | Total<br>MVC's | RTD Occupancy Times |         |         | Minimum<br>RTD's | Average<br>RTD's | Maximum<br>RTD's | Maximum Concurrent RTD Usage |       |       |
| Used                                                              | Mounted        | Minimum             | Average | Maximum | Allocated        | Allocated        | Allocated        | 1---                         | 10--- | 20--- |
|                                                                   |                |                     |         |         |                  |                  |                  | 30---                        | 40--- | 50--- |
|                                                                   |                |                     |         |         |                  |                  |                  | 60---                        |       |       |
| 0                                                                 | 4              | 6                   | 0:16:57 | 0:26:38 | 1:21:33          | 1                | 2                | 3                            | ***   |       |
| 2                                                                 | 8              | 14                  | 0:22:25 | 0:06:04 | 4:42:38          | 2                | 5                | 7                            | ***** |       |
| 3                                                                 | 7              | 6                   | 0:40:21 | 0:59:10 | 1:43:49          | 1                | 2                | 4                            | ****  |       |
| 4                                                                 | 7              | 9                   | 1:00:19 | 0:12:28 | 3:36:54          | 2                | 4                | 6                            | ***** |       |
| 5                                                                 | 6              | 19                  | 0:45:14 | 0:05:52 | 4:41:28          | 2                | 4                | 5                            | ***** |       |
| 6                                                                 | 8              | 20                  | 0:56:12 | 0:11:59 | 6:50:59          | 5                | 6                | 7                            | ***** |       |
| 7                                                                 | 8              | 31                  | 1:50:31 | 0:12:49 | 10:59:42         | 6                | 7                | 7                            | ***** |       |
| 8                                                                 | 8              | 16                  | 0:20:25 | 0:55:12 | 10:38:29         | 5                | 7                | 8                            | ***** |       |
| 9                                                                 | 8              | 12                  | 0:57:08 | 8:23:14 | 8:42:33          | 5                | 6                | 8                            | ***** |       |
| 10                                                                | 8              | 10                  | 1:08:32 | 0:15:18 | 7:47:19          | 5                | 6                | 7                            | ***** |       |
| 11                                                                | 8              | 13                  | 0:19:15 | 1:08:04 | 10:09:28         | 6                | 6                | 8                            | ***** |       |
| 12                                                                | 8              | 10                  | 0:59:16 | 0:44:43 | 9:07:53          | 5                | 6                | 7                            | ***** |       |
| 13                                                                | 8              | 24                  | 0:30:09 | 4:38:39 | 9:55:24          | 5                | 7                | 8                            | ***** |       |
| 14                                                                | 8              | 57                  | 0:12:25 | 0:03:42 | 13:28:14         | 6                | 7                | 8                            | ***** |       |
| 15                                                                | 8              | 63                  | 0:17:03 | 9:18:01 | 12:28:11         | 6                | 7                | 8                            | ***** |       |
| 16                                                                | 8              | 64                  | 0:05:12 | 0:08:12 | 10:41:40         | 6                | 7                | 8                            | ***** |       |
| 17                                                                | 8              | 52                  | 0:09:30 | 0:04:00 | 10:11:24         | 7                | 8                | 8                            | ***** |       |
| 18                                                                | 8              | 43                  | 0:08:14 | 0:06:29 | 9:22:26          | 5                | 7                | 8                            | ***** |       |
| 19                                                                | 8              | 16                  | 0:32:59 | 0:09:58 | 6:46:16          | 5                | 6                | 7                            | ***** |       |
| 20                                                                | 8              | 26                  | 1:10:09 | 0:06:02 | 8:04:07          | 5                | 7                | 8                            | ***** |       |
| 21                                                                | 8              | 13                  | 0:13:08 | 0:01:05 | 5:51:22          | 3                | 5                | 8                            | ***** |       |
| 22                                                                | 5              | 2                   | 0:38:03 | 1:10:51 | 3:57:41          | 2                | 3                | 5                            | ***** |       |
| 23                                                                | 5              | 27                  | 0:25:56 | 1:11:15 | 2:13:09          | 1                | 2                | 4                            | ****  |       |
| -----                                                             |                |                     |         |         |                  |                  |                  |                              |       |       |

Figure 3-16. StorageTek VSM RTD Usage Summary Report

### 3.2.2.7 STK VSM VTD Mount Time Distribution (TAPPSF)

The CA MICS STK VSM VTD Mount Time Distribution report is created from the VTV Mount Activity (SVTVMR) file. The values on the X axis are the VTV mount times specified in VTSOPS by the CA MICS administrator on the VTVMOUNTTIME parameter. Most virtual mounts should occur very quickly, which will be obvious from the tallest bars on the left. The bars in the middle or right of the chart should appear to be very low. If they do not, that may indicate excessive recalls from real tape or tape drive contention. This may require more detailed analysis to focus in on the offending mounts.

The chart body displays the following measurements from the VTV Mount file (SVTVMR):

- o Number of virtual tape mounts that were satisfied between 0 and less than half a second
- o Number of virtual tape mounts that were satisfied between .5 seconds and less than 1 second
- o Number of virtual tape mounts that were satisfied between 1 second and less than 2 seconds
- o Number of virtual tape mounts that were satisfied between 2 seconds and less than 5 seconds
- o Number of virtual tape mounts that were satisfied between 5 seconds and less than 30 seconds
- o Number of virtual tape mounts that were satisfied between 30 seconds and less than 60 seconds .
- o Number of virtual tape mounts that were satisfied between 1 minute and less than 2 minutes
- o Number of virtual tape mounts that were satisfied in a time greater than 2 minutes

The metrics from the database used to create this chart were as follows:

- o SVTWALx - VTV Mount Time Distribution Limits
- o SVTVDSTx - VTV Mount Time Distribution Counts

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 TAPPSF, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows the distribution of virtual tape mounts based on the time values defined in the VTVMOUNTTIME parameter set in prefix.parms(VTSOPS).

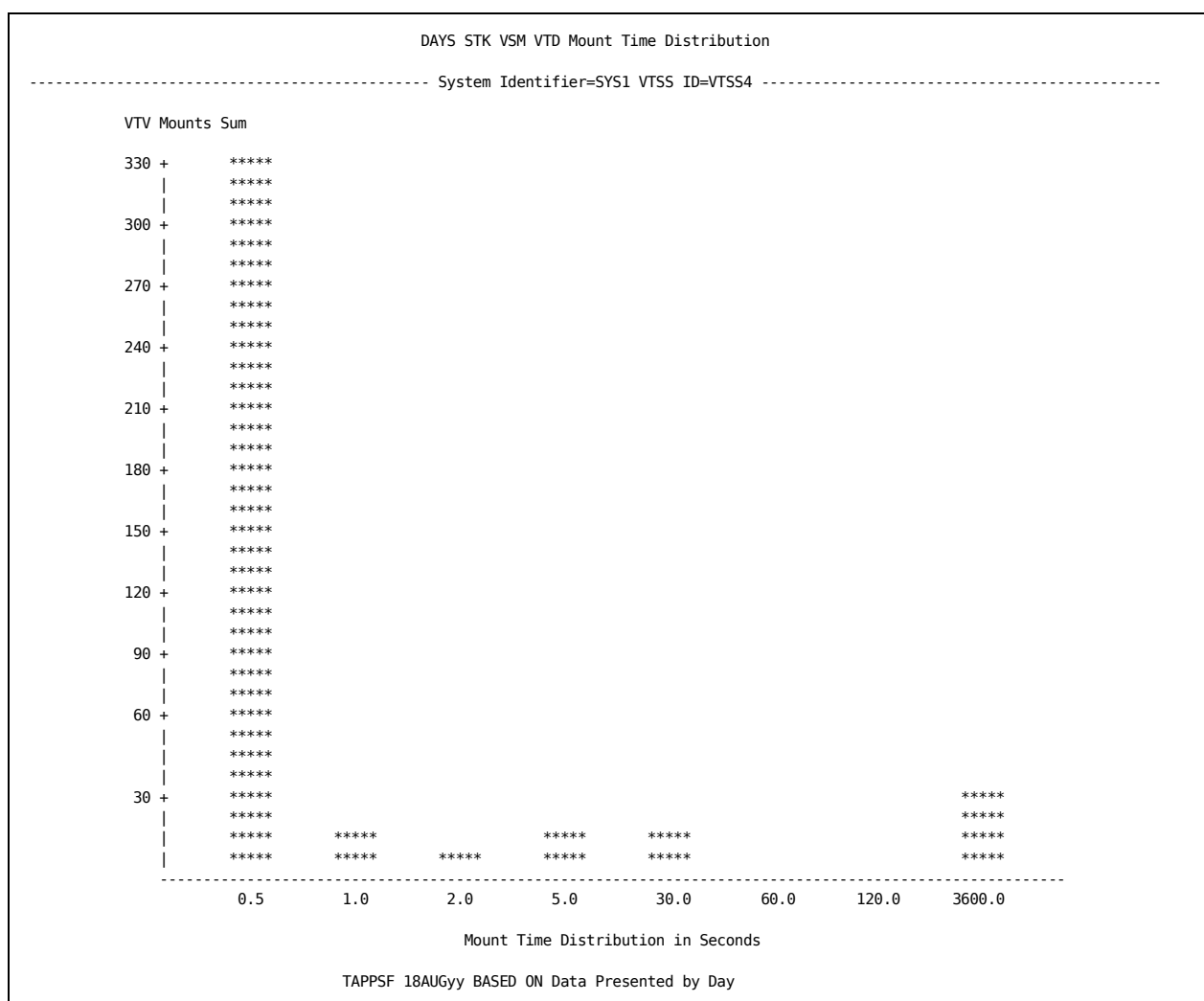


Figure 3-17. StorageTek VSM VTD Mount Time Distribution

### 3.2.2.8 STK VSM RTD Mount Time Distribution (TAPPSG)

The CA MICS STK VSM RTD Mount Time Distribution report is created from the Real Tape Mount Activity (SVTRMR) file. The values on the X axis are the real tape mount times specified in VTSOPS by the CA MICS administrator on the RTDMOUNTTIME parameter. Real tape mounts take longer by nature than virtual tape mounts. The tape needs to be retrieved from a slot in the library by the robot arm. Then the tape is inserted into a drive and spun down to the point on the tape where the virtual volume is located, so it can be copied back to the disk buffer. Still, the chart will show the distribution in mount times. Depending on the values set in the RTDMOUNTTIME parameter, the bars will probably be in the middle of the chart. If any bars appear to be excessive on the right side of the chart, they may have taken a long time to satisfy. Additional reporting may be needed to determine the cause of the excessive mount times.

The chart body displays the following measurements from the RTD Mount file (SVTRMR):

- o Number of real tape mounts that were satisfied between 0 and less than 5 seconds
- o Number of real tape mounts that were satisfied between 5 seconds and less than 10 seconds
- o Number of real tape mounts that were satisfied between 10 seconds and less than 30 seconds
- o Number of real tape mounts that were satisfied between 30 seconds and less than 60 seconds
- o Number of real tape mounts that were satisfied between 1 minute and less than 2 minutes
- o Number of real tape mounts that were satisfied between 2 minutes and less than 3 minutes
- o Number of real tape mounts that were satisfied between 3 minutes and less than 4 minutes
- o Number of real tape mounts that were satisfied in a time greater than 4 minutes

The metrics from the database used to create this chart were as follows:

- o SVTRVALx - RTD Mount Time Distribution Limits
- o SVTRDSTx - RTD Mount Time Distribution Counts

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 TAPPSG, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows the distribution of real tape mounts by system by day based on the time values defined in the RTDMOUNTTIME parameter set in prefix.parms(VTSOPS).

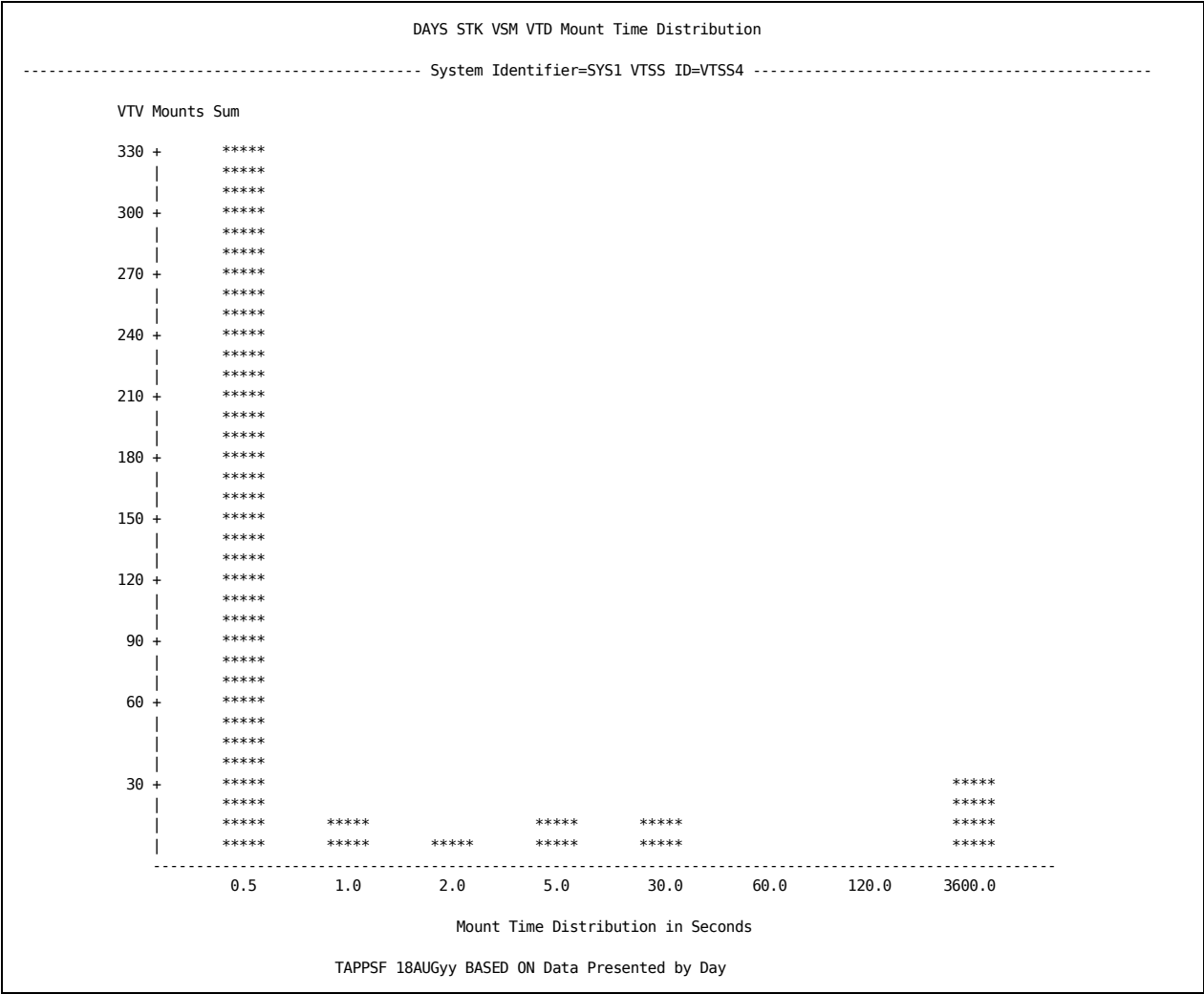


Figure 3-18. StorageTek VSM VSM RTD Mount Time Distribution

### 3.2.2.9 STK VSM Age Distribution of Recalled VTV (TAPLSH)

The CA MICS STK VSM Age Distribution of Recalled VTV report is created from the Recall VTV Request (SVTVRR) file. This report shows the elapsed time between the time the VTV was last accessed and when it was recalled back to the disk buffer. Counts on the left side of the report indicate that the VTV was migrated and then recalled in a very short time. If these numbers are excessive, further detailed analysis of these recalls are necessary to determine the reason for the fast recall. The reason may indicate that particular volumes should be created with a storage class that will keep the volume in the disk buffer longer to avoid recall delays.

The report body displays the following measurements from the VTV Recall file (SVTVRR):

- o Number of virtual tape volume recalls from a multivolume cartridge based on the age since the VTV was last used in:
  - 0 seconds to less than 1 minute
  - 1 minute to less than 5 minutes
  - 5 minutes to less than 10 minutes
  - 10 minutes to less than 30 minutes
  - 30 minutes to less than 60 minutes
  - 1 hour to less than 2 hours
  - 2 hours to less than 5 hours
  - 5 hours to less than 12 hours
  - 12 hours to less than 24 hours
  - 1 day to less than 2 days
  - 2 days to less than 3 days
  - Greater than 3 days

The metrics from the database used to create this chart were as follows:

- o VRRMTA - Total VTV Recalls (Auto)
- o VRRLTM - Age Since Last Mounted



**USAGE CONSIDERATIONS:**

This report can be surprising, especially if there are significant counts in the columns on the left side of the report. This means that the virtual tape volumes are being migrated out of the disk buffer, only to be recalled a very short time later. If these numbers are significant, further analysis can help you determine the data usage requirements. This may lead to a change in the storage class assignments, so these virtual volumes stay in the disk buffer longer to be readily available to the next job that needs the data.

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 TAPLSH, whose Catalog Group is PERFORM
- o Complete the MICF Execution panel
- o Complete the specification panel. Refer to section 3.2.2.1, StorageTek VSM MICF Inquiry Specification Panels, for information about modifiable panel fields.

The following report sample shows the recall distribution by host system within each VTSS.

### 3.2 VTS Component Reports

INQUIRY: TAPLSH  
RUN DATE: 18AUGyy  
VTSS Library ID:VTSS1

CA MICS STK VSM Recall Age Distribution Report  
Activity Summarized by Day

Page 001  
Report Start: 04MAYyy:02:16  
Report End : 04MAYyy:23:59  
Timespan : Daily

Day: 04MAYyy

| System ID | <<br>00:01:00<br>Minute | <<br>00:05:00<br>Minutes | <<br>00:10:00<br>Minutes | <<br>00:30:00<br>Minutes | <<br>01:00:00<br>Hours | <<br>02:00:00<br>Hours | <<br>05:00:00<br>Hours | <<br>12:00:00<br>Hours | <<br>24:00:00<br>Hours | <<br>48:00:00<br>Hours | <<br>72:00:00<br>Hours | ><br>72:00:00<br>Hours |
|-----------|-------------------------|--------------------------|--------------------------|--------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| SYS1      | 4                       | 1                        | 0                        | 1                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 167                    |
| SYS2      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 5                      |
| SYS3      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      |
| SYS4      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 10                     |
| SYS5      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 144                    |
| Totals    | 4                       | 1                        | 0                        | 1                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 326                    |

INQUIRY: TAPLSH  
RUN DATE: 18AUGyy  
VTSS Library ID:VTSS2

STK VSM Recall Age Distribution Report  
Activity Summarized by Day

Page 002  
Report Start: 04MAYyy:02:16  
Report End : 04MAYyy:23:59  
Timespan : Daily

Day: 04MAYyy

| System ID | <<br>00:01:00<br>Minute | <<br>00:05:00<br>Minutes | <<br>00:10:00<br>Minutes | <<br>00:30:00<br>Minutes | <<br>01:00:00<br>Hours | <<br>02:00:00<br>Hours | <<br>05:00:00<br>Hours | <<br>12:00:00<br>Hours | <<br>24:00:00<br>Hours | <<br>48:00:00<br>Hours | <<br>72:00:00<br>Hours | ><br>72:00:00<br>Hours |
|-----------|-------------------------|--------------------------|--------------------------|--------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| SYS1      | 3                       | 1                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 188                    |
| SYS2      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      |
| SYS3      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 6                      |
| SYS4      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 11                     |
| SYS5      | 0                       | 0                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 98                     |
| Totals    | 3                       | 1                        | 0                        | 0                        | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 0                      | 303                    |

Figure 3-19. StorageTek VSM Age Distribution of Recalled VTV

### 3.2.3 IBM Hydra MICF Inquiries

Reports for IBM Hydra TS7700 series virtual tape servers are distributed as MICF inquiries and are listed in Figure 3-4.

All of the IBM Hydra inquiries generate line-printer reports. Samples of each report are presented in the following sections.

All reports can be produced at multiple summarization levels. Dates and titles are adjusted appropriately based on the timespan and summarization level that is selected for the execution. After data has been collected for a time period, this summarization capability can be used to "drill down" to a specific time frame.

For example, production trend reporting can be done at the WEEKS timespan level for the most recent 26 weeks. If the report from last week's data shows erratic behavior at the weekly level, the same report can be used to drill down to the DAYS and DAYS BY HOUR level to determine the specific interval where the abnormal behavior occurred.

User Modification

-----

The MICF inquiries provide a user exit in the independent source step that can be used to perform more data element modification or record selection from the CA MICS database. To invoke this exit, the shared inquiry must first be copied into the private MICF catalog, then selected for modification. Finally, the SAS statements must be coded in the SELECT macro, bracketed by the %MACRO and %MEND statements, which are provided.

The default for the SELECT macro is null. This macro is invoked when the observations are read from the specified CA MICS files. The macro can be used to delete observations from the data as it is processed. For example, for a published study, you can change the actual VTS Library Sequence Numbers (IVTVLS) and VTS Composite Library ID (IVTCMPID) values that appear in the report. The following code would accomplish this requirement:

```
%MACRO SELECT;
  IF IVTVLS  = 'PROD01' THEN IVTVLS  ='VTS001' ;
  IF IVTCMPID = 'PRDC01' THEN IVTCMPID ='CMP001' ;
  ... additional remapping statements ...
%MEND  SELECT;
```

Use this macro to exclude systems from the report, for example, exclude all test systems:

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

**IMPORTANT!** All SAS statements must be coded in accordance with the syntax of the SAS Macro Language, as described in the SAS guides. No validity checking is done on the defined code. If the user code contains syntax errors or the logic produces syntax errors, the inquiry is either terminated abnormally or produces unpredictable results.

### Inquiry Naming Conventions

-----

The VTS component MICF inquiry names follow the form `cccptn`, where:

|                    |                                                                  |
|--------------------|------------------------------------------------------------------|
| <code>ccc</code> = | The three-character product identifier (TAP).                    |
| <code>p</code> =   | The type of report: C (color graphic), L (list), or P (printer). |
| <code>t</code> =   | The technology reported on: V (IBM VTS) or S (StorageTek VSM).   |
| <code>n</code> =   | A character that differentiates this inquiry from others.        |

For example, an inquiry named `TAPLVC` would be interpreted as follows:

```
TAPLHC  
---||+= the third list inquiry  
|  ||  
|  |= for IBM Hydra TS7700 Series Servers  
|  |  
|  += a list inquiry  
|  
+= a Tape Analyzer Option inquiry
```

| +-----+-----+-----+ |         |                                        |           |
|---------------------|---------|----------------------------------------|-----------|
| Report Class        |         | Report Name                            | Report ID |
| +-----+-----+-----+ |         |                                        |           |
|                     | Perform | IBM HYDRA Performance Overview         | TAPLHA    |
|                     |         | IBM HYDRA Preference Group Analysis    | TAPLHB    |
|                     |         | IBM HYDRA Physical Tape Drive Analysis | TAPLHC    |
|                     |         | IBM HYDRA Virtual Tape Mount Analysis  | TAPLHD    |
| +-----+-----+-----+ |         |                                        |           |

Figure 3-20. MICF Distributed Inquiries for IBM Hydra

These MICF inquiries for IBM Hydra TS7700 series are accessed through the MICF Inquiries panel of the CA MICS Workstation Facility (MWF).

The first subsection below explains the layout and user-modifiable fields in the MICF displays for IBM Hydra inquiries. The next sections discuss each of the MICF inquiries for IBM Hydra TS7700 series virtual tape servers:

- 1 - IBM Hydra MICF Inquiry General Information
- 2 - IBM Hydra Performance Overview (TAPLHA)
- 3 - IBM Hydra Cache Preference Group Analysis (TAPLHB)
- 4 - IBM Hydra Physical Tape Drive Analysis (TAPLHC)
- 5 - IBM Hydra Virtual Tape Mount Analysis (TAPLHD)

### 3.2.3.1 IBM Hydra MICF Inquiry General Information

All IBM Hydra MICF inquiries use similar inquiry specification panels. In addition, the report headings have similar content. The specification panels and report headings are described in the following sections:

- 1 - IBM Hydra MICF Inquiry Specification Panels
- 2 - IBM Hydra Report Headers

### 3.2.3.1.1 IBM Hydra MICS Inquiry Specification Panels

The rules for filling in fields on the panels are identical for all IBM Hydra reports, with the following exceptions:

- o The "Composing Inquiry" line is different for each report. It gives the report ID (for example, TAPLHA) and the report title (for example, IBM Hydra Performance Overview Report).

A sample inquiry specification panel for inquiry TAPLHA is shown below. Explanations for field choices follow.

```
+-----+
| ----- MICS IBM Hydra Inquiry ----- |
| Command ==>                               |
| Composing Inquiry: TAPLHA - IBM Hydra Performance Overview |
| Database ==> _                               |
| Cycle(s) ==> _ - _                               |
| Timespan ==> _____ (DETAIL/DAYS/WEEKS/MONTHS) |
| Report by hour (DETAIL, DAYS, WEEKS only) ==> _ (Y/N) |
| Generate report for each value of ZONE ==> _ (Y/N) |
| Data Selection:                               |
|      dd mmm yy   dd mmm yy   dd mmm yy   dd mmm yy   |
| Date Ranges ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Hour ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Zone ==> _ - _ - _ - _ - _ - _ - _ - _ - _ |
| Cluster ID Selection - ALL (default) |
| (HVTCLID) ==> _ - _ - _ - _ - _ - _ - _ - _ - _ (blank/0-7) |
+-----+
```

Composing Inquiry: - Required. No default. The report ID and report title.

Database - Required. No default. Up to six database unit IDs can be specified (the IDs of the CA MICS database units from which files are read). Duplicates are not allowed. 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. The cycle of the specified timespan of the CA MICS files that are used as input to the analysis. A range of cycles can be specified. The fields can contain any numeric value between 0 and 99. If a single cycle is required (such as cycle 01), it must be specified in the first entry field, and the second field must be blank. Leading zeros are not required and are inserted automatically if a single-digit number is entered (for example, 7 becomes 07). If a cycle range is specified, it can be specified in either ascending or descending order (for example, 01-05 or 05-01).

Timespan - Required. Default varies by report. The timespan of the CA MICS files that are used as input to the analysis. Required input files must be available at the specified timespan.

Report by hour - Required. Defaults to Y. At the DAYS and WEEKS timespans, reports can be produced at an hourly, daily, or weekly level. If you specify Y (Yes), the data is summarized and displayed by hour, and separate reports are produced for each day or week. If you specify N (No), the data is summarized by day or week, and a single report listing all days or weeks is produced.

Generate report for each value of Zone - Required. Defaults to N. Reports for each zone can be generated when requested if you specify Y (Yes). The nature and resource requirements of processing often change from one zone to another (for example, prime shift online demands versus production batch requirements at non-prime shift periods). Zone reporting gives you the ability to display separate reports for each observed zone. If you specify N (No), the data is summarized to the appropriate level and displayed on a single report.

Date Ranges - 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 the higher range can be specified before the lower range. For example, a valid date

range specification is specifying date range 1 as 01 JAN 09 - 31 DEC 09 and specifying date range 2 as 01 JAN 08 - 31 DEC 08. 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. 0 to 23. Up to three hour ranges. 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. The hour ranges should not overlap, but the higher range can be specified before the lower range. For example, a valid hour range specification is 18 - 23 and 09 - 17. 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 any specified hour range.

Zone - Optional. No default. A one-character value from 1 to 9. Up to nine zone values can be specified. An input observation is selected if its zone value is equal to any of the specified values.

Cluster ID (HVTCLID) - Optional. Default is blank. The specific Cluster ID's on which to report. Valid values are blank or any numbers 0 through 7. If specific Cluster ID's are specified, the observations that are selected for reporting are limited to those that match the ID's. The default value (blank) means that all Cluster ID's are selected for reporting.



### 3.2.3.1.2 IBM Hydra Report Headers

The report headings for all IBM Hydra reports are similar and consist of general information. The headings and content are as follows:

#### o General Hydra and report information

All IBM Hydra report headings include the following general information:

| Report Label        | Example                                            |
|---------------------|----------------------------------------------------|
| -----               | -----                                              |
| report title        | CA MICS IBM Hydra Cache Preference<br>Group Report |
| report granularity  | Data Presented by Hour within DAY                  |
| Inquiry             | TAPLHB                                             |
| Run Date            | 10SEPy                                             |
| Cluster             |                                                    |
| Identification #    | 0                                                  |
| Node                |                                                    |
| Identification #    | 0                                                  |
| Node Serial Number  | 78-AB123                                           |
| Grid Composite      |                                                    |
| Identification      | 10000                                              |
| Distributed Library |                                                    |
| Sequence #          | 00001                                              |
| Virtual Engine      |                                                    |
| Code Level          | 5.4.2.132                                          |
| Report Start        | 08SEPy                                             |
| Report End          | 10SEPy                                             |
| Timespan            | DAYS                                               |

The data elements used to populate the heading data are:

|                     |                                                  |
|---------------------|--------------------------------------------------|
| Report title        | MICF generated                                   |
| Report granularity  | MICF generated                                   |
| Inquiry             | MICF generated                                   |
| Run Date            | MICF generated                                   |
| Cluster Id          | HVTCLID - Cluster ID                             |
| Node Identification | HVTNODE - Node ID                                |
| Node Serial #       | HVTSN - Node Serial Number                       |
| Grid Composite      |                                                  |
| Identification      | HVTGRID - Grid Composite ID                      |
| Distributed Library |                                                  |
| Sequence #          | HVTDLSN - Distributed Library<br>Sequence Number |
| Virtual Engine Code |                                                  |
| Level               | HVTVECD - VE Code Level                          |

|              |                |
|--------------|----------------|
| Report Start | MICF generated |
| Report End   | MICF generated |
| Timespan     | MICF generated |

The first column of each report indicates the time period represented by each line of the report and is dynamically changed based on the report granularity. For example, if the report is by-hour-within-day, the first column heading will be HOUR, and each line of the report will list the hour value reported (for example, 0, 1, 2, and so on). If the report is by-day-within-month, however, the first column heading will be DAY, and each line of the report will list the day value reported (for example, 01-Mo, 02-Tu, 03-We, and so on).

### 3.2.3.2 IBM Hydra Performance Overview (TAPLHA)

The CA MICS IBM Hydra Performance Overview Report provides a consolidated view of important virtual tape server metrics. While each of the other IBM VTS reports focuses on a particular area of the VTS (such as the physical tape drives, cache, or virtual mounts) this overview report provides a consolidated set of critical performance metrics that quantify the performance, throughput, and constraining factors such as throttling.

Of particular interest are the percentage of VTS DASD cache virtual volume mount misses, and non-zero throttle percentages. Cache misses and throttling degrade the optimal performance of the virtual tape subsystem.

The report uses the report header described in section 3.2.3.1.2.

The report body reports on the following measurements from left to right:

Interval count:

- o Number of Recording Intervals      - INTERVLS

Virtual Mounts (virtual mount counts, by type, scratch and specific, with a further breakdown of specific mounts by hits and misses. The percentage of cache misses is also provided):

- o Total Virtual Mounts                      - HCATVM
- o Virtual Fast-Ready (Scratch) Mounts      - HCAFRM
- o Total Virtual Specific Mounts              - HCACHM+HCACMM
- o Specific Cache-Hit Mounts                - HCACHM
- o Specific Cache-Miss Mounts                - HCACMM
- o Percent of specific mounts that were  
    cache misses                              - HCAPCVCM

Data Transferred (data moved in and out of the VTS DASD cache):

- o Channel blocks written to cache (1000s)      - HCANUMBS
- o Estimated Avg channel block blocksize      - HCAAVBSZ
- o GB Data Read from VTS DASD Cache          - HCAVDR
- o GB Data Written to VTS DASD Cache          - HCAVDW

Note: HCANUMBS is divided by 1000 for reporting. HCAVDR and HCAVDW are divided by 1024 to convert MB to GB for reporting.

Channel MB/Sec (minimum, average, and maximum MB data per second passing through z/OS host channels to/from the VTS DASD cache):

- o Minimum Channel MB per second - HCAMNCDS
- o Average Channel MB per second - HCAAVCDS
- o Maximum Channel MB per second - HCAMXCDS

Compress Ratios (data compression ratios for data written to cache):

- o Compression ratio writes to VTS DASD Cache - HCAAVCWC

Throttle percentages:

- o Write-overflow throttle percentage - HCAPCWOT
- o Copy-predominant percentage - HCAPCCPT
- o Deferred-copy percentage - HCAPCDCT

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

All report data is generated from the Hydra Cluster Summary (HVTHCA) file.

To produce the report:

1. Enter the CA MICS Workstation Facility (MWF)
2. Select option 2, CA MICS Information Center Facility (MICF)
3. Select option 2, Database Inquiries
4. Select TAPLHA, IBM HYDRA Performance Overview, in Catalog Group PERFORM
5. Complete the MICF Execution panel
6. Complete the specification panel.  
Refer to section 3.2.3.1.1, IBM HYDRA MICF Inquiry Specification Panels, for information about modifiable panel fields.

|                              |      |                                               |       |        |       |       |      |         |       |                              |       |                             |       |                            |        |     |          |          |  |        |
|------------------------------|------|-----------------------------------------------|-------|--------|-------|-------|------|---------|-------|------------------------------|-------|-----------------------------|-------|----------------------------|--------|-----|----------|----------|--|--------|
| Inquiry : TAPLHA             |      | CA MICS IBM Hydra Performance Overview Report |       |        |       |       |      |         |       |                              |       |                             |       | Page 001                   |        |     |          |          |  |        |
| Run Date: 29MAYyy            |      | Data Presented by Hour within Day             |       |        |       |       |      |         |       |                              |       |                             |       |                            |        |     |          |          |  |        |
| Cluster Identification #: 0  |      | Grid Composite Identification: 10000          |       |        |       |       |      |         |       |                              |       | Report Start: 28MAYyy:00:00 |       |                            |        |     |          |          |  |        |
| Node Identification #: N/A   |      | Distributed Library Sequence #: 10001         |       |        |       |       |      |         |       |                              |       | Report End : 29MAYyy:00:00  |       |                            |        |     |          |          |  |        |
| Node Serial Number: 78-42FG3 |      | Virtual Engine Code Level: 8.5.0.154          |       |        |       |       |      |         |       |                              |       | Timespan : DAYS             |       |                            |        |     |          |          |  |        |
| ----- Day: 28MAYyy -----     |      |                                               |       |        |       |       |      |         |       |                              |       |                             |       |                            |        |     |          |          |  |        |
| ----- Virtual Mounts -----   |      |                                               |       |        |       |       |      |         |       | ----- Data Transferred ----- |       |                             |       | ----- -Channel MB/Sec----- |        |     | Compress | Throttle |  | Values |
|                              |      |                                               |       |        | Cache | Cache | Pct  | 1000's  | Avg   | GB                           | GB    |                             |       |                            | Ratio  |     |          | Defr     |  |        |
| HOURL                        | Numb | Total                                         | Scrth | Spcfic | Hits  | Miss  | Miss | Ch Blks | BSize | Cache                        | Cache | Min                         | Avg   | Max                        | Wrt to | Wrt | Copy     | Copy     |  |        |
|                              | Intv |                                               |       |        |       |       |      | Written | (Est) | Read                         | Write |                             |       |                            | Cache  | Pct | Pct      | Pct      |  |        |
| 0                            | 4    | 137                                           | 73    | 64     | 64    | 0     | 0%   | 6940.87 | 28000 | 0.0                          | 81.1  | 28.6                        | 51.2  | 61.6                       | 2.22   | 3%  | 0%       | 0%       |  |        |
| 1                            | 4    | 443                                           | 303   | 140    | 139   | 1     | 1%   | 23869.7 | 26000 | 2.0                          | 225.8 | 142.8                       | 211.6 | 271.3                      | 3.26   | 0%  | 0%       | 0%       |  |        |
| 2                            | 4    | 311                                           | 203   | 108    | 107   | 1     | 1%   | 26503.6 | 40000 | 1.5                          | 251.2 | 229.8                       | 288.2 | 329.2                      | 4.02   | 0%  | 0%       | 0%       |  |        |
| 3                            | 4    | 218                                           | 119   | 99     | 99    | 0     | 0%   | 14052.6 | 39000 | 5.6                          | 164.8 | 137.4                       | 153.8 | 171.5                      | 3.10   | 0%  | 0%       | 0%       |  |        |
| 4                            | 4    | 198                                           | 127   | 71     | 71    | 0     | 0%   | 9551.71 | 35000 | 15.0                         | 131.2 | 30.9                        | 112.3 | 203.7                      | 2.60   | 0%  | 0%       | 0%       |  |        |
| 5                            | 4    | 144                                           | 109   | 35     | 35    | 0     | 0%   | 9387.68 | 33000 | 0.0                          | 177.3 | 50.3                        | 89.0  | 112.3                      | 1.76   | 0%  | 0%       | 0%       |  |        |
| 6                            | 4    | 153                                           | 100   | 53     | 53    | 0     | 0%   | 5880.13 | 37000 | 0.6                          | 146.5 | 52.3                        | 60.6  | 75.6                       | 1.45   | 0%  | 0%       | 0%       |  |        |
| 7                            | 4    | 159                                           | 96    | 63     | 59    | 4     | 6%   | 6496.04 | 32000 | 0.1                          | 131.9 | 40.6                        | 62.7  | 84.5                       | 1.67   | 0%  | 0%       | 0%       |  |        |
| 8                            | 4    | 177                                           | 71    | 106    | 99    | 7     | 7%   | 3491.27 | 25000 | 1.2                          | 64.2  | 20.0                        | 25.9  | 30.4                       | 1.40   | 0%  | 0%       | 0%       |  |        |
| 9                            | 4    | 116                                           | 39    | 77     | 64    | 13    | 17%  | 1955.04 | 23000 | 9.1                          | 28.7  | 4.8                         | 16.5  | 25.8                       | 1.51   | 0%  | 0%       | 0%       |  |        |
| 10                           | 4    | 173                                           | 71    | 102    | 97    | 5     | 5%   | 4375.45 | 25000 | 31.3                         | 46.0  | 14.7                        | 60.1  | 98.2                       | 2.64   | 0%  | 0%       | 0%       |  |        |
| 11                           | 4    | 219                                           | 66    | 153    | 147   | 6     | 4%   | 5224.22 | 23000 | 7.2                          | 62.6  | 16.0                        | 39.6  | 61.9                       | 1.98   | 0%  | 0%       | 0%       |  |        |
| 12                           | 4    | 145                                           | 62    | 83     | 83    | 0     | 0%   | 4415.21 | 24000 | 2.5                          | 66.3  | 21.6                        | 33.4  | 49.3                       | 1.70   | 0%  | 0%       | 0%       |  |        |
| 13                           | 4    | 163                                           | 49    | 114    | 105   | 9     | 8%   | 2304.81 | 24000 | 0.5                          | 33.3  | 12.5                        | 15.8  | 23.6                       | 1.65   | 0%  | 0%       | 0%       |  |        |
| 14                           | 4    | 178                                           | 122   | 56     | 56    | 0     | 0%   | 5661.48 | 24000 | 0.3                          | 77.0  | 29.2                        | 42.3  | 55.9                       | 1.92   | 0%  | 0%       | 0%       |  |        |
| 15                           | 4    | 122                                           | 89    | 33     | 33    | 0     | 0%   | 6278.13 | 25000 | 0.1                          | 92.2  | 44.0                        | 47.5  | 57.0                       | 1.80   | 0%  | 0%       | 0%       |  |        |
| 16                           | 4    | 153                                           | 88    | 65     | 58    | 7     | 11%  | 6594.72 | 29000 | 10.1                         | 92.0  | 25.2                        | 65.8  | 117.3                      | 2.15   | 0%  | 0%       | 0%       |  |        |
| 17                           | 4    | 143                                           | 114   | 29     | 28    | 1     | 3%   | 10415.0 | 25000 | 0.1                          | 83.5  | 6.1                         | 73.0  | 172.9                      | 3.07   | 0%  | 0%       | 0%       |  |        |
| 18                           | 4    | 174                                           | 89    | 85     | 84    | 1     | 1%   | 5593.18 | 24000 | 1.1                          | 71.3  | 15.6                        | 40.3  | 68.0                       | 1.95   | 0%  | 0%       | 0%       |  |        |
| 19                           | 4    | 125                                           | 83    | 42     | 41    | 1     | 2%   | 5646.15 | 25000 | 0.1                          | 76.4  | 20.7                        | 45.4  | 88.0                       | 2.08   | 0%  | 0%       | 0%       |  |        |
| 20                           | 4    | 160                                           | 105   | 55     | 49    | 6     | 11%  | 5325.32 | 25000 | 6.4                          | 64.7  | 18.0                        | 45.9  | 71.6                       | 2.30   | 0%  | 0%       | 0%       |  |        |
| 21                           | 4    | 120                                           | 83    | 37     | 33    | 4     | 11%  | 4850.14 | 27000 | 0.2                          | 66.7  | 23.6                        | 42.2  | 64.0                       | 2.22   | 0%  | 0%       | 0%       |  |        |
| 22                           | 4    | 293                                           | 214   | 79     | 60    | 19    | 24%  | 22502.5 | 24000 | 14.0                         | 226.1 | 107.4                       | 144.3 | 201.1                      | 2.06   | 0%  | 0%       | 0%       |  |        |
| 23                           | 4    | 149                                           | 116   | 33     | 33    | 0     | 0%   | 19926.2 | 27000 | 15.8                         | 251.5 | 105.6                       | 148.0 | 195.6                      | 1.90   | 22% | 0%       | 0%       |  |        |
| Tots                         | 96   | 4373                                          | 2591  | 1782   | 1697  | 85    | 5%   | 217241  | 29000 | 124.7                        | 2712  | 4.8                         | 113.0 | 329.2                      | 2.35   | 1%  | 0%       | 0%       |  |        |

Figure 3-21. CA MICS IBM Hydra Performance Overview

### 3.2.3.3 IBM Hydra Cache Preference Group Analysis (TAPLHB)

The CA MICS IBM Hydra Cache Preference Group Report displays important virtual tape server cache usage information for each preference group within a cache partition.

The report provides an excellent view of the DASD cache utilization, including the average number of virtual volumes resident, their average size, and total data volume. Several different views of volume age are listed (how long volumes stay in cache), and frequency of volumes migrated out of cache.

This report provides data useful for evaluating the effectiveness of preference level setting. Using preference levels for virtual volumes supports the automation of separating virtual volumes into two groups: those that should remain in cache as long as possible, and those that should be removed from cache as soon as possible.

The report uses the report header described in section 3.2.3.1.2. Additionally, in the upper left of the main report body, the cache partition reported is listed.

The report body reports on the following measurements from left to right:

Interval count and general cache volume information:

- o Number of Recording Intervals - INTERVLS
- o Avg Virtual Volumes in Cache - HPGAVVVC
- o Avg Virtual Volume Size (MB) - HPGAVVSZ
- o Avg Data Resident in Cache (GB) - HPGAVDRC

Average age of the virtual volumes in cache:

- o 4 HR Rolling Avg Virt Vol Age - HPGVA4
- o 48 HR Rolling Avg Virt Vol Age - HPGVA48
- o 35 Day Rolling Avg Virt Vol Age - HPGVA35

Number of volumes migrated last 4 and 48 hours, and 35 days:

- o Virt Vols Migrated Last 4 Hrs - HPGVM4
- o Virt Vols Migrated Last 48 Hrs - HPGVM48
- o Virt Vols Migrated Last 35 Days - HPGVM35

At the bottom of the report, a line shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

All report data is generated from the Hydra Hnode Cache Pref Grp Statistics (HVTHHA) file.

To produce the report:

1. Enter the CA MICS Workstation Facility (MWF)
2. Select option 2, CA MICS Information Center Facility (MICF)
3. Select option 2, Database Inquiries
4. Select TAPLHB, IBM HYDRA Preference Group Analysis, in Catalog Group PERFORM
5. Complete the MICF Execution panel
6. Complete the specification panel. Refer to section 3.2.3.1.1, IBM Hydra MICF Inquiry Specification Panels, for information about modifiable panel fields.

|                                                              |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      |                                                  |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
|--------------------------------------------------------------|----|-----|------|-----|-------|-------|-------|------|------|-------------------------------------------------|--|--|--|------|--------------------------------------------------|------|-----|-----|-----|-----------------------------|------|-------|--|--|--|--|--|--|--|
| Inquiry : TAPLHB                                             |    |     |      |     |       |       |       |      |      | CA MICS IBM Hydra Cache Preference Group Report |  |  |  |      |                                                  |      |     |     |     | Page 001                    |      |       |  |  |  |  |  |  |  |
| Run Date: 29MAYyy                                            |    |     |      |     |       |       |       |      |      | Data Presented by Hour within Day               |  |  |  |      |                                                  |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| Cluster Identification #: 0                                  |    |     |      |     |       |       |       |      |      | Grid Composite Identification: 10000            |  |  |  |      |                                                  |      |     |     |     | Report Start: 28MAYyy:00:00 |      |       |  |  |  |  |  |  |  |
| Node Identification #: 0                                     |    |     |      |     |       |       |       |      |      | Distributed Library Sequence #: 10001           |  |  |  |      |                                                  |      |     |     |     | Report End : 29MAYyy:00:00  |      |       |  |  |  |  |  |  |  |
| Node Serial Number: 78-42FG3                                 |    |     |      |     |       |       |       |      |      | Virtual Engine Code Level: 8.5.0.154            |  |  |  |      |                                                  |      |     |     |     | Timespan : DAYS             |      |       |  |  |  |  |  |  |  |
| -----                                                        |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      |                                                  |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| Cache Partition # 1                                          |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | Day: 28MAYyy                                     |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| ----- Preference Group 0 (Remove from Cache) -----           |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | ----- Preference Group 1 (Keep in Cache) -----   |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| +-----                                                       |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | +-----                                           |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| Avg Vol Cache Volume Age Migrated                            |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | Avg Vol Cache Volume Age Migrated                |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| Numb Vols in Size Data 4-HR 48-HR 35-DY Last                 |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | Vols in Size Data 4-HR 48-HR 35-DY Last          |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| HOUR Intv Cache (MB) (GB) HH:MM HH:MM HH:MM 4-HR 48-HR 35-DY |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | Cache (MB) (GB) (--- HOURS ---) 4-HR 48-HR 35-DY |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| -----                                                        |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | -----                                            |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| 0                                                            | 4  | 253 | 764  | 194 | 52:22 | 13:47 | 11:38 | 593  | 8927 | 134176                                          |  |  |  | 4542 | 1098                                             | 4988 | 341 | 344 | 318 | 219                         | 1073 | 14319 |  |  |  |  |  |  |  |
| 1                                                            | 4  | 359 | 618  | 221 | 1:46  | 13:47 | 11:38 | 682  | 8890 | 134176                                          |  |  |  | 4551 | 1104                                             | 5026 | 338 | 343 | 318 | 219                         | 1073 | 14319 |  |  |  |  |  |  |  |
| 2                                                            | 4  | 559 | 812  | 454 | 1:58  | 13:46 | 11:38 | 823  | 8933 | 134176                                          |  |  |  | 4496 | 1108                                             | 4983 | 334 | 343 | 318 | 312                         | 1084 | 14319 |  |  |  |  |  |  |  |
| 3                                                            | 4  | 591 | 906  | 535 | 2:22  | 13:46 | 11:38 | 1152 | 9043 | 134176                                          |  |  |  | 4386 | 1110                                             | 4870 | 330 | 343 | 318 | 171                         | 1091 | 14319 |  |  |  |  |  |  |  |
| 4                                                            | 4  | 547 | 744  | 407 | 2:47  | 13:45 | 11:38 | 1101 | 9034 | 134176                                          |  |  |  | 4411 | 1109                                             | 4893 | 327 | 342 | 318 | 171                         | 1048 | 14319 |  |  |  |  |  |  |  |
| 5                                                            | 4  | 213 | 806  | 172 | 4:00  | 13:52 | 11:38 | 1298 | 8702 | 134176                                          |  |  |  | 4435 | 1108                                             | 4912 | 324 | 342 | 318 | 171                         | 1048 | 14319 |  |  |  |  |  |  |  |
| 6                                                            | 4  | 108 | 980  | 106 | 3:36  | 13:52 | 11:38 | 1337 | 8892 | 134176                                          |  |  |  | 4456 | 1105                                             | 4925 | 322 | 341 | 318 | 78                          | 1048 | 14319 |  |  |  |  |  |  |  |
| 7                                                            | 4  | 15  | 1071 | 16  | 2:42  | 13:52 | 11:38 | 1175 | 8981 | 134176                                          |  |  |  | 4474 | 1106                                             | 4947 | 325 | 341 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 8                                                            | 4  | 35  | 767  | 27  | 1:45  | 13:52 | 11:38 | 1133 | 8986 | 134176                                          |  |  |  | 4511 | 1117                                             | 5038 | 327 | 340 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 9                                                            | 4  | 20  | 661  | 13  | 36:05 | 16:51 | 11:38 | 766  | 8995 | 134176                                          |  |  |  | 4529 | 1123                                             | 5088 | 329 | 340 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 10                                                           | 4  | 26  | 573  | 15  | 36:46 | 16:55 | 11:38 | 529  | 8995 | 134176                                          |  |  |  | 4561 | 1125                                             | 5132 | 329 | 340 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 11                                                           | 4  | 25  | 584  | 14  | 37:43 | 16:59 | 11:38 | 411  | 8939 | 134176                                          |  |  |  | 4586 | 1124                                             | 5155 | 330 | 339 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 12                                                           | 4  | 25  | 846  | 21  | 38:43 | 17:05 | 11:38 | 386  | 8953 | 134176                                          |  |  |  | 4610 | 1123                                             | 5175 | 330 | 339 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 13                                                           | 4  | 22  | 738  | 16  | 4:26  | 17:12 | 11:38 | 397  | 8917 | 134176                                          |  |  |  | 4621 | 1124                                             | 5195 | 330 | 338 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 14                                                           | 4  | 34  | 740  | 25  | 5:26  | 17:21 | 11:38 | 487  | 8893 | 134176                                          |  |  |  | 4659 | 1123                                             | 5233 | 331 | 338 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 15                                                           | 4  | 30  | 1002 | 30  | 6:26  | 17:30 | 11:38 | 543  | 8901 | 134176                                          |  |  |  | 4665 | 1122                                             | 5232 | 332 | 337 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 16                                                           | 4  | 30  | 1001 | 30  | 7:26  | 17:41 | 11:38 | 586  | 8922 | 134176                                          |  |  |  | 4697 | 1119                                             | 5254 | 334 | 337 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 17                                                           | 4  | 37  | 783  | 29  | 8:26  | 17:53 | 11:38 | 712  | 8916 | 134176                                          |  |  |  | 4709 | 1118                                             | 5265 | 337 | 336 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 18                                                           | 4  | 31  | 766  | 24  | 9:26  | 18:06 | 11:38 | 690  | 8921 | 134176                                          |  |  |  | 4717 | 1119                                             | 5279 | 340 | 336 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 19                                                           | 4  | 28  | 782  | 22  | 10:26 | 18:21 | 11:38 | 677  | 8908 | 134176                                          |  |  |  | 4730 | 1123                                             | 5310 | 342 | 336 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 20                                                           | 4  | 30  | 656  | 20  | 11:26 | 18:37 | 11:38 | 689  | 8892 | 134176                                          |  |  |  | 4737 | 1126                                             | 5332 | 343 | 335 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 21                                                           | 4  | 29  | 742  | 21  | 12:26 | 18:54 | 11:38 | 648  | 8914 | 134176                                          |  |  |  | 4736 | 1127                                             | 5338 | 345 | 335 | 318 | 0                           | 1048 | 14319 |  |  |  |  |  |  |  |
| 22                                                           | 4  | 78  | 1114 | 87  | 9:58  | 18:54 | 11:38 | 706  | 8958 | 134176                                          |  |  |  | 4767 | 1123                                             | 5352 | 346 | 334 | 318 | 63                          | 1024 | 14319 |  |  |  |  |  |  |  |
| 23                                                           | 4  | 183 | 1834 | 335 | 7:23  | 18:53 | 11:55 | 643  | 9020 | 134325                                          |  |  |  | 4540 | 1128                                             | 5123 | 341 | 334 | 320 | 294                         | 684  | 14241 |  |  |  |  |  |  |  |
| -----                                                        |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      | -----                                            |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |
| Tots                                                         | 96 | 138 | 845  | 118 | 13:10 | 16:19 | 11:39 | 757  | 8935 | 134182                                          |  |  |  | 4589 | 1117                                             | 5127 | 334 | 339 | 318 | 71                          | 1037 | 14316 |  |  |  |  |  |  |  |
| -----                                                        |    |     |      |     |       |       |       |      |      |                                                 |  |  |  |      |                                                  |      |     |     |     |                             |      |       |  |  |  |  |  |  |  |

Figure 3-22. IBM Hydra Cache Preference Group Analysis



### 3.2.3.4 IBM Hydra Physical Tape Drive Analysis (TAPLHC)

The CA MICS IBM Hydra Physical Tape Drive Analysis Report displays physical tape drive and tape mount statistics for the real tape drives attached to the virtual tape server, including cartridge mount statistics broken down by type, such as those for recall (due to a virtual volume DASD cache miss) or reclamation (because the reclamation threshold has been met).

The report uses the report header described in section 3.2.3.1.2.

The report body reports on the following measurements from left to right:

Interval count and general tape drive information:

- o Number of Recording Intervals - INTERVLS
- o Number of Installed Physical Tape Device - HHA VIPD
- o Avg Physical Drives Available - HHA VAPD

Minimum, average, and maximum number of concurrently mounted physical drives:

- o Min Physical Drives Concur Mounted - HHAMNPDM
- o Avg Physical Drives Concur Mounted - HHA AVPDM
- o Max Physical Drives Concur Mounted - HHAMXPDM

Tape mount counts, total and by category:

- o Total Physical Mounts - HHATPM
- o Physical Stage (Recall) Mounts - HHAPRM
- o Physical Migrate (Copy) Mounts - HHAPPM
- o Physical Reclaim Mounts - HHARCM
- o Physical Secure Data Erase Mounts - HHAPSM

Minimum, average, and maximum mount times (mm:ss)

- o Min Physical Mount Time - HHAMNMTM
- o Avg Physical Mount Time - HHA AVMTM
- o Max Physical Mount Time - HHAMXMTM

Amount of data transferred to and from physical cartridges:

- o Data Read from Physical Media (MB) - HHADRP
- o Data Written to Physical Media (MB) - HHADWP

Number of logical volumes, and borrowed private and scratch stacked volumes:

- o Number of Active Logical Volumes        - HHAVALV
- o Borrowed Stacked Private Cartridges    - HHAABPV
- o Borrowed Stacked Scratch Cartridges   - HHAABSV

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages, as appropriate for the detailed data in each column.

All report data is generated from the Hydra Hnode Activity (HVTHHA) file.

To produce the report:

1. Enter the CA MICS Workstation Facility (MWF)
2. Select option 2, CA MICS Information Center Facility (MICF)
3. Select option 2, Database Inquiries
4. Select TAPLHC, IBM HYDRA Physical Tape Drive Analysis, in Catalog Group PERFORM
5. Complete the MICF Execution panel
6. Complete the specification panel. Refer to section 3.2.3.1.1, IBM Hydra MICF Inquiry Specification Panels, for information about modifiable panel fields.

|                              |              |                                                   |     |                                       |     |     |                            |       |      |                             |     |                   |              |              |                    |         |        |          |    |
|------------------------------|--------------|---------------------------------------------------|-----|---------------------------------------|-----|-----|----------------------------|-------|------|-----------------------------|-----|-------------------|--------------|--------------|--------------------|---------|--------|----------|----|
| Inquiry : TAPLHC             |              | CA MICS Hydra Physical Tape Drive Analysis Report |     |                                       |     |     |                            |       |      |                             |     | Page 001          |              |              |                    |         |        |          |    |
| Run Date: 29MAYyy            |              | Data Presented by Hour within Day                 |     |                                       |     |     |                            |       |      |                             |     |                   |              |              |                    |         |        |          |    |
| Cluster Identification #: 0  |              |                                                   |     | Grid Composite Identification: 10000  |     |     |                            |       |      | Report Start: 28MAYyy:00:00 |     |                   |              |              |                    |         |        |          |    |
| Node Identification #: 0     |              |                                                   |     | Distributed Library Sequence #: 10001 |     |     |                            |       |      | Report End : 29MAYyy:00:00  |     |                   |              |              |                    |         |        |          |    |
| Node Serial Number: 78-42FG3 |              |                                                   |     | Virtual Engine Code Level: 8.5.0.154  |     |     |                            |       |      | Timespan : DAYS             |     |                   |              |              |                    |         |        |          |    |
| -----                        |              |                                                   |     |                                       |     |     |                            |       |      |                             |     |                   |              |              |                    |         |        |          |    |
| Day: 28MAYyy                 |              |                                                   |     |                                       |     |     |                            |       |      |                             |     |                   |              |              |                    |         |        |          |    |
|                              |              |                                                   |     |                                       |     |     |                            |       |      |                             |     |                   |              |              |                    |         |        |          |    |
|                              |              | -Tape--                                           |     | Concurrent                            |     |     | -----VTS Mount Counts----- |       |      |                             |     | ---Mount Times--- |              |              | Cartridge MB Data- |         | Active | Borrowed |    |
| HOUR                         | Numb<br>Intv | Drives                                            |     | Mounts                                |     |     | Total                      | Recal | Copy | Reclm                       | SDE | Min<br>MM:SS      | Avg<br>MM:SS | Max<br>MM:SS | Transferred        |         |        |          |    |
|                              |              | Ins                                               | Avl | Min                                   | Avg | Max |                            |       |      |                             |     |                   |              |              | Read               | Written |        |          |    |
| 0                            | 4            | 8                                                 | 8   | 3                                     | 5   | 9   | 6                          | 2     | 4    | 0                           | 0   | 0:00              | 0:30         | 0:45         | 7478               | 688925  | 181222 | 1459     | 20 |
| 1                            | 4            | 8                                                 | 8   | 0                                     | 2   | 7   | 3                          | 0     | 3    | 0                           | 0   | 0:00              | 0:21         | 0:24         | 0                  | 189025  | 181196 | 1465     | 20 |
| 2                            | 4            | 8                                                 | 8   | 0                                     | 2   | 5   | 3                          | 1     | 2    | 0                           | 0   | 0:00              | 0:36         | 1:01         | 4186               | 136453  | 180966 | 1465     | 20 |
| 3                            | 4            | 8                                                 | 8   | 1                                     | 7   | 9   | 11                         | 1     | 10   | 0                           | 0   | 0:00              | 0:26         | 0:38         | 7738               | 556542  | 180905 | 1467     | 20 |
| 4                            | 4            | 8                                                 | 8   | 2                                     | 6   | 9   | 13                         | 0     | 11   | 2                           | 0   | 0:19              | 0:24         | 0:39         | 940                | 427563  | 180979 | 1474     | 20 |
| 5                            | 4            | 8                                                 | 8   | 1                                     | 6   | 9   | 8                          | 1     | 7    | 0                           | 0   | 0:00              | 0:23         | 0:32         | 1153               | 429266  | 181006 | 1474     | 20 |
| 6                            | 4            | 8                                                 | 8   | 1                                     | 8   | 9   | 21                         | 6     | 14   | 1                           | 0   | 0:20              | 0:26         | 0:44         | 4952               | 593089  | 181316 | 1476     | 20 |
| 7                            | 4            | 8                                                 | 8   | 4                                     | 7   | 9   | 11                         | 7     | 4    | 0                           | 0   | 0:20              | 0:36         | 2:09         | 21933              | 251546  | 181520 | 1481     | 20 |
| 8                            | 4            | 8                                                 | 8   | 3                                     | 7   | 9   | 26                         | 19    | 7    | 0                           | 0   | 0:19              | 0:25         | 0:50         | 63414              | 174058  | 181566 | 1478     | 20 |
| 9                            | 4            | 8                                                 | 8   | 2                                     | 4   | 9   | 8                          | 6     | 2    | 0                           | 0   | 0:19              | 0:22         | 0:34         | 18766              | 74721   | 181581 | 1478     | 20 |
| 10                           | 4            | 8                                                 | 8   | 2                                     | 6   | 9   | 12                         | 5     | 6    | 1                           | 0   | 0:00              | 0:23         | 0:32         | 18332              | 137832  | 181583 | 1478     | 20 |
| 11                           | 4            | 8                                                 | 8   | 2                                     | 5   | 9   | 15                         | 6     | 8    | 1                           | 0   | 0:18              | 0:21         | 0:30         | 14001              | 88829   | 181574 | 1478     | 20 |
| 12                           | 4            | 8                                                 | 8   | 3                                     | 5   | 8   | 10                         | 4     | 6    | 0                           | 0   | 0:00              | 0:22         | 0:38         | 10212              | 185775  | 181570 | 1477     | 20 |
| 13                           | 4            | 8                                                 | 8   | 2                                     | 6   | 9   | 20                         | 17    | 3    | 0                           | 0   | 0:18              | 0:21         | 0:31         | 55815              | 110434  | 181572 | 1474     | 20 |
| 14                           | 4            | 8                                                 | 8   | 2                                     | 4   | 8   | 4                          | 0     | 4    | 0                           | 0   | 0:00              | 0:19         | 0:21         | 3208               | 184446  | 181578 | 1474     | 20 |
| 15                           | 4            | 8                                                 | 8   | 3                                     | 4   | 8   | 6                          | 1     | 5    | 0                           | 0   | 0:00              | 0:26         | 0:33         | 3441               | 184843  | 181571 | 1474     | 20 |
| 16                           | 4            | 8                                                 | 8   | 2                                     | 4   | 8   | 9                          | 3     | 6    | 0                           | 0   | 0:18              | 0:26         | 0:48         | 62                 | 248070  | 181563 | 1474     | 20 |
| 17                           | 4            | 8                                                 | 8   | 1                                     | 3   | 5   | 6                          | 0     | 6    | 0                           | 0   | 0:18              | 0:19         | 0:21         | 0                  | 176157  | 181565 | 1474     | 20 |
| 18                           | 4            | 8                                                 | 8   | 2                                     | 5   | 9   | 9                          | 0     | 8    | 1                           | 0   | 0:00              | 0:23         | 0:34         | 0                  | 220819  | 181567 | 1475     | 20 |
| 19                           | 4            | 8                                                 | 8   | 2                                     | 5   | 6   | 6                          | 0     | 4    | 2                           | 0   | 0:00              | 0:20         | 0:24         | 0                  | 156907  | 181570 | 1477     | 20 |
| 20                           | 4            | 8                                                 | 8   | 4                                     | 6   | 8   | 6                          | 0     | 6    | 0                           | 0   | 0:00              | 0:20         | 0:22         | 0                  | 184722  | 181574 | 1474     | 20 |
| 21                           | 4            | 8                                                 | 8   | 2                                     | 4   | 7   | 6                          | 0     | 6    | 0                           | 0   | 0:18              | 0:20         | 0:26         | 2049               | 178973  | 181566 | 1473     | 20 |
| 22                           | 4            | 8                                                 | 8   | 2                                     | 4   | 7   | 6                          | 2     | 4    | 0                           | 0   | 0:00              | 0:22         | 0:27         | 6407               | 202022  | 181555 | 1470     | 20 |
| 23                           | 4            | 8                                                 | 8   | 0                                     | 5   | 9   | 10                         | 0     | 8    | 2                           | 0   | 0:00              | 0:33         | 0:50         | 1566               | 274582  | 181458 | 1473     | 20 |
| Tots                         | 96           | 8                                                 | 8   | 0                                     | 5   | 9   | 235                        | 81    | 144  | 10                          | 0   | 0:00              | 0:24         | 0:39         | 245653             | 6055599 | 181422 | 1473     | 20 |
| -----                        |              |                                                   |     |                                       |     |     |                            |       |      |                             |     |                   |              |              |                    |         |        |          |    |

Figure 3-23. IBM Hydra Physical Tape Drive Analysis

### 3.2.3.5 IBM Hydra Virtual Tape Mount Analysis (TAPLHD)

The CA MICS Hydra Virtual Tape Mount Analysis Report displays statistics for the virtual tape mounts satisfied by the virtual tape server. The report provides the total cache size and cache usage in addition to the total number of virtual tape mounts with three sets of statistics for each mount type: scratch (fast-ready), cache hit, and cache miss (recall). The final two report columns show the percent of specific virtual mount requests that were cache misses, both as a number and a graphic. At a glance, this graphic shows periods where excessive cache misses occur. Cache misses result in degraded virtual tape performance.

The report uses the report header described in section 3.2.3.1.2.

The report body reports on the following measurements from left to right:

Interval count, cache usage, and total number of virtual mounts:

|                                   |            |
|-----------------------------------|------------|
| o Number of Recording Intervals   | - INTERVLS |
| o Total Cache Size (GB)           | - HHCAVTVC |
| o Avg Data Resident in Cache (GB) | - HHCAVDRC |
| o Percent Cache Utilization       | - HHCPCCUT |
| o Avg Virtual Volumes in Cache    | - HHCAVVVC |
| o Avg Virtual Volume Size         | - HHCAVVSZ |
| o Total Virtual Mounts            | - HHCTVM   |

Virtual scratch (fast-ready) mount statistics:

|                                     |            |
|-------------------------------------|------------|
| o Virtual Fast-Ready Mounts         | - HHCFRM   |
| o Avg Virtual Fast-Ready Mount Time | - HHCAVFTM |

Virtual cache hit mount statistics:

|                                    |            |
|------------------------------------|------------|
| o Virtual Cache-Hit Mounts         | - HHCCHM   |
| o Avg Virtual Cache-Hit Mount Time | - HHCAVHTM |

Virtual cache miss (recall) mount statistics:

|                                 |            |
|---------------------------------|------------|
| o Virtual Recall Mounts         | - HHCCMM   |
| o Avg Virtual Recall Mount Time | - HHCAVRTM |

Percentage of specific mounts that were cache misses, resulting in the recall of a virtual tape from a physical cartridge. This value is displayed as both a percentage and

a graphic:

o Pct Virtual Specific Mount Cache Misses - HHCPVCVM

At the bottom of the report, a line is generated that shows summary totals, minimums, maximums, averages, or percentages as appropriate for the detailed data in each column.

All report data is generated from the Hydra Hnode Cache Activity (HVTHHA) file.

To produce the report:

1. Enter the CA MICS Workstation Facility (MWF)
2. Select option 2, CA MICS Information Center Facility (MICF)
3. Select option 2, Database Inquiries
4. Select TAPLHD, IBM HYDRA Virtual Tape Mount Analysis, in Catalog Group PERFORM
5. Complete the MICF Execution panel
6. Complete the specification panel. Refer to section 3.2.3.1.1, IBM Hydra MICF Inquiry Specification Panels, for information about modifiable panel fields.

|                              |    |                                                  |       |       |      |                             |             |             |             |             |              |          |                                |   |
|------------------------------|----|--------------------------------------------------|-------|-------|------|-----------------------------|-------------|-------------|-------------|-------------|--------------|----------|--------------------------------|---|
| Inquiry : TAPLHD             |    | CA MICS Hydra Virtual Tape Mount Analysis Report |       |       |      |                             |             |             |             |             |              | Page 001 |                                |   |
| Run Date: 29MAYyy            |    | Data Presented by Hour within Day                |       |       |      |                             |             |             |             |             |              |          |                                |   |
| Cluster Identification #: 0  |    | Grid Composite Identification: 10000             |       |       |      | Report Start: 28MAYyy:00:00 |             |             |             |             |              |          |                                |   |
| Node Identification #: 0     |    | Distributed Library Sequence #: 10001            |       |       |      | Report End : 29MAYyy:00:00  |             |             |             |             |              |          |                                |   |
| Node Serial Number: 78-42FG3 |    | Virtual Engine Code Level: 8.5.0.154             |       |       |      | Timespan : DAYS             |             |             |             |             |              |          |                                |   |
| -----                        |    |                                                  |       |       |      |                             |             |             |             |             |              |          |                                |   |
| Day: 28MAYyy                 |    |                                                  |       |       |      |                             |             |             |             |             |              |          |                                |   |
|                              |    |                                                  |       |       |      |                             |             |             |             |             |              |          |                                |   |
|                              |    | Cache                                            | Data  |       | Avg  | Avg                         | --Scratch-- |             | -Cache Hit- |             | -Cache Miss- |          | -----Percent Cache Misses----- |   |
|                              |    | Size                                             | in    | Pct   | Vol  | Vol                         | (Fast Ready |             | Hit Hit     |             | (Recalls)    |          |                                |   |
|                              |    | Cache                                            | Cache | Cache | in   | Size                        | Total       | Scr Avg     | Total Avg   | Miss Avg    |              |          | Pct                            | 1 |
| HOUR                         |    | Numb                                             | Size  | Cache | Util | Cache                       | Mounts      | Total MM:SS | Total MM:SS | Total MM:SS | Total MM:SS  | Miss     |                                | 0 |
|                              |    | Intv                                             | (GB)  | (GB)  |      |                             |             |             |             |             |              |          |                                | 0 |
| -----                        |    |                                                  |       |       |      |                             |             |             |             |             |              |          |                                |   |
| 0                            | 4  | 6000                                             | 5181  | 86%   | 4795 | 1081                        | 137         | 73 0:01     | 64 0:01     | 0 0:00      | 0%           |          |                                |   |
| 1                            | 4  | 6000                                             | 5248  | 87%   | 4910 | 1069                        | 443         | 303 0:01    | 139 0:01    | 1 1:06      | 1% *         |          |                                |   |
| 2                            | 4  | 6000                                             | 5437  | 91%   | 5055 | 1076                        | 311         | 203 0:01    | 107 0:01    | 1 1:22      | 1% *         |          |                                |   |
| 3                            | 4  | 6000                                             | 5405  | 90%   | 4977 | 1086                        | 218         | 119 0:01    | 99 0:01     | 0 0:00      | 0%           |          |                                |   |
| 4                            | 4  | 6000                                             | 5300  | 88%   | 4958 | 1069                        | 198         | 127 0:01    | 71 0:01     | 0 0:00      | 0%           |          |                                |   |
| 5                            | 4  | 6000                                             | 5083  | 85%   | 4647 | 1094                        | 144         | 109 0:01    | 35 0:01     | 0 0:00      | 0%           |          |                                |   |
| 6                            | 4  | 6000                                             | 5030  | 84%   | 4564 | 1102                        | 153         | 100 0:01    | 53 0:01     | 0 0:00      | 0%           |          |                                |   |
| 7                            | 4  | 6000                                             | 4963  | 83%   | 4489 | 1106                        | 159         | 96 0:01     | 59 0:01     | 4 1:48      | 6% **        |          |                                |   |
| 8                            | 4  | 6000                                             | 5065  | 84%   | 4546 | 1114                        | 177         | 71 0:01     | 99 0:01     | 7 1:52      | 7% **        |          |                                |   |
| 9                            | 4  | 6000                                             | 5101  | 85%   | 4549 | 1121                        | 116         | 39 0:00     | 64 0:00     | 13 1:05     | 17% ****     |          |                                |   |
| 10                           | 4  | 6000                                             | 5147  | 86%   | 4587 | 1122                        | 173         | 71 0:01     | 97 0:01     | 5 1:01      | 5% *         |          |                                |   |
| 11                           | 4  | 6000                                             | 5169  | 86%   | 4610 | 1121                        | 219         | 66 0:01     | 147 0:01    | 6 1:26      | 4% *         |          |                                |   |
| 12                           | 4  | 6000                                             | 5196  | 87%   | 4635 | 1121                        | 145         | 62 0:01     | 83 0:00     | 0 0:00      | 0%           |          |                                |   |
| 13                           | 4  | 6000                                             | 5211  | 87%   | 4643 | 1122                        | 163         | 49 0:01     | 105 0:00    | 9 1:18      | 8% **        |          |                                |   |
| 14                           | 4  | 6000                                             | 5258  | 88%   | 4693 | 1121                        | 178         | 122 0:01    | 56 0:00     | 0 0:00      | 0%           |          |                                |   |
| 15                           | 4  | 6000                                             | 5262  | 88%   | 4694 | 1121                        | 122         | 89 0:01     | 33 0:00     | 0 0:00      | 0%           |          |                                |   |
| 16                           | 4  | 6000                                             | 5284  | 88%   | 4727 | 1118                        | 153         | 88 0:01     | 58 0:01     | 7 0:36      | 11% ***      |          |                                |   |
| 17                           | 4  | 6000                                             | 5294  | 88%   | 4746 | 1116                        | 143         | 114 0:01    | 28 0:00     | 1 0:54      | 3% *         |          |                                |   |
| 18                           | 4  | 6000                                             | 5303  | 88%   | 4748 | 1117                        | 174         | 89 0:01     | 84 0:01     | 1 1:24      | 1% *         |          |                                |   |
| 19                           | 4  | 6000                                             | 5332  | 89%   | 4758 | 1121                        | 125         | 83 0:01     | 41 0:00     | 1 0:38      | 2% *         |          |                                |   |
| 20                           | 4  | 6000                                             | 5352  | 89%   | 4767 | 1123                        | 160         | 105 0:01    | 49 0:01     | 6 0:39      | 11% ***      |          |                                |   |
| 21                           | 4  | 6000                                             | 5359  | 89%   | 4765 | 1125                        | 120         | 83 0:00     | 33 0:00     | 4 1:06      | 11% ***      |          |                                |   |
| 22                           | 4  | 6000                                             | 5439  | 91%   | 4846 | 1123                        | 293         | 214 0:01    | 60 0:01     | 19 0:48     | 24% *****    |          |                                |   |
| 23                           | 4  | 6000                                             | 5457  | 91%   | 4722 | 1156                        | 149         | 116 0:01    | 33 0:01     | 0 0:00      | 0%           |          |                                |   |
| -----                        |    |                                                  |       |       |      |                             |             |             |             |             |              |          |                                |   |
| Tots                         | 96 | 6000                                             | 5245  | 87%   | 4726 | 1110                        | 4373        | 2591 0:01   | 1697 0:01   | 85 1:06     | 5% *         |          |                                |   |
| -----                        |    |                                                  |       |       |      |                             |             |             |             |             |              |          |                                |   |

Figure 3-24. IBM Hydra Virtual Tape Mount Analysis

## Chapter 4: EXCEPTIONS

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The CA MICS Tape Analyzer Option does not distribute sample exceptions. The infrastructure supporting user defined exceptions, however, is in place for both the TLM and VTS Components.





# Chapter 5: FILES

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The CA MICS Tape Analyzer Option (TAP) is comprised of two separately deployable CA MICS components:

- o Tape Library Management (TLM) component
- o Virtual Tape Subsystems (VTS) component

This section contains the following topics:

[5.1 TLM Component Files](#) (see page 145)

[5.2 VTS Component Files](#) (see page 166)

## 5.1 TLM Component Files

The Tape Library Management (TLM) Component organizes files into a single information area:

TMC - Tape Management Catalog Information Area

The following sections provide an overview of the data element naming conventions used for the TLM component files, followed by descriptions of each file in the TMC information area.

- 1 - TLM Component Data Element Naming Conventions
- 2 - Tape Dataset File (TMCTMD)
- 3 - Tape Volume File (TMCTMV)

### 5.1.1 TLM Component 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.

TCM - Tape Management Catalog Information Area

|                     |        |                  |
|---------------------|--------|------------------|
| +-----+-----+-----+ |        |                  |
| File Name           | File   | Names Begin With |
| +-----+-----+-----+ |        |                  |
| Tape Data Set       | TMCTMD | TMD              |
| Tape Volume         | TMCTMV | TMV              |
| +-----+-----+-----+ |        |                  |

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 will find Common data elements are listed under Sequence/Summary Data Elements and Common Data Elements in the Data Elements List sections that follow.

### 5.1.2 TMC Information Area Files

This section identifies each file in the Tape Management Catalog (TMC) Information Area and defines its levels of summarization and data sequencing. The active data elements for each file are also listed.

The files maintained in the TMC Information Area include:

- 1 - Tape Data Set File (TMCTMD)
- 2 - Tape Volume File (TMCTMV)

#### 5.1.2.1 Tape Data Set File (TMCTMD)

The Tape Data Set file contains information about individual tape data sets managed by the tape management system.

At the DETAIL timespan, the TMCTMD file contains one record for each active tape data set. For tape data sets that reside on a single volume, there is one record in the DETAIL timespan TMCTMD file. For multivolume tape data sets, there are multiple records, one for each data set segment on each of the tape volumes spanned.

Tape data sets created during the TMCC scan process are deemed 'Future' data sets. When the TMCC scan starts, it sets the ENDTS (End timestamp) to base all duration calculations on. Tape data sets created during the TMCC scan process will have a later create date than the ENDTS which would result in negative durations and invalid calculations based off timestamp durations. To preserve data integrity, these 'Future' data sets are discarded during DAY091 input processing and the count of 'Future' data sets dropped is displayed in a MICSLOG message.

At summarized timespans, Data Set Name (DSNAME) and VOLSER are dropped. Tape Library Identifier (TAPELIB), TMS Product Name (TLMPROD), TLMACtN account codes, Volume Group (VOLGROUP), and Storage Class related data elements serve as summarization keys. This significantly reduces the volume of summarized TMCTMD timespan files. It is important that due consideration is given in setting the TLMACtN and VOLGROUP summarization key values so that summarized timespans meet organizational reporting, chargeback, and analysis requirements.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - TMCTMD File Organization
- 2 - TMCTMD Data Elements List
- 3 - TMCTMD Usage Considerations
- 4 - TMCTMD Retrieval Examples

### 5.1.2.1.1 TMCTMD 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   | TAPELIB                   | TLMPROD  | TLMACT1  | TLMACT2  | TLMACT3  |  |
|          | VOLGROUP                  | STORNAME | STORSTGC | STORMGTC | STORDATC |  |
|          | YEAR                      | MONTH    | DAY      | HOURL    | ENDTS    |  |
| DAYS     | TAPELIB                   | TLMPROD  | TLMACT1  | TLMACT2  | TLMACT3  |  |
|          | VOLGROUP                  | STORNAME | STORSTGC | STORMGTC | STORDATC |  |
|          | YEAR                      | MONTH    | DAY      | HOURL    |          |  |
| WEEKS    | TAPELIB                   | TLMPROD  | TLMACT1  | TLMACT2  | TLMACT3  |  |
|          | VOLGROUP                  | STORNAME | STORSTGC | STORMGTC | STORDATC |  |
|          | YEAR                      | WEEK     | ZONE     | HOURL    |          |  |
| MONTHS   | TAPELIB                   | TLMPROD  | TLMACT1  | TLMACT2  | TLMACT3  |  |
|          | VOLGROUP                  | STORNAME | STORSTGC | STORMGTC | STORDATC |  |
|          | 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 5-1. TMCTMD Sort Sequence and Data Granularity

#### 5.1.2.1.2 TMCTMD 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-<br>Span * | Data<br>Element | Data Element<br>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 | STORDATC | - DFSMS Data Class Name       |
| XDWM..E | STORMGTC | - DFSMS Management Class Name |
| XDWM..E | STORNAME | - DFSMS Storage Group Name    |
| XDWM..E | STORSTGC | - DFSMS Storage Class Name    |
| XDWM..E | TAPELIB  | - Tape Library Identifier     |
| XDWM..E | TLMACT1  | - DIVISION                    |
| XDWM..E | TLMACT2  | - PROJECT                     |
| XDWM..E | TLMACT3  | - USER                        |
| XDWM..E | TLMPROD  | - Tape Management System Name |
| XDWM..E | VOLGROUP | - Volume Group                |
| XDW...E | WEEK     | - Week of Year                |
| XDWM..E | YEAR     | - Year of Century             |
| XDWM..E | ZONE     | - Time Zone                   |

#### Common Data Elements

|         |          |                                     |
|---------|----------|-------------------------------------|
| X.....E | BASEVOL  | - Base Volume of Set (CA 1)         |
| X.....E | BLKSIZE  | - Data Set Physical Block Size      |
| XD....E | DAYNAME  | - Name of Day of Week               |
| X.....E | DSNAME   | - Data Set Name                     |
| XDWM..E | DURATION | - Recording Interval Time           |
| XDWM..E | ENDTS    | - End Time Stamp                    |
| X.....E | FIRSTVOL | - First Volume of Set               |
| XDWM..E | INTERVLS | - Number of Recording Intervals     |
| X.....E | LRECL    | - Data Set Logical Record Length    |
| X.....E | MVMSID   | - Multi-Volume, Multi-Dataset ID    |
| XDWM..E | ORGSYSID | - Originating System Identification |
| X.....E | RECFM    | - Data Set Record Format            |
| X.....E | SCRATCH  | - Scratch Status                    |
| X.....E | SERVICE  | - Service Status                    |
| XDWM..E | STARTTS  | - Start Time Stamp                  |
| XDWM..E | SYSID    | - System Identifier                 |
| X.....  | TLMFSEG  | - First Segment of Data Set Flag    |

```

X..... TLMFSET - First Volume of Volume Set Flag
X..... TLMFVOL - First File of Volume Flag
X..... TLMLSEG - Last Segment of Data Set Flag
X..... TLMLSET - Last Volume of Volume Set Flag
X..... TLMLVOL - Last File of Volume Flag
X.....E TLMPROD - Tape Management System Id Code
X.....E TLMRLSE - Tape Management System Release
XDWM..E TLMSCAN - TMCC Scan Count
X..... TMCLAST - TMCC Previous Scan Timestamp
X..... TMCSKAN - TMCC Scan Timestamp
X.....E VOLCNT - Volumes in Volume Set
X.....E VOLSEQ - Volume Sequence in Volume Set
X.....E VOLSER - Volume Serial Number

```

#### Retained Data Elements

```

X..... TMDAUBLK - Exception Codes
X..... TMDAUDCD - Audit Code
X..... TMDAUDID - Audit User ID
X.....E TMDAUDIT - Audit Timestamp
X.....E TMDCCDN - Creation DDname
X.....E TMDCJOB - Creation Job
XDWM..E TMDCLOSE - Close Indicator
X.....E TMDCOMPR - Compression Rate
X.....E TMDCPGM - Creating Program
X.....E TMDCPUID - Creation System ID
X.....E TMDCREAT - Creation Timestamp
X.....E TMDCRSID - Create System ID Data Set Record
X.....E TMDCSTEP - Creation Step
X.....E TMDCUNIT - Creation Device Address
X.....E TMDDEN - Recording Density
X.....E TMDDKPDT - Data Set Keep Date
X.....E TMDDSNSQ - Data Set Sequence Number
X..... TMDDSSEQ - Data Set Sequence Number on Volume
X.....E TMDEXPDO - Original Data Set Expiration Date
X.....E TMDEXPDT - Data Set Expiration Date
X.....E TMDFILCT - File Count
X.....E TMDFPERC - Percent of Volume Used by File
X.....E TMDJXPDT - Expiration Date(Julian)
X.....E TMDKEYIX - Tape Encryption Key Index
X.....E TMDLAST - Last Use Timestamp
X.....E TMDLB TYP - Tape Label Type
X..... TMDLCDAT - Last Change Date of Data Set Record
X.....E TMDLCSID - Last Change System of Data Set Record
X..... TMDLCTIM - Last Change Time of Data Set Record
X.....E TMDLCUID - Last Change Userid of Data Set Record
X.....E TMDLDDNM - Last Use DD Name
X.....E TMDLJOB - Last Use Jobname
X.....E TMDLPGM - Last Use Program

```

```

X..... TMDLRDDT - Date Data Set Last Read
X.....E TMDLSTEP - Last Use Step Name
X.....E TMDLUNIT - Last Use Device Address
X..... TMDLWTD - Date Data Set Last Written
X.....E TMDOUTLO - Out of Area Location Code
X.....E TMDOWNDS - Data Set Owner
X..... TMDRETDT - Retention Date
X..... TMDSECLG - Security Level - Long
X..... TMDSECLV - Security Level - Short
X..... TMDTBLKS - Cumulative Total Block Count
X.....E TMDTMPDS - Temporary Data Set Indicator
X.....E TMDTRTCH - Data Set Recording Technique
X.....E TMDUSER - User Data
X.....E TMDUSRID - User ID (Transactions)
X.....E TMDVOWNR - Volume Owner/EDM ID
X..... TMDVRS - Primary VRS Subchain Start Date
X..... TMDVRSJB - Matching VRS Job Name Mask
X..... TMDVRSNM - Matching VRS Name
X..... TMDVRSR - Retained by VRS Count
X..... TMDVRSSC - Primary VRS Subchain Name
X..... TMDVRSTP - Matching VRS Type
X..... TMDVRSV - VRS Management Value
X..... TMD2VJBN - Secondary VRS Jobname Mask
X..... TMD2VNME - Secondary VRS Name Mask
X..... TMD2VSCH - Secondary VRS Subchain Name
X..... TMD2VXDS - Secondary VRS Subchain Startdate

```

#### Accumulated Data Elements

```

XDWM..E TMDAGE - Data Set Age (Days)
XDWM..E TMDAGECT - Count of Datasets With Creation Date
XDWM..E TMDBLKCT - Block Count
XDWM.. TMDCOMP - Compaction Used Count
XDWM..E TMDCOST - Space Charges
XDWM.. TMDCPYCT - Copycat Created Tape
XDWM..E TMDDEFRT - Default RETPD Used
XDWM..E TMDSDUR - Data Set Duration
XDWM..E TMDDSNCT - Data Set Count
XDWM..E TMDSSZK - Approx. Data Set Size (KB)
XDWM..E TMDSSZM - Approx. Data Set Size (MB)
XDWM..E TMDURSP - Amount of Space-Time (Megabyte Hours)
XDWM..E TMDFCAT - File is on OS Catalog
XDWM..E TMDKBHR - Amount of Space-Time (Kilobyte Hours)
XDWM..E TMDLUSCT - Count of Datasets with Last Usage Date
XDWM..E TMDLUSE - Days Since Last Use
XDWM..E TMDNCRYP - Encrypted Data Set Count
XDWM.. TMDNOBLK - Invalid Blksize Count
X..... TMDRDCAT - Read Via Catalog Indicator
X..... TMDRECRE - Recreated Indicator

```



XDWM..E TMDSEGS - Data Set Segments

#### Maximum Data Elements

XDWM..E TMDMXAGE - Max Data Set Age (Days)

XDWM..E TMDMXDSD - Max Data Set Duration

XDWM..E TMDMXLUS - Max Days Since Last Use

#### Derived Data Elements

XDWM..E TMDAVAGE - Avg Data Set Age (Days)

XDWM..E TMDAVDSD - Avg Data Set Duration

XDWM..E TMDAVLUS - Avg Days Since Last Use

XDWM..E TMDAVSEG - Avg Data Set Segments

XDWM..E TMDAVSZK - Avg Approx. Data Set Size (KB)

XDWM..E TMDAVSZM - Avg Approx. Data Set Size (MB)

### 5.1.2.1.3 TMCTMD Usage Considerations

This section identifies any special considerations or techniques related to using the TMCTMD file.

### 5.1.2.1.4 TMCTMD 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. Using the most current DETAIL timespan TMCTMD file, list all tape data sets created in the last 30 days with a high level data set name qualifier of 'CMPR'. Display the data set name, volser, creation date, space used, and the job name, job step, and JCL DDNAME used to create the data set.

```
DATA;
SET &PTMCX..TMCTMD01;
IF DSNAME=: 'CMPR';
CDATE=DATEPART(TMDCREAT) ;
IF CDATE > DATEPART(ENDTS) - 30;
FORMAT CDATE DATE8. ;
* ;
PROC PRINT LABEL ;
VAR DSNAME VOLSER CDATE TMDDSSZM TMDCJOB TMDCSTEP TMDCDDN ;
FORMAT CDATE DATE8. ;
TITLE1 'CMPR* Data Sets Created in Last Month' ;
```

2. When CA 1 is the the input data source, the data element VOLCNT is always zero. The code below will compute VOLCNT for reporting purposes.

```
PROC SQL;
CREATE VIEW WORK.TEMP1 AS
SELECT *
FROM &TM CX..TMCTMD01
ORDER BY MVMSID DESC, TLMLSET DESC, TMDDSNSQ DESC ;
QUIT;
DATA TEMP2 / VIEW=TEMP2 ; SET TEMP1;
RETAIN XCNT ;
LENGTH XSEQ 2 XBASE $6 ;
XSEQ = INPUT(SUBSTR(MVMSID,9,2),PIB2.);
XBASE = INPUT(SUBSTR(MVMSID,1,6),$CHAR6.);
IF TLMFSET AND TLMLSET THEN DO;
VOLCNT = 1;
END;
ELSE DO;
IF TLMLSET THEN DO;
XCNT = XSEQ;
VOLCNT = XCNT;
END;
IF (TLMFSET = 0 AND TLMLSET = 0) OR TLMFSET THEN DO;
VOLCNT = XCNT;
END;
END;
RUN;
/* user report code using VOLCNT would follow */
/* using work.temp2 as the input */
```

### 5.1.2.2 Tape Volume File (TMCTMV)

The Tape Volume File contains information about each in-service tape volume in the tape library catalog.

In-service tape volumes are defined as follows:

- o For CA 1 (r) Tape Management, any volume that is not in DELETE status.
- o For CA TLMS (r) Tape Management, any volume that is not in Out-of-Service status.
- o For DFSMS/MVS Removable Media Manager (RMM), all volumes in the catalog are considered in-service.

Scratch volumes are considered in-service in the TMC. Data element SCRATCH (Scratch Status) indicates whether the tape is scratch or not.

For CA 1 and CA TLMS, volumes in the DELETE and Out-of-Service status, respectively either do not exist, are physically damaged, or are otherwise inaccessible. These volume records are discarded by the TLM component DAY091 step. A MICSLOG message displays how many out-of-service volumes were discarded during the DAY091 daily update step.

While the Tape Management Catalog Collector (TMCC) is running to read and extract the tape data from your tape management catalog, tape volumes and tape datasets continue to be created. As a result, the extracted TMCC records might include the tape volumes created after the TMCC starts. These are deemed 'future' records. When the TMCC starts, it first sets the End Timestamp (ENDTS) value for all extracted records, on which all duration calculations are based. These records will have a create datetime after the End Timestamp, which would result in negative durations and invalid calculations based off of timestamp durations. To preserve data integrity, these 'future' volumes are written to the Tape Volume (TMCTMV) file as a scratch volume, and the count displayed in a MICSLOG message. These 'future' volumes and datasets will be picked up on the next TMCC run and the appropriate durations will be applied.

At the DETAIL timespan, the TMCTMV file contains one record for each in-service tape volume managed by the tape library.

At summarized timespans, the Volume Serial Number (VOLSER) is dropped. Tape Library Identifier (TAPELIB), TMS Product Name Volume Group (VOLGROUP) and DFSMS Management Class Name (STORMGTC) serve as summarization keys. This significantly reduces the volume of summarized TMCTMV timespans files. It is important that due consideration is given in setting the VOLGROUP summarization key values so that the summarized timespans meet organizational reporting and analysis requirements.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - TMCTMV File Organization
- 2 - TMCTMV Data Elements List
- 3 - TMCTMV Usage Considerations
- 4 - TMCTMV Retrieval Examples

### 5.1.2.2.1 TMCTMV 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   | TAPELIB                   | TLMPROD | STORMGTC | VOLGROUP | YEAR |  |
|          | MONTH                     | DAY     | HOUR     | ENDTS    |      |  |
| DAYS     | TAPELIB                   | TLMPROD | STORMGTC | VOLGROUP | YEAR |  |
|          | MONTH                     | DAY     | HOUR     |          |      |  |
| WEEKS    | TAPELIB                   | TLMPROD | STORMGTC | VOLGROUP | YEAR |  |
|          | MONTH                     | WEEK    | ZONE     | HOUR     |      |  |
| MONTHS   | TAPELIB                   | TLMPROD | STORMGTC | VOLGROUP | 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 5-2. TMCTMV Sort Sequence and Data Granularity

### 5.1.2.2.2 TMCTMV 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                               |
|---------|----------|-------------------------------|
| XD...E  | DAY      | - Day of Month                |
| XDW...E | HOURL    | - Hour of Day                 |
| XDWM..E | MONTH    | - Month of Year               |
| XDWM..E | STORMGTC | - DFSMS Management Class Name |
| XDWM..E | TAPELIB  | - Tape Library Identifier     |
| XDWM..E | TLMPROD  | - Tape Management System Name |

XDWM..E VOLGROUP - Volume Group  
XDW...E WEEK - Week of Year  
XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

#### Common Data Elements

X.....E BASEVOL - Base Volume of Set (CA 1)  
XD....E DAYNAME - Name of Day of Week  
XDWM..E DURATION - Recording Interval Time  
XDWM..E ENDTS - End Time Stamp  
X.....E FIRSTVOL - First Volume of Set  
XDWM..E INTERVLS - Number of Recording Intervals  
X.....E MMDSID - Multi-Volume, Multi-Dataset ID  
XDWM..E ORGSYSID - Originating System Identification  
X.....E SCRATCH - Scratch Status  
X.....E SERVICE - Service Status  
XDWM..E STARTTS - Start Time Stamp  
XDWM..E SYSID - System Identifier  
X..... TLMFRMT - CTM Record Format  
X..... TLMFSEG - First Segment of Data Set Flag  
X..... TLMFSET - First Volume of Volume Set Flag  
X..... TLMFVOL - First File of Volume Flag  
X..... TLMSEG - Last Segment of Data Set Flag  
X..... TLMSET - Last Volume of Volume Set Flag  
X..... TLMVOL - Last File of Volume Flag  
X..... TLMPROD - Tape Management System Id Code  
X..... TLMRLSE - Tape Management System Release  
X..... TLMRTYPE - CTM Record Type  
XDWM..E TLMSCAN - TMCC Scan Count  
X..... TMCLAST - TMCC Previous Scan Timestamp  
X..... TMCSCAN - TMCC Scan Timestamp  
X.....E VOLCNT - Volumes in Volume Set  
X.....E VOLSEQ - Volume Sequence in Volume Set  
X.....E VOLSER - Volume Serial Number

#### Retained Data Elements

X..... TMVACLST - Number of Access List Entries  
X..... TMVACTFL - Active Files  
X.....E TMVACTUL - Actual Volser In Use Indicator  
X.....E TMVACTVL - Actual Volser of Tape  
X.....E TMVAGENT - Tape Agent  
X..... TMVALVER - ANSI Label Versions  
X..... TMVASTS - Assigned Timestamp  
X..... TMVAUBLK - Exception Codes  
X.....E TMVAUDCD - Audit Code  
X.....E TMVAUDID - Audit User ID  
X.....E TMVAUDIT - Audit Timestamp

```

X..... TMVAUTID - Authorized User Ids Area
X.....E TMVBLP - Volume Last Written BLP
X..... TMVBMEDN - Bin Media Name
X.....E TMVCAP - Volume Capacity In Mbytes
X..... TMVCDS - CDS File Sequence
X.....E TMVCLOC - Current Location Name
X.....E TMVCPUID - Creation System ID
X.....E TMVCREAT - Volume Creation Timestamp
X..... TMVCRSID - Create System ID of Volume Record
X..... TMVDATCR - Date Certified
X.....E TMVDATSC - Date Volume Scratched
X.....E TMVDBIN - Destination Bin Number
X.....E TMVDBINM - Destination Bin Media Name
X.....E TMVDEFRT - Parmlib Default Retention Used
X.....E TMVDEN - Recording Density
X.....E TMVDEST - Destination Name
X.....E TMVDESTP - Destination Type
X..... TMVDSNBA - Active DSNB Indicator
X.....E TMVDSNNO - Number of Datasets On Volume
X..... TMVDSNRC - DS Recording
X..... TMVDSN1 - First File Data Set Name
X.....E TMVDTECL - Date Cleaned
X.....E TMVDTEMV - Date Moved to Location
X.....E TMVEXPDO - Expiration Date - Original
X.....E TMVEXPDT - Expiration Date - Current
X..... TMVFEAT - Program Product Feature Code
X.....E TMVHLOC - Home Location Name
X.....E TMVHOMTP - Home Location Type
X..... TMVINCON - In Container Name
X..... TMVINIT - Reinitialize
X.....E TMVINTDT - Initial Date
X.....E TMVINUSE - Stacking Volume In-Use Indicator
X..... TMVKYEN1 - Encrypt Key Encoding Method 1
X..... TMVKYEN2 - Encrypt Key Encoding Method 2
X..... TMVKYLB1 - Encryption Key Label 1
X..... TMVKYLB2 - Encryption Key Label 2
X.....E TMVLAST - Volume Last Use Timestamp
X.....E TMVLBL1 - Label No of First File On Volume
X.....E TMVLBTYP - Label Type
X..... TMVLCHTS - Last Volume Record Change Timestamp
X..... TMVLCSID - Last Change System ID of Volume Record
X..... TMVLCUID - Last Change User ID of Volume Record
X..... TMVLNLOC - Loan Location
X.....E TMVLOAN - Volume On Loan
X.....E TMVLOCTP - Location Type
X.....E TMVLUDEV - Last Used Drive
X.....E TMVMEDAT - Special Attributes
X.....E TMVMEDCT - Compaction Technique
X..... TMVMEDIN - Media Information

```



X.....E TMVMEDRF - Volume Recording Format  
 X.....E TMVMEDTY - Volume Media Type  
 X.....E TMVMMVID - Multi-Dataset, Multi-Volume ID  
 X.....E TMVMVDS1 - First Dsname of a Volume Set  
 X..... TMVMVMOD - Move Mode  
 X.....E TMVNAME - Media Name  
 X.....E TMVNEXTP - Next Location Type  
 X..... TMVNLOC - Required Location Name  
 X.....E TMVNOSTK - Volume Not Stackable Indicator  
 X.....E TMVNRS - Tape is Non-Resident  
 X..... TMVNTFY - Notify Owner  
 X.....E TMVNXTVL - Next Volume  
 X.....E TMVOBIN - Previous Bin Number  
 X..... TMVOBMED - Previous Bin Media Name  
 X.....E TMVOCER - Volume Recorded By O/C/E0V  
 X..... TMVOLNLO - Previous Loan Location  
 X.....E TMVOLOC - Previous Location Name  
 X.....E TMVOPEN - Volume is Opened  
 X..... TMVOUTCD - Out-of-Service Codes  
 X..... TMVOUTDT - Out-of-Service Date  
 X.....E TMVOUTLO - Location Id  
 X.....E TMVOUTSL - Location Slot ID  
 X.....E TMVOWNAC - Owner Access - R/U/A  
 X.....E TMVOWNID - Volume Owner Id  
 X.....E TMVPNDRS - Volume Pending Release  
 X..... TMVPPNUM - Program Product Number  
 X.....E TMVPPTAP - Program Product Tape  
 X.....E TMVPREVL - Previous Volume  
 X.....E TMVRACK - Rack Number  
 X..... TMVRBYST - Volume Retained By Set  
 X..... TMVRELIX - Ignore Expdt  
 X..... TMVREPL - Replace On Release  
 X..... TMVRETD - Retention Date Calculated By VRS  
 X..... TMVRETS - Return Action - OWNER/SCRATCH  
 X.....E TMVROBID - Robot Device Number  
 X.....E TMVROBTY - Robot Device Type  
 X..... TMVRQPTY - Movement Priority  
 X.....E TMVRTNDT - TLMS Retention Data  
 X.....E TMVSCRFG - Scratch Flag  
 X.....E TMVSCRS - Scratch Source  
 X..... TMVSECLG - Security Level - Long  
 X..... TMVSECLV - Security Level - Short  
 X..... TMVSERAS - Security Erase  
 X.....E TMVSGNAM - Storage Group Name  
 X.....E TMVSRVIN - Service Status  
 X.....E TMVSTACK - Files Dynamically Stacked  
 X.....E TMVSTBIN - Bin Number  
 X..... TMVSTDAT - Movement Tracking Date  
 X..... TMVSTKVL - Stacked Volume Record Enabled

X.....E TMVSTVLS - Logical Vols on Physical Volume  
X..... TMVTAPLN - Tape Length  
X..... TMVTAPTP - Tape Type  
X.....E TMVTMSCL - Times Cleaned  
X.....E TMVTRANS - Volume In Transit  
X.....E TMVTRTCH - Recording Technique  
X.....E TMVUSECL - Uses Since Cleaned  
X.....E TMVUSEFL - User Description  
X.....E TMVUSER - User Data  
X.....E TMVUSRAC - User Access - R/U  
X.....E TMVVDGAU - Volume Has Been Degaussed  
X.....E TMVVENDR - Media Vendor  
X..... TMVVER - Program Product Ver/Rel/Mod Number  
X.....E TMVVEEDT - Volume Expiration Date  
X.....E TMVVKPDT - Volume Keep Date  
X.....E TMVVLRTD - Volume Last Read Date  
X.....E TMVVLWDT - Volume Last Write Date  
X.....E TMVVOLT - Volume Type  
X.....E TMVVOWNR - Volume Owner/EDM ID  
X.....E TMVPERC - Percent of Volume In Use  
X.....E TMVRS - Volume Retained By VRS  
X.....E TMVSR - Tape Vaulted Due to Spec Req  
X..... TMVWWID - World Wide WORM Id  
X..... TMVXTOKN - Export Token

### Accumulated Data Elements

XDWM..E TMVACERA - Pending Action: Erase  
XDWM..E TMVACINI - Pending Action: Initialize  
XDWM..E TMVACNOT - Pending Action: Notify  
XDWM..E TMVACREP - Pending Action: Replace Volume  
XDWM..E TMVACRET - Pending Action: Return to Owner  
XDWM..E TMVACSCR - Pending Action: Return to Scratch  
XDWM..E TMVACTOT - Total Pending Actions  
XDWM..E TMVAGE - Volume Age from Creation (Days)  
XDWM..E TMVAGECT - Count of Volumes With Creation Date  
X.....E TMVBADTP - Bad Tape Indicator  
XDWM..E TMVBAGCT - Count of Volumes with Birth Date  
XDWM..E TMVBAGE - Volume Age from Birth (Days)  
X.....E TMVBYCAT - Expired By Catalog  
X.....E TMVBYCYC - Expired By Cycle  
X.....E TMVBYJUL - Expired By Julian  
X.....E TMVBYLDT - Expired By Last Date  
X.....E TMVBYSMS - Expired By SMS  
X.....E TMVBTMS - Expired By TMS Interface  
X.....E TMVCLEAN - Clean Indicator  
X.....E TMVCOMP - Compaction Use Count  
XDWM..E TMVCPYCT - Copycat Created Tape  
X.....E TMVDEFEX - Default Expdt Used At Open

X.....E TMVDELET - Delete Indicator  
 XDWM..E TMVDURSP - Amount of Space-Time (Megabyte Hours)  
 X.....E TMVDYNAM - DYNAM/TLMS Controlled Indicator  
 X.....E TMVEDM - EDM Controlled Indicator  
 X.....E TMVERASE - Data Set Erase Required  
 XDWM..E TMVFILES - Total Files on Non-Scratch Volumes  
 XDWM..E TMVGBHR - Amount of Space-Time (Gigabyte Hours)  
 X.....E TMVINTCH - Internal Change Indicator  
 XDWM..E TMVKBHR - Amount of Space-Time (Kilobyte Hours)  
 XDWM..E TMVLUSCT - Count of Volumes with Last Usage Date  
 XDWM..E TMVLUSE - Days Since Last Use  
 X.....E TMVMULTF - Additional Files Exist On Tape  
 XDWM..E TMVMVSUS - z/OS Use Count  
 X.....E TMVOPOUT - Opened For Output Indicator  
 XDWM..E TMVPRDCL - Perm Read Errs Since Last Clean  
 XDWM..E TMVPRDIN - Perm Read Errs Since Init  
 XDWM..E TMVPWTCL - Perm Write Errs Since Last Clean  
 XDWM..E TMVPWTIN - Perm Write Errs Since Init  
 X.....E TMVRDSOV - RDS Override Indicator  
 X.....E TMVRLEVM - Released By External Vault Mgr  
 XDWM.. TMVTIMCR - Times Certified  
 XDWM..E TMVTRDCL - Temp Read Errs since Last Clean  
 XDWM..E TMVTRDIN - Temp Read Errs Since Init  
 XDWM..E TMVTUSEG - Non-Scratch Volume Usage(G)  
 XDWM..E TMVTUSEK - Non-Scratch Volume Usage(K)  
 XDWM..E TMVTUSEM - Non-Scratch Volume Usage(M)  
 XDWM..E TMVTWTCL - Temp Write Errs Since Last Clean  
 XDWM..E TMVTWTIN - Temp Write Errs Since Init  
 XDWM.. TMVUSECR - Uses Since Certification  
 X.....E TMVUSES - Total Uses  
 X.....E TMVUSER - Updated User Indicator  
 XDWM..E TMVVDUR - Volume Duration  
 XDWM..E TMVVMUSE - z/VM Use Count  
 XDWM..E TMVVOLN - Non-Scratch Volume Count  
 XDWM..E TMVVOLS - Scratch Volume Count  
 XDWM..E TMVVOLT - Total Volume Count  
 XDWM..E TMVWORM - WORM Volume Count  
 XDWM..E TMVWWMC - Write Mount Count

#### Maximum Data Elements

XDWM..E TMVMXAGE - Max Volume Age from Creation (Days)  
 XDWM..E TMVMXBAG - Max Volume Age from Birth (Days)  
 XDWM..E TMVMXLUS - Max Days Since Last Use  
 XDWM..E TMVMXVDU - Max Volume Duration

### Derived Data Elements

XDWM..E TMVAVAGE - Avg Age from Creation (Days)  
XDWM..E TMVAVBAG - Avg Age from Birth (Days)  
XDWM..E TMVAVFIL - Avg Files on Non-Scratch Volumes  
XDWM..E TMVAVLUS - Avg Days Since Last Use  
XDWM..E TMVAVOLN - Avg Non-Scratch Volumes  
XDWM..E TMVAVOLS - Avg Scratch Volumes  
XDWM..E TMVAVOLT - Avg Volumes  
XDWM..E TMVAVPRC - Avg Perm Read Errs Since Last Clean  
XDWM..E TMVAVPRI - Avg Perm Read Errs Since Init  
XDWM..E TMVAVPWC - Avg Perm Write Errs Since Last Clean  
XDWM..E TMVAVPWI - Avg Perm Write Errs Since Init  
XDWM..E TMVAVTRC - Avg Temp Read Errs Since Last Clean  
XDWM..E TMVAVTRI - Avg Temp Read Errs Since Init  
XDWM..E TMVAVTWC - Avg Temp Write Errs Since Last Clean  
XDWM..E TMVAVTWI - Avg Temp Write Errs Since Init  
XDWM..E TMVAVUSG - Avg Non-Scratch Volume Usage(G)  
XDWM..E TMVAVUSK - Avg Non-Scratch Volume Usage(K)  
XDWM..E TMVAVUSM - Avg Non-Scratch Volume Usage(M)  
XDWM..E TMVAVVUR - Avg Volume Duration  
XDWM..E TMVPCERA - Percent Erase  
XDWM..E TMVPCINI - Percent Initialize  
XDWM..E TMVPCMVS - Percent z/OS Use  
XDWM..E TMVPCNOT - Percent Notify  
XDWM..E TMVPCREP - Percent Replace Volume  
XDWM..E TMVPCRET - Percent Return to Owner  
XDWM..E TMVPCSCR - Percent Return to Scratch  
XDWM..E TMVPCVM - Percent z/VM Use  
XDWM..E TMVPCVNS - Percent of Non-Scratch Volumes  
XDWM..E TMVPCVSC - Percent of Scratch Volumes

### 5.1.2.2.3 TMCTMV Usage Considerations

This section identifies special considerations and techniques related to using the TMCTMV file.

#### 5.1.2.2.4 TMCTMV 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 number of scratch, non-scratch, total, and percent scratch volumes for each Volume Group (VOLGROUP) and DFSMS Management Class Name (STORMGTC) using the most recent DAYS timespan observation.

```
DATA ;
SET &PTMCD..TMCTMV01 ;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
*;
PROC SORT ;
  BY TAPELIB TLMPROD DATE VOLGROUP STORMGTC;
*;
PROC PRINT LABEL ;
  BY TAPELIB TLMPROD DATE ;
  PAGEBY TAPELIB ;
  ID VOLGROUP STORMGTC ;
  VAR TMVVOLT TMVVOLN TMVVOLS TMVPCVSC ;
  TITLE1 'Tape Volume Availability Report' ;
```

## 5.2 VTS Component Files

The Virtual Tape System (VTS) Component organizes files into three information areas:

IVT - IBM Virtual Tape Subsystem Information Area  
SVT - StorageTek VSM Virtual Tape Subsystem Information Area  
HVT - IBM TS7700 Hydra Information Area

The following sections provide an overview of the data element naming conventions used for the VTS component files, followed by descriptions of the files in each information area.

- 1 - VTS Component Data Element Naming Conventions
- 2 - VTS Component IVT Information Area Files
- 3 - VTS Component SVT Information Area Files
- 4 - VTS Component HVT Information Area Files

### 5.2.1 VTS Component 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.

## IBM Virtual Tape Subsystem Information Area (IVT)

| +-----+-----+                        |        |             |
|--------------------------------------|--------|-------------|
|                                      |        | Names       |
| File Name                            | File   | Begin With: |
| +-----+-----+                        |        |             |
| VTS Distributed Library Activity     | IVTVDL | VDL         |
| VTS Composite Library Activity       | IVTVCL | VCL         |
| VTS VTC Controller Detail            | IVTVTC | VTC         |
| VTS Cache Usage Preference Level     | IVTVCU | VCU         |
| VTS Physical Drive Activity          | IVTPTU | PTU         |
| VTS Volume Pool Statistics           | IVTVPS | VPS         |
| VTS Tape Library Config and Activity | IVTTCA | TCA         |
| VTS Import/Export Statistics         | IVTIEX | IEX         |
| +-----+-----+                        |        |             |

## StorageTek VSM Virtual Tape Subsystem Information Area (SVT)

| +-----+-----+                         |        |             |
|---------------------------------------|--------|-------------|
|                                       |        | Names       |
| File Name                             | File   | Begin With: |
| +-----+-----+                         |        |             |
| StorageTek VTSS Summary               | SVTSVS | SVS         |
| VTSS Subsystem Performance            | SVTSSP | SSP         |
| Channel Interface Performance         | SVTCIP | CIP         |
| Virtual Tape Volume Mount Activity    | SVTVMR | VMR         |
| Virtual Tape Volume Dismount Activity | SVTVDR | VDR         |
| Virtual Tape Volume Delete Activity   | SVTVXR | VXR         |
| Virtual Tape Volume Migrate Activity  | SVTVGR | VGR         |
| Virtual Tape Volume Recall Activity   | SVTVRR | VRR         |
| Virtual Tape Volume Movement          | SVTVMV | VMV         |
| Virtual Tape Volume Scratch Status    | SVTVSS | VSS         |
| Real Tape Drive Mount Activity        | SVTRMR | RMR         |
| Real Tape Drive Dismount Activity     | SVTRDR | RDR         |
| Real Tape Drive Performance           | SVTRPR | RPR         |
| Multi-Volume Cartridge Activity       | SVTMVC | MVC         |
| +-----+-----+                         |        |             |

## IBM TS7700 Hydra Virtual Tape Server Information Area (HVT)

| +-----+-----+                        |        |            |
|--------------------------------------|--------|------------|
|                                      |        | Names      |
| File Name                            | File   | Begin With |
| +-----+-----+                        |        |            |
| Hydra Vnode Device Activity          | HVTVDA | VDA        |
| Hydra Vnode Adapter Port Activity    | HVTVAP | VAP        |
| Hydra Hnode Cache Activity           | HVTHHC | HHC        |
| Hydra Hnode Cache Partition Activity | HVTHCP | HCP        |

|                                       |        |     |  |
|---------------------------------------|--------|-----|--|
| Hydra Hnode Cache Pref Grp Statistics | HVTHPG | HPG |  |
| Hydra Hnode Physical Drive Activity   | HVTHPD | HPD |  |
| Hydra Hnode G-Use Pool Activity       | HVTHGP | HGP |  |
| Hydra Hnode G-Use Pool Media Activity | HVTHGM | HGM |  |
| Hydra Hnode Activity                  | HVTHHA | HHA |  |
| Hydra Cluster Summary                 | HVTHCA | HCA |  |
| Hydra Hnode Grid Activity             | HVTGRC | GRC |  |
| Hydra Hnode Grid Cluster Activity     | HVTGCC | GCC |  |
| +-----+-----+-----+                   |        |     |  |

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. The common data elements are listed under Sequence/Summary Data Elements and Common Data Elements in the Data Elements List sections that follow.

## 5.2.2 VTS Component IVT Information Area Files

This section identifies each file in the IBM Virtual Tape Subsystem (IVT) information Area and defines its levels of summarization and data sequencing. The active data elements for each file are also listed.

### IMPORTANT NOTES:

- o The SMF type 94 records used to create all IVT information area files are produced at hourly intervals. This is the timespan granularity associated with the MICS DAYS timespan. The IVT information area files are all turned off by default in the DETAIL timespan. If DETAIL is activated for any IVT information area files, the file content is identical to that in the DAYS timespan.
- o The SMF type 94 records used to create all IVT information area files contain information collected from the VTS perspective. The z/OS system collecting SMF type 94 records is irrelevant, and if collected from multiple systems, is redundant. The VTS component filters all SMF type 94 data to select a representative hour for each VTS, and stores a user specified SYSID value in the IVT information area files. The SYSID value used is specified with the VTSSYSID statement in prefix.MICS.PARMS(VTSOPS). If not specified, a default value of 'SYS1' is assigned to the SYSID data element. See section 7.2.3.1.3 for more information.



The files maintained in the IVT information area include:

- 1 - VTS Distributed Library Activity File (IVTVDL)
- 2 - VTS Composite Library Activity File (IVTVCL)
- 3 - VTS VTC Controller Detail File (IVTVTC)
- 4 - VTS Preference Mgmt Cache Usage File (IVTVCU)
- 5 - VTS Physical Drive Activity File (IVTPTU)
- 6 - VTS Volume Pool Statistics File (IVTVPS)
- 7 - VTS Tape Library Config and Activity File (IVTTCA)
- 8 - VTS Import/Export Statistics File (IVTIEX)

### 5.2.2.1 VTS Distributed Library Activity File (IVTVDL)

The VTS Distributed Library Activity file provides information for distributed VTSs (standalone, UI, and secondary). The IVTVDL file is created from statistics in SMF type 94 subtype 1 records.

At the DETAIL and DAYS timespans, the file provides hourly statistics for each VTS distributed library.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTVDL File Organization
- 2 - IVTVDL Data Elements List
- 3 - IVTVDL Usage Considerations
- 4 - IVTVDL Retrieval Examples

### 5.2.2.1.1 IVTVDL 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                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | MONTH                     | DAY      | HOUR    |        |      |
|                                             | WEEKS  | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | WEEK                      | ZONE     | HOUR    |        |      |
|                                             | MONTHS | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | 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 5-3. IVTVDL Sort Sequence and Data Granularity

### 5.2.2.1.2 IVTVDL 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                 |
|---------|----------|---------------------------------|
| .D....E | DAY      | - Day of Month                  |
| .DW...E | HOURL    | - Hour of Day                   |
| .DWM..E | IVTCMPID | - Composite Library Association |
| .DWM..E | IVTTYPE  | - VTS Type                      |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number   |
| .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

|         |          |                                            |
|---------|----------|--------------------------------------------|
| .D....E | DAYNAME  | - Name of Day of Week                      |
| .DWM..E | DURATION | - Recording Interval Time                  |
| .DWM..E | ENDTS    | - End Time Stamp                           |
| .DWM..E | INTERVLS | - Number of Recording Intervals            |
| .DWM..E | IVTLMAN  | - System-Managed Tape Library Manufacturer |
| .DWM..E | IVTLMODL | - System-Managed Tape Library Model        |
| .DWM..E | IVTLPLNT | - System-Managed Tape Library Plant        |
| .DWM..E | IVTLTYPE | - System-Managed Tape Library Type         |
| .DWM..E | IVTPNM   | - Product Name                             |
| .D....E | IVTRVN   | - Version Number                           |
| .D....E | IVTSMFTM | - Write to SMF Timestamp                   |
| .DWM..E | IVTSNO   | - System-Managed Tape Library Seq Number   |
| .DWM..E | IVT4001  | - F/C 4001 Indicator                       |
| .D....E | ORGSYSID | - Originating System Identification        |
| .DWM..E | STARTTS  | - Start Time Stamp                         |
| .D....E | SUBSYSID | - JES Execution Subsystem ID               |

## Retained Data Elements

.DWM..E VDLCVMP - Copy Volume Mgmt Preference Level  
.DWM..E VDLESCON - Number of ESCON Channels  
.DWM..E VDLLVLM - Library Manager Version and Release  
.DWM..E VDLLVTS - VTS Code Modification and Fix Level  
.DWM..E VDLPDI - Number of Installed Physical Tape Device  
.DWM..E VDLRVMPL - Recall Volume Mgmt Preference Level  
.DWM..E VDLSCSI - Number of SCSI Channels  
.DWM..E VDLVA35 - 35 Day Rolling Avg Virt Vol Age  
.DWM..E VDLVA4 - 4 HR Rolling Avg Virt Vol Age  
.DWM..E VDLVA48 - 48 HR Rolling Avg Virt Vol Age  
.DWM..E VDLVM35 - Virtual Vols Migrated Last 35 Days  
.DWM..E VDLVM4 - Virtual Vols Migrated Last 4 Hours  
.DWM..E VDLVM48 - Virtual Vols Migrated Last 48 Hours

## Accumulated Data Elements

.DWM..E VDLACMA - Accessor A Mounts  
.DWM..E VDLACMB - Accessor B Mounts  
.DWM..E VDLBSRAT - Sum of Backstore Compression Ratio  
.DWM..E VDLCSIZ - Sum of VTS Cache Size (GB)  
.DWM..E VDLDRIC - Sum of Data Resident in Cache (GB)  
.DWM..E VDLDRVV - Data Read from Virtual Volumes (MB)  
.DWM..E VDLDTV - Total Data R/W Virtual Volumes (MB)  
.DWM..E VDLDWV - Data Written to Virtual Volumes (MB)  
.DWM..E VDLHARAT - Sum of Host Adapter Compression Ratio  
.DWM..E VDLLVD - Sum of Active Logical Volume Data (GB)  
.DWM..E VDLLVS - Sum of Active Logical Volumes  
.DWM..E VDLNUMBS - Channel Blocks Written  
.DWM..E VDLPCPY - Virtual Volumes Copied to Physical  
.DWM..E VDLPDR - Data Read from Physical Media (MB)  
.DWM..E VDLPDW - Data Written to Physical Media (MB)  
.DWM..E VDLPDWP - Data Written to Primary Pool (MB)  
.DWM..E VDLPDWS - Data Written to Secondary Pool (MB)  
.DWM..E VDLPHYSZ - Sum Est Available Physical Storage (GB)  
.DWM..E VDLPMIG - Physical Migrate (Copy) Mounts  
.DWM..E VDLPMTM - Total Physical Mount Time  
.DWM..E VDLPREC - Physical Reclaim Mounts  
.DWM..E VDLPSDE - Physical Secure Data Erase Mounts  
.DWM..E VDL PSTG - Physical Stage (Recall) Mounts  
.DWM..E VDLPSVC - Private Stacked Volume Count  
.DWM..E VDLRCPR - Sum of Recall Predominate Throttle Pct  
.DWM..E VDL SARCT - Sum of Avg Recall Throttle Value  
.DWM..E VDL SAWOT - Sum of Avg Write Overrun Throttle Value  
.DWM..E VDLSDV0 - Sum Total Volumes With Active Data  
.DWM..E VDLSDV00 - Sum Vols With 0% to 5% Active Data  
.DWM..E VDLSDV05 - Sum Vols With > 5% to 10% Active Data  
.DWM..E VDLSDV10 - Sum Vols With > 10% to 15% Active Data

.DWM..E VDLSDV15 - Sum Vols With > 15% to 20% Active Data  
.DWM..E VDLSDV20 - Sum Vols With > 20% to 25% Active Data  
.DWM..E VDLSDV25 - Sum Vols With > 25% to 30% Active Data  
.DWM..E VDLSDV30 - Sum Vols With > 30% to 35% Active Data  
.DWM..E VDLSDV35 - Sum Vols With > 35% to 40% Active Data  
.DWM..E VDLSDV40 - Sum Vols With > 40% to 45% Active Data  
.DWM..E VDLSDV45 - Sum Vols With > 45% to 50% Active Data  
.DWM..E VDLSDV50 - Sum Vols With > 50% to 55% Active Data  
.DWM..E VDLSDV55 - Sum Vols With > 55% to 60% Active Data  
.DWM..E VDLSDV60 - Sum Vols With > 60% to 65% Active Data  
.DWM..E VDLSDV65 - Sum Vols With > 65% to 70% Active Data  
.DWM..E VDLSDV70 - Sum Vols With > 70% to 75% Active Data  
.DWM..E VDLSDV75 - Sum Vols With > 75% to 80% Active Data  
.DWM..E VDLSDV80 - Sum Vols With > 80% to 85% Active Data  
.DWM..E VDLSDV85 - Sum Vols With > 85% to 90% Active Data  
.DWM..E VDLSDV90 - Sum Vols With > 90% to 95% Active Data  
.DWM..E VDLSDV95 - Sum Vols With > 95% to 100% Active Data  
.DWM..E VDLSPCM - Sum of Avg Phys Drives Concur Mounted  
.DWM..E VDLSPDA - Sum of Physical Drives Available  
.DWM..E VDLSSVC - Scratch Stacked Volume Count  
.DWM..E VDLSTOAT - Sum of Overall Average Throttle Value  
.DWM..E VDLVCA - Sum of Avg Cache Last Reference Time  
.DWM..E VDLVCM - Sum of Avg Virtual Drives Concur Mounted  
.DWM..E VDLVDC - Sum of Virtual Drives Configured  
.DWM..E VDLVMD - Total Virtual Mount Duration  
.DWM..E VDLTHRES - Sum of Reclaim Threshold Percentage  
.DWM..E VDLTPM - Total Physical Mounts  
.DWM..E VDLTVM - Total Virtual Mounts  
.DWM..E VDLVCHM - Virtual Cache-Hit Mounts  
.DWM..E VDLVFMTM - Total Virtual Fast-Ready Mount Time  
.DWM..E VDLVFRM - Virtual Fast-Ready Mounts  
.DWM..E VDLVHMTM - Total Virtual Cache-Hit Mount Time  
.DWM..E VDLVMTM - Total Virtual Mount Time  
.DWM..E VDLVRM - Virtual Recall Mounts  
.DWM..E VDLVRMTM - Total Virtual Recall Mount Time  
.DWM..E VDLVSPM - Total Virtual Specific Mounts  
.DWM..E VDLVVIC - Sum of Virtual Volumes in Cache  
.DWM..E VDLWROVT - Sum W/Overrun Predominate Throttle Pct  
.DWM..E VDL00KB - 0 to 2K Channel Blocks Written  
.DWM..E VDL02KB - > 2K to 4K Channel Blocks Written  
.DWM..E VDL04KB - > 4K to 8K Channel Blocks Written  
.DWM..E VDL08KB - > 8K to 16K Channel Blocks Written  
.DWM..E VDL16KB - > 16K to 32K Channel Blocks Written  
.DWM..E VDL32KB - > 32K to 64K Channel Blocks Written  
.DWM..E VDL64KB - > 64K Channel Blocks Written

## Minimum Data Elements

.DWM..E VDLMNCHT - Min Virtual Cache-Hit Mount Time  
.DWM..E VDLMNFRM - Min Virtual Fast-Ready Mount Time  
.DWM..E VDLMNPCM - Min Physical Drives Concur Mounted  
.DWM..E VDLMNPPA - Min Physical Drives Available  
.DWM..E VDLMNPMT - Min Physical Mount Time  
.DWM..E VDLMNPSC - Min Channel Data per Second (MB)  
.DWM..E VDLMNRMT - Min Virtual Recall Mount Time  
.DWM..E VDLMNVCN - Min Virtual Drives Concur Mounted  
.DWM..E VDLMNVDC - Min Virtual Drives Configured  
.DWM..E VDLMNVMD - Min Virtual Mount Duration  
.DWM..E VDLMNVMT - Min Virtual Mount Time

## Maximum Data Elements

.DWM..E VDLMXCHT - Max Virtual Cache-Hit Mount Time  
.DWM..E VDLMXFRM - Max Virtual Fast-Ready Mount Time  
.DWM..E VDLMXPCM - Max Physical Drives Concur Mounted  
.DWM..E VDLMXPPA - Max Physical Drives Available  
.DWM..E VDLMXPMT - Max Physical Mount Time  
.DWM..E VDLMXPSC - Max Channel Data per Second (MB)  
.DWM..E VDLMXRMT - Max Virtual Recall Mount Time  
.DWM..E VDLMXVCA - Max Virtual Volume Cache Age  
.DWM..E VDLMXVCN - Max Virtual Drives Concur Mounted  
.DWM..E VDLMXVDC - Max Virtual Drives Configured  
.DWM..E VDLMXVMD - Max Virtual Mount Duration  
.DWM..E VDLMXVMT - Max Virtual Mount Time

## Derived Data Elements

.DWM..E VDLAVAT0 - Avg Total Volumes with Active Data  
.DWM..E VDLAVA00 - Avg Vols With 0% to 5% Active Data  
.DWM..E VDLAVA05 - Avg Vols With > 5% to 10% Active Data  
.DWM..E VDLAVA10 - Avg Vols With > 10% to 15% Active Data  
.DWM..E VDLAVA15 - Avg Vols With > 15% to 20% Active Data  
.DWM..E VDLAVA20 - Avg Vols With > 20% to 25% Active Data  
.DWM..E VDLAVA25 - Avg Vols With > 25% to 30% Active Data  
.DWM..E VDLAVA30 - Avg Vols With > 30% to 35% Active Data  
.DWM..E VDLAVA35 - Avg Vols With > 35% to 40% Active Data  
.DWM..E VDLAVA40 - Avg Vols With > 40% to 45% Active Data  
.DWM..E VDLAVA45 - Avg Vols With > 45% to 50% Active Data  
.DWM..E VDLAVA50 - Avg Vols With > 50% to 55% Active Data  
.DWM..E VDLAVA55 - Avg Vols With > 55% to 60% Active Data  
.DWM..E VDLAVA60 - Avg Vols With > 60% to 65% Active Data  
.DWM..E VDLAVA65 - Avg Vols With > 65% to 70% Active Data  
.DWM..E VDLAVA70 - Avg Vols With > 70% to 75% Active Data  
.DWM..E VDLAVA75 - Avg Vols With > 75% to 80% Active Data  
.DWM..E VDLAVA80 - Avg Vols With > 80% to 85% Active Data

.DWM..E VDLAVA85 - Avg Vols With > 85% to 90% Active Data  
.DWM..E VDLAVA90 - Avg Vols With > 90% to 95% Active Data  
.DWM..E VDLAVA95 - Avg Vols With > 95% to 100% Active Data  
.DWM..E VDLAVBSR - Avg Backstore Compression Ratio  
.DWM..E VDLAVBSZ - Avg Channel Blocksize (Est)  
.DWM..E VDLAVCSZ - Avg VTS Cache Size (GB)  
.DWM..E VDLAVDRC - Avg Data Resident in Cache (GB)  
.DWM..E VDLAVDRV - Avg Data Read from Virtual Volumes (MB)  
.DWM..E VDLAVDTV - Avg Total Data R/W Virtual Volumes (MB)  
.DWM..E VDLAVDW - Avg Data Written to Virtual Volumes (MB)  
.DWM..E VDLAVFMT - Avg Virtual Fast-Ready Mount Time  
.DWM..E VDLAVHAR - Avg Host Adapter Compression Ratio  
.DWM..E VDLAVHMT - Avg Virtual Cache-Hit Mount Time  
.DWM..E VDLAVLVD - Avg Active Logical Volume Data (GB)  
.DWM..E VDLAVLVS - Avg Active Logical Volumes  
.DWM..E VDLAVLVZ - Avg Active Logical Volume Size (MB)  
.DWM..E VDLAVPCM - Avg Physical Drives Concur Mounted  
.DWM..E VDLAVPDA - Avg Physical Drives Available  
.DWM..E VDLAVPM - Avg Physical Mounts  
.DWM..E VDLAVPMT - Avg Physical Mount Time  
.DWM..E VDLAVPSV - Avg Private Stacked Volume Count  
.DWM..E VDLAVPSZ - Avg Est Available Physical Storage (GB)  
.DWM..E VDLAVRCP - Avg Recall Predominate Throttle Pct  
.DWM..E VDLAVRCT - Avg Recall Throttle Value  
.DWM..E VDLAVRMT - Avg Virtual Recall Mount Time  
.DWM..E VDLAVSSV - Avg Scratch Stacked Volume Count  
.DWM..E VDLAVTOT - Overall Avg Throttle Value  
.DWM..E VDLAVTPC - Avg Reclaim Threshold Percentage  
.DWM..E VDLAVVCA - Avg Cache Last Reference Time  
.DWM..E VDLAVVCM - Avg Virtual Drives Concur Mounted  
.DWM..E VDLAVVDC - Avg Virtual Devices Configured  
.DWM..E VDLAVVIC - Avg Virtual Volumes in Cache  
.DWM..E VDLAVVM - Avg Virtual Mounts  
.DWM..E VDLAVVMD - Avg Virtual Mount Duration  
.DWM..E VDLAVVMT - Avg Virtual Mount Time  
.DWM..E VDLAVVSZ - Avg Virtual Volume Size (MB)  
.DWM..E VDLAVWOT - Avg Write Overrun Throttle Value  
.DWM..E VDLAVWRO - Avg W/Overrun Predominate Throttle Pct  
.DWM..E VDLPCCSU - Pct VTS Cache Capacity Used  
.DWM..E VDLPCD00 - Pct Vols With 0% to 5% Active Data  
.DWM..E VDLPCD05 - Pct Vols With > 5% to 10% Active Data  
.DWM..E VDLPCD10 - Pct Vols With > 10% to 15% Active Data  
.DWM..E VDLPCD15 - Pct Vols With > 15% to 20% Active Data  
.DWM..E VDLPCD20 - Pct Vols With > 20% to 25% Active Data  
.DWM..E VDLPCD25 - Pct Vols With > 25% to 30% Active Data  
.DWM..E VDLPCD30 - Pct Vols With > 30% to 35% Active Data  
.DWM..E VDLPCD35 - Pct Vols With > 35% to 40% Active Data  
.DWM..E VDLPCD40 - Pct Vols With > 40% to 45% Active Data  
.DWM..E VDLPCD45 - Pct Vols With > 45% to 50% Active Data



.DWM..E VDLPCD50 - Pct Vols With > 50% to 55% Active Data  
.DWM..E VDLPCD55 - Pct Vols With > 55% to 60% Active Data  
.DWM..E VDLPCD60 - Pct Vols With > 60% to 65% Active Data  
.DWM..E VDLPCD65 - Pct Vols With > 65% to 70% Active Data  
.DWM..E VDLPCD70 - Pct Vols With > 70% to 75% Active Data  
.DWM..E VDLPCD75 - Pct Vols With > 75% to 80% Active Data  
.DWM..E VDLPCD80 - Pct Vols With > 80% to 85% Active Data  
.DWM..E VDLPCD85 - Pct Vols With > 85% to 90% Active Data  
.DWM..E VDLPCD90 - Pct Vols With > 90% to 95% Active Data  
.DWM..E VDLPCD95 - Pct Vols With > 95% to 100% Active Data  
.DWM..E VDLPCPSU - Pct Physical Storage Capacity Used  
.DWM..E VDLPCSTG - Pct Physical Stage (Recall) Mounts  
.DWM..E VDLPCVMS - Pct Virtual Specific Mount Cache Misses  
.DWM..E VDLPC00K - Pct 0 to 2K Channel Blocks Written  
.DWM..E VDLPC02K - Pct > 2K to 4K Channel Blocks Written  
.DWM..E VDLPC04K - Pct > 4K to 8K Channel Blocks Written  
.DWM..E VDLPC08K - Pct > 8K to 16K Channel Blocks Written  
.DWM..E VDLPC16K - Pct > 16K to 32K Channel Blocks Written  
.DWM..E VDLPC32K - Pct > 32K to 64K Channel Blocks Written  
.DWM..E VDLPC64K - Pct > 64K Channel Blocks Written  
.DWM..E VDLPSCH - Avg Channel Data per Second (MB)

### 5.2.2.1.3 IVTVDL Usage Considerations

This section identifies any special considerations or techniques related to using the IVTVDL file.

For reporting purposes, it is important to examine data element VTS Type (IVTTYPE). IVTTYPE can take on up to three values in the IVTVDL file; 'STANDALONE', 'UI', and 'SECONDARY'.

For IVTVDL observations where the IVTTYPE='STANDALONE', the VTS is an autonomous virtual tape server.

For IVTVDL observations where the IVTTYPE='UI' or 'SECONDARY', however, the VTS is a participant in a peer-to-peer configuration. All peer-to-peer VTS configurations have two IVTVDL observations and one VTS Composite Library Activity (IVTVCL) file observation for each hour in the DETAIL and DAYS timespans.

Data element Composite Library Association (IVTCMPID) contains the same value for all three observations and is used to identify all participating VTSs in a peer-to-peer configuration.

In general, the two hourly IVTVDL observations ('UI' and 'SECONDARY') for a peer-to-peer configuration, contain the statistics related to the virtual volume, DASD cache, and physical cartridge activity related to their half of the configuration.

The hourly IVTVCL observation contains the composite, or logical view of the peer-to-peer VTS and provides overall z/OS throughput and virtual volume activity statistics.

#### 5.2.2.1.4 IVTVDL 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. Using the most recent DAYS timespan IVTVDL file, display the total blocks of data moved between DASD cache and z/OS for each VTS, per HOUR. Display the percent buckets for each blocksize range and the estimated average blocksize. Generate a separate page for each VTS.

```
DATA;
SET &pIVTd..IVTVDL01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY IVTVLS ;
  BY IVTCMPID IVTTYPE IVTVLS DATE ;
ID HOUR ;
VAR VDLNUMBS VDLPC00K VDLPC02K VDLPC04K VDLPC08K VDLPC16K
    VDLPC32K VDLPC64K VDLAVBSZ ;
TITLE1
'Daily VTS System I/O Block Size Analysis by HOUR' ;
RUN ;
```

### 5.2.2.2 VTS Composite Library Activity File (IVTVCL)

The VTS Composite Library Activity file provides information for the composite, or logical view of a peer-to-peer VTS configuration. Information included in the file represents overall VTS activity achieved by both the User Interface (UI) VTS and secondary VTS components of the peer-to-peer configuration. The IVTVCL file is created from statistics in SMF type 94 subtype 1 records.

At the DETAIL and DAYS timespans, the file provides hourly statistics for each VTS composite library.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTVCL File Organization
- 2 - IVTVCL Data Elements List
- 3 - IVTVCL Usage Considerations
- 4 - IVTVCL Retrieval Examples

### 5.2.2.2.1 IVTVCL 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                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | MONTH                     | DAY      | HOUR    |        |      |
|                                             | WEEKS  | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | WEEK                      | ZONE     | HOUR    |        |      |
|                                             | MONTHS | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | 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 5-4. IVTVCL Sort Sequence and Data Granularity

### 5.2.2.2.2 IVTVCL 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                 |
|---------|----------|---------------------------------|
| .D....E | DAY      | - Day of Month                  |
| .DW...E | HOURL    | - Hour of Day                   |
| .DWM..E | IVTCMPID | - Composite Library Association |
| .DWM..E | IVTTYPE  | - VTS Type                      |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number   |
| .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

|         |          |                                            |
|---------|----------|--------------------------------------------|
| .D....E | DAYNAME  | - Name of Day of Week                      |
| .DWM..E | DURATION | - Recording Interval Time                  |
| .DWM..E | ENDTS    | - End Time Stamp                           |
| .DWM..E | INTERVLS | - Number of Recording Intervals            |
| .DWM..E | IVTLMAN  | - System-Managed Tape Library Manufacturer |
| .DWM..E | IVTLMODL | - System-Managed Tape Library Model        |
| .DWM..E | IVTLPLNT | - System-Managed Tape Library Plant        |
| .DWM..E | IVTLTYPE | - System-Managed Tape Library Type         |
| .DWM..E | IVTPNM   | - Product Name                             |
| .D....E | IVTRVN   | - Version Number                           |
| .D....E | IVTSMFTM | - Write to SMF Timestamp                   |
| .DWM..E | IVTSNO   | - System-Managed Tape Library Seq Number   |
| .DWM..E | IVT4001  | - F/C 4001 Indicator                       |
| .D....E | ORGSYSID | - Originating System Identification        |
| .DWM..E | STARTTS  | - Start Time Stamp                         |
| .D....E | SUBSYSID | - JES Execution Subsystem ID               |

### Retained Data Elements

.DWM..E VCLESCON - Number of ESCON Channels  
.DWM..E VCLLVVTC - VTC Code Modification and Fix Level  
.DWM..E VCLOPCPY - Operation Copy Mode  
.DWM..E VCLPIO - Composite VTC Preferred I/O VTS  
.DWM..E VCLPMST - Composite VTC Preferred Master VTS  
.DWM..E VCLSECID - SECONDARY IVTVLS ID  
.DWM..E VCLUIID - UI IVTVLS ID

### Accumulated Data Elements

.DWM..E VCLCLCR - Sum of Compression Ratio Write to Cache  
.DWM..E VCLCVMT0 - Completed Mounts VTS-0  
.DWM..E VCLCVMT1 - Completed Mounts VTS-1  
.DWM..E VCLDCPY - Virtual Volume Data Copied (MB)  
.DWM..E VCLDRVV - Data Read from Virtual Volumes (MB)  
.DWM..E VCLDTCPY - Virtual Volume Data to be Copied (MB)  
.DWM..E VCLDTVV - Total Data R/W Virtual Volumes (MB)  
.DWM..E VCLDWV - Data Written to Virtual Volumes (MB)  
.DWM..E VCLHARAT - Sum of Host Adapter Compression Ratio  
.DWM..E VCLNUMBS - Channel Blocks Written  
.DWM..E VCLSVCM - Sum of Avg Virtual Drives Concur Mounted  
.DWM..E VCLSVDC - Sum of Virtual Drives Configured  
.DWM..E VCLSVMD - Total Virtual Mount Duration  
.DWM..E VCLTVM - Total Virtual Mounts  
.DWM..E VCLVCHM - Virtual Cache-Hit Mounts  
.DWM..E VCLVCPY - Virtual Volumes Copied  
.DWM..E VCLVFMTM - Total Virtual Fast-Ready Mount Time  
.DWM..E VCLVFRM - Virtual Fast-Ready Mounts  
.DWM..E VCLVHMTM - Total Virtual Cache-Hit Mount Time  
.DWM..E VCLVMTM - Total Virtual Mount Time  
.DWM..E VCLVRM - Virtual Recall Mounts  
.DWM..E VCLVRMTM - Total Virtual Recall Mount Time  
.DWM..E VCLVSPM - Total Virtual Specific Mounts  
.DWM..E VCLVTCPY - Virtual Volumes to be Copied  
.DWM..E VCL00KB - 0 to 2K Channel Blocks Written  
.DWM..E VCL02KB - > 2K to 4K Channel Blocks Written  
.DWM..E VCL04KB - > 4K to 8K Channel Blocks Written  
.DWM..E VCL08KB - > 8K to 16K Channel Blocks Written  
.DWM..E VCL16KB - > 16K to 32K Channel Blocks Written  
.DWM..E VCL32KB - > 32K to 64K Channel Blocks Written  
.DWM..E VCL64KB - > 64K Channel Blocks Written



## Minimum Data Elements

.DWM..E VCLMNCHT - Min Virtual Cache-Hit Mount Time  
 .DWM..E VCLMNFRT - Min Virtual Fast-Ready Mount Time  
 .DWM..E VCLMNPSC - Min Channel Data per Second (MB)  
 .DWM..E VCLMNRMT - Min Virtual Recall Mount Time  
 .DWM..E VCLMNVCM - Min Virtual Drives Concur Mounted  
 .DWM..E VCLMNVDC - Min Virtual Drives Configured  
 .DWM..E VCLMNVMD - Min Virtual Mount Duration  
 .DWM..E VCLMNVMT - Min Virtual Mount Time

## Maximum Data Elements

.DWM..E VCLMXCHT - Max Virtual Cache-Hit Mount Time  
 .DWM..E VCLMXFRT - Max Virtual Fast-Ready Mount Time  
 .DWM..E VCLMXPSC - Max Channel Data per Second (MB)  
 .DWM..E VCLMXRMT - Max Virtual Recall Mount Time  
 .DWM..E VCLMXVCM - Max Virtual Drives Concur Mounted  
 .DWM..E VCLMXVDC - Max Virtual Drives Configured  
 .DWM..E VCLMXVMD - Max Virtual Mount Duration  
 .DWM..E VCLMXVMT - Max Virtual Mount Time

## Derived Data Elements

.DWM..E VCLAVBSZ - Avg Channel Blocksize (Est)  
 .DWM..E VCLAVCLC - Avg Compression Ratio Write to Cache  
 .DWM..E VCLAVDRV - Avg Data Read from Virtual Volumes (MB)  
 .DWM..E VCLAVDTV - Avg Total Data R/W Virtual Volumes (MB)  
 .DWM..E VCLAVDWV - Avg Data Written to Virtual Volumes (MB)  
 .DWM..E VCLAVFMT - Avg Virtual Fast-Ready Mount Time  
 .DWM..E VCLAVHAR - Avg Host Adapter Compression Ratio  
 .DWM..E VCLAVHMT - Avg Virtual Cache-Hit Mount Time  
 .DWM..E VCLAVRMT - Avg Virtual Recall Mount Time  
 .DWM..E VCLAVVCM - Avg Virtual Drives Concur Mounted  
 .DWM..E VCLAVVDC - Avg Virtual Devices Configured  
 .DWM..E VCLAVVM - Avg Virtual Mounts  
 .DWM..E VCLAVVMD - Avg Virtual Mount Duration  
 .DWM..E VCLAVVMT - Avg Virtual Mount Time  
 .DWM..E VCLPCVMS - Pct Virtual Specific Mount Cache Misses  
 .DWM..E VCLPC00K - Pct 0 to 2K Channel Blocks Written  
 .DWM..E VCLPC02K - Pct > 2K to 4K Channel Blocks Written  
 .DWM..E VCLPC04K - Pct > 4K to 8K Channel Blocks Written  
 .DWM..E VCLPC08K - Pct > 8K to 16K Channel Blocks Written  
 .DWM..E VCLPC16K - Pct > 16K to 32K Channel Blocks Written  
 .DWM..E VCLPC32K - Pct > 32K to 64K Channel Blocks Written  
 .DWM..E VCLPC64K - Pct > 64K Channel Blocks Written  
 .DWM..E VCLPSCH - Avg Channel Data per Second (MB)

### 5.2.2.2.3 IVTVCL Usage Considerations

This section identifies any special considerations or techniques related to using the IVTVCL file.

The IVTVCL observations contain statistics relating to the logical view of a peer-to-peer VTS. For IVTVCL observations, both the Composite Library Association (IVTCMPID) and Library Sequence Number (IVTVLS) will contain the same value. The User Interface (UI) and secondary VTSs that participate in the peer-to-peer configuration are identified with data elements UI IVTVLS ID (VCLUIID) and SECONDARY IVTVLS ID (VCLSECID).

Statistics for the UI and Secondary VTS activity are found in the VTS Distributed Library Activity (IVTVDL) file.

IVTVCL file observations primarily contain statistics related to overall virtual volume activity and are useful for determining z/OS throughput of a peer-to-peer VTS configuration. In addition, IVTVCL file observations are useful for monitoring the virtual volume copy function and overall virtual volume controller activity of each peer-to-peer VTS.

### 5.2.2.2.4 IVTVCL 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, i 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. Using the most recent DAYS timespan IVTVCL file, display the total number of virtual volumes accessed in the DASD cache of the UI and secondary VTs.

Break the total down by category: Fast ready, recall, and cache-hit. Show the average overall virtual mount time as well as the mount times for the various categories.

```
DATA;
SET &pIVTd..IVTVCL01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY IVTVLS ;
  BY IVTCMPID IVTTYPE IVTVLS DATE ;
ID HOUR ;
VAR VCLTVM VCLAVVMT VCLVFRM VCLAVFMT VCLVCHM VCLAVHMT
VCLVRM VCLAVRMT ;
TITLE1 'Daily Composite Virtual Mounts/Times by HOUR' ;
RUN ;
```

### 5.2.2.3 VTC Statistics Detail File (IVTVTC)

The VTC Statistics Detail file provides detailed virtual tape controller activity and usage statistics for peer-to-peer VTSs. The IVTVTC file is created from statistics in SMF type 94 subtype 1 records.

At the DETAIL and DAYS timespans, the file provides hourly statistics for each virtual tape controller.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTVTC File Organization
- 2 - IVTVTC Data Elements List
- 3 - IVTVTC Usage Considerations
- 4 - IVTVTC Retrieval Examples

### 5.2.2.3.1 IVTVTC 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                     | IVTCMPID | IVTTYPE | IVTVLS | IVTVTCNO |
|                                             |        | YEAR                      | MONTH    | DAY     | HOURL  |          |
|                                             | WEEKS  | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | IVTVTCNO |
|                                             |        | YEAR                      | WEEK     | ZONE    | HOURL  |          |
|                                             | MONTHS | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | IVTVTCNO |
|                                             |        | 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 5-5. IVTVTC Sort Sequence and Data Granularity

### 5.2.2.3.2 IVTVTC 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                 |
|---------|----------|---------------------------------|
| .D...E  | DAY      | - Day of Month                  |
| .DW...E | HOURL    | - Hour of Day                   |
| .DWM..E | IVTCMPID | - Composite Library Association |
| .DWM..E | IVTTYPE  | - VTS Type                      |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number   |
| .DWM..E | IVTVTCNO | - VTS VTC Number                |

.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

.D....E DAYNAME - Name of Day of Week  
.DWM..E DURATION - Recording Interval Time  
.DWM..E ENDTS - End Time Stamp  
.DWM..E INTERVLS - Number of Recording Intervals  
.DWM..E IVTLMAN - System-Managed Tape Library Manufacturer  
.DWM..E IVTLMODL - System-Managed Tape Library Model  
.DWM..E IVTLPLNT - System-Managed Tape Library Plant  
.DWM..E IVTLTYPE - System-Managed Tape Library Type  
.DWM..E IVTPNM - Product Name  
.D....E IVTRVN - Version Number  
.D....E IVTSMFTM - Write to SMF Timestamp  
.DWM..E IVTSNO - System-Managed Tape Library Seq Number  
.DWM..E IVT4001 - F/C 4001 Indicator  
.D....E ORGSYSID - Originating System Identification  
.DWM..E STARTTS - Start Time Stamp  
.D....E SUBSYSID - JES Execution Subsystem ID

#### Retained Data Elements

.D....E VTCLCS - Configured Settings  
.D....E VTCLPF - IO VTS and Mast VTS Pref. for VTS  
.D....E VTCDFCPY - Default Copy Mode  
.D....E VTCFSCR - Force Scratch to Preferred VTS Indicator  
.DWM..E VTCLVWTC - VTC Code Modification and Fix Level  
.D....E VTCOPCPY - Operation Copy Mode  
.D....E VTCPIO - Preferred I/O VTS  
.D....E VTCPMST - Preferred Master VTS  
.D....E VTCPRIM - Primary I/O Indicator  
.DWM..E VTCSPD0 - VTC to VTS0 Link Speed  
.DWM..E VTCSPD1 - VTC to VTS1 Link Speed  
.D....E VTCWPM - Write Protect Mode Indicator

#### Accumulated Data Elements

.DWM..E VTCLCR - Sum of Compression Ratio Write to Cache  
.DWM..E VTCDPY - Virtual Volume Data Copied  
.DWM..E VTCDRVV - Data Read from Virtual Volumes (MB)  
.DWM..E VTCDTVV - Total Data R/W Virtual Volumes (MB)  
.DWM..E VTCDWVV - Data Written to Virtual Volumes (MB)  
.DWM..E VTCTVM - Total Virtual Mounts  
.DWM..E VTCVCHM - Virtual Cache-Hit Mounts

.DWM..E VTCVCPY - Virtual Volumes Copied  
.DWM..E VTCVFRM - Virtual Fast-Ready Mounts  
.DWM..E VTCVRM - Virtual Recall Mounts  
.DWM..E VTCVSPM - Total Virtual Specific Mounts

### Derived Data Elements

.DWM..E VTCVCLC - Avg Compression Ratio Write to Cache  
.DWM..E VTCVDRV - Avg Data Read from Virtual Volumes (MB)  
.DWM..E VTCVDTV - Avg Total Data R/W Virtual Volumes (MB)  
.DWM..E VTCVDWW - Avg Data Written to Virtual Volumes (MB)  
.DWM..E VTCPSCH - Avg Channel Data per Second (MB)

### 5.2.2.3.3 IVTVTC Usage Considerations

This section identifies any special considerations or techniques related to using the IVTVTC file.

The IVTVTC file contains an observation for each virtual tape controller associated with a peer-to-peer VTS configuration.

In a peer-to-peer VTS configuration, the virtual controllers (up to eight) handle the virtual tape I/O reads and writes between workloads on z/OS and the DASD cache of the participating UI and Secondary VTSs.

An important function of a peer-to-peer VTS is making copies of each virtual volume. If a virtual volume is created in the DASD cache of the UI VTS, a copy is made in the DASD cache of the secondary VTS and the other way around.

In addition to managing the z/OS I/O, the virtual controllers also manage the I/O associated with making copies of virtual volumes in the DASD cache of the UI or secondary VTSs.

Data element Composite Library Association (IVTCMPID) identifies the peer-to-peer composite VTS served by the virtual tape controllers. VTS Composite Library Activity (IVTVCL) file observations with the same IVTCMPID value contain data elements summarizing the virtual tape controller activity captured in the individual IVTVTC file observations.



### 5.2.2.3.4 IVTVTC 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. Using the most recent DAYS timespan IVTVTC file, show the virtual tape mounts (total, fast ready, cache-hit, and recall) data transferred (total, read and write), write compression ratio and average channel MB/sec rate for each VTC controller.

Summarize the data by VTC Controller (IVTVTCNO) to show the totals for each controller over all 24 hours of the day.

```
%LET BY=%VTCSEQ(TS=DAYS) ;
%LET SUMBY=IVTVTCNO ;
%LET BREAK=IVTVTCNO ;
* ;
DATA;
SET &pIVTd..IVTVCL01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
%VTCSUM ;
* ;
PROC PRINT LABEL ;
  PAGEBY IVTVLS ;
  BY IVTCMPID IVTTYPE IVTVLS DATE ;
  ID IVTVTCNO ;
  VAR VTCTVM VTCVFRM VTCVCHM VTCVRM VTCDTW VTCDRVV VTCDWVV
      VTCVCLC VTCPSCH ;
  TITLE1
  'Overall Daily Composite VTC Controller Statistics' ;
```

### 5.2.2.4 VTS Cache Usage File (IVTVCU)

The VTS Cache Usage file contains detailed VTS DASD cache utilization and activity information for distributed VTSS (standalone, UI, and secondary). The IVTVCU file is created from the VTS Cache Usage Information Array sections in SMF type 94 subtype 1 records.

At the DETAIL and DAYS timespans, the file provides hourly cache statistics for each Cache Usage Preference Level Identifier (IVTCUPL) level.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTVCU File Organization
- 2 - IVTVCU Data Elements List
- 3 - IVTVCU Usage Considerations
- 4 - IVTVCU Retrieval Examples

### 5.2.2.4.1 IVTVCU 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                     | IVTCMPID | IVTTYPE | IVTVLS | IVTCUPL |
|                                             |        | YEAR                      | MONTH    | DAY     | HOURL  |         |
|                                             |        |                           |          |         |        |         |
|                                             | WEEKS  | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | IVTCUPL |
|                                             |        | YEAR                      | WEEK     | ZONE    | HOURL  |         |
|                                             |        |                           |          |         |        |         |
|                                             | MONTHS | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | IVTCUPL |
|                                             |        | 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. IVTVCU Sort Sequence and Data Granularity

#### 5.2.2.4.2 IVTVCU 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                   |
|---------|----------|-----------------------------------|
| .D...E  | DAY      | - Day of Month                    |
| .DW...E | HOURL    | - Hour of Day                     |
| .DWM..E | IVTCMPID | - Composite Library Association   |
| .DWM..E | IVTCUPL  | - Cache Usage Preference Level ID |
| .DWM..E | IVTTYPE  | - VTS Type                        |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number     |

.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

.D....E DAYNAME - Name of Day of Week  
 .DWM..E DURATION - Recording Interval Time  
 .DWM..E ENDTS - End Time Stamp  
 .DWM..E INTERVLS - Number of Recording Intervals  
 .DWM..E IVTLMAN - System-Managed Tape Library Manufacturer  
 .DWM..E IVTLMODL - System-Managed Tape Library Model  
 .DWM..E IVTLPLNT - System-Managed Tape Library Plant  
 .DWM..E IVTLTYPE - System-Managed Tape Library Type  
 .DWM..E IVTPNM - Product Name  
 .D....E IVTRVN - Version Number  
 .D....E IVTSMFTM - Write to SMF Timestamp  
 .DWM..E IVTSNO - System-Managed Tape Library Seq Number  
 .DWM..E IVT4001 - F/C 4001 Indicator  
 .D....E ORGSYSID - Originating System Identification  
 .DWM..E STARTTS - Start Time Stamp  
 .D....E SUBSYSID - JES Execution Subsystem ID

#### Retained Data Elements

.D....E VCUPMC - Preference Management Control  
 .DWM..E VCUVA35 - 35 Day Rolling Avg Virt Vol Age  
 .DWM..E VCUVA4 - 4 HR Rolling Avg Virt Vol Age  
 .DWM..E VCUVA48 - 48 HR Rolling Avg Virt Vol Age  
 .DWM..E VCUVM35 - Virtual Vols Migrated Last 35 Days  
 .DWM..E VCUVM4 - Virtual Vols Migrated Last 4 Hours  
 .DWM..E VCUVM48 - Virtual Vols Migrated Last 48 Hours

#### Accumulated Data Elements

.DWM..E VCUCSIZ - Sum of VTS Cache Size (GB)  
 .DWM..E VCUDRIC - Sum of Data Resident in Cache (GB)  
 .DWM..E VCUTVM - Total Virtual Mounts  
 .DWM..E VCUVCHM - Virtual Cache-Hit Mounts  
 .DWM..E VCUVFTM - Total Virtual Fast-Ready Mount Time  
 .DWM..E VCUVFRM - Virtual Fast-Ready Mounts  
 .DWM..E VCUVHMTM - Total Virtual Cache-Hit Mount Time  
 .DWM..E VCUVMTM - Total Virtual Mount Time  
 .DWM..E VCUVRM - Virtual Recall Mounts  
 .DWM..E VCUVRMTM - Total Virtual Recall Mount Time  
 .DWM..E VCUVVIC - Sum of Virtual Volumes in Cache

### Derived Data Elements

.DWM..E VCUAVCSZ - Avg VTS Cache Size (GB)  
.DWM..E VCUAVDRC - Avg Data Resident in Cache (GB)  
.DWM..E VCUAVFMT - Avg Virtual Fast-Ready Mount Time  
.DWM..E VCUAVHMT - Avg Virtual Cache-Hit Mount Time  
.DWM..E VCUAVRMT - Avg Virtual Recall Mount Time  
.DWM..E VCUAVVIC - Avg Virtual Volumes in Cache  
.DWM..E VCUAVVMT - Avg Virtual Mount Time  
.DWM..E VCUAVVSZ - Avg Virtual Volume Size (MB)

### 5.2.2.4.3 IVTVCU Usage Considerations

This section identifies any special considerations or techniques related to using the IVTVCU file.

The overall DASD cache utilization for distributed VTSs (STANDALONE, UI, and SECONDARY) are contained in the VTS Distributed Library Activity file.

The IVTVCU file contains a further breakdown of DASD cache activity by Cache Usage Preference Level Identifier (IVTCUPL). This file is only created for VTS's that are operating at the IBM function code F/C 4001 level.

### 5.2.2.4.3 IVTVCU Usage Considerations

This section identifies any special considerations or techniques related to using the IVTVCU file.

The overall DASD cache utilization for distributed VTSs (STANDALONE, UI, and SECONDARY) are contained in the VTS Distributed Library Activity file.

The IVTVCU file contains a further breakdown of DASD cache activity by Cache Usage Preference Level Identifier (IVTCUPL). This file is only created for VTS's that are operating at the IBM function code F/C 4001 level.

#### 5.2.2.4.4 IVTVCU 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. Using the most recent DAYS timespan IVTVCU file, generate cache utilization statistics for each distributed VTS (UI, secondary, and standalone).

Display the number of virtual volumes, total cache utilization, average virtual volume size, and the 4 hour, 48 hour, and 35 day rolling virtual volume ages by cache preference level for each hour of the DAY.

```
DATA;
SET &pIVTd..IVTVCU01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
PAGEBY IVTCUPL ;
    BY IVTCMPID IVTTYPE IVTVLS DATE IVTCUPL ;
ID HOUR ;
VAR VCUVVIC VCUDRIC VCUAVVSZ VCUVA4 VCUVA48 VCUVA35
VCUVM4 VCUVM48 VCUVM35 ;
TITLE1 'Daily Cache Report by Preference Level and HOUR';
RUN ;
SET &pIVTd..IVTMDE01;
```

### 5.2.2.5 Physical Tape Usage File (IVTPTU)

The Physical Tape Usage file contains detailed physical tape drive activity and usage statistics for distributed VTSs (standalone, UI, and secondary). The IVTPTU file is created from statistics in SMF type 94 subtype 1 records.

At the DETAIL and DAYS timespans, the file provides hourly physical tape drive statistics at the Physical Tape Drive Type (IVTDCI) level.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTPTU File Organization
- 2 - IVTPTU Data Elements List
- 3 - IVTPTU Usage Considerations
- 4 - IVTPTU Retrieval Examples



### 5.2.2.5.1 IVTPTU 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                     | IVTCMPID | IVTTYPE | IVTVLS | IVTDCI |
|                                             |        | YEAR                      | MONTH    | DAY     | HOURL  |        |
|                                             | WEEKS  | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | IVTDCI |
|                                             |        | YEAR                      | WEEK     | ZONE    | HOURL  |        |
|                                             | MONTHS | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | IVTDCI |
|                                             |        | 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 5-7. IVTPTU Sort Sequence and Data Granularity

### 5.2.2.5.2 IVTPTU 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                    |
|---------|----------|------------------------------------|
| .D...E  | DAY      | - Day of Month                     |
| .DW...E | HOURL    | - Hour of Day                      |
| .DWM..E | IVTCMPID | - Composite Library Association    |
| .DWM..E | IVTDCI   | - Physical Tape Drive Device Class |
| .DWM..E | IVTTYPE  | - VTS Type                         |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number      |

.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

.D....E DAYNAME - Name of Day of Week  
.DWM..E DURATION - Recording Interval Time  
.DWM..E ENDTS - End Time Stamp  
.DWM..E INTERVLS - Number of Recording Intervals  
.DWM..E IVTLMAN - System-Managed Tape Library Manufacturer  
.DWM..E IVTLMODL - System-Managed Tape Library Model  
.DWM..E IVTLPLNT - System-Managed Tape Library Plant  
.DWM..E IVTLTYPE - System-Managed Tape Library Type  
.DWM..E IVTPNM - Product Name  
.D....E IVTRVN - Version Number  
.D....E IVTSMFTM - Write to SMF Timestamp  
.DWM..E IVTSNO - System-Managed Tape Library Seq Number  
.DWM..E IVT4001 - F/C 4001 Indicator  
.D....E ORGSYSID - Originating System Identification  
.DWM..E STARTTS - Start Time Stamp  
.D....E SUBSYSID - JES Execution Subsystem ID

#### Retained Data Elements

.D....E PTUPDI - Physical Drives Installed

#### Accumulated Data Elements

.DWM..E PTUPDW - Data Written to Physical Media (MB)  
.DWM..E PTUPDWP - Data Written to Primary Pool (MB)  
.DWM..E PTUPDWS - Data Written to Secondary Pool (MB)  
.DWM..E PTUPMIG - Physical Migrate (Copy) Mounts  
.DWM..E PTUPMTM - Total Physical Mount Time  
.DWM..E PTUPREC - Physical Reclaim Mounts  
.DWM..E PTUPSDE - Physical Secure Data Erase Mounts  
.DWM..E PTUPSTG - Physical Stage (Recall) Mounts  
.DWM..E PTUSPCM - Sum of Avg Physical Drives Concur Mounte  
.DWM..E PTUSPDA - Sum of Physical Drives Available  
.DWM..E PTUTPM - Total Physical Mounts

#### Minimum Data Elements

.DWM..E PTUMNPCM - Min Physical Drives Concur Mounted  
.DWM..E PTUMNPDA - Min Physical Drives Available  
.DWM..E PTUMNPMT - Min Physical Mount Time

### Maximum Data Elements

.DWM..E PTUMXPCM - Max Physical Drives Concur Mounted  
.DWM..E PTUMXPDA - Max Physical Drives Available  
.DWM..E PTUMXPMT - Max Physical Mount Time

### Derived Data Elements

.DWM..E PTUAVPCM - Avg Physical Drives Concur Mounted  
.DWM..E PTUAVPDA - Avg Physical Drives Available  
.DWM..E PTUAVPM - Avg Physical Mounts  
.DWM..E PTUAVPMT - Avg Physical Mount Time  
.DWM..E PTUAVPW - Avg Data Written to Physical Media (MB)  
.DWM..E PTUAVPWP - Avg Data Written to Primary Pool (MB)  
.DWM..E PTUAVPWS - Avg Data Written to Secondary Pool (MB)

### 5.2.2.5.3 IVTPTU Usage Considerations

This section identifies any special considerations or techniques related to using the IVTPTU file.

The overall physical tape drive statistics for distributed VTSs (standalone, UI, and secondary) are contained in the VTS Distributed Library Activity (IVTVDL) file.

The IVTPTU file contains a further breakdown of physical tape usage by Physical Tape Drive Type (IVTDCI). This file is only created for VTSs that are operating at the IBM function code F/C 4001 level.

#### 5.2.2.5.4 IVTPTU 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. Using the most recent DAYS timespan IVTPTU file, show the quantity of physical mounts (total and by type), and the total, MIN, MAX, and AVG mount times for each hour of the day.

Generate a single page for each distributed VTS (UI, secondary, and standalone).

```
DATA;
SET &pIVTd..IVTPTU01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
PAGEBY IVTVLS ;
    BY IVTCMPID IVTTYPE IVTVLS DATE ;
ID HOUR ;
VAR PTUTPM PTUPSTG PTUPMIG PTUPREC PTUPSDE PTUPMTM
PTUMXPMT PTUMNPMT PTUAVPMT ;
TITLE1 'Daily Physical Mounts and Times by HOUR' ;
RUN ;
```

### 5.2.2.6 Volume Pool Statistics File (IVTVPS)

The Volume Pool Statistics file contains detailed cartridge utilization and volume count statistics for distributed VTSs (standalone, UI, and secondary). The IVTVPS file is created from statistics in SMF type 94 subtype 2 records.

At the DETAIL and DAYS timespans, the file provides hourly cartridge statistics at the Volume Pool Identifier (IVTVPN) level.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTVPS File Organization
- 2 - IVTVPS Data Elements List
- 3 - IVTVPS Usage Considerations
- 4 - IVTVPS Retrieval Examples

### 5.2.2.6.1 IVTVPS 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<br>YEAR | IVTCMPID<br>MONTH         | IVTTYPE<br>DAY  | IVTVLS<br>HOUR | IVTVPN |  |
| WEEKS    | SYSID<br>YEAR | IVTCMPID<br>WEEK          | IVTTYPE<br>ZONE | IVTVLS<br>HOUR | IVTVPN |  |
| MONTHS   | SYSID<br>YEAR | IVTCMPID<br>MONTH         | IVTTYPE<br>ZONE | IVTVLS         | IVTVPN |  |
| 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 5-8. IVTVPS Sort Sequence and Data Granularity

### 5.2.2.6.2 IVTVPS 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                 |
|---------|----------|---------------------------------|
| .D....E | DAY      | - Day of Month                  |
| .DW...E | HOURL    | - Hour of Day                   |
| .DWM..E | IVTCMPID | - Composite Library Association |
| .DWM..E | IVTTYPE  | - VTS Type                      |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number   |
| .DWM..E | IVTVPN   | - Volume Pool Identifier        |
| .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

|         |          |                                            |
|---------|----------|--------------------------------------------|
| .D....E | DAYNAME  | - Name of Day of Week                      |
| .DWM..E | DURATION | - Recording Interval Time                  |
| .DWM..E | ENDTS    | - End Time Stamp                           |
| .DWM..E | INTERVLS | - Number of Recording Intervals            |
| .DWM..E | IVTLMAN  | - System-Managed Tape Library Manufacturer |
| .DWM..E | IVTLMODL | - System-Managed Tape Library Model        |
| .DWM..E | IVTLPLNT | - System-Managed Tape Library Plant        |
| .DWM..E | IVTLTYPE | - System-Managed Tape Library Type         |
| .DWM..E | IVTPNM   | - Product Name                             |
| .D....E | IVTRVN   | - Version Number                           |
| .D....E | IVTSMFTM | - Write to SMF Timestamp                   |
| .DWM..E | IVT4001  | - F/C 4001 Indicator                       |
| .D....E | ORGSYSID | - Originating System Identification        |
| .DWM..E | STARTTS  | - Start Time Stamp                         |
| .D....E | SUBSYSID | - JES Execution Subsystem ID               |

### Retained Data Elements

.D...E VPSBPMI0 - Scratch Pool Media ID 0  
.D...E VPSBPMI1 - Scratch Pool Media ID 1  
.D...E VPSBPMI2 - Scratch Pool Media ID 2  
.D...E VPSBPMI3 - Scratch Pool Media ID 3  
.D...E VPSLRTS - Last Reconcile Timestamp  
.DWM..E VPSMI0 - Media Identifier 0  
.DWM..E VPSMI1 - Media Identifier 1  
.D...E VPSMNVP - Maximum Number of Volume Pools  
.DWM..E VSPDCI - Pool Tape Drive Device Class  
.DWM..E VSPPPP - Physical Pool Properties  
.DWM..E VSPPPB1 - Physical Props (1st Media to Borrow)  
.DWM..E VSPPPB2 - Physical Props (2nd Media to Borrow)  
.DWM..E VSPPPRA - Physical Props (Returns Allowed)  
.DWM..E VPSRPLA - Days Since Last Access (Policy Value)  
.DWM..E VPSRPLDI - Days Since Last Inval (Policy Value)  
.DWM..E VPSRPLW - Days Since Last Written (Policy Value)  
.DWM..E VPSRPMAD - Min Active Data Percent (Policy Value)  
.DWM..E VPSRPN - Reclamation Pool  
.DWM..E VPSVPRT - Volume Pool Reclaim Threshold Percentage

### Accumulated Data Elements

.DWM..E VPSAA0FP - Sum Avg Age Full Stacked Vols  
.DWM..E VPSAAORD - Sum Avg Age Residual Stacked Vols  
.DWM..E VPSADIVP - Active Data in Volume Pool (GB)  
.DWM..E VPSALVIP - Active Logical Volumes in Pool  
.DWM..E VPSBPSC0 - Scratch Stacked Vols - Media 0  
.DWM..E VPSBPSC1 - Scratch Stacked Vols - Media 1  
.DWM..E VPSBPSC2 - Scratch Stacked Vols - Media 2  
.DWM..E VPSBPSC3 - Scratch Stacked Vols - Media 3  
.DWM..E VPSDWTP - Data Written to the Pool (MB)  
.DWM..E VPSBPSP0 - Borrowed Private Stacked Vols Media 0  
.DWM..E VPSBPSP1 - Borrowed Private Stacked Vols Media 1  
.DWM..E VPSBPSS0 - Borrowed Scratch Stacked Vols Media 0  
.DWM..E VPSBPSS1 - Borrowed Scratch Stacked Vols Media 1  
.DWM..E VPSPPSP0 - Static Private Stacked Vols Media 0  
.DWM..E VPSPPSP1 - Static Private Stacked Vols Media 1  
.DWM..E VPSPPSS0 - Static Scratch Stacked Vols Media 0  
.DWM..E VPSPPSS1 - Static Scratch Stacked Vols Media 1  
.DWM..E VPSSDVT0 - Sum Total Volumes With Active Data  
.DWM..E VPSSDV00 - Sum Vols With 0% to 5% Active Data  
.DWM..E VPSSDV05 - Sum Vols With > 5% to 10% Active Data  
.DWM..E VPSSDV10 - Sum Vols With > 10% to 15% Active Data  
.DWM..E VPSSDV15 - Sum Vols With > 15% to 20% Active Data  
.DWM..E VPSSDV20 - Sum Vols With > 20% to 25% Active Data  
.DWM..E VPSSDV25 - Sum Vols With > 25% to 30% Active Data  
.DWM..E VPSSDV30 - Sum Vols With > 30% to 35% Active Data

.DWM..E VPSSDV35 - Sum Vols With > 35% to 40% Active Data  
.DWM..E VPSSDV40 - Sum Vols With > 40% to 45% Active Data  
.DWM..E VPSSDV45 - Sum Vols With > 45% to 50% Active Data  
.DWM..E VPSSDV50 - Sum Vols With > 50% to 55% Active Data  
.DWM..E VPSSDV55 - Sum Vols With > 55% to 60% Active Data  
.DWM..E VPSSDV60 - Sum Vols With > 60% to 65% Active Data  
.DWM..E VPSSDV65 - Sum Vols With > 65% to 70% Active Data  
.DWM..E VPSSDV70 - Sum Vols With > 70% to 75% Active Data  
.DWM..E VPSSDV75 - Sum Vols With > 75% to 80% Active Data  
.DWM..E VPSSDV80 - Sum Vols With > 80% to 85% Active Data  
.DWM..E VPSSDV85 - Sum Vols With > 85% to 90% Active Data  
.DWM..E VPSSDV90 - Sum Vols With > 90% to 95% Active Data  
.DWM..E VPSSDV95 - Sum Vols With > 95% to 100% Active Data  
.DWM..E VPST0BPS - Scratch Stacked Vols  
.DWM..E VPST0BPB - Total Borrowed Private Stacked Vols  
.DWM..E VPST0PBS - Total Borrowed Scratch Stacked Vols  
.DWM..E VPST0PSP - Total Static Private Stacked Vols  
.DWM..E VPST0PSS - Total Static Scratch Stacked Vols

### Maximum Data Elements

.DWM..E VPSMX0FP - Max Age of Full Stacked Vols  
.DWM..E VPSMX0RD - Max Age of Residual Stacked Vols

### Derived Data Elements

.DWM..E VPSAVAT0 - Avg Total Volumes with Active Data  
.DWM..E VPSAVA00 - Avg Vols With 0% to 5% Active Data  
.DWM..E VPSAVA05 - Avg Vols With > 5% to 10% Active Data  
.DWM..E VPSAVA10 - Avg Vols With > 10% to 15% Active Data  
.DWM..E VPSAVA15 - Avg Vols With > 15% to 20% Active Data  
.DWM..E VPSAVA20 - Avg Vols With > 20% to 25% Active Data  
.DWM..E VPSAVA25 - Avg Vols With > 25% to 30% Active Data  
.DWM..E VPSAVA30 - Avg Vols With > 30% to 35% Active Data  
.DWM..E VPSAVA35 - Avg Vols With > 35% to 40% Active Data  
.DWM..E VPSAVA40 - Avg Vols With > 40% to 45% Active Data  
.DWM..E VPSAVA45 - Avg Vols With > 45% to 50% Active Data  
.DWM..E VPSAVA50 - Avg Vols With > 50% to 55% Active Data  
.DWM..E VPSAVA55 - Avg Vols With > 55% to 60% Active Data  
.DWM..E VPSAVA60 - Avg Vols With > 60% to 65% Active Data  
.DWM..E VPSAVA65 - Avg Vols With > 65% to 70% Active Data  
.DWM..E VPSAVA70 - Avg Vols With > 70% to 75% Active Data  
.DWM..E VPSAVA75 - Avg Vols With > 75% to 80% Active Data  
.DWM..E VPSAVA80 - Avg Vols With > 80% to 85% Active Data  
.DWM..E VPSAVA85 - Avg Vols With > 85% to 90% Active Data  
.DWM..E VPSAVA90 - Avg Vols With > 90% to 95% Active Data  
.DWM..E VPSAVA95 - Avg Vols With > 95% to 100% Active Data  
.DWM..E VPSAV0FP - Avg Age of Full Stacked Vols  
.DWM..E VPSAV0RD - Avg Age of Residual Stacked Vols  
.DWM..E VPSPCD00 - Pct Vols With 0% to 5% Active Data  
.DWM..E VPSPCD05 - Pct Vols With > 5% to 10% Active Data  
.DWM..E VPSPCD10 - Pct Vols With > 10% to 15% Active Data  
.DWM..E VPSPCD15 - Pct Vols With > 15% to 20% Active Data  
.DWM..E VPSPCD20 - Pct Vols With > 20% to 25% Active Data  
.DWM..E VPSPCD25 - Pct Vols With > 25% to 30% Active Data  
.DWM..E VPSPCD30 - Pct Vols With > 30% to 35% Active Data  
.DWM..E VPSPCD35 - Pct Vols With > 35% to 40% Active Data  
.DWM..E VPSPCD40 - Pct Vols With > 40% to 45% Active Data  
.DWM..E VPSPCD45 - Pct Vols With > 45% to 50% Active Data  
.DWM..E VPSPCD50 - Pct Vols With > 50% to 55% Active Data  
.DWM..E VPSPCD55 - Pct Vols With > 55% to 60% Active Data  
.DWM..E VPSPCD60 - Pct Vols With > 60% to 65% Active Data  
.DWM..E VPSPCD65 - Pct Vols With > 65% to 70% Active Data  
.DWM..E VPSPCD70 - Pct Vols With > 70% to 75% Active Data  
.DWM..E VPSPCD75 - Pct Vols With > 75% to 80% Active Data  
.DWM..E VPSPCD80 - Pct Vols With > 80% to 85% Active Data  
.DWM..E VPSPCD85 - Pct Vols With > 85% to 90% Active Data  
.DWM..E VPSPCD90 - Pct Vols With > 90% to 95% Active Data

.DWM..E VPSPCD95 - Pct Vols With > 95% to 100% Active Data

#### 5.2.2.6.3 IVTVPS Usage Considerations

This section identifies any special considerations or techniques related to using the IVTVPS file.

The overall physical cartridge usage and availability statistics for distributed VTSS (standalone, UI, and secondary) are contained in the VTS Distributed Library Activity (IVTVDL) file.

The IVTVPS file contains a further breakdown of physical cartridge usage and availability by by Volume Pool Identifier (IVTVPN). This file is only created for VTSS that are operating at the IBM function code F/C 4001 level and have activated IBM Outboard Policy Management.

### 5.2.2.6.4 IVTVPS 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. Generate a plot showing the quantity of physical cartridges at each of 20 bracketed percent utilization levels for each volume pool with active cartridges.

Use the data from the last hour of the most recent DAYS timespan data. Only include volume pools with active cartridges.

Use an array and a DO loop with 20 iterations to access the 20 VPSSDVnn data elements. An equation is used to convert the DO loop variable (I) to grab every 5th element in array, which corresponds to the VPSSDVnn data element names.

```
DATA;
SET &pIVTd..IVTVPS01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
LABEL VOLCOUNT="Cartridge Count" ;
LABEL AVAL="Percent Cartridge Utilization" ;
ARRAY BUCKETS {96} VPSSDV00-VPSSDV95 ;
IF HOUR=23 ;
IF VPSSDVT0 GT 0 ;
DO I=1 TO 20 ;
  VOLCOUNT=BUCKETS(((I-1)*5)+1); /*1st, 5th, 10th, etc.*/
  AVAL=PUT((I*5-5),2.) ;           /*00, 05, 10, 20, etc.*/
  OUTPUT ;
END ;
* ;
PROC SORT ;
  BY IVTVLS IVTTYPE IVTVPN ;
* ;
PROC CHART ;
  BY IVTVLS IVTTYPE IVTVPN ;
VBAR AVAL / SUMVAR=VOLCOUNT DISCRETE;
TITLE1 'Physical Cartridge PCT Utilization Distribution';
```

RUN;

#### 5.2.2.7 VTS Tape Library Config and Activity (IVTTCA)

The VTS Tape Library Config and Activity file contains physical tape device configuration, activity, and usage statistics for the drives in the Self Managed 34xx tape library assigned to distributed VTSs (standalone, UI, and secondary). The IVTTCA file is created from statistics in SMF type 94 subtype 1 records.

At the DETAIL and DAYS timespans, the file provides hourly tape library statistics for each distributed VTS.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTTCA File Organization
- 2 - IVTTCA Data Elements List
- 3 - IVTTCA Usage Considerations
- 4 - IVTTCA Retrieval Examples

### 5.2.2.7.1 IVTTCA 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                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | MONTH                     | DAY      | HOUR    |        |      |
|                                             | WEEKS  | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | WEEK                      | ZONE     | HOUR    |        |      |
|                                             | MONTHS | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | 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 5-9. IVTTCA Sort Sequence and Data Granularity



### 5.2.2.7.2 IVTTCA 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                 |
|---------|----------|---------------------------------|
| .D...E  | DAY      | - Day of Month                  |
| .DW...E | HOURL    | - Hour of Day                   |
| .DWM..E | IVTCMPID | - Composite Library Association |
| .DWM..E | IVTTYPE  | - VTS Type                      |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number   |
| .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

.D....E DAYNAME - Name of Day of Week  
.DWM..E DURATION - Recording Interval Time  
.DWM..E ENDTS - End Time Stamp  
.DWM..E INTERVLS - Number of Recording Intervals  
.DWM..E IVTLMAN - System-Managed Tape Library Manufacturer  
.DWM..E IVTLMODL - System-Managed Tape Library Model  
.DWM..E IVTLPLNT - System-Managed Tape Library Plant  
.DWM..E IVTLTYPE - System-Managed Tape Library Type  
.DWM..E IVTPNM - Product Name  
.D....E IVTRVN - Version Number  
.D....E IVTSMFTM - Write to SMF Timestamp  
.DWM..E IVTSNO - System-Managed Tape Library Seq Number  
.DWM..E IVT4001 - F/C 4001 Indicator  
.D....E ORGSYSID - Originating System Identification  
.DWM..E STARTTS - Start Time Stamp  
.D....E SUBSYSID - JES Execution Subsystem ID

### Retained Data Elements

.D....E TCAPAR - Physical Audit Requests Pending EOI  
.D....E TCAPDI - Physical Drives Installed  
.D....E TCAPDM - Physical Drives Mounted EOI  
.D....E TCAPDR - Physical Demount Requests Pending EOI  
.D....E TCAPER - Physical Eject Requests Pending EOI  
.D....E TCAPMR - Physical Mount Requests Pending EOI

### Accumulated Data Elements

.DWM..E TCAACMA - Accessor A Mounts  
.DWM..E TCAACMB - Accessor B Mounts  
.DWM..E TCAPATM - Total Physical Audit Time  
.DWM..E TCAPDTM - Total Physical Demount Time  
.DWM..E TCAPETM - Total Physical Eject Time  
.DWM..E TCAPIDXD - Total Physical Index Demounts  
.DWM..E TCAPIDXM - Total Physical Index Mounts  
.DWM..E TCAPMTM - Total Physical Mount Time  
.DWM..E TCAPPOSD - Total Physical Post-Demounts  
.DWM..E TCAPPREM - Total Physical Pre-Mounts  
.DWM..E TCASPAR - Sum of Avg Physical Audit Requests Pend  
.DWM..E TCASPCM - Sum of Avg Physical Drives Concur Mounte  
.DWM..E TCASPDR - Sum of Avg Physical Demount Requests Pen  
.DWM..E TCASPER - Sum of Avg Physical Eject Requests Pend

.DWM..E TCASPMO - Sum of Avg Physical Mount Duration  
.DWM..E TCASPMR - Sum of Avg Physical Mount Requests Pending  
.DWM..E TCATPA - Total Physical Audits  
.DWM..E TCATPD - Total Physical Demounts  
.DWM..E TCATPE - Total Physical Ejects  
.DWM..E TCATPI - Total Physical Inserts  
.DWM..E TCATPM - Total Physical Mounts

#### Minimum Data Elements

.DWM..E TCAMNPAR - Min Physical Audit Requests Pending  
.DWM..E TCAMNPAT - Min Physical Audit Time  
.DWM..E TCAMNPCM - Min Physical Drives Concur Mounted  
.DWM..E TCAMNPDR - Min Physical Demount Requests Pending  
.DWM..E TCAMNPDT - Min Physical Demount Time  
.DWM..E TCAMNPER - Min Physical Eject Requests Pending  
.DWM..E TCAMNPET - Min Physical Eject Time  
.DWM..E TCAMNPMO - Min Physical Mount Duration  
.DWM..E TCAMNPMR - Min Physical Mount Requests Pending  
.DWM..E TCAMNPMT - Min Physical Mount Time

#### Maximum Data Elements

.DWM..E TCAMXPAR - Max Physical Audit Requests Pending  
.DWM..E TCAMXPAT - Max Physical Audit Time  
.DWM..E TCAMXPCM - Max Physical Drives Concur Mounted  
.DWM..E TCAMXPDR - Max Physical Demount Requests Pending  
.DWM..E TCAMXPDT - Max Physical Demount Time  
.DWM..E TCAMXPER - Max Physical Eject Requests Pending  
.DWM..E TCAMXPET - Max Physical Eject Time  
.DWM..E TCAMXPMO - Max Physical Mount Duration  
.DWM..E TCAMXPMR - Max Physical Mount Requests Pending  
.DWM..E TCAMXPMT - Max Physical Mount Time

#### Derived Data Elements

.DWM..E TCAAVPA - Avg Physical Audits  
.DWM..E TCAAVPAR - Avg Physical Audit Requests Pending  
.DWM..E TCAAVPAT - Avg Physical Audit Time  
.DWM..E TCAAVPCM - Avg Physical Drives Concur Mounted  
.DWM..E TCAAVPD - Avg Physical Demounts  
.DWM..E TCAAVPDR - Avg Physical Demount Requests Pending  
.DWM..E TCAAVPDT - Avg Physical Demount Time  
.DWM..E TCAAVPE - Avg Physical Ejects  
.DWM..E TCAAVPER - Avg Physical Eject Requests Pending  
.DWM..E TCAAVPET - Avg Physical Eject Time  
.DWM..E TCAAVPM - Avg Physical Mounts  
.DWM..E TCAAVPMO - Avg Physical Mount Duration  
.DWM..E TCAAVPMR - Avg Physical Mount Requests Pending

.DWM..E TCAAVPMT - Avg Physical Mount Time

### 5.2.2.7.3 IVTTCA Usage Considerations

This section identifies any special considerations or techniques related to using the IVTTCA file.

### 5.2.2.7.4 IVTTCA 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 &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. Using the most recent DAYS timespan IVTTCA file, display the quantity of physical mounts and the counts for each robotic accessor. Display the total and average physical mount time and duration. Finally, display the number of available physical drives and the maximum number concurrently mounted during the hour.

Generate a single page for each IBM Self Managed 34xx library assigned to each distributed VTS (UI, secondary, and standalone).

```
DATA;
SET &pIVTd..IVTTCA01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
PAGEBY IVTVLS ;
    BY IVTCMPID IVTTYPE IVTVLS DATE ;
ID HOUR ;
VAR TCATPM TCAACMA TCAACMB TCAPMTM TCAAVPMT TCAAVPMD
TCAPDI TCAMXPCM ;
TITLE1 'Daily Tape Library Statistics by HOUR' ;
RUN ;
```

#### 5.2.2.8 VTS Import/Export File (IVTIEX)

The VTS Import/Export file contains statistics relating to the import and export of physical cartridges and logical volumes for distributed VTSs (standalone, UI, and secondary). The IVTIEX file is created from statistics in SMF type 94 subtype 1 records.

At the DETAIL and DAYS timespans, the file provides hourly import and export statistics for each distributed VTS.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - IVTIEX File Organization
- 2 - IVTIEX Data Elements List
- 3 - IVTIEX Usage Considerations
- 4 - IVTIEX Retrieval Examples

### 5.2.2.8.1 IVTIEX 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                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | MONTH                     | DAY      | HOUR    |        |      |
|                                             | WEEKS  | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | YEAR |
|                                             |        | WEEK                      | ZONE     | HOUR    |        |      |
|                                             | MONTHS | SYSID                     | IVTCMPID | IVTTYPE | IVTVLS | 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 5-10. IVTIEX Sort Sequence and Data Granularity



### 5.2.2.8.2 IVTIEX 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |          |                                 |
|---------|----------|---------------------------------|
| .D...E  | DAY      | - Day of Month                  |
| .DW...E | HOURL    | - Hour of Day                   |
| .DWM..E | IVTCMPID | - Composite Library Association |
| .DWM..E | IVTTYPE  | - VTS Type                      |
| .DWM..E | IVTVLS   | - VTS Library Sequence Number   |
| .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

.D....E DAYNAME - Name of Day of Week  
.DWM..E DURATION - Recording Interval Time  
.DWM..E ENDTS - End Time Stamp  
.DWM..E INTERVLS - Number of Recording Intervals  
.DWM..E IVTLMAN - System-Managed Tape Library Manufacturer  
.DWM..E IVTLMODL - System-Managed Tape Library Model  
.DWM..E IVTLPLNT - System-Managed Tape Library Plant  
.DWM..E IVTLTYPE - System-Managed Tape Library Type  
.DWM..E IVTPNM - Product Name  
.D....E IVTRVN - Version Number  
.D....E IVTSMFTM - Write to SMF Timestamp  
.DWM..E IVTSNO - System-Managed Tape Library Seq Number  
.DWM..E IVT4001 - F/C 4001 Indicator  
.D....E ORGSYSID - Originating System Identification  
.DWM..E STARTTS - Start Time Stamp  
.D....E SUBSYSID - JES Execution Subsystem ID

#### Accumulated Data Elements

.DWM..E IEXDE - Data Exported (MB)  
.DWM..E IEXDI - Data Imported (MB)  
.DWM..E IEXDME - Data Moved During Export (MB)  
.DWM..E IEXDMI - Data Moved During Import (MB)  
.DWM..E IEXLVE - Logical Volumes Successfully Exported  
.DWM..E IEXLVI - Logical Volumes Successfully Imported  
.DWM..E IEXPVE - Phys Volumes w/Exported Logical Vols  
.DWM..E IEXPVI - Phys Volumes Processed During Import

#### Derived Data Elements

.DWM..E IEXAVLVE - Avg Size Logical Volume Exported (MB)  
.DWM..E IEXAVLVI - Avg Size Logical Volume Imported (MB)

### 5.2.2.8.3 IVTIEX Usage Considerations

This section identifies any special considerations or techniques related to using the IVTIEX file.

### 5.2.2.8.4 IVTIEX 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. Using the most recent DAYS timespan IVTIEX display physical and logical volume import and export activity for each distributed VTS (UI, secondary, and standalone).

Summarize the data by date, and generate a single page per DATE, with one line for each distributed VTS (UI, secondary, and standalone).

```
DATA;
%LET BY=%IEXSEQ(TS=DAYS) ;
%LET SUMBY=DAY ;
%LET BREAK=DAY ;
* ;
DATA;
SET &pIVTd..IVTTCA01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
%IEXSUM ;
* ;
PROC SORT ;
  BY DATE ;
* ;
PROC PRINT LABEL ;
  BY DATE ;
  PAGEBY DATE ;
  ID IVTCMPID IVTVLS IVTTYPE ;
  VAR IEXPVI IEXLVI IEXDI IEXDMI IEXPVE IEXLVE IEXDE
      IEXDME ;
  TITLE1 'Overall Daily Import/Export Stats per VTS' ;
RUN ;
```

### 5.2.3 VTS Component SVT Information Area Files

This section identifies each file in the StorageTek VSM (SVT) Information Area and defines its levels of summarization and data sequencing. The active data elements for each file are also listed.

The files maintained in the StorageTek VSM Information Area include:

- 1 - StorageTek VTSS Summary File (SVTSVS)
- 2 - VTSS Subsystem Performance File (SVTSSP)
- 3 - Channel Interface Performance File (SVTCIP)
- 4 - Virtual Tape Volume Mount Activity File (SVTVMR)
- 5 - Virtual Tape Volume Dismount Activity File (SVTVDR)
- 6 - Virtual Tape Volume Delete Activity File (SVTVXR)
- 7 - Virtual Tape Volume Migrate Activity File (SVTVGR)
- 8 - Virtual Tape Volume Recall Activity File (SVTVRR)
- 9 - Virtual Tape Volume Movement File (SVVMV)
- 10 - Virtual Tape Volume Scratch Status File (SVTVSS)
- 11 - Real Tape Drive Mount Activity File (SVTRMR)
- 12 - Real Tape Drive Dismount Activity File (SVTRDR)
- 13 - Real Tape Drive Performance File (SVTRPR)
- 14 - Multi-Volume Cartridge Activity File (SVTMVC)
- 15 - VTV - MVC Unlink Activity File (SVTVUN)

### 5.2.3.1 StorageTek VTSS Summary File (SVTSVS)

This file is a combination of several files dividing the data into 15 minute intervals. It provides a central repository for the most common system summary reporting needs. It is derived by a merge of the following detail level work files:

- o SVTVMR - Virtual Tape Volume Mount Activity
- o SVTVDR - Virtual Tape Volume Dismount Activity
- o SVTVGR - Virtual Tape Volume Migrate Activity
- o SVTVRR - Virtual Tape Volume Recall Activity
- o SVTRMR - Real Tape Drive Mount Activity

During this merge of event and interval driven data, the observations are placed or summarized into one of the following intervals based on the value of their end timestamp (ENDTS): 00:00 - 14:59, 15:00 - 29.59, 30:00 - 44.59, 45:00 - 59.59.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTSVS File Organization
- 2 - SVTSVS Data Elements List
- 3 - SVTSVS Usage Considerations
- 4 - SVTSVS Retrieval Examples

### 5.2.3.1.1 SVTSVS 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                     | VTSSID  | YEAR | MONTH | DAY  |  |
|          | HOUR                      | SVTIETS |      |       |      |  |
| DAYS     | SYSID                     | VTSSID  | YEAR | MONTH | DAY  |  |
|          | HOUR                      |         |      |       |      |  |
| WEEKS    | SYSID                     | VTSSID  | YEAR | WEEK  | ZONE |  |
|          | HOUR                      |         |      |       |      |  |
| MONTHS   | SYSID                     | VTSSID  | 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 5-11. SVTSVS Sort Sequence and Data Granularity

### 5.2.3.1.2 SVTSVS 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID | - VTSS ID           |
| XDW...E | WEEK   | - Week of Year      |
| XDWM..E | YEAR   | - Year of Century   |
| XDWM..E | ZONE   | - Time Zone         |

#### Common Data Elements

|         |           |                                       |
|---------|-----------|---------------------------------------|
| 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 | ORGSYSID  | - Originating System Identification   |
| XDWM..E | STARTTS   | - Start Time Stamp                    |
| XDWM..E | SVTIETS   | - Interval End Timestamp              |
| XDWM..E | SVTISTS   | - Interval Start Timestamp            |
| XDWM..E | SVTRDST1  | - Total RTD Mounts within Limit 1     |
| XDWM..E | SVTRDST2  | - Total RTD Mounts within Limit 2     |
| XDWM..E | SVTRDST3  | - Total RTD Mounts within Limit 3     |
| XDWM..E | SVTRDST4  | - Total RTD Mounts within Limit 4     |
| XDWM..E | SVTRDST5  | - Total RTD Mounts within Limit 5     |
| XDWM..E | SVTRDST6  | - Total RTD Mounts within Limit 6     |
| XDWM..E | SVTRDST7  | - Total RTD Mounts within Limit 7     |
| XDWM..E | SVTRDST8  | - Total RTD Mounts within Limit 8     |
| XDWM..E | SVTRVAL1  | - RTD Mount Time Distribution Limit 1 |
| XDWM..E | SVTRVAL2  | - RTD Mount Time Distribution Limit 2 |
| XDWM..E | SVTRVAL3  | - RTD Mount Time Distribution Limit 3 |
| XDWM..E | SVTRVAL4  | - RTD Mount Time Distribution Limit 4 |
| XDWM..E | SVTRVAL5  | - RTD Mount Time Distribution Limit 5 |
| XDWM..E | SVTRVAL6  | - RTD Mount Time Distribution Limit 6 |
| XDWM..E | SVTRVAL7  | - RTD Mount Time Distribution Limit 7 |
| XDWM..E | SVTV DST1 | - Total VTV Mounts within Limit 1     |
| XDWM..E | SVTV DST2 | - Total VTV Mounts within Limit 2     |

XDWM..E SVTV DST3 - Total VTV Mounts within Limit 3  
XDWM..E SVTV DST4 - Total VTV Mounts within Limit 4  
XDWM..E SVTV DST5 - Total VTV Mounts within Limit 5  
XDWM..E SVTV DST6 - Total VTV Mounts within Limit 6  
XDWM..E SVTV DST7 - Total VTV Mounts within Limit 7  
XDWM..E SVTV DST8 - Total VTV Mounts within Limit 8  
XDWM..E SVTV VAL1 - VTV Mount Time Distribution Limit 1  
XDWM..E SVTV VAL2 - VTV Mount Time Distribution Limit 2  
XDWM..E SVTV VAL3 - VTV Mount Time Distribution Limit 3  
XDWM..E SVTV VAL4 - VTV Mount Time Distribution Limit 4  
XDWM..E SVTV VAL5 - VTV Mount Time Distribution Limit 5  
XDWM..E SVTV VAL6 - VTV Mount Time Distribution Limit 6  
XDWM..E SVTV VAL7 - VTV Mount Time Distribution Limit 7

### Retained Data Elements

XD....E SVSMASK - Input Record Mask

### Accumulated Data Elements

XDWM..E SVSBCM - Virtual Tape Page Bytes Migrated  
XDWM..E SVSDISCT - Total VTVs Dismounted  
XDWM..E SVSEXT - Mount Existing VTV Count  
XDWM..E SVSMECT - 800MB (E) Cartridge Migrate Requests  
XDWM..E SVSMIGCT - Total VTVs Migrated  
XDWM..E SVSMMTM - Migrate Time  
XDWM..E SVSMNR - VTV Mount Without Recall Count  
XDWM..E SVSMNTCT - Total VTVs Mounted  
XDWM..E SVSMRC - VTV Mount After Recall Count  
XDWM..E SVSMSCT - 400MB (S) Cartridge Migrate Requests  
XDWM..E SVSMSZ - VTV Page Bytes for Migration  
XDWM..E SVSMSZU - VTV Uncompressed Size for Migration  
XDWM..E SVSMTA - Migrate Request Count (Auto)  
XDWM..E SVSMT C - Migrate Request Count (Consolidate)  
XDWM..E SVSMTD - Migrate Request Count (Demand)  
XDWM..E SVSMTI - Migrate Request Count (Immediate)  
XDWM..E SVSMTM - VTV Mount Time  
XDWM..E SVSMTR - Migrate Request Count (Reclaim)  
XDWM..E SVSMTX - Migrate Request Count (Export)  
XDWM..E SVSM2GB - 2000MB Cartridge Migrate Requests  
XDWM..E SVSM4GB - 4000MB Cartridge Migrate Requests  
XDWM..E SVSRBCM - Total Bytes Recalled  
XDWM..E SVSRCLCT - Total VTVs Recalled  
XDWM..E SVSRCMA - Recall Request Count (Auto)  
XDWM..E SVSRCMC - Recall Request Count (Consolidate)  
XDWM..E SVSRCMD - Recall Request Count (Demand)  
XDWM..E SVSRCMN - Recall Request Count (Drain)  
XDWM..E SVSRCMR - Recall Request Count (Reclaim)  
XDWM..E SVSRCMX - Recall Request Count (Export)



XDWM..E SVSRMTA - RTD Mounts for Audit  
 XDWM..E SVSRMTC - RTD Mounts for Consolidate  
 XDWM..E SVSRMTD - RTD Mounts for Drain  
 XDWM..E SVSRMTL - RTD Mounts for Reclaim  
 XDWM..E SVSRMTM - RTD Mounts for Migrate  
 XDWM..E SVSRMTR - RTD Mounts for Recall  
 XDWM..E SVSRMTTM - RTD Mount Time  
 XDWM..E SVSRMTX - RTD Mounts for Export  
 XDWM..E SVSRRO - VTV Mounted Read Only Count  
 XDWM..E SVSRRTM - Recall Time  
 XDWM..E SVSRRW - VTV Mounted Read/Write Count  
 XDWM..E SVSRTDCT - Total RTD Mounts  
 XDWM..E SVSRTRO - RTD Mounts for Read Only  
 XDWM..E SVSRTRW - RTD Mounts for Read/Write  
 XDWM..E SVSSAL - Mount ANSI Label Scratch VTV Count  
 XDWM..E SVSSNL - Mount Exist as Scratch VTV Count  
 XDWM..E SVSSSL - Mount SL Scratch VTV Count  
 XDWM..E SVSVSZ - Uncompressed Byte Size of VTV

#### Minimum Data Elements

XDWM..E SVSMNGTM - Min Migrate Time  
 XDWM..E SVSMNMTM - VTV Min Mount Time  
 XDWM..E SVSMNRMT - RTD Min Mount Time  
 XDWM..E SVSMNRTM - Min Recall Time  
 XDWM..E SVSMNVSZ - Min VTV MB Size on Dismount

#### Maximum Data Elements

XDWM..E SVSMXGTM - Max Migrate Time  
 XDWM..E SVSMXMTM - VTV Max Mount Time  
 XDWM..E SVSMXRMT - RTD Max Mount Time  
 XDWM..E SVSMXRMT - Max Recall Time  
 XDWM..E SVSMXVSZ - Max VTV MB Size on Dismount

#### Derived Data Elements

XDWM..E SVSAVGTM - Avg Migrate Time  
 XDWM..E SVSAVMTM - VTV Avg Mount Time  
 XDWM..E SVSAVRMT - RTD Avg Mount Time  
 XDWM..E SVSAVRTM - Avg Recall Time  
 XDWM..E SVSAVVSZ - Avg VTV Uncompressed Size on Dismount  
 XDWM..E SVSCPRT0 - Approx. VTV Compression Ratio (x:1)  
 XDWM..E SVSPCCMP - Approx. VTV Percent Compressed  
 XDWM..E SVSPCEXT - Pct Mount Existing VTV  
 XDWM..E SVSPCHIT - VTV Recall Disk Buffer Hit Pct  
 XDWM..E SVSPCMIS - VTV Recall Disk Buffer Miss Pct  
 XDWM..E SVSPCMTA - Pct Migrate Request (Auto)  
 XDWM..E SVSPCMTC - Pct Migrate Request (Consolidate)

XDWM..E SVSPCMD - Pct Migrate Request (Demand)  
XDWM..E SVSPCMTI - Pct Migrate Request (Immediate)  
XDWM..E SVSPCMTR - Pct Migrate Request (Reclaim)  
XDWM..E SVSPCMTX - Pct Migrate Request (Export)  
XDWM..E SVSPCRM1 - Pct RTDs Mounted Within Limit 1  
XDWM..E SVSPCRM2 - Pct RTDs Mounted Within Limit 2  
XDWM..E SVSPCRM3 - Pct RTDs Mounted Within Limit 3  
XDWM..E SVSPCRM4 - Pct RTDs Mounted Within Limit 4  
XDWM..E SVSPCRM5 - Pct RTDs Mounted Within Limit 5  
XDWM..E SVSPCRM6 - Pct RTDs Mounted Within Limit 6  
XDWM..E SVSPCRM7 - Pct RTDs Mounted Within Limit 7  
XDWM..E SVSPCRM8 - Pct RTDs Mounted Within Limit 8  
XDWM..E SVSPCRRA - Pct Recall Request (Auto)  
XDWM..E SVSPCRRC - Pct Recall Request (Consolidate)  
XDWM..E SVSPCRRD - Pct Recall Request (Demand)  
XDWM..E SVSPCRRN - Pct Recall Request (Drain)  
XDWM..E SVSPCRRR - Pct Recall Request (Reclaim)  
XDWM..E SVSPCRRX - Pct Recall Request (Export)  
XDWM..E SVSPCSAL - Pct Mount ANSI Label Scratch VTV  
XDWM..E SVSPCSNL - Pct Mount Existing as Scratch VTV  
XDWM..E SVSPCSSL - Pct Mount SL Scratch VTV  
XDWM..E SVSPCVM1 - Pct VTVs Mounted Within Limit 1  
XDWM..E SVSPCVM2 - Pct VTVs Mounted Within Limit 2  
XDWM..E SVSPCVM3 - Pct VTVs Mounted Within Limit 3  
XDWM..E SVSPCVM4 - Pct VTVs Mounted Within Limit 4  
XDWM..E SVSPCVM5 - Pct VTVs Mounted Within Limit 5  
XDWM..E SVSPCVM6 - Pct VTVs Mounted Within Limit 6  
XDWM..E SVSPCVM7 - Pct VTVs Mounted Within Limit 7  
XDWM..E SVSPCVM8 - Pct VTVs Mounted Within Limit 8

### 5.2.3.1.3 SVTSVS Usage Considerations

This section identifies any special considerations or techniques related to using the SVTSVS file.

The SVTSVS file is generated from a mix of files representing both interval level statistics and event data. For data elements associated with events, missing values will result if no events occurred during the interval.

If the values for particular metrics are always missing, it may be that the source SMF record subtypes are not being recorded. Consult with the VSM Storage Administrator and review the SMF parameters for VTCS in SYS1.PARMLIB to verify which records are recorded.

In addition, data element SVSMASK, in the DETAIL timespan indicates the SVTfff records that contributed to the observation. Each byte of SVSMASK represents whether or not a particular SVTfff file contributed to the SVS file observation. See the data dictionary description for SVSMASK for the mapping of SVTfff file pertains to each SVSMASK byte.

#### 5.2.3.1.4 SVTSVS 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. Generate a report displaying virtual cache mount statistics and recall statistics, by hour, from the DAYS timespan. This reports shows the total virtual mounts, number of scratch, cache hit, cache miss mounts, percentage relationships and minimum, maximum, and average mount times. It also shows specific metrics on the time to mount a recalled volume.

```
PROC PRINT DATA=&pSVTd..SVTSVS01 NOOBS LABEL;  
  ID SYSID VTSSID;  
  VAR SVSMNTCT SVSSSL SVSMNR SVSMRC SVSPCHIT SVSPCMIS  
      SVSMNMTM SVSAVMTM SVSMXMTM SVSMNRTM SVSAVRTM  
      SVSMXRTM;  
  TITLE 'VTSS TAPE MOUNT AND RECALL ACTIVITY';  
RUN;
```

#### 5.2.3.2 Subsystem Performance Request File(SVTSSP)

At the DETAIL timespan, this file provides statistics on VTSS performance. It is derived from the VTSS user SMF record, subtype 10, 'VTSS Subsystem Performance'. This record is produced on an interval basis, typically every 15 minutes. VTSS disk buffer usage statistics are contained this file.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTSSP File Organization
- 2 - SVTSSP Data Elements List
- 3 - SVTSSP Usage Considerations
- 4 - SVTSSP Retrieval Examples

### 5.2.3.2.1 SVTSSP 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                     | VTSSID | YEAR | MONTH | DAY  |  |
|          | HOUR                      | ENDTS  |      |       |      |  |
| DAYS     | SYSID                     | VTSSID | YEAR | MONTH | DAY  |  |
|          | HOUR                      |        |      |       |      |  |
| WEEKS    | SYSID                     | VTSSID | YEAR | WEEK  | ZONE |  |
|          | HOUR                      |        |      |       |      |  |
| MONTHS   | SYSID                     | VTSSID | 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 5-12. SVTSSP Sort Sequence and Data Granularity

### 5.2.3.2.2 SVTSSP 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID | - VTSS ID           |
| XDW...E | WEEK   | - Week of Year      |

XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

#### Common Data Elements

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 ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp

#### Accumulated Data Elements

XDWM..E SSPBCH - Base Cache Size (MB)  
XDWM..E SSPBRP - GB Read for Free Space Collection (GB)  
XDWM..E SSPCCH - Customer Cache Size (MB)  
XDWM..E SSPCDP - Standard Capacity Defined (GB)  
XDWM..E SSPCFP - Collected Free Disk Buf. Capacity (GB)  
XDWM..E SSPCOUNT - Subsystem Performance Record Count  
XDWM..E SSPEBC - ECAM-T Msgs. Bypassed (Config Busy)  
XDWM..E SSPEBS - ECAM-T Msgs. Bypassed (No Buffer)  
XDWM..E SSPECP - Total ECAM-T Channel Programs  
XDWM..E SSPEMP - Total ECAM-T Messages Processed  
XDWM..E SSPFCP - Total Free Disk Buffer Capacity (GB)  
XDWM..E SSPNSZ - NVS Size (MB)  
XDWM..E SSPOCH - Offline Cache Size  
XDWM..E SSPPCH - Pinned Cache Size  
XDWM..E SSPRGC - Redundancy Group Count  
XDWM..E SSPSCP - Total Free Space Collection (GB)  
XDWM..E SSPTCP - Total Disk Buffer Capacity (GB)  
XDWM..E SSPUCP - Total Used Disk Buffer Capacity (GB)

#### Derived Data Elements

XDWM..E SSPAVBRP - Avg Bytes Read for Free Space (GB)  
XDWM..E SSPAVCDP - Avg Defined Capacity (GB)  
XDWM..E SSPAVCFP - Avg Collected Free Disk Buffer (GB)  
XDWM..E SSPAVFCP - Avg Free Disk Buffer Capacity (GB)  
XDWM..E SSPAVSCP - Avg Free Space Collected (GB)  
XDWM..E SSPAVTCP - Avg Disk Buffer Capacity (GB)  
XDWM..E SSPAVUCP - Avg Used Disk Buffer Capacity (GB)  
XDWM..E SSPPCFCP - Pct Free Disk Buffer Capacity  
XDWM..E SSPPCUCP - Pct Used Disk Buffer Capacity

### 5.2.3.2.3 SVTSSP Usage Considerations

The disk buffer capacity metrics are accumulated at higher timespans. The values must be divided by the intervals to obtain the real values. Average elements have already been provided in the file for this reason. For example, using SSPTCP, Total Disk Buffer Capacity reporting on disk buffer usage with SSPTCP (Total Disk Buffer Capacity) and SSPUCP (Used Disk Buffer Capacity), at higher timespans will display highly inflated numbers. Using the SSPAVTCP and SSPAVUCP will display the average total and average used disk buffer capacity, and will reflect reality.

When multiple z/OS hosts share a VTSS, reporting can be done by subsetting to one of the hosts to get an accurate picture of VTSS capacity usage. Since this file is created from interval records the statistics are as of the time the SMF record was produced for the VTSS. If 4 hosts share a VTSS, the timestamps on the StorageTek User SMF record, subtype 10, will vary from host to host, sometimes minutes apart. Thus this record is a global view of the VTSS at that point in time.



### 5.2.3.2.4 SVTSSP 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. Generate a plot chart of virtual tape disk buffer usage throughout the previous day for each SYSID/VTSSID combination. The chart displays the total disk buffer capacity in the VTSS, and the amount used throughout the day.

```
PROC PLOT DATA=&pSVTd..SVTSSP01;
  PLOT SSPAVTCP*HOUR='*' SSPAVUCP*HOUR='='
    / OVERLAY;
  BY SYSID VTSSID;
  LABEL SSPAVTCP='Total Disk Buffer Capacity';
  LABEL SSPAVUCP='Used Disk Buffer Capacity';
  TITLE 'Virtual Tape Storage Subsystem';
  TITLE2 'Total Capacity vs Usage';
```

Note: For VTSSs that are shared among various SYSIDs, the plot will have a similar pattern for the same VTSS, because the subtype 10 interval record for each SYSID will have a snapshot view of the VTSS cache status at that point in time. Pick one SYSID as the reporting SYSID for each VTSS. Summarizing data across SYSIDs for the same VTSS will result in inflated values.

2. Generate a plot chart of virtual tape disk buffer usage throughout the previous day by hour, summarized for each VTSSID. The chart displays the total disk buffer capacity in the VTSS, and the amount used throughout the day by hour. No matter how many SYSIDs have the VTSS as a shared resource, this provides the view from the VTSS.

```
PROC MEANS DATA=&pSVTX..SVTSSP01 NONOBS NWAY NOPRINT;
  CLASS VTSSID HOUR;
  VAR SSPTCP SSPFCP SSPUCP;
  OUTPUT OUT=TEMP
    MEAN = TOTAL FREE USED;
```

```
RUN;

PROC PLOT DATA=TEMP;
  PLOT TOTAL*HOUR='*' FREE*HOUR='=' USED*HOUR='@'
    / OVERLAY;
  BY VTSSID;
  TITLE1 'VIRTUAL TAPE STORAGE SUBSYSTEM';
  TITLE2 'Capacity vs Usage by hour';
RUN;

PROC SORT DATA=TEMP;
  BY VTSSID HOUR;
RUN;

PROC PRINT DATA=TEMP NOOBS SPLIT='*';
  VAR  VTSSID HOUR TOTAL USED FREE;

  LABEL VTSSID = 'VTSS*NAME'
        TOTAL  = 'Backend*Capacity(GB)'
        FREE   = 'Free*Backend*Capacity(GB)'
        USED   = 'Used*Backend*Capacity(GB)'
        ;
  FORMAT TOTAL  COMMA9.;
  FORMAT FREE   COMMA9.;
  FORMAT USED   COMMA9.;

  TITLE1 "Virtual Tape Storage Subsystem";
  TITLE2 "Backend Capacity Usage";
RUN;
```

### 5.2.3.3 Channel Interface Performance File(SVTCIP)

At the DETAIL timespan, this file contains statistics related to channel activity associated to the VTSS. It is derived from the VTSS user SMF record, subtype 11, 'VTSS Channel Interface Performance'. This record is produced on an interval basis, typically every 15 minutes. The SVTCIP file contains statistics on I/O throughput and channel capacity between the host and the VTSS, and the VTSS to the RTD's (Real Tape Devices).

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTCIP File Organization
- 2 - SVTCIP Data Elements List
- 3 - SVTCIP Usage Considerations
- 4 - SVTCIP Retrieval Examples

### 5.2.3.3.1 SVTCIP 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<br>MONTH            | VTSSID<br>DAY  | CIPINM<br>HOUR | CIPTOL<br>ENDTS | YEAR |
| DAYS     | SYSID<br>MONTH            | VTSSID<br>DAY  | CIPINM<br>HOUR | CIPTOL          | YEAR |
| WEEKS    | SYSID<br>WEEK             | VTSSID<br>ZONE | CIPINM<br>HOUR | CIPTOL          | YEAR |
| MONTHS   | SYSID<br>MONTH            | VTSSID<br>ZONE | CIPINM         | CIPTOL          | YEAR |
| 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. SVTCIP Sort Sequence and Data Granularity



### 5.2.3.3.2 SVTCIP 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

- XDWM..E CIPINM - Channel Interface Name
- XDWM..E CIPTOL - Type of Link
- 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 VTSSID - VTSS ID  
XDW...E WEEK - Week of Year  
XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

#### Common Data Elements

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 ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp

#### Retained Data Elements

XDWM..E CIPCSP - Channel Speed  
X.....E CIPNAT - Number of Addresses Trapped

#### Accumulated Data Elements

XDWM..E CIPCE - Channel Interface Enabled  
XDWM..E CIPCI - Channel Interface Installed  
XDWM..E CIPCOUNT - Channel Interface Performance Count  
XDWM..E CIPCUB - Control Unit Busy Time  
XDWM..E CIPNIO - Number of IOs

#### Minimum Data Elements

XDWM..E CIPMNCUB - Min Control Unit Busy Time  
XDWM..E CIPMNNIO - Min Number of IOs

#### Maximum Data Elements

XDWM..E CIPMXCUB - Max Control Unit Busy Time  
XDWM..E CIPMXNIO - Max Number of IOs

#### Derived Data Elements

XDWM..E CIPAVCUB - Avg Control Unit Busy Time  
XDWM..E CIPAVNIO - Avg Number of IOs  
XDWM..E CIPPCUB - Pct Control Unit Busy

### 5.2.3.3.3 SVTCIP Usage Considerations

Up to 32 channels can be defined. Channels can be defined or installed but not actually enabled. Data element Channel Interface Enabled, CICPE, can be used to determine channel status.

If channel was enabled during the interval, CICPE has a value of one (1). At higher timespans, CICPE indicates the number of intervals the channel was enabled. In addition, data element Type of Link (CIPTOL) indicates the type of channel, whether it services the host or the real tape drives.

### 5.2.3.3.4 SVTCIP 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. Generate a chart displaying the total channel I/O activity on HOST and RTD channels by hour.

```
%LET BY    = SYSID VTSSID CIPTOL HOUR;
%LET BREAK = HOUR;
PROC SORT DATA=&pSVTd..SVTCIP01 OUT=CIP;
  BY &BY;
RUN;
DATA CIP2; SET CIP;
  WHERE CIPCE GE 1;
  %CIPSUM(SUMBY=&BY, SUMBREAK=&BREAK);
RUN;
PROC CHART DATA=CIP2;
  BY SYSID VTSSID;
  VBAR CIPTOL / GROUP=HOUR SUMVAR=CIPNIO DISCRETE;
  TITLE 'HOST and RTD Channel I/O Activity';
RUN;
```



#### 5.2.3.4 Virtual Tape Volume Mount Request File(SVTVMR)

At the DETAIL timespan, this file provides information for virtual tape volume mounts. It is derived from the VTSS user SMF record, subtype 13. This record is produced at the time the virtual tape mount is satisfied, ie: ready state. This is a key file for analysis of virtual tape mount times, delays in mounts, and buffer hit/miss ratios.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVMR File Organization
- 2 - SVTVMR Data Elements List
- 3 - SVTVMR Usage Considerations
- 4 - SVTVMR Retrieval Examples

### 5.2.3.4.1 SVTVMR 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                     | VTSSID | VTSSHST | VTSSMCL | YEAR |  |
|          | MONTH                     | DAY    | HOUR    | ENDTS   |      |  |
| DAYS     | SYSID                     | VTSSID | VTSSHST | VTSSMCL | YEAR |  |
|          | MONTH                     | DAY    | HOUR    |         |      |  |
| WEEKS    | SYSID                     | VTSSID | VTSSHST | VTSSMCL | YEAR |  |
|          | MONTH                     | WEEK   | ZONE    | HOUR    |      |  |
| MONTHS   | SYSID                     | VTSSID | VTSSHST | VTSSMCL | 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 5-14. SVTVMR Sort Sequence and Data Granularity



### 5.2.3.4.2 SVTVMR 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-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                         |
|---------|---------|-------------------------|
| XD...E  | DAY     | - Day of Month          |
| XDW...E | HOURL   | - Hour of Day           |
| XDWM..E | MONTH   | - Month of Year         |
| XDWM..E | SYSID   | - System Identifier     |
| XDWM..E | VTSSHST | - Originating Host Name |
| XDWM..E | VTSSID  | - VTSS ID               |

XDWM..E VTSSMCL - VTV Management Class  
XDW...E WEEK - Week of Year  
XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

#### Common Data Elements

XD....E DAYNAME - Name of Day of Week  
X.....E DSNAME - Data Set Name  
XDWM..E ENDTS - End Time Stamp  
X.....E JOB - Job Identification  
XDWM..E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp  
X.....E STEPNAME - Program Step Name  
XDWM..E SVTV DST1 - Total VTV Mounts within Limit 1  
XDWM..E SVTV DST2 - Total VTV Mounts within Limit 2  
XDWM..E SVTV DST3 - Total VTV Mounts within Limit 3  
XDWM..E SVTV DST4 - Total VTV Mounts within Limit 4  
XDWM..E SVTV DST5 - Total VTV Mounts within Limit 5  
XDWM..E SVTV DST6 - Total VTV Mounts within Limit 6  
XDWM..E SVTV DST7 - Total VTV Mounts within Limit 7  
XDWM..E SVTV DST8 - Total VTV Mounts within Limit 8  
XDWM..E SVTV VAL1 - VTV Mount Time Distribution Limit 1  
XDWM..E SVTV VAL2 - VTV Mount Time Distribution Limit 2  
XDWM..E SVTV VAL3 - VTV Mount Time Distribution Limit 3  
XDWM..E SVTV VAL4 - VTV Mount Time Distribution Limit 4  
XDWM..E SVTV VAL5 - VTV Mount Time Distribution Limit 5  
XDWM..E SVTV VAL6 - VTV Mount Time Distribution Limit 6  
XDWM..E SVTV VAL7 - VTV Mount Time Distribution Limit 7  
X.....E VTSSCTP - Cartridge Type  
X.....E VTSSDID - VTD Device ID  
X.....E VTSSVID - VTV Volser ID

#### Retained Data Elements

X.....E VMRMET - Mount End Timestamp  
X.....E VMRMST - Mount Start Timestamp  
X.....E VMRRCI - Recall Indicator  
X.....E VMRRWS - Read/Write Status  
X.....E VMRTIM - VTV Timestamp  
X.....E VMRVMT - Virtual Mount Type

#### Accumulated Data Elements

XDWM..E VMRCOUNT - Total VTV Mounts  
XDWM..E VMRETM - VTV Specific Mount Time  
XDWM..E VMREXT - Mount Existing VTV Count  
XDWM..E VMRHTM - VTV Buffer Hit Mount Time  
XDWM..E VMRMNR - VTV Mount Without Recall Count

XDW..E VMRMRC - VTV Mount After Recall Count  
XDW..E VMRMTM - VTV Mount Time  
XDW..E VMRRRO - Mounted Read Only Count  
XDW..E VMRRRW - Mounted Read/Write Count  
XDW..E VMRSAL - Mount ANSI Label Scratch VTV Count  
XDW..E VMRSCTPO - Other cartridge Mounts  
XDW..E VMRSECT - 800MB (E) Cartridge Mounts  
XDW..E VMRSMT - Total VTV Scratch Mounts  
XDW..E VMRSNL - Mount Existing as Scratch VTV Count  
XDW..E VMRSST - 400MB (S) Cartridge Mounts  
XDW..E VMRSSL - Mount SL Scratch VTV Count  
XDW..E VMRSTM - VTV Scratch Mount Time  
XDW..E VMRS2GB - 2GB Cartridge Mounts  
XDW..E VMRS4GB - 4GB Cartridge Mounts  
XDW..E VMRVMTOT - Mount Other Count  
XDW..E VMRXTM - VTV Buffer Miss Mount Time

### Minimum Data Elements

XDW..E VMRMNETM - Min VTV Specific Mount Time  
XDW..E VMRMNHTM - Min VTV Buffer Hit Mount Time  
XDW..E VMRMNMTM - Min VTV Mount Time  
XDW..E VMRMNSTM - Min VTV Scratch Mount Time  
XDW..E VMRMNXTM - Min VTV Buffer Miss Mount Time

### Maximum Data Elements

XDW..E VMRMXETM - Max VTV Specific Mount Time  
XDW..E VMRMXHTM - Max VTV Buffer Hit Mount Time  
XDW..E VMRMXMTM - Max Mount Time  
XDW..E VMRMXSTM - Max VTV Scratch Mount Time  
XDW..E VMRMXXTM - Max VTV Buffer Miss Mount Time

### Derived Data Elements

XDW..E VMRAVETM - Avg VTV Specific Mount Time  
XDW..E VMRAVHTM - Avg VTV Buffer Hit Mount Time  
XDW..E VMRAVMTM - Avg VTV Mount Time  
XDW..E VMRAVSTM - Avg VTV Scratch Mount Time  
XDW..E VMRAVXTM - Avg VTV Buffer Miss Mount Time  
XDW..E VMRPCEXT - Pct Mount Existing VTV  
XDW..E VMRPCHIT - VTV Recall Disk Buffer Hit Pct  
XDW..E VMRPCMIS - VTV Recall Disk Buffer Miss Pct  
XDW..E VMRPCSAL - Pct Mount ANSI Label Scratch VTV  
XDW..E VMRPCSNL - Pct Mount Existing as Scratch VTV  
XDW..E VMRPCSSL - Pct Mount SL Scratch VTV  
XDW..E VMRPCVM1 - Pct Mounted Within Limit 1  
XDW..E VMRPCVM2 - Pct Mounted Within Limit 2  
XDW..E VMRPCVM3 - Pct Mounted Within Limit 3

```
XDWM..E VMRPCVM4 - Pct Mounted Within Limit 4
XDWM..E VMRPCVM5 - Pct Mounted Within Limit 5
XDWM..E VMRPCVM6 - Pct Mounted Within Limit 6
XDWM..E VMRPCVM7 - Pct Mounted Within Limit 7
XDWM..E VMRPCVM8 - Pct Mounted Within Limit 8
```

#### 5.2.3.4.3 SVTVMR Usage Considerations

A primary performance goal for virtual tape subsystems is to satisfy virtual tape accesses in the disk buffer. When virtual tapes must be recalled from physical tape cartridges, performance suffers dramatically. While totally eliminating virtual volume recalls is impossible, recalls should be minimized.

Data in the SVTVMR file can provide insight to assist the storage administrator in adjusting management classes to either keep virtual volumes in the disk buffer longer, or to predict when volumes might be needed; thus forcing them to be recalled in advance so they are resident in the disk buffer when required. Any improvement in minimizing virtual volume recalls increases virtual tape subsystem throughput.

### 5.2.3.4.4 SVTVMR 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. Generate a report displaying virtual tape mount activity and mount response time by hour.

```
%LET BY      = SYSID VTSSID VTSSMCL HOUR;
%LET BREAK = HOUR;
PROC SORT DATA=&psvtx..SVTVMR01 OUT=VMR;
  BY &BY;
RUN;
DATA VMR2; SET VMR;
  %VMRSUM(SUMBY=&BY, SUMBREAK=&BREAK);
RUN;
PROC PRINT DATA=VMR2 LABEL NOOBS;
  BY SYSID VTSSID;
  VAR SYSID VTSSID VTSSMCL HOUR VMRCOUNT
      VMRMNR VMRMRC VMRAVMTM VMRMNMTM VMRMXMTM;
  TITLE 'Virtual Tape Mount Activity';
RUN;
```

Note: Drop management class from the BY and VAR statements to get gross mounts by SYSID and VTSSID.



### 5.2.3.5 Virtual Tape Volume Dismount Request File

At the DETAIL timespan, this file provides information about virtual tape volume dismounts. It is derived from the VTSS user SMF record, subtype 14. The subtype 14 record is produced when a VTV dismount event occurs, and contains metrics on number of bytes written to the virtual volume and the compression ratio achieved.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVDR File Organization
- 2 - SVTVDR Data Elements List
- 3 - SVTVDR Usage Considerations
- 4 - SVTVDR Retrieval Examples

### 5.2.3.5.1 SVTVDR 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                     | VTSSID | VTSSHST | VTSSMCL | YEAR |
|          | MONTH                     | DAY    | HOUR    | ENDTS   |      |
| DAYS     | SYSID                     | VTSSID | VTSSHST | VTSSMCL | YEAR |
|          | MONTH                     | DAY    | HOUR    |         |      |
| WEEKS    | SYSID                     | VTSSID | VTSSHST | VTSSMCL | YEAR |
|          | WEEK                      | ZONE   | HOUR    |         |      |
| MONTHS   | SYSID                     | VTSSID | VTSSHST | VTSSMCL | 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 5-15. SVTVDR Sort Sequence and Data Granularity

### 5.2.3.5.2 SVTVDR 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSHST | - Originating Host Name |
| XDWM..E | VTSSID  | - VTSS ID               |
| XDWM..E | VTSSMCL | - VTV Management Class  |
| XDW...E | WEEK    | - Week of Year          |
| XDWM..E | YEAR    | - Year of Century       |
| XDWM..E | ZONE    | - Time Zone             |

#### Common Data Elements

|         |          |                                     |
|---------|----------|-------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week               |
| X.....E | DSNAME   | - Data Set Name                     |
| XDWM..E | ENDTS    | - End Time Stamp                    |
| X.....E | JOB      | - Job Identification                |
| XDWM..E | ORGSYSID | - Originating System Identification |
| XDWM..E | STARTTS  | - Start Time Stamp                  |
| X.....E | STEPNAME | - Program Step Name                 |
| X.....E | VTSSCTP  | - Cartridge Type                    |
| X.....E | VTSSDID  | - VTD Device ID                     |
| X.....E | VTSSVID  | - VTV Volser ID                     |

#### Retained Data Elements

|         |        |                         |
|---------|--------|-------------------------|
| X.....E | VDRSTA | - VTV State             |
| X.....E | VDRTIM | - Last VTV Mount on VTD |
| X.....E | VDRVMT | - Virtual Mount Type    |

#### Accumulated Data Elements

XDW..E VDRCOUNT - Total VTV Dismounts  
XDW..E VDRDSM - VTV Dismount Count  
XDW..E VDREXT - Dismount Existing VTV Count  
XDW..E VDRMIG - VTV Migrated Count  
XDW..E VDRMNT - VTV Mounted Count  
XDW..E VDRMSZ - VTV Page Bytes for Migration  
XDW..E VDRNON - VTV Does Not Exist Count  
XDW..E VDRREC - VTV Recalled Count  
XDW..E VDRSCTP0 - Other Cartridge Dismounts  
XDW..E VDRSECT - 800MB (E) Cartridge Dismounts  
XDW..E VDRSSCT - 400MB (S) Cartridge Dismounts  
XDW..E VDRSSL - Dismount SL Scratch VTV Count  
XDW..E VDRSTA0T - Other State Count  
XDW..E VDRS2GB - 2GB Cartridge Dismounts  
XDW..E VDRS4GB - 4GB Cartridge Dismounts  
XDW..E VDRULNUM - Number of MVCs To Unlink  
XDW..E VDRVMT0T - Other Dismount VTV Count  
XDW..E VDRVSZ - Uncompressed Size of VTV (MB)  
XDW..E VDRVMT - Total VTVMaint Dismounts

#### Derived Data Elements

XDW..E VDRCPRT0 - Approx. VTV Compression Ratio (x:1)  
XDW..E VDRPCCMP - Approx. VTV Pct Compressed

### 5.2.3.5.3 SVTVDR Usage Considerations

The SVTVDR and Virtual Tape Volume Mount Request (SVTVMR) files can be merged to determine tape drive occupancy time.

### 5.2.3.5.4 SVTVDR 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.

No report suggestions at this time from this file.

### 5.2.3.6 Virtual Tape Volume Delete Request File

At the DETAIL timespan, this file provides information about virtual tape volume delete requests. It is derived from the VTSS user SMF record, subtype 15. This record is produced for each virtual tape volume that is deleted from the disk buffer.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVXR File Organization
- 2 - SVTVXR Data Elements List
- 3 - SVTVXR Usage Considerations
- 4 - SVTVXR Retrieval Examples

### 5.2.3.6.1 SVTVXR 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<br>DAY              | VTSSID<br>HOUR | VTSSMCL<br>ENDTS | YEAR | MONTH |
| DAYS     | SYSID<br>DAY              | VTSSID<br>HOUR | VTSSMCL          | YEAR | MONTH |
| WEEKS    | SYSID<br>ZONE             | VTSSID<br>HOUR | VTSSMCL          | YEAR | WEEK  |
| MONTHS   | SYSID<br>ZONE             | VTSSID         | VTSSMCL          | YEAR | MONTH |
| 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. SVTVXR Sort Sequence and Data Granularity

### 5.2.3.6.2 SVTVXR 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-<br>Span * | Data<br>Element | Data Element<br>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 VTSSID - VTSS ID
- XDWM..E VTSMCL - VTV Management Class



XDWM...E WEEK - Week of Year  
XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

#### Common Data Elements

XD....E DAYNAME - Name of Day of Week  
XDWM..E ENDTS - End Time Stamp  
XDWM..E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp  
X.....E VTSSCTP - Cartridge Type  
X.....E VTSSVID - VTV Volser ID

#### Retained Data Elements

X.....E VXRLRI - Last Residency Indicator  
X.....E VXRLTR - Time VTV Last Referenced  
X.....E VXRRSN - VTV Delete Reason Code  
X.....E VXRTIM - VTV Creation Time

#### Accumulated Data Elements

XDWM..E VXRAGE - Age of VTV Since Creation  
XDWM..E VXRCN - VTV Consolidated Count  
XDWM..E VXRCOUNT - Total VTVs Deleted  
XDWM..E VXRDS - VTV Deleted on Scratch Count  
XDWM..E VXRDSU - VTV Deleted by DELETSCR Count  
XDWM..E VXRIMP - VTV Deleted by Import Count  
XDWM..E VXRLAGE - Age of VTV Since Last Used  
XDWM..E VXRLRC - Last Residency Create Count  
XDWM..E VXRLRR - Last Residency Recall Count  
XDWM..E VXRMPPR - VTV Previously Migrated Count  
XDWM..E VXRNMM - VTV Migrated then Deleted Count  
XDWM..E VXROLD - VTV Invalid VTV Version Count  
XDWM..E VXRSCTP0 - Other Cartridge Delete Requests  
XDWM..E VXRSECT - 800MB (E) Cartridge Delete Requests  
XDWM..E VXRSPR - VTV Reclaimed Count  
XDWM..E VXRSSCT - 400MB (S) Cartridge Delete Requests  
XDWM..E VXRS2GB - 2GB Cartridge Delete Requests  
XDWM..E VXRS4GB - 4GB Cartridge Delete Requests

#### Minimum Data Elements

XDWM..E VXRMNAGE - Min Age of VTV Since Creation  
XDWM..E VXRMNLAG - Min Age of VTV Since Last Used

#### Maximum Data Elements

XDWM..E VXRMXAGE - Max Age of VTV Since Creation

XDWM..E VXRMLAG - Max Age of VTV Since Last Used

Derived Data Elements

XDWM..E VXRAVAGE - Avg Age of VTV Since Creation

XDWM..E VXRAVLGE - Avg Age of VTV Since Last Used

### 5.2.3.6.3 SVTVXR Usage Considerations

The SVTVXR file contains interesting metrics regarding the reason for deletion, to the delete reasons, age of the deleted virtual tape volume, and whether the deleted volume was in the disk buffer since creation, or had been recalled.

#### 5.2.3.6.4 SVTVXR 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. Generate a report displaying virtual tape deletion activity, average age of the VTV and the reason for deletion.

```
%LET BY      = SYSID VTSSID VTSSMCL HOUR;
%LET BREAK = HOUR;
PROC SORT DATA=&psvtd..SVTVXR01 OUT=VXR;
  BY &BY;
RUN;
DATA VXR2; SET VXR;
  %VXRSUM(SUMBY=&BY, SUMBREAK=&BREAK);
RUN;
PROC PRINT DATA=VXR2 LABEL NOOBS;
  BY SYSID VTSSID;
  VAR SYSID VTSSID VTSSMCL HOUR VXRCOUNT
      VXRAVAGE VXRNMV VXRMPR VXRSPR VXRCON
      VXROLD VXRDCS VXRIMP VXRDSU;
  TITLE 'VTV Deletion Activity';
```

Note: Drop management class from the BY and VAR statements to get gross mounts by SYSID and VTSSID.

### 5.2.3.7 Virtual Tape Volume Migrate Request File

At the DETAIL timespan, this file describes the event where a virtual tape volume is requested to be migrated to a multivolume cartridge. It is derived from the VTSS user SMF record, subtype 18. This record is produced for every virtual tape volume that is migrated to real tape.

The SVTVGR file contains interesting metrics pertaining to the migration reason and the elapsed time since the virtual volume was last mounted on a virtual tape drive (ie; disk buffer residency time). In addition the file can be used to determine migration durations, frequency of migrations, and migrated data volume.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVGR File Organization
- 2 - SVTVGR Data Elements List
- 3 - SVTVGR Usage Considerations
- 4 - SVTVGR Retrieval Examples

### 5.2.3.7.1 SVTVGR 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                     | VTSSID | VTSSMCL | VTSSSCL | YEAR |
|          | MONTH                     | DAY    | HOUR    | ENDTS   |      |
| DAYS     | SYSID                     | VTSSID | VTSSMCL | VTSSSCL | YEAR |
|          | MONTH                     | DAY    | HOUR    |         |      |
| WEEKS    | SYSID                     | VTSSID | VTSSMCL | VTSSSCL | YEAR |
|          | WEEK                      | ZONE   | HOUR    |         |      |
| MONTHS   | SYSID                     | VTSSID | VTSSMCL | VTSSSCL | 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 5-17. SVTVGR Sort Sequence and Data Granularity



### 5.2.3.7.2 SVTVGR 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID  | - VTSS ID              |
| XDWM..E | VTSSMCL | - VTV Management Class |

XDWM..E VTSSSCL - MVC Storage Class  
XDW...E WEEK - Week of Year  
XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

### Common Data Elements

XD....E DAYNAME - Name of Day of Week  
XDWM..E ENDTS - End Time Stamp  
XDWM..E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp  
X.....E VTSSAID - Actual Volser from Vol1 Label  
X.....E VTSSCTP - Cartridge Type  
X.....E VTSSMID - MVC Volser ID  
X.....E VTSSRID - RTD Device ID  
X.....E VTSSSNS - RTD Sense Data  
X.....E VTSSVID - VTV Volser ID

### Retained Data Elements

X.....E VGRMET - Migrate End Timestamp  
X.....E VGRMST - Migrate Start Timestamp  
X.....E VGRMTP - Migrate Request Type  
X.....E VGRNPO - Next MVC Position (Block Id)  
X.....E VGRTIM - Last Time VTV Mount on VTD  
X.....E VGRVPO - VTV Position on the MVC (Block Id)

### Accumulated Data Elements

XDWM..E VGRBCM - Virtual Tape Page Bytes Migrated  
XDWM..E VGRCOUNT - Total VTVs Migrated  
XDWM..E VGRMSZ - Uncompressed Size of the VTV (Bytes)  
XDWM..E VGRMTA - Total Migrate Requests (Auto)  
XDWM..E VGRMTC - Total Migrate Requests (Consolidate)  
XDWM..E VGRMTD - Total Migrate Requests (Demand)  
XDWM..E VGRMTI - Total Migrate Requests (Immediate)  
XDWM..E VGRMTM - Migrate Time  
XDWM..E VGRMTOTH - Total Migrate Requests (Other)  
XDWM..E VGRMTR - Total Migrate Requests (Reclaim)  
XDWM..E VGRMTX - Total Migrate Requests (Export)  
XDWM..E VGRPBU - MVC Blocks Used  
XDWM..E VGRRTDER - RTD Error count  
XDWM..E VGRSCTPO - Other Cartridge Migrate Requests  
XDWM..E VGRSECT - 800MB (E) Cartridge Migrate Requests  
XDWM..E VGRSSCT - 400MB (S) Cartridge Migrate Requests  
XDWM..E VGRS2GB - 2000MB Cartridge Migrate Requests  
XDWM..E VGRS4GB - 4000MB Cartridge Migrate Requests

### Minimum Data Elements



XDWM..E VGRMMTM - Min Migrate Time

Maximum Data Elements

XDWM..E VGRMXMTM - Max Migrate Time

Derived Data Elements

XDWM..E VGRAVMTM - Avg Migrate Time

XDWM..E VGRPCERR - Pct RTD Migrate Errors

XDWM..E VGRPCMTA - Pct Migrate Request (Auto)

XDWM..E VGRPCMTC - Pct Migrate Request (Consolidate)

XDWM..E VGRPCMTD - Pct Migrate Request (Demand)

XDWM..E VGRPCMTI - Pct Migrate Request (Immediate)

XDWM..E VGRPCMTO - Pct Migrate Request (Other)

XDWM..E VGRPCMTR - Pct Migrate Request (Reclaim)

XDWM..E VGRPCMTX - Pct Migrate Request (Export)

### 5.2.3.7.3 SVTVGR Usage Considerations

The SVTVGR file, as well as the Virtual Tape Volume Recall Activity (SVTVRR) file contain data useful for hourly trend analysis.

In some cases, migrations occur immediately after VTV is created. In other cases, policies delay migration until certain criteria are met. For example, delaying migrations during peak batch activity times or until the disk buffer approaches full capacity.

### 5.2.3.7.4 SVTVGR 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. Generate a report displaying VTV migration activity by hour.

```
%LET BY      = SYSID VTSSID VTSSSCL HOUR;
%LET BREAK = HOUR;
PROC SORT DATA=&psvtd..SVTVGR01 OUT=VGR;
  BY &BY;
RUN;
DATA VGR2; SET VGR;
  VGRMSZ=VGRMSZ/(1024*1024);
  %VGRSUM(SUMBY=&BY, SUMBREAK=&BREAK);
RUN;
PROC PRINT DATA=VGR2 LABEL NOOBS;
  BY SYSID VTSSID;
  VAR SYSID VTSSID VTSSSCL HOUR VGRCOUNT
      VGRAVMTM VGRMXMTM VGRMTA VGRMTI VGRMTD
      VGRMTR VGRMTC VGRMTX VGRMSZ;
  FORMAT VGRMSZ COMMA12.2;
  LABEL VGRMSZ='Uncompressed Size of VTV (MB)';
  TITLE 'VTV Migration Activity';
RUN;
```

Note: Drop storage class from the BY and VAR statements to get gross mounts by SYSID and VTSSID.

### 5.2.3.8 Virtual Tape Volume Recall Request File (SVTVRR)

(SVTVRR)

At the DETAIL timespan, this file contains information related to virtual tape volume recalls. It is derived from the VTSS user SMF record, subtype 19. DETAIL level records contain metrics covering the time frame from the point where the real tape cartridge was mounted and ready, to the point where data transfer back to the VTSS disk buffer is complete.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVRR File Organization
- 2 - SVTVRR Data Elements List
- 3 - SVTVRR Usage Considerations
- 4 - SVTVRR Retrieval Examples

### 5.2.3.8.1 SVTVRR 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                     | VTSSID | VTSSMCL | VTSSSCL | YEAR |  |
|          | MONTH                     | DAY    | HOUR    | ENDTS   |      |  |
| DAYS     | SYSID                     | VTSSID | VTSSMCL | VTSSSCL | YEAR |  |
|          | MONTH                     | DAY    | HOUR    |         |      |  |
| WEEKS    | SYSID                     | VTSSID | VTSSMCL | VTSSSCL | YEAR |  |
|          | WEEK                      | ZONE   | HOUR    |         |      |  |
| MONTHS   | SYSID                     | VTSSID | VTSSMCL | VTSSSCL | 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 5-18. SVTVRR Sort Sequence and Data Granularity

### 5.2.3.8.2 SVTVRR 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID  | - VTSS ID              |
| XDWM..E | VTSSMCL | - VTV Management Class |

XDWM..E VTSSSCL - MVC Storage Class  
XDW...E WEEK - Week of Year  
XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

### Common Data Elements

XD....E DAYNAME - Name of Day of Week  
XDWM..E ENDTS - End Time Stamp  
XDWM..E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp  
X.....E VTSSAID - Actual Volser from Vol1 Label  
X.....E VTSSCTP - Cartridge Type  
X.....E VTSSMID - MVC Volser ID  
X.....E VTSSRID - RTD Device ID  
X.....E VTSSSNS - RTD Sense Data  
X.....E VTSSVID - VTV Volser ID

### Retained Data Elements

X.....E VRRMTP - Recall Request Type  
X.....E VRRRET - Recall End Timestamp  
X.....E VRRRST - Recall Start Timestamp  
X.....E VRRTIM - Last Time VTV Successfully Mounted  
X.....E VRRVPO - VTV Position on this MVC (Block ID)

### Accumulated Data Elements

XDWM..E VRRBCM - Total Bytes Recalled  
XDWM..E VRRCOUNT - Total VTV Recalls  
XDWM..E VRRLTM - Age Since Last Mounted  
XDWM..E VRRMSZ - VTV Media Size  
XDWM..E VRRMTA - Total VTV Recalls (Auto)  
XDWM..E VRRMTC - Total VTV Recalls (Consolidate)  
XDWM..E VRRMTD - Total VTV Recalls (Demand)  
XDWM..E VRRMTN - Total VTV Recalls (Drain)  
XDWM..E VRRMTOTH - Total VTV Recalls (Other)  
XDWM..E VRRMTR - Total VTV Recalls (Reclaim)  
XDWM..E VRRMTX - Total VTV Recalls (Export)  
XDWM..E VRRRECNT - Recall Error Count  
XDWM..E VRRRTDER - RTD Error count  
XDWM..E VRRRTM - Recall Time  
XDWM..E VRRSCTP0 - Other Cartridge Recall Requests  
XDWM..E VRRSECT - 800MB (E) Cartridge Recall Requests  
XDWM..E VRRSSCT - 400MB (S) Cartridge Recall Requests  
XDWM..E VRRS2GB - 2000MB Cartridge Recall Requests  
XDWM..E VRRS4GB - 4000MB Cartridge Recall Requests

### Minimum Data Elements

XDWM..E VRRMNRTM - Min Recall Time

Maximum Data Elements

XDWM..E VRRMXRTM - Max Recall Time

Derived Data Elements

XDWM..E VRRAVLTM - Avg Age Since Last Mounted

XDWM..E VRRAVRTM - Avg Recall Time

XDWM..E VRRPCERR - Pct Recall RTD Errors

XDWM..E VRRPCMTA - Pct Recall Request (Auto)

XDWM..E VRRPCMTC - Pct Recall Request (Consolidate)

XDWM..E VRRPCMTD - Pct Recall Request (Demand)

XDWM..E VRRPCMTN - Pct Recall Request (Drain)

XDWM..E VRRPCMTO - Pct Recall Request (Other)

XDWM..E VRRPCMTR - Pct Recall Request (Reclaim)

XDWM..E VRRPCMTX - Pct Recall Request (Export)

### 5.2.3.8.3 SVTVRR Usage Considerations

A primary performance goal for virtual tape subsystems is to satisfy virtual tape accesses in the disk buffer. When virtual tapes must be recalled from physical tape cartridges, performance suffers dramatically. While totally eliminating virtual volume recalls is impossible, recalls should be minimized.

Data in both the SVTVRR and the Virtual Tape Volume Mount Activity (SVTVMR) files can provide insights to assist the storage administrator in adjusting management classes to either keep virtual volumes in the disk buffer longer, or to predict when volumes might be needed; thus forcing them to be recalled in advance so they are resident in the disk buffer when required. Any improvement in minimizing virtual volume recalls increases virtual tape subsystem throughput.

#### 5.2.3.8.4 SVTVRR 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. Generate a report displaying VTV recall activity by hour.

```
%LET BY      = SYSID VTSSID VTSSSCL HOUR;
%LET BREAK = HOUR;
PROC SORT DATA=&psvtd..SVTVRR01 OUT=VRR;
  BY &BY;
RUN;
DATA VRR2; SET VRR;
  %VRRSUM(SUMBY=&BY, SUMBREAK=&BREAK);
RUN;
PROC PRINT DATA=VRR2 LABEL NOOBS;
  BY SYSID VTSSID VTSSSCL;
  VAR HOUR VRRCOUNT
      VRRVRTM VRRMXRTM VRRMNRMTM VRRMTA VRRMTN
      VRRMTD VRRMTR VRRMTC VRRMTX VRRBCM;
  TITLE 'VTV Recall Activity';
RUN;
```

Note: Drop storage class from the BY and VAR statements to get gross mounts by SYSID and VTSSID.



### 5.2.3.9 Virtual Tape Volume Movement File (SVTVMV)

At the DETAIL timespan, this file records the movement of a Virtual Tape Volume from one multivolume cartridge to another. It is derived from the VTSS user SMF record, subtype 26, 'VTV Movement'. This record is produced on an event basis every time a virtual tape volume is moved from one MVC to another.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVMV File Organization
- 2 - SVTVMV Data Elements List
- 3 - SVTVMV Usage Considerations
- 4 - SVTVMV Retrieval Examples

### 5.2.3.9.1 SVTVMV 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<br>DAY              | VTSSID<br>HOUR | VTSSMCL<br>ENDTS | YEAR | MONTH |
| DAYS     | SYSID<br>DAY              | VTSSID<br>HOUR | VTSSMCL          | YEAR | MONTH |
| WEEKS    | SYSID<br>ZONE             | VTSSID<br>HOUR | VTSSMCL          | YEAR | WEEK  |
| MONTHS   | SYSID<br>ZONE             | VTSSID         | VTSSMCL          | YEAR | MONTH |
| 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. SVTVMV Sort Sequence and Data Granularity



### 5.2.3.9.2 SVTVMV 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID  | - VTSS ID              |
| XDWM..E | VTSSMCL | - VTV Management Class |

XDW...E WEEK - Week of Year  
XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

#### Common Data Elements

XD....E DAYNAME - Name of Day of Week  
XDWM..E ENDTS - End Time Stamp  
XDWM..E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp  
X.....E VTSSVID - VTV Volser ID

#### Retained Data Elements

X.....E VMVMET - Move End Timestamp  
X.....E VMVMST - Move Start Timestamp  
X.....E VMVNMI - New MVC Volser ID  
X.....E VMVOMI - Old MVC Volser ID  
X.....E VMVPO - VTV Position on New MVC

#### Accumulated Data Elements

XDWM..E VMVCOUNT - VTV Movement Count  
XDWM..E VMVMTM - VTV Move Time

#### Minimum Data Elements

XDWM..E VMVMNMTM - Min VTV Move Time

#### Maximum Data Elements

XDWM..E VMVMXMTM - Max VTV Move Time

#### Derived Data Elements

XDWM..E VMVAVMTM - Avg VTV Move Time

### 5.2.3.9.3 SVTVMV Usage Considerations

The SVTVMV file contains statistics useful in determining the amount of time and resources spent moving virtual tape volumes from one multivolume cartridge to another. This activity is generally automated by the VSM when consolidating or reclaiming MVC's to make the best use of the resource (similar to defragmenting a hard drive).

This activity uses real tape drives and should be monitored to ensure it is not occurring during heavy virtual volume recall times. If so, it may be degrading workload performance.

### 5.2.3.9.4 SVTVMV 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.

No report examples are available at this time for this file.

### 5.2.3.10 Virtual Tape Volume Scratch Status File (SVTVSS)

At the DETAIL timespan, this file records the scratch of a virtual tape volume from a multivolume cartridge. It is derived from the VTSS user record, subtype 26, 'VTV Scratch Status'. This record is produced for every scratch event.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVSS File Organization
- 2 - SVTVSS Data Elements List
- 3 - SVTVSS Usage Considerations
- 4 - SVTVSS Retrieval Examples

### 5.2.3.10.1 SVTVSS 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                     | VTSSID  | YEAR | MONTH | DAY  |  |
|          | HOUR                      | SVTIETS |      |       |      |  |
| DAYS     | SYSID                     | VTSSID  | YEAR | MONTH | DAY  |  |
|          | HOUR                      |         |      |       |      |  |
| WEEKS    | SYSID                     | VTSSID  | YEAR | WEEK  | ZONE |  |
|          | HOUR                      |         |      |       |      |  |
| MONTHS   | SYSID                     | VTSSID  | 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.

FIGC Figure 5-20. SVTVSS Sort Sequence and Data Granularity

### 5.2.3.10.2 SVTVSS 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID  | - VTSS ID              |
| XDWM..E | VTSSMCL | - VTV Management Class |
| XDW...E | WEEK    | - Week of Year         |
| XDWM..E | YEAR    | - Year of Century      |
| XDWM..E | ZONE    | - Time Zone            |

#### Common Data Elements

|         |          |                                     |
|---------|----------|-------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week               |
| XDWM..E | ENDTS    | - End Time Stamp                    |
| XDWM..E | ORGSYSID | - Originating System Identification |
| XDWM..E | STARTTS  | - Start Time Stamp                  |
| X.....E | VTSSCTP  | - Cartridge Type                    |
| X.....E | VTSSVID  | - VTV Volser ID                     |

#### Retained Data Elements

|         |        |                                  |
|---------|--------|----------------------------------|
| X.....E | VSSLUS | - Last Time VTV Used             |
| X.....E | VSSMV1 | - Volser of MVC 1 Containing VTV |
| X.....E | VSSMV2 | - Volser of MVC 2 Containing VTV |
| X.....E | VSSMV3 | - Volser of MVC 3 Containing VTV |
| X.....E | VSSMV4 | - Volser of MVC 4 Containing VTV |
| X.....E | VSSRES | - VTV Last Resident Indicator    |
| X.....E | VSSSTP | - VTV Scratch Type               |
| X.....E | VSSTIM | - Last Time VTV Updated          |

#### Accumulated Data Elements

|         |          |                                   |
|---------|----------|-----------------------------------|
| XDWM..E | VSSCOUNT | - VTV Scratch Count               |
| XDWM..E | VSSMSZ   | - VTV Media Size                  |
| XDWM..E | VSSRESOT | - VTV Last Resident Other Count   |
| XDWM..E | VSSRM1   | - VTV Last Resident on MVC1 Count |

|         |          |                                      |
|---------|----------|--------------------------------------|
| XDWM..E | VSSRM2   | - VTV Last Resident on MVC2 Count    |
| XDWM..E | VSSRM3   | - VTV Last Resident on MVC3 Count    |
| XDWM..E | VSSRM4   | - VTV Last Resident on MVC4 Count    |
| XDWM..E | VSSRVT   | - VTV Last Resident on VTSS Count    |
| XDWM..E | VSSSCTP0 | - Other Cartridge Scratch Events     |
| XDWM..E | VSSSECT  | - 800MB (E) Cartridge Scratch Events |
| XDWM..E | VSSSSCT  | - 400MB (S) Cartridge Scratch Events |
| XDWM..E | VSSSTD   | - VTV Scratch Count (Delete)         |
| XDWM..E | VSSSTN   | - VTV Scratch Count (No Delete)      |
| XDWM..E | VSSSTP0T | - VTV Scratch Count (other)          |
| XDWM..E | VSSS2GB  | - 2000MB Cartridge Scratch Events    |
| XDWM..E | VSSS4GB  | - 4000MB Cartridge Scratch Events    |

### 5.2.3.10.3 SVTVSS Usage Considerations

This section identifies any special considerations or techniques related to using the SVTVSS file.

None.

### 5.2.3.10.4 SVTVSS 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.

No report examples are available at this time for this file.

#### 5.2.3.11 Real Tape Drive Mount Request File (SVTRMR)

At the DETAIL timespan, this file provides information about a mount request for a multivolume cartridge on a real tape drive. It is derived from the VTSS user SMF record, subtype 16. This record is produced for every mount request event and contains metrics covering the time from mount request until mount satisfaction (ready status).

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTRMR File Organization
- 2 - SVTRMR Data Elements List
- 3 - SVTRMR Usage Considerations
- 4 - SVTRMR Retrieval Examples

### 5.2.3.11.1 SVTRMR 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<br>DAY              | VTSSID<br>HOUR | VTSSSCL<br>ENDTS | YEAR | MONTH |  |
| DAYS     | SYSID<br>DAY              | VTSSID<br>HOUR | VTSSSCL          | YEAR | MONTH |  |
| WEEKS    | SYSID<br>ZONE             | VTSSID<br>HOUR | VTSSSCL          | YEAR | WEEK  |  |
| MONTHS   | SYSID<br>ZONE             | VTSSID         | VTSSSCL          | YEAR | MONTH |  |
| 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. SVTRMR Sort Sequence and Data Granularity

### 5.2.3.11.2 SVTRMR 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID  | - VTSS ID           |
| XDWM..E | VTSSSCL | - MVC Storage Class |
| XDW...E | WEEK    | - Week of Year      |
| XDWM..E | YEAR    | - Year of Century   |
| XDWM..E | ZONE    | - Time Zone         |

#### Common Data Elements

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |
| XDWM..E | SVTRDST1 | - Total RTD Mounts within Limit 1     |
| XDWM..E | SVTRDST2 | - Total RTD Mounts within Limit 2     |
| XDWM..E | SVTRDST3 | - Total RTD Mounts within Limit 3     |
| XDWM..E | SVTRDST4 | - Total RTD Mounts within Limit 4     |
| XDWM..E | SVTRDST5 | - Total RTD Mounts within Limit 5     |
| XDWM..E | SVTRDST6 | - Total RTD Mounts within Limit 6     |
| XDWM..E | SVTRDST7 | - Total RTD Mounts within Limit 7     |
| XDWM..E | SVTRDST8 | - Total RTD Mounts within Limit 8     |
| XDWM..E | SVTRVAL1 | - RTD Mount Time Distribution Limit 1 |
| XDWM..E | SVTRVAL2 | - RTD Mount Time Distribution Limit 2 |
| XDWM..E | SVTRVAL3 | - RTD Mount Time Distribution Limit 3 |
| XDWM..E | SVTRVAL4 | - RTD Mount Time Distribution Limit 4 |
| XDWM..E | SVTRVAL5 | - RTD Mount Time Distribution Limit 5 |
| XDWM..E | SVTRVAL6 | - RTD Mount Time Distribution Limit 6 |
| XDWM..E | SVTRVAL7 | - RTD Mount Time Distribution Limit 7 |
| X.....E | VTSSAID  | - Actual Volser from Vol1 Label       |
| X.....E | VTSSMID  | - MVC Volser ID                       |
| X.....E | VTSSRID  | - RTD Device ID                       |
| X.....  | VTSSNS   | - RTD Sense Data                      |

## Retained Data Elements

X.....E RMRMET - Mount End Timestamp  
X.....E RMRMST - Mount Start Timestamp  
X.....E RMRMTP - Mount Request Type  
X.....E RMRRWS - Read/Write Status

## Accumulated Data Elements

XDWM..E RMRCOUNT - Total RTD Mounts  
XDWM..E RMRMNTTM - Mount Time  
XDWM..E RMRMTA - Audit Count  
XDWM..E RMRMTC - Consolidate Count  
XDWM..E RMRMTD - Drain Count  
XDWM..E RMRMTL - Reclaim Count  
XDWM..E RMRMTM - Migrate Count  
XDWM..E RMRMTOTH - Other Count  
XDWM..E RMRMTR - Recall Count  
XDWM..E RMRMTX - Export Count  
XDWM..E RMRRRO - Read Only Count  
XDWM..E RMRRRW - Read/Write Count  
XDWM..E RMRRTDER - RTD Error Count

## Minimum Data Elements

XDWM..E RMRMNTM - Min Mount Time

## Maximum Data Elements

XDWM..E RMRMXMTM - Max Mount Time

## Derived Data Elements

XDWM..E RMRAVMTM - Avg Mount Time  
XDWM..E RMRPCRM1 - Pct Mounted Within Limit 1  
XDWM..E RMRPCRM2 - Pct Mounted Within Limit 2  
XDWM..E RMRPCRM3 - Pct Mounted Within Limit 3  
XDWM..E RMRPCRM4 - Pct Mounted Within Limit 4  
XDWM..E RMRPCRM5 - Pct Mounted Within Limit 5  
XDWM..E RMRPCRM6 - Pct Mounted Within Limit 6  
XDWM..E RMRPCRM7 - Pct Mounted Within Limit 7  
XDWM..E RMRPCRM8 - Pct Mounted Within Limit 8

### 5.2.3.11.3 SVTRMR Usage Considerations

Mount time and the mount request type are key statistics to track in this file. Monitoring mount time trends and mount characteristics can provide the Storage Administrator with information useful in making performance and tuning recommendations.

Trending the eight RTD mount time distribution buckets supports identification of possible performance issues. If a significant number of mounts are falling into the higher distribution bucket elements, meaning they are excessively long, a detailed analysis should be performed to determine the reason for the excessive mount time. It may be due to tape drive contention, robot contention, library maintenance conflicting with production batch, and so on.



#### 5.2.3.11.4 SVTRMR 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 &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. Generate a report displaying real tape mount activity and mount response time by hour.

```
%LET BY      = SYSID VTSSID VTSSSCL HOUR;
%LET BREAK = HOUR;
PROC SORT DATA=&psvtd..SVTRMR01 OUT=RMR;
  BY &BY;
RUN;
DATA RMR2; SET RMR;
  %RMRSUM(SUMBY=&BY, SUMBREAK=&BREAK);
RUN;
PROC PRINT DATA=RMR2 LABEL NOOBS;
  BY SYSID VTSSID;
  VAR SYSID VTSSID VTSSSCL HOUR RMRCOUNT
      RMRVMTM RMRXMTM RMRMTM RMRMTR RMRMTL
      RMRMTD RMRMTA RMRMTC RMRMTX;
  TITLE 'RTD Mount Activity';
RUN;
```

Note: Drop storage class from the BY and VAR statements to get gross mounts by SYSID and VTSSID.

### 5.2.3.12 Real Tape Drive Dismount Request File (SVTRDR)

At the DETAIL timespan, this file contains data regarding the dismount of a multivolume cartridge from a real tape drive. It is derived from the VTSS user SMF record, subtype 17. This record is produced for every tape dismount.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTRDR File Organization
- 2 - SVTRDR Data Elements List
- 3 - SVTRDR Usage Considerations
- 4 - SVTRDR Retrieval Examples

### 5.2.3.12.1 SVTRDR 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<br>DAY              | VTSSID<br>HOUR | VTSSSCL<br>ENDTS | YEAR | MONTH |
| DAYS     | SYSID<br>DAY              | VTSSID<br>HOUR | VTSSSCL          | YEAR | MONTH |
| WEEKS    | SYSID<br>ZONE             | VTSSID<br>HOUR | VTSSSCL          | YEAR | WEEK  |
| MONTHS   | SYSID<br>ZONE             | VTSSID         | VTSSSCL          | YEAR | MONTH |
| 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. SVTRDR Sort Sequence and Data Granularity

### 5.2.3.12.2 SVTRDR 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID  | - VTSS ID           |
| XDWM..E | VTSSSCL | - MVC Storage Class |

|         |      |                   |
|---------|------|-------------------|
| XDW...E | WEEK | - Week of Year    |
| XDWM..E | YEAR | - Year of Century |
| XDWM..E | ZONE | - Time Zone       |

#### Common Data Elements

|         |          |                                     |
|---------|----------|-------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week               |
| XDWM..E | ENDTS    | - End Time Stamp                    |
| XDWM..E | ORGSYSID | - Originating System Identification |
| XDWM..E | STARTTS  | - Start Time Stamp                  |
| X.....E | VTSSMID  | - MVC Volser ID                     |
| X.....E | VTSSRID  | - RTD Device ID                     |
| X.....  | VTSSNS   | - RTD Sense Data                    |

#### Accumulated Data Elements

|         |          |                       |
|---------|----------|-----------------------|
| XDWM..E | RDRCOUNT | - Total RTD Dismounts |
| XDWM..E | RDRRTDER | - RTD Error count     |

#### Derived Data Elements

|         |          |                           |
|---------|----------|---------------------------|
| XDWM..E | RDRPCERR | - Pct RTD Dismount Errors |
|---------|----------|---------------------------|

### 5.2.3.12.3 SVTRDR Usage Considerations

This section identifies any special considerations or techniques related to using the SVTRDR file.

None.

### 5.2.3.12.4 SVTRDR 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 &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.

There are no sample reports for this file at this time.

### 5.2.3.13 Real Tape Drive Performance Request File (SVTRPR)

(SVTRPR)

At the DETAIL timespan, this file contains performance information for real tape drives. It is derived from the StorageTek user SMF record, subtype 20 interval record, 'RTD Performance Request'. This record is produced at 15 minute intervals and contains utilization statistics for each real tape drive, including the volume of data read and written.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTRPR File Organization
- 2 - SVTRPR Data Elements List
- 3 - SVTRPR Usage Considerations
- 4 - SVTRPR Retrieval Examples

### 5.2.3.13.1 SVTRPR 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<br>DAY              | VTSSID<br>HOUR | VTSSRNM<br>ENDTS | YEAR | MONTH |
| DAYS     | SYSID<br>DAY              | VTSSID<br>HOUR | VTSSRNM          | YEAR | MONTH |
| WEEKS    | SYSID<br>ZONE             | VTSSID<br>HOUR | VTSSRNM          | YEAR | WEEK  |
| MONTHS   | SYSID<br>ZONE             | VTSSID         | VTSSRNM          | YEAR | MONTH |
| 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. SVTRPR Sort Sequence and Data Granularity

### 5.2.3.13.2 SVTRPR 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-<br>Span * | Data<br>Element | Data Element<br>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 | VTSSID  | - VTSS ID           |
| XDWM..E | VTSSRNM | - RTD Name          |



XDW...E WEEK - Week of Year  
XDW..E YEAR - Year of Century  
XDW..E ZONE - Time Zone

#### Common Data Elements

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 ORGSYSID - Originating System Identification  
XDW..E STARTTS - Start Time Stamp

#### Retained Data Elements

X.....E RPRST - RTD State

#### Accumulated Data Elements

XDW..E RPRACT - RTD Initial Selects  
XDW..E RPRATM - Duration MVC Mounted on RTD  
XDW..E RPRBTR - RTD MB Transferred - Read  
XDW..E RPRBTT - Total RTD MB Transferred  
XDW..E RPRBTW - RTD MB Transferred - Write  
XDW..E RPRCOUNT - RTD Performance Request Counts  
XDW..E RPRDCT - RTD Device Connect Time  
XDW..E RPRSTC - RTD Configured Count  
XDW..E RPRSTOTH - RTD Other Count  
XDW..E RPRSTU - RTD Unconfigured Count

#### Derived Data Elements

XDW..E RPRAVATM - Avg Duration MVC Mounted on RTD  
XDW..E RPRAVBTR - Avg RTD MB Transferred - Read  
XDW..E RPRAVBTT - Avg RTD MB Transferred  
XDW..E RPRAVBTW - Avg RTD MB Transferred - Write  
XDW..E RPRAVDCT - Avg Device Connect Time  
XDW..E RPRBPS - RTD MB Transferred Per Second

### 5.2.3.13.3 SVTRPR Usage Considerations

The SVTRPR file can be used to monitor trends for the real tape drives assigned to the VTSS. An interesting analysis is to determine if the I/O is balanced across all the assigned tape drives.

### 5.2.3.13.4 SVTRPR 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.

No report examples are available at this time for this file.

### 5.2.3.14 Multivolume Cartridge Status File (SVTMVC)

At the DETAIL timespan, this file contains information about multivolume (MVC) cartridges. It is derived from the VTSS user record, subtype 25, 'MVC Status'. This record is produced for every MVC event activity. For example, if four virtual tape volumes are migrated to a particular MVC, four records are produced. The data is not associated with any particular VTSS.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTMVC File Organization
- 2 - SVTMVC Data Elements List
- 3 - SVTMVC Usage Considerations
- 4 - SVTMVC Retrieval Examples

### 5.2.3.14.1 SVTMVC 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                     | VTSSSCL | YEAR | MONTH | DAY  |  |
|          | HOUR                      | ENDTS   |      |       |      |  |
| DAYS     | SYSID                     | VTSSSCL | YEAR | MONTH | DAY  |  |
|          | HOUR                      |         |      |       |      |  |
| WEEKS    | SYSID                     | VTSSSCL | YEAR | WEEK  | ZONE |  |
|          | HOUR                      |         |      |       |      |  |
| MONTHS   | SYSID                     | VTSSSCL | 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. SVTMVC Sort Sequence and Data Granularity

### 5.2.3.14.2 SVTMVC 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-<br>Span * | Data<br>Element | Data Element<br>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 VTSSSCL - MVC Storage Class
- XDW...E WEEK - Week of Year

XDWM..E YEAR - Year of Century  
XDWM..E ZONE - Time Zone

#### Common Data Elements

XD....E DAYNAME - Name of Day of Week  
XDWM..E ENDTS - End Time Stamp  
XDWM..E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp  
X.....E VTSSMID - MVC Volser ID

#### Retained Data Elements

X.....E MVCLUT - MVC Was Last Used  
X.....E MVCLWT - MVC Was Last Updated

#### Accumulated Data Elements

XDWM..E MVCCOUNT - MVC Status Count  
XDWM..E MVCNAV - Number of Active VTVs  
XDWM..E MVCNDV - Number of Holes  
XDWM..E MVCTFS - Total MVC Free Space (KB)  
XDWM..E MVCTUS - Total MVC Space Used by VTVs (KB)  
XDWM..E MVCUFS - Usable MVC Free Space (KB)

#### Derived Data Elements

XDWM..E MVCAVNAV - Avg Number of Active VTVs  
XDWM..E MVCAVNDV - Avg Number of Holes  
XDWM..E MVCAVTFS - Avg MVC Free Space (KB)  
XDWM..E MVCAVTUS - Avg MVC Space Used by VTVs (KB)  
XDWM..E MVCAVUFS - Avg Usable MVC Free Space (KB)

### 5.2.3.14.3 SVTMVC Usage Considerations

This section identifies any special considerations or techniques related to using the SVTMVC file.

None.

### 5.2.3.14.4 SVTMVC 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.

No report examples are available at this time for this file.

### 5.2.3.15 - VTV - MVC Unlink Activity File (SVTVUN)

At the DETAIL timespan, this file contains information about the VTV / MVC unlink activity. It is derived from the VTSS user record, subtype 29, 'VTV/MVC Unlink'. This record is produced for every unlink event where a VTV is unlinked (deleted) from a MVC. VTV's can exist on multiple MVC's. For each MVC the VTV is unlinked and a record is produced. This file is mostly useful at the detail timespan to research specific events where a VTV was unlinked from the MVC.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - SVTVUN File Organization
- 2 - SVTVUN Data Elements List
- 3 - SVTVUN Usage Considerations
- 4 - SVTVUN Retrieval Examples

### 5.2.3.15.1 SVTVUN 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                     | VTSSID | YEAR | MONTH | DAY  |  |
|                                             | HOUR                      | ENDTS  |      |       |      |  |
| DAYS                                        | SYSID                     | VTSSID | YEAR | MONTH | DAY  |  |
|                                             | HOUR                      |        |      |       |      |  |
| WEEKS                                       | SYSID                     | VTSSID | YEAR | WEEK  | ZONE |  |
|                                             | HOUR                      |        |      |       |      |  |
| MONTHS                                      | SYSID                     | VTSSID | YEAR | MONTH | ZONE |  |
|                                             |                           |        |      |       |      |  |
| YEARS                                       | SYSID                     | VTSSID | YEAR | ZONE  |      |  |
|                                             |                           |        |      |       |      |  |
| +-----+-----+-----+-----+-----+-----+-----+ |                           |        |      |       |      |  |
| TABLES                                      | N/A                       |        |      |       |      |  |
| +-----+-----+-----+-----+-----+-----+-----+ |                           |        |      |       |      |  |

Generation Date: Wed, Jan 16, 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 5-25. SVTVUN Sort Sequence and Data Granularity

### 5.2.3.15.2 - SVTVUN 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, Jan 16, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>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     |
| XDWMY.E | SYSID  | - System Identifier |
| XDWMY.E | VTSSID | - VTSS ID           |
| XDW...E | WEEK   | - Week of Year      |
| XDWMY.E | YEAR   | - Year of Century   |
| XDWMY.E | ZONE   | - Time Zone         |



#### Common Data Elements

XD....E DAYNAME - Name of Day of Week  
XDWMY.E ENDTS - End Time Stamp  
XDWMY.E ORGSYSID - Originating System Identification  
XDWMY.E STARTTS - Start Time Stamp  
X.....E VTSSMID - MVC Volser ID  
XDWMY.E VTSSTPX - TapePlex Name  
X.....E VTSSVID - VTV Volser ID

#### Retained Data Elements

X.....E VUNMVCS - Remaining MVCs  
X.....E VUNRSN - Unlink Reason

#### Accumulated Data Elements

XDWMY.E VUNCOUNT - Total VTV-MVC Unlinks  
XDWMY.E VUNDOS - Unlink Delete on Scratch  
XDWMY.E VUNDRN - Unlink MVC Drain or Reclaim  
XDWMY.E VUNDSU - Unlink DELETSCR Utility  
XDWMY.E VUNIMP - Unlink VTV Import  
XDWMY.E VUNMVC - Unlink MVC Inventory  
XDWMY.E VUNNLC - Unlink VTV No Longer Current  
XDWMY.E VUNVAD - Unlink VTV Audit  
XDWMY.E VUNVMN - Unlink VTVMaint Utility  
XDWMY.E VUNVTS - Unlink VTSS Inventory

### 5.2.3.15.3 - SVTVUN Usage Considerations

This section identifies any special considerations or techniques related to using the SVTVUN file.

This file is delivered by default with only the DETAIL timespan active. The file is mostly useful in researching when a VTV was unlinked from the MVC and the reason.

### 5.2.3.15.4 - SVTVUN 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 &ddiit, 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.

No report examples are available at this time for this file.

## 5.2.4 VTS Component HVT Information Area Files

This section identifies each file in the IBM TS7700 Hydra Virtual Tape Servers (HVT) information Area and defines its levels of summarization and data sequencing. The active data elements for each file are also listed.

### IMPORTANT NOTES:

- o The performance statistics for the TS7700 are not written to SMF. They are stored in a database on the TS7700 itself and are retrieved using the Bulk Volume Information Retrieval (BVIR) facility. See the IBM Virtualization Engine TS7700 Series Bulk Volume Information Retrieval Function Users Guide for information on extracting the Historical Performance records.
- o There is no host identification in the Historical Performance records. The statistics pertain to the activity of the TS7700 Virtual Tape System itself. CA MICS components require a SYSID value. The SYSID value used is specified with the VTSSYSID statement in prefix.MICS.PARMS(VTSOPS). If it is not specified, a default value of 'SYS1' is assigned to the SYSID data element. See section 7.2.3.1.3 for more information.

The files maintained in the HVT information area include:

- 1 - Hydra Vnode Device Activity File (HVTVDA)
- 2 - Hydra Vnode Adapter Port Activity File (HVTVAP)
- 3 - Hydra Hnode Cache Activity File (HVTHHC)
- 4 - Hnode Cache Partition Activity File (HVTHCP)
- 5 - Hydra Hnode Cache Pref Grp Statistics File (HVTHPG)
- 6 - Hydra Hnode Physical Drive Activity File (HVTHPD)
- 7 - Hydra Hnode G-Use Pool Activity File (HVTHGP)
- 8 - Hydra Hnode G-Use Pool Media Activity File (HVTHGM)
- 9 - Hydra Hnode Activity File (HVTHHA)
- 10 - Hydra Cluster Summary File (HVTHCA)
- 11 - Hnode Grid Activity File (HVTGRC)
- 12 - Hnode Grid Cluster Activity File (HVTGCC)
- 13 - Hydra Hnode Export/Import Activity File (HVTHEI)

### 5.2.4.1 Hydra Vnode Device Activity File (HVTVDA)

The Hydra Vnode Device Activity file contains statistics on concurrent virtual device mount activity and channel blocksize distribution. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, type 20, Vnode Virtual Device Historical Record. This record is produced every 15 minutes. In addition, this file also contains a roll-up of the statistics from the HVTVAP file to the Vnode level.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTVDA File Organization
- 2 - HVTVDA Data Elements List
- 3 - HVTVDA Usage Considerations
- 4 - HVTVDA Retrieval Examples

### 5.2.4.1.1 HVTVDA 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                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | DAY     | HOUR    | ENDTS   |      |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | DAY     | HOUR    |         |      |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | WEEK                      | ZONE    | HOUR    |         |      |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | ZONE    |         |         |      |  |
| YEARS    | N/A                       |         |         |         |      |  |
| TABLES   | N/A                       |         |         |         |      |  |

Generation Date: Thu, Apr 1, 2010

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. HVTVDA Sort Sequence and Data Granularity



### 5.2.4.1.2 HVTVDA 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:** Thu, Nov 21, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                     |
|---------|---------|---------------------|
| XD....E | DAY     | - Day of Month      |
| XDW...E | HOUR    | - Hour of Day       |
| XDWM..E | HVTCLID | - Cluster ID        |
| XDWM..E | HVTGRID | - Grid Composite ID |
| XDWM..E | HVTNODE | - Node 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

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | DURATION | - Recording Interval Time             |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | HVTDLSN  | - Distributed Library Sequence Number |
| XDWM..E | HVTMODEL | - Node Machine Model                  |
| XDWM..E | HVTMTYPE | - Node Machine Type                   |
| XD....E | HVTRVN   | - Record Version Number               |
| XDWM..E | HVTSN    | - Node Serial Number                  |
| XDWM..E | HVTVECD  | - VE Code Level                       |
| XDWM..E | INTERVLS | - Number of Recording Intervals       |
| XD....E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |

### Retained Data Elements

|         |         |                                     |
|---------|---------|-------------------------------------|
| XDWM..E | VDAMXCT | - Configured Max Channel Throughput |
| XDWM..E | VDAVDM  | - Virtual Device Model              |
| XDWM..E | VDAVDT  | - Virtual Device Type               |

### Accumulated Data Elements

|         |          |                                            |
|---------|----------|--------------------------------------------|
| XDWM..E | VDACR    | - Data Read from Cache (uncomp MB)         |
| XDWM..E | VDACRW   | - Total Data R/W Cache (uncomp MB)         |
| XDWM..E | VDACW    | - Data Written to Cache (uncomp MB)        |
| XDWM..E | VDALPR   | - Selective Port Resets                    |
| XDWM..E | VDANUMBS | - Channel Blocks Written                   |
| XDWM..E | VDASAFCT | - Sum of Times Cluster Ahead of FICON Chnl |
| XDWM..E | VDASBFCT | - Sum of Times Cluster Behind FICON Chnl   |
| XDWM..E | VDASDLY  | - Sum of Avg Throughput Delay Time         |
| XDWM..E | VDASPCD  | - Sum of Host Throttle Delay Percentage    |
| XDWM..E | VDASPR   | - System Port Resets                       |
| XDWM..E | VDASVCM  | - Sum of Avg Virtual Drives Concur Mounted |
| XDWM..E | VDASVDC  | - Sum of Virtual Drives Configured         |
| XDWM..E | VDAVDR   | - Data Read from Cache (comp MB)           |
| XDWM..E | VDAVDW   | - Data Written to Cache (comp MB)          |
| XDWM..E | VDAVRW   | - Total Data R/W to Cache (comp MB)        |
| XDWM..E | VDA00KB  | - 0 to 2K Channel Blocks Written           |
| XDWM..E | VDA02KB  | - > 2K to 4K Channel Blocks Written        |
| XDWM..E | VDA04KB  | - > 4K to 8K Channel Blocks Written        |
| XDWM..E | VDA08KB  | - > 8K to 16K Channel Blocks Written       |
| XDWM..E | VDA16KB  | - > 16K to 32K Channel Blocks Written      |



XDWM..E VDA32KB - > 32K to 64K Channel Blocks Written  
XDWM..E VDA64KB - > 64K Channel Blocks Written

#### Minimum Data Elements

XDWM..E VDAMNCDS - Min Channel Data per Second (MB)  
XDWM..E VDAMNCR - Min Data Read from Cache (uncomp MB)  
XDWM..E VDAMNCRC - Min Compression Ratio Read from Cache  
XDWM..E VDAMNCW - Min Data Written to Cache (uncomp MB)  
XDWM..E VDAMNCWC - Min Compression Ratio Write to Cache  
XDWM..E VDAMNVCM - Min Virtual Drives Concur Mounted  
XDWM..E VDAMNVDR - Min Data Read from Cache (comp MB)  
XDWM..E VDAMNVDW - Min Data Written to Cache (comp MB)

#### Maximum Data Elements

XDWM..E VDAMXACT - Max Times Cluster Ahead of FICON Chnl  
XDWM..E VDAMXBCT - Max Times Cluster Behind FICON Chnl  
XDWM..E VDAMXCDS - Max Channel Data per Second (MB)  
XDWM..E VDAMXCR - Max Data Read from Cache (uncomp MB)  
XDWM..E VDAMXCRC - Max Compression Ratio Read from Cache  
XDWM..E VDAMXCW - Max Data Written to Cache (uncomp MB)  
XDWM..E VDAMXCWC - Max Compression Ratio Write to Cache  
XDWM..E VDAMXDLY - Max Throughput Delay Time  
XDWM..E VDAMXDTR - Max Data Rate (G-bits)  
XDWM..E VDAMXLPR - Max Selective Port Resets  
XDWM..E VDAMXPCD - Max Percent Delay Due to Host Throttle  
XDWM..E VDAMXSPR - Max System Port Resets  
XDWM..E VDAMXVCM - Max Virtual Drives Concur Mounted  
XDWM..E VDAMXVDR - Max Data Read from Cache (comp MB)  
XDWM..E VDAMXVDW - Max Data Written to Cache (comp MB)

#### Derived Data Elements

XDWM..E VDAAVACT - Avg Times Cluster Ahead of FICON Chnl  
XDWM..E VDAAVBCT - Avg Times Cluster Behind FICON Chnl  
XDWM..E VDAAVBSZ - Avg Estimated Channel Blocksize  
XDWM..E VDAAVCDS - Avg Channel Data per Second (MB)  
XDWM..E VDAAVCR - Avg Data Read from Cache (uncomp MB)  
XDWM..E VDAAVCRC - Avg Compression Ratio Read from Cache  
XDWM..E VDAAVCW - Avg Data Written to Cache (uncomp MB)  
XDWM..E VDAAVCWC - Avg Compression Ratio Write to Cache  
XDWM..E VDAAVDLY - Avg Throughput Delay Time  
XDWM..E VDAAVPCD - Avg Percent Delay Due to Host Throttle  
XDWM..E VDAAVVCM - Avg Virtual Drives Concur Mounted  
XDWM..E VDAAVVDC - Avg Virtual Drives Configured  
XDWM..E VDAAVVDR - Avg Data Read from Cache (comp MB)  
XDWM..E VDAAVVDW - Avg Data Written to Cache (comp MB)  
XDWM..E VDAPC00K - Pct 0 to 2K Channel Blocks Written

XDWM..E VDAPC02K - Pct > 2K to 4K Channel Blocks Written  
XDWM..E VDAPC04K - Pct > 4K to 8K Channel Blocks Written  
XDWM..E VDAPC08K - Pct > 8K to 16K Channel Blocks Written  
XDWM..E VDAPC16K - Pct > 16K to 32K Channel Blocks Written  
XDWM..E VDAPC32K - Pct > 32K to 64K Channel Blocks Written  
XDWM..E VDAPC64K - Pct > 64K Channel Blocks Written  
XDWM..E VDAPSCR - Data Read from Cache (uncomp MB/s)  
XDWM..E VDAPSCW - Data Written to Cache (uncomp MB/s)  
XDWM..E VDAPSVDR - Data Read from Cache (comp MB/s)  
XDWM..E VDAPSVDW - Data Written to Cache (comp MB/s)

### 5.2.4.1.3 HVTVDA Usage Considerations

This section identifies any special considerations or techniques related to using the HVTVDA file.

None.

#### 5.2.4.1.4 HVTVDA 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. Using the most recent DAYS timespan HVTVDA file, display the total blocks of data moved between DASD cache and z/OS for each cluster, per HOUR. Display the percent buckets for each blocksize range and the estimated average blocksize. Generate a separate page for each cluster.

```
DATA;
SET &pHVTd..HVTVDA01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY HVTCLID ;
  BY HVTCLID DATE ;
  ID HOUR ;
VAR VDANUMBS VDAPC00K VDAPC02K VDAPC04K VDAPC08K VDAPC16K
    VDAPC32K VDAPC64K VDAAVBSZ ;
TITLE1
'Daily Tape Server I/O Block Size Analysis by HOUR' ;
RUN ;
```

### 5.2.4.2 Hydra Vnode Adapter Port Activity File (HVTVAP)

The Hydra Vnode Adapter Port Activity file contains statistics on the volume of data processed through each of the Host Bus Adapters (HBAs). It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, type 21, Vnode Adapter Historical Record. This record is produced every 15 minutes.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTVAP File Organization
- 2 - HVTVAP Data Elements List
- 3 - HVTVAP Usage Considerations
- 4 - HVTVAP Retrieval Examples

### 5.2.4.2.1 HVTVP 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                     | HVTGRID | HVTCLID | HVTNODE | HVTHBAID |  |
|          | YEAR                      | MONTH   | DAY     | HOUR    | ENDTS    |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHBAID |  |
|          | YEAR                      | MONTH   | DAY     | HOUR    |          |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHBAID |  |
|          | YEAR                      | WEEK    | ZONE    | HOUR    |          |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHBAID |  |
|          | YEAR                      | MONTH   | ZONE    |         |          |  |
| YEARS    | N/A                       |         |         |         |          |  |
| TABLES   | N/A                       |         |         |         |          |  |

Generation Date: Mon, Apr 23, 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 5-27. HVTVP Sort Sequence and Data Granularity

#### 5.2.4.2.2 HVTVAP 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:** Thu, Apr 1, 2010

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

##### Sequence/Summary Data Elements

|         |          |                        |
|---------|----------|------------------------|
| XD...E  | DAY      | - Day of Month         |
| XDW...E | HOURL    | - Hour of Day          |
| XDWM..E | HVTCLID  | - Cluster ID           |
| XDWM..E | HVTGRID  | - Grid Composite ID    |
| XDWM..E | HVTHBAID | - HBA Port Internal ID |

XDWM..E HVTNODE - Node 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

XD....E DAYNAME - Name of Day of Week  
XDWM..E DURATION - Recording Interval Time  
XDWM..E ENDTS - End Time Stamp  
XDWM..E HVTDLN - Distributed Library Sequence Number  
XDWM..E HVTMODEL - Node Machine Model  
XDWM..E HVTMTYPE - Node Machine Type  
XD....E HVTRVN - Record Version Number  
XDWM..E HVTSN - Node Serial Number  
XDWM..E HVTVECD - VE Code Level  
XDWM..E INTERVLS - Number of Recording Intervals  
XD....E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp

#### Retained Data Elements

XDWM..E VAPHBADR - HBA Drawer  
XDWM..E VAPHBASL - HBA Slot Number  
XD....E VAPSTATE - HBA State  
XDWM..E VAPTYPE - HBA Type

#### Accumulated Data Elements

XDWM..E VAPCR - Data Read from Cache (uncomp MB)  
XDWM..E VAPCRW - Total Data R/W to Cache (uncomp MB)  
XDWM..E VAPCW - Data Written to Cache (uncomp MB)  
XDWM..E VAPDTR - Actual Data Rate (G-bits)  
XDWM..E VAPHBAC1 - No. Intervals HBA was in Check 1 State  
XDWM..E VAPHBANW - No. Intervals HBA was Not Working  
XDWM..E VAPHBAOF - No. Intervals HBA was in Offline State  
XDWM..E VAPHBAON - No. Intervals HBA was in Online State  
XDWM..E VAPHBAOT - No. Intervals HBA was in Unknown State  
XDWM..E VAPHBARL - No. Intervals HBA was in Reloading State  
XDWM..E VAPLPR - Selective Port Resets  
XDWM..E VAPSPR - System Port Resets  
XDWM..E VAPVDR - Data Read from Cache (comp MB)  
XDWM..E VAPVDW - Data Written to Cache (comp MB)  
XDWM..E VAPVRW - Total Data R/W to Cache (comp MB)

#### Minimum Data Elements

XDWM..E VAPMNCDS - Min Channel Data per Second (MB)  
XDWM..E VAPMNCR - Min Data Read from Cache (uncomp MB)  
XDWM..E VAPMNCRC - Min Compression Ratio Read from Cache  
XDWM..E VAPMNCW - Min Data Written to Cache (uncomp MB)  
XDWM..E VAPMNCWC - Min Compression Ratio Write to Cache  
XDWM..E VAPMNVDR - Min Data Read from Cache (comp MB)  
XDWM..E VAPMNVDW - Min Data Written to Cache (comp MB)

### Maximum Data Elements

XDWM..E VAPMXCDS - Max Channel Data per Second (MB)  
XDWM..E VAPMXCR - Max Data Read from Cache (uncomp MB)  
XDWM..E VAPMXCRC - Max Compression Ratio Read from Cache  
XDWM..E VAPMXCW - Max Data Written to Cache (uncomp MB)  
XDWM..E VAPMXCWC - Max Compression Ratio Write to Cache  
XDWM..E VAPMXDTR - Max Data Rate (G-bits)  
XDWM..E VAPMXLPR - Max Selective Port Resets  
XDWM..E VAPMXSPR - Max System Port Resets  
XDWM..E VAPMXVDR - Max Data Read from Cache (comp MB)  
XDWM..E VAPMXVDW - Max Data Written to Cache (comp MB)

### Derived Data Elements

XDWM..E VAPAVCR - Avg Data Read from Cache (uncomp MB)  
XDWM..E VAPAVCRC - Avg Compression Ratio Read from Cache  
XDWM..E VAPAVCRW - Avg Channel Data (MB)  
XDWM..E VAPAVCW - Avg Data Written to Cache (uncomp MB)  
XDWM..E VAPAVCWC - Avg Compression Ratio Write to Cache  
XDWM..E VAPAVDTR - Avg Data Rate EOI (G-bits)  
XDWM..E VAPAVVDR - Avg Data Read from Cache (comp MB)  
XDWM..E VAPAVVDW - Avg Data Written to Cache (comp MB)  
XDWM..E VAPPSCR - Data Read from Cache (uncomp MB/s)  
XDWM..E VAPPSCRW - Channel Data per Second (MB)  
XDWM..E VAPPSCW - Data Written to Cache (uncomp MB/s)  
XDWM..E VAPPSVDR - Data Read from Cache (comp MB/s)  
XDWM..E VAPPSVDW - Data Written to Cache (comp MB/s)

### 5.2.4.2.3 HVTVAP Usage Considerations

This section identifies any special considerations or techniques related to using the HVTVAP file.

None.



#### 5.2.4.2.4 HVTVP 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. Using the most recent DAYS timespan HVTVP file, display channel I/O through each Host Bus Adapter (HBA), per HOUR. Observe the balance of I/O through each HBA. For finer 15-minute granularity, change HOUR to ENDTS and point to the DETAIL HVTVP file.

```
PROC TABULATE DATA=&pHVTd.HVTVP01;
  BY HVTCLID;
  CLASS HVTHBAID HOUR ;
  VAR VAPCRW ;
  TABLE HOUR, HVTHBAID*VAPCRW /
    RTS=20;
  TITLE 'HBA I/O Distribution';
RUN;
```

#### 5.2.4.3 Hydra Hnode Cache Activity File (HVTHHC)

At the DETAIL timespan, this file contains statistics on the Tape Volume Cache (TVC) size and throttle activity. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode HSM Historical Record. This record is produced every 15 minutes. In addition, this file also contains a summarization of the statistics for each cache partition and preference groups from the HVTHCP and HVTHPG work files to the Hnode level.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHHC File Organization
- 2 - HVTHHC Data Elements List
- 3 - HVTHHC Usage Considerations
- 4 - HVTHHC Retrieval Examples

### 5.2.4.3.1 HVTHHC 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                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | DAY     | HOUR    | ENDTS   |      |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | DAY     | HOUR    |         |      |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | WEEK                      | ZONE    | HOUR    |         |      |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | ZONE    |         |         |      |  |
| YEARS    | N/A                       |         |         |         |      |  |
| TABLES   | N/A                       |         |         |         |      |  |

Generation Date: Thu, Apr 1, 2010

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. HVTHHC Sort Sequence and Data Granularity

### 5.2.4.3.2 -VTHHC 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:** Thu, Nov 21, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                     |
|---------|---------|---------------------|
| XD....E | DAY     | - Day of Month      |
| XDW...E | HOUR    | - Hour of Day       |
| XDWM..E | HVTCLID | - Cluster ID        |
| XDWM..E | HVTGRID | - Grid Composite ID |
| XDWM..E | HVTNODE | - Node 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

XD....E DAYNAME - Name of Day of Week  
 XDWM..E DURATION - Recording Interval Time  
 XDWM..E ENDTS - End Time Stamp  
 XDWM..E HVTDLN - Distributed Library Sequence Number  
 XDWM..E HVTMODEL - Node Machine Model  
 XDWM..E HVTMTYPE - Node Machine Type  
 XD....E HVTRVN - Record Version Number  
 XDWM..E HVTSN - Node Serial Number  
 XDWM..E HVTVECD - VE Code Level  
 XDWM..E INTERVLS - Number of Recording Intervals  
 XD....E ORGSYSID - Originating System Identification  
 XDWM..E STARTTS - Start Time Stamp

#### Retained Data Elements

XDWM..E HHCAN - Active Node  
 XDWM..E HHCBDCT - Base Deferred Copy Throttle Value (Sec)  
 X....E HHCCTR - Copy Throttle Reason  
 X....E HHCDCR - Deferred Copy Throttle Reason  
 XDWM..E HHCDRV - Disaster Recovery Volume  
 X....E HHCHWTR - Host Write Throttle Reason  
 XDWM..E HHCPMT - Pre-migration Throttle Threshold (GB)

#### Accumulated Data Elements

XDWM..E HHCCHM - Virtual Cache-Hit Mounts  
 XDWM..E HHCCMM - Virtual Recall Mounts  
 XDWM..E HHCCPLFS - CT - Low on Cache Free Space  
 XDWM..E HHCCPNOT - CT - No Throttling  
 XDWM..E HHCCPPSS - CT - Pre-migrate Steady State  
 XDWM..E HHCCPTCT - Copy Predominate Throttle count  
 XDWM..E HHCDCCRU - DCT - Cluster Resource Usage  
 XDWM..E HHCDCHIO - DCT - Preferring Host IO  
 XDWM..E HHCDCIMC - DCT - Immediate Copy Throttling  
 XDWM..E HHCDCNOT - DCT - No Throttling  
 XDWM..E HHCDCTCT - Deferred Copy Throttle Count  
 XDWM..E HHCDRIC - Sum of Data Resident in Cache (GB)  
 XDWM..E HHCFRM - Virtual Fast-Ready Mounts  
 XDWM..E HHCFMT - Virtual Fast-Ready Mount Time  
 XDWM..E HHCHTM - Virtual Cache-Hit Mount Time  
 XDWM..E HHCHWECC - HWT - Excess Cached Content for Copy  
 XDWM..E HHCHWGPS - HWT - Grid Pre-migrate Steady State

XDWM..E HHCHWIMC - HWT - Immediate Copy Throttling  
XDWM..E HHCHWLFS - HWT - Low on Cache Free Space  
XDWM..E HHCHWNOT - HWT - No Throttling  
XDWM..E HHCHWPSS - HWT - Pre-migrate Steady State  
XDWM..E HHCRTM - Virtual Recall Mount Time  
XDWM..E HHCSACT - Sum of Avg Copy Throttle  
XDWM..E HHCSAWOT - Sum of Avg Write Overrun Throttle  
XDWM..E HHCSCP - Sum of Active Cache Partitions  
XDWM..E HHCSCP B - Sum of Avg CPU Percent Busy  
XDWM..E HHCSDCT - Sum of Avg Deferred Copy Throttle  
XDWM..E HHCSLM - Sync Mode Mounts  
XDWM..E HHCSMDU - Sum of Average Max Disk Usage Percentage  
XDWM..E HHCSTM - Sync Mode Mount Time  
XDWM..E HHCSTOAT - Sum of Overall Average Throttle  
XDWM..E HHCSTUC - Sum of Total Used Cache (GB)  
XDWM..E HHCSTUFC - Sum of Total Used Flash Cache (GB)  
XDWM..E HHCTVC - Sum of Total Cache Size (GB)  
XDWM..E HHCTVM - Total Virtual Mounts  
XDWM..E HHCVVIC - Sum of Virtual Volumes in Cache  
XDWM..E HHCWROCT - W/Overrun Predominate Throttle Count

### Maximum Data Elements

XDWM..E HHCMXCPB - Max CPU Usage Percentage  
XDWM..E HHCMXMDU - Max Disk Usage Percentage

### Derived Data Elements

XDWM..E HHCAVACP - Avg Active Cache Partitions  
XDWM..E HHCAVCHM - Avg Virtual Cache-Hit Mounts  
XDWM..E HHCAVCMM - Avg Virtual Recall Mounts  
XDWM..E HHCAVCPU - Avg CPU Percent Busy  
XDWM..E HHCAVCTV - Avg Copy Predominate Throttle Value  
XDWM..E HHCAVDCT - Avg Deferred Copy Throttle Value  
XDWM..E HHCAVDRC - Avg Data Resident in Cache (GB)  
XDWM..E HHCAVFRM - Avg Virtual Fast-Ready Mounts  
XDWM..E HHCAVFTM - Avg Virtual Fast-Ready Mount Time  
XDWM..E HHCAVHTM - Avg Virtual Cache-Hit Mount Time  
XDWM..E HHCAVMDU - Avg Max Disk Usage Percentage  
XDWM..E HHCAVOAT - Avg Overall Throttle Value  
XDWM..E HHCAVRTM - Avg Virtual Recall Mount Time  
XDWM..E HHCAVSTM - Avg Sync Mode Mount Time  
XDWM..E HHCAVTUC - Avg Used Cache (GB)  
XDWM..E HHCAVTVC - Avg Cache Size (GB)  
XDWM..E HHCAVTVM - Avg Virtual Mounts  
XDWM..E HHCAVUFC - Avg Used Flash Cache (GB)  
XDWM..E HHCAVVSZ - Avg Virtual Volume Size (MB)  
XDWM..E HHCAVVVC - Avg Virtual Volumes in Cache  
XDWM..E HHCAVWOT - Avg Write Overrun Throttle Value

XDWM..E HHCPCHM - Pct Virtual Cache-Hit Mounts  
XDWM..E HHCPCCMM - Pct Virtual Recall Mounts  
XDWM..E HHCPCCPT - Pct Copy Predominate Throttle  
XDWM..E HHCPCCUT - Pct Cache Utilization  
XDWM..E HHCPDCT - Pct Deferred Copy Throttle  
XDWM..E HHCPCFRM - Pct Virtual Fast-Ready Mounts  
XDWM..E HHCPCCVM - Pct Virtual Cache-Miss Mounts  
XDWM..E HHCPCWOT - Pct W/Overrun Predominate Throttle  
XDWM..E HHCPSCHM - Virtual Cache-Hit Mounts (per/sec)  
XDWM..E HHCPSCMM - Virtual Recall Mounts (per/sec)  
XDWM..E HHCPSFRM - Virtual Fast-Ready Mounts (per/sec)  
XDWM..E HHCPSTVM - Total Virtual Mounts (per/sec)

#### 5.2.4.3.3 HVTHHC Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHHC file.

None.

#### 5.2.4.3.4 HVTHHC 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. Using the most recent DAYS timespan HVTHHC file, display the throttling statistics on the tape server, per hour. Display the throttle percent buckets and throttle values for write-overflow, copy-predominant, and deferred-copy activities. A report with all zeros is good. If any throttle values are significantly large or continue for extended periods of time, further investigation may be required.

```
DATA;
SET &pHVTd..HVTHHC01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL
PAGEBY HVTCLID;
ID DATE HOUR ;
VAR HHCPWOT HHCAWOT HHCPDCT HHCAVDCT
      HHCPCCPT HHCAVCTV;
TITLE 'Throttle Activity';
RUN;
```



#### 5.2.4.4 Hnode Cache Partition Activity File (HVTHCP)

The Hydra Cache Partition Activity file contains statistics on virtual tape mounts, scratch, cache hit, and cache miss activity for each cache partition. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode HSM Historical Record. This record is produced every 15 minutes. In addition, this file also contains a roll-up of the statistics for preference groups from the HVTHPG work file to the partition level.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHCP File Organization
- 2 - HVTHCP Data Elements List
- 3 - HVTHCP Usage Considerations
- 4 - HVTHCP Retrieval Examples

#### 5.2.4.4.1 HVTHCP 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                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | YEAR                      | MONTH   | DAY     | HOURL   | ENDTS   |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | YEAR                      | MONTH   | DAY     | HOURL   |         |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | YEAR                      | WEEK    | ZONE    | HOURL   |         |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | YEAR                      | MONTH   | ZONE    |         |         |  |
| YEARS    | N/A                       |         |         |         |         |  |
| TABLES   | N/A                       |         |         |         |         |  |

Generation Date: Thu, Apr 1, 2010

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. HVTHCP Sort Sequence and Data Granularity



#### 5.2.4.4.2 HVTHCP 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:** Thu, Apr 1, 2010

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

##### Sequence/Summary Data Elements

|         |         |                              |
|---------|---------|------------------------------|
| XD...E  | DAY     | - Day of Month               |
| XDW...E | HOURL   | - Hour of Day                |
| XDWM..E | HVTCLID | - Cluster ID                 |
| XDWM..E | HVTGRID | - Grid Composite ID          |
| XDWM..E | HVTHCPC | - HSM Cache Partition Number |
| XDWM..E | HVTNODE | - Node 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

XD....E DAYNAME - Name of Day of Week  
 XDWM..E DURATION - Recording Interval Time  
 XDWM..E ENDTS - End Time Stamp  
 XDWM..E HVTDLN - Distributed Library Sequence Number  
 XDWM..E HVTMODEL - Node Machine Model  
 XDWM..E HVTMTYPE - Node Machine Type  
 XD....E HVTRVN - Record Version Number  
 XDWM..E HVTSN - Node Serial Number  
 XDWM..E HVTVECD - VE Code Level  
 XDWM..E INTERVLS - Number of Recording Intervals  
 XD....E ORGSYSID - Originating System Identification  
 XDWM..E STARTTS - Start Time Stamp

#### Accumulated Data Elements

XDWM..E HCPCHM - Virtual Cache-Hit Mounts  
 XDWM..E HCPCMM - Virtual Recall Mounts  
 XDWM..E HCPDRIC - Sum of Data Resident in Cache (GB)  
 XDWM..E HCPFRM - Virtual Fast-Ready Mounts  
 XDWM..E HCPFTM - Virtual Fast-Ready Mount Time  
 XDWM..E HCPHTM - Virtual Cache-Hit Mount Time  
 XDWM..E HCPPTS - Sum of Cache Partition Size (GB)  
 XDWM..E HCPRTM - Virtual Recall Mount Time  
 XDWM..E HCPTVM - Total Virtual Mounts  
 XDWM..E HCPVVIC - Sum of Virtual Volumes in Cache

#### Derived Data Elements

XDWM..E HCPAVCHM - Avg Virtual Cache-Hit Mounts  
 XDWM..E HCPAVCMM - Avg Virtual Recall Mounts  
 XDWM..E HCPAVDRC - Avg Data Resident in Cache (GB)  
 XDWM..E HCPAVFRM - Avg Virtual Fast-Ready Mounts  
 XDWM..E HCPAVFTM - Avg Virtual Fast-Ready Mount Time  
 XDWM..E HCPAVHTM - Avg Virtual Cache-Hit Mount Time  
 XDWM..E HCPAVPTS - Avg Cache Partition Size (GB)  
 XDWM..E HCPAVRTM - Avg Virtual Recall Mount Time  
 XDWM..E HCPAVTVM - Avg Virtual Mounts  
 XDWM..E HCPAVVSZ - Avg Virtual Volume Size (MB)  
 XDWM..E HCPAVVVC - Avg Virtual Volumes in Cache  
 XDWM..E HCPPCCHM - Pct Virtual Cache-Hit Mounts  
 XDWM..E HCPPCCMM - Pct Virtual Recall Mounts

XDWM..E HCPPCCUT - Pct Cache Utilization  
XDWM..E HCPPCFRM - Pct Virtual Fast-Ready Mounts  
XDWM..E HCPPCVCN - Pct Virtual Cache-Miss Mounts  
XDWM..E HCPPSCHM - Virtual Cache-Hit Mounts (per/sec)  
XDWM..E HCPPSCMM - Virtual Recall Mounts (per/sec)  
XDWM..E HCPPSFRM - Virtual Fast-Ready Mounts (per/sec)  
XDWM..E HCPPSTVM - Total Virtual Mounts (per/sec)

### 5.2.4.4.3 HVTHCP Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHCP file.

None.

#### 5.2.4.4.4 HVTHCP 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. Using the most recent DAYS timespan HVTHCP file, display the total virtual tape mounts by type and the associated average mount times per HOUR.

```
DATA;
SET &pIVTd..HVTHCP01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY HVTHCPC;
  BY HVTCLID HVTHCPC DATE ;
ID HOUR ;
VAR HCPTVM HCPFRM HCPAVFTM HCPCHM HCPAVHTM
    HCPMM HCPAVRTM;
FORMAT HCPAVFTM HHSS.;
FORMAT HCPAVHTM HHSS.;
FORMAT HCPAVRTM HHSS.;
TITLE1
'Daily Virtual Tape Mount Analysis by HOUR' ;
RUN ;
```

### 5.2.4.5 Hydra Hnode Cache Pref Grp Statistics File (HVTHPG)

The Hydra Cache Preference Group Statistics file contains metrics on virtual volume totals, and data in cache age for each preference group with a cache partition. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode HSM Historical Record. This record is produced every 15 minutes.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHPG File Organization
- 2 - HVTHPG Data Elements List
- 3 - HVTHPG Usage Considerations
- 4 - HVTHPG Retrieval Examples



### 5.2.4.5.1 HVTHPG 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                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | HVTCPPG                   | YEAR    | MONTH   | DAY     | HOURL   |  |
|          | ENDTS                     |         |         |         |         |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | HVTCPPG                   | YEAR    | MONTH   | DAY     | HOURL   |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | HVTCPPG                   | YEAR    | WEEK    | ZONE    | HOURL   |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTHCPC |  |
|          | HVTCPPG                   | YEAR    | MONTH   | ZONE    |         |  |
| YEARS    | N/A                       |         |         |         |         |  |
| TABLES   | N/A                       |         |         |         |         |  |

Generation Date: Thu, Apr 1, 2010

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. HVTHPG Sort Sequence and Data Granularity



### 5.2.4.5.2 HVTHPG 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:** Thu, Nov 21, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                                        |
|---------|---------|----------------------------------------|
| XD....E | DAY     | - Day of Month                         |
| XDW...E | HOUR    | - Hour of Day                          |
| XDWM..E | HVTCLID | - Cluster ID                           |
| XDWM..E | HVTCPPG | - HSM Cache Partition Preference Group |
| XDWM..E | HVTGRID | - Grid Composite ID                    |

|          |         |                              |
|----------|---------|------------------------------|
| XDWM..E  | HVTHCPC | - HSM Cache Partition Number |
| XDWM..E  | HVTNODE | - Node 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

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | DURATION | - Recording Interval Time             |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | HVTDLSN  | - Distributed Library Sequence Number |
| XDWM..E | HVTMODEL | - Node Machine Model                  |
| XDWM..E | HVTMTYPE | - Node Machine Type                   |
| XD....E | HVTRVN   | - Record Version Number               |
| XDWM..E | HVTSN    | - Node Serial Number                  |
| XDWM..E | HVTVECD  | - VE Code Level                       |
| XDWM..E | INTERVLS | - Number of Recording Intervals       |
| XD....E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |

### Retained Data Elements

|         |          |                                            |
|---------|----------|--------------------------------------------|
| XDWM..E | HPGAVATD | - Avg Age Time Delayed Copy Volumes Remove |
| XDWM..E | HPGCTD   | - Time Delayed Copy Volumes Removed        |
| XDWM..E | HPGVA35  | - 35 Day Rolling Avg Virt Vol Age          |
| XDWM..E | HPGVA4   | - 4 HR Rolling Avg Virt Vol Age            |
| XDWM..E | HPGVA48  | - 48 HR Rolling Avg Virt Vol Age           |
| XDWM..E | HPGVM35  | - Virtual Vols Migrated Last 35 Days       |
| XDWM..E | HPGVM4   | - Virtual Vols Migrated Last 4 Hours       |
| XDWM..E | HPGVM48  | - Virtual Vols Migrated Last 48 Hours      |

### Accumulated Data Elements

|         |         |                                         |
|---------|---------|-----------------------------------------|
| XDWM..E | HPGARC  | - Sum of Data Awaiting Replication (MB) |
| XDWM..E | HPGDRIC | - Sum of Data Resident in Cache (GB)    |
| XDWM..E | HPGUMD  | - Sum of Unmigrated Data (MB)           |
| XDWM..E | HPGVVIC | - Sum of Virtual Volumes in Cache       |

### Derived Data Elements

|         |          |                                      |
|---------|----------|--------------------------------------|
| XDWM..E | HPGAVARC | - Avg Data Awaiting Replication (MB) |
| XDWM..E | HPGAVDRC | - Avg Data Resident in Cache (GB)    |
| XDWM..E | HPGAVUMD | - Avg Unmigrated Data (MB)           |
| XDWM..E | HPGAVVSZ | - Avg Virtual Volume Size (MB)       |
| XDWM..E | HPGAVVVC | - Avg Virtual Volumes in Cache       |

### 5.2.4.5.3 HVTHPG Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHPG file.

None.

### 5.2.4.5.4 HVTHPG 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 &ddiit, 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. Using the most recent DAYS timespan HVTHPG file, display the cache preference group activity per hour. Display the cache age metrics for virtual volumes; volumes in cache for 4 hours, 48 hours, and 35 days; in addition to the volume count migrated for each of these time metrics. Typically Preference Group 0 is defined to migrate volumes as soon as possible and remove from cache, so the age and number of volumes in cache will be smaller than Preference Group 1. Preference Group 1 is defined to keep virtual volumes in cache as long as possible if they are likely to be recalled or have short retention periods.

```
DATA;
SET &pIVTd..HVTHPG01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY HVTCPG;
  BY HVTCLID HVTHCPC HVTCPG DATE ;
ID HOUR ;
VAR HPGAVVC HPGAVDRC HPGVM4 HPGVM48 HPGVM35
    HPGVA4 HPGVA48 HPGVA35;
TITLE1
'Daily Cache Preference Group Analysis by HOUR' ;
RUN ;
```

### 5.2.4.6 Hydra Hnode Physical Drive Activity File (HVTHPD)

The Hydra Hnode Physical Drive Activity file contains statistics on the number of physical drives available and mount type activity for each device class. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode Library Historical Record. This record is produced every 15 minutes.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHPD File Organization
- 2 - HVTHPD Data Elements List
- 3 - HVTHPD Usage Considerations
- 4 - HVTHPD Retrieval Examples

### 5.2.4.6.1 HVTHPD 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                     | HVTGRID | HVTCLID | HVTNODE | HVTDCI |  |
|          | YEAR                      | MONTH   | DAY     | HOURL   | ENDTS  |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTDCI |  |
|          | YEAR                      | MONTH   | DAY     | HOURL   |        |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTDCI |  |
|          | YEAR                      | WEEK    | ZONE    | HOURL   |        |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTDCI |  |
|          | YEAR                      | MONTH   | ZONE    |         |        |  |
| YEARS    | N/A                       |         |         |         |        |  |
| TABLES   | N/A                       |         |         |         |        |  |

Generation Date: Thu, Apr 1, 2010

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. HVTHPD Sort Sequence and Data Granularity





### 5.2.4.6.2 HVTHPD 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:** Thu, Apr 1, 2010

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                     |
|---------|---------|---------------------|
| XD...E  | DAY     | - Day of Month      |
| XDW...E | HOURL   | - Hour of Day       |
| XDWM..E | HVTCLID | - Cluster ID        |
| XDWM..E | HVTDCI  | - Device Class ID   |
| XDWM..E | HVTGRID | - Grid Composite ID |
| XDWM..E | HVTNODE | - Node 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

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | DURATION | - Recording Interval Time             |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | HVTDLSN  | - Distributed Library Sequence Number |
| X.....  | HVTLMA   | - Library Manufacturer                |
| X.....  | HVTLMN   | - Library Model Number                |
| X.....  | HVTLMT   | - Library Machine Type                |
| X.....  | HVTLPM   | - Library Plant of Manufacture        |
| X.....  | HVTLN    | - Library Sequence Number             |
| X.....E | HVTMODEL | - Node Machine Model                  |
| X.....E | HVTMTYPE | - Node Machine Type                   |
| X.....E | HVTRVN   | - Record Version Number               |
| XDWM..E | HVTSN    | - Node Serial Number                  |
| X.....E | HVTVECD  | - VE Code Level                       |
| XDWM..E | INTERVLS | - Number of Recording Intervals       |
| XD....E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |

### Accumulated Data Elements

|         |         |                                             |
|---------|---------|---------------------------------------------|
| XDWM..E | HPDPPM  | - Physical Pre-Migrate Mounts               |
| XDWM..E | HPDPRM  | - Physical Recall Mounts                    |
| XDWM..E | HPDPSM  | - Physical Security Data Erase Mounts       |
| XDWM..E | HPDRCM  | - Physical Reclaim Mounts                   |
| XDWM..E | HPDSAPD | - Sum of Available Physical Devices         |
| XDWM..E | HPDSIPD | - Sum of Installed Physical Devices         |
| XDWM..E | HPDSPDM | - Sum of Avg Physical Drives Concur Mounted |
| XDWM..E | HPDTPM  | - Total Physical Mounts                     |
| XDWM..E | HPDTTM  | - Total Physical Mount Time                 |

### Minimum Data Elements

|         |          |                                      |
|---------|----------|--------------------------------------|
| XDWM..E | HPDMNMTM | - Min Physical Mount Time            |
| XDWM..E | HPDMNPDM | - Min Physical Drives Concur Mounted |

### Maximum Data Elements

|         |          |                                      |
|---------|----------|--------------------------------------|
| XDWM..E | HPDMXMTM | - Max Physical Mount Time            |
| XDWM..E | HPDMXPDM | - Max Physical Drives Concur Mounted |

### Derived Data Elements

XDWM..E HPDAVAPD - Avg Physical Drives Available  
XDWM..E HPDAVIPD - Avg Physical Drives Installed  
XDWM..E HPDAVMTM - Avg Physical Mount Time  
XDWM..E HPDAVPDM - Avg Physical Drives Concur Mounted

### 5.2.4.6.3 HVTHPD Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHPD file.

None.

### 5.2.4.6.4 HVTHPD 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. Using the most recent DAYS timespan HVTHPD file, display the total physical tape mount counts by type, and average and maximum tape mount times by cluster.

```
DATA;  
SET &pHVTd..HVTGCC01;  
DATE=DATEPART(ENDTS) ;  
FORMAT DATE DATE8. ;  
* ;  
PROC PRINT LABEL ;  
  PAGEBY HVTCLID ;  
  ID DATE HOUR ;  
  VAR HPDTPM HPDPRM HPDPPM HPDRCM HPDPSM  
      HPDAVMTM HPDMXMTM;  
  TITLE 'Physical Tape Mount Statistics';  
RUN;
```

### 5.2.4.7 Hydra Hnode G-Use Pool Activity File (HVTHGP)

The Hydra Hnode General Use Pool Activity file contains statistics on the physical tape and logical volume activity for each of the 32 general use pools. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode Library Historical Record. This record is produced every 15 minutes. In addition, this file contains a roll-up of the tape media statistics from the HVTHGM file.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHGP File Organization
- 2 - HVTHGP Data Elements List
- 3 - HVTHGP Usage Considerations
- 4 - HVTHGP Retrieval Examples

### 5.2.4.7.1 HVTHGP 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                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|                                             | HVTDCI                    | YEAR    | MONTH   | DAY     | HOUR     |  |
|                                             | ENDTS                     |         |         |         |          |  |
| DAYS                                        | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|                                             | HVTDCI                    | YEAR    | MONTH   | DAY     | HOUR     |  |
|                                             |                           |         |         |         |          |  |
| WEEKS                                       | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|                                             | HVTDCI                    | YEAR    | WEEK    | ZONE    | HOUR     |  |
|                                             |                           |         |         |         |          |  |
| MONTHS                                      | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|                                             | HVTDCI                    | YEAR    | MONTH   | ZONE    |          |  |
|                                             |                           |         |         |         |          |  |
| YEARS                                       | N/A                       |         |         |         |          |  |
| +-----+-----+-----+-----+-----+-----+-----+ |                           |         |         |         |          |  |
| TABLES                                      | N/A                       |         |         |         |          |  |
| +-----+-----+-----+-----+-----+-----+-----+ |                           |         |         |         |          |  |

Generation Date: Thu, Apr 1, 2010

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. HVTHGP Sort Sequence and Data Granularity

### 5.2.4.7.2 HVTHGP 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:** Thu, Apr 1, 2010

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

- XD...E DAY - Day of Month
- XDW...E HOUR - Hour of Day
- XDWM..E HVTCLID - Cluster ID
- XDWM..E HVTDCI - Device Class ID
- XDWM..E HVTGRID - Grid Composite ID
- XDWM..E HVTNODE - Node ID

XDWM..E HVTPOOL - Library GUP Number  
 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

XD....E DAYNAME - Name of Day of Week  
 XDWM..E DURATION - Recording Interval Time  
 XDWM..E ENDTS - End Time Stamp  
 XDWM..E HVTDLN - Distributed Library Sequence Number  
 X..... HVTLMA - Library Manufacturer  
 X..... HVTLMN - Library Model Number  
 X..... HVTLMT - Library Machine Type  
 X..... HVTLPM - Library Plant of Manufacture  
 X..... HVTLSN - Library Sequence Number  
 X.....E HVTMODEL - Node Machine Model  
 X.....E HVTMTYPE - Node Machine Type  
 XD....E HVTRVN - Record Version Number  
 XDWM..E HVTSN - Node Serial Number  
 X.....E HVTVECD - VE Code Level  
 XDWM..E INTERVLS - Number of Recording Intervals  
 XD....E ORGSYSID - Originating System Identification  
 XDWM..E STARTTS - Start Time Stamp

#### Retained Data Elements

XDWM..E HGPFEF - Force Erasure Policy Value (Days)  
 XDWM..E HGPFMBF - 1st Media to Borrow Policy Value  
 XDWM..E HGPLAP - Last Access Policy Value (Days)  
 XDWM..E HGPLIP - Last Data Invalidation Policy Value(Days)  
 XDWM..E HGPLPW - Last Written Policy Value (Days)  
 XDWM..E HGPMAP - Min Active Data Pct Policy Value  
 XDWM..E HGPPTPF - Pool Type Policy Value  
 XDWM..E HGPRBVF - Returns Allowed Policy Value  
 XDWM..E HGPRCT - Reclaim Threshold Pct Policy Value  
 XDWM..E HGPRPL - Reclaim Pool Policy Value  
 XDWM..E HGPSMBF - 2nd Media to Borrow Policy Value

#### Accumulated Data Elements

XDWM..E HGPALV - Sum of Active Logical Volumes  
 XDWM..E HGPBPV - Borrowed Private Stacked Volume Count  
 XDWM..E HGPBSV - Borrowed Scratch Stacked Volume Count  
 XDWM..E HGPDRP - Data Read from the Pool (MB)  
 XDWM..E HGPDWP - Data Written to the Pool (MB)  
 XDWM..E HGPMAD - Sum of Active Logical Volume Data (MB)

XDWM..E HGPPVC - Private Stacked Volume Count  
XDWM..E HGPRRV - Read Only Recovery Volume Count  
XDWM..E HGPMSETM - Sum of Avg Age of Residual Stacked Vols  
XDWM..E HGPMFPV - Sum of Avg Age of Full Stacked Vols  
XDWM..E HGPMSCV - Scratch Stacked Volume Count  
XDWM..E HGPMUVC - Volumes in Unavailable Status  
XDWM..E HGPMWSE - Stacked Volumes Waiting Security Data

### Maximum Data Elements

XDWM..E HGPMXETM - Max Age of Residual Stacked Vols  
XDWM..E HGPMXFPV - Max Age of Full Stacked Vols

### Derived Data Elements

XDWM..E HGPAVALV - Avg Active Logical Volumes  
XDWM..E HGPAVBPV - Avg Borrowed Private Stacked Volumes  
XDWM..E HGPAVBSV - Avg Borrowed Scratch Stacked Volumes  
XDWM..E HGPAVETM - Avg Age of Residual Stacked Vols  
XDWM..E HGPAVFPV - Avg Age of Full Stacked Volumes  
XDWM..E HGPAVMAD - Avg Active Logical Volume Data (MB)  
XDWM..E HGPAVPVC - Avg Private Stacked Volume Count  
XDWM..E HGPAVSVC - Avg Scratch Stacked Volume Count

### 5.2.4.7.3 HVTHGP Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHGP file.

None.



#### 5.2.4.7.4 HVTHGP 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 &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. Using the most recent DAYS timespan HVTHGP file, display the data read and written to the general use pools, including the number of logical volumes in each pool.

```
PROC SUMMARY DATA=DAYS.HVTHGP01 NWAY;
  CLASS HVTCLID HVTPPOOL;
  VAR HGPDRP HGPDWP HGPAVALV;
  OUTPUT OUT=STATS SUM=HGPDRP HGPDWP MEAN=HGPAVALV;
RUN;
PROC PRINT DATA=STATS LABEL ;
  VAR HVTCLID HVTPPOOL HGPDRP HGPDWP HGPAVALV;
TITLE1
'Daily General Use Pool Statistics' ;
RUN ;
```

#### 5.2.4.8 Hydra Hnode G-Use Pool Media Activity File (HVTHGM)

The Hydra Hnode General Use Pool Media Activity file contains statistics on the eight possible sets of physical media type for each of the 32 general use pools. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode Library Historical Record. This record is produced every 15 minutes.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHGM File Organization
- 2 - HVTHGM Data Elements List
- 3 - HVTHGM Usage Considerations
- 4 - HVTHGM Retrieval Examples

### 5.2.4.8.1 HVTHGM 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                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|          | HVTDCI                    | HVTPMG  | YEAR    | MONTH   | DAY      |  |
|          | HOUR                      | ENDTS   |         |         |          |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|          | HVTDCI                    | HVTPMG  | YEAR    | MONTH   | DAY      |  |
|          | HOUR                      |         |         |         |          |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|          | HVTDCI                    | HVTPMG  | YEAR    | WEEK    | ZONE     |  |
|          | HOUR                      |         |         |         |          |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTPPOOL |  |
|          | HVTDCI                    | HVTPMG  | YEAR    | MONTH   | ZONE     |  |
|          |                           |         |         |         |          |  |
| YEARS    | N/A                       |         |         |         |          |  |
|          |                           |         |         |         |          |  |
| TABLES   | N/A                       |         |         |         |          |  |

Generation Date: Thu, Apr 1, 2010

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 5-33. HVTHGM Sort Sequence and Data Granularity

### 5.2.4.8.2 HVTHGM 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:** Thu, Apr 1, 2010

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

- XD...E DAY - Day of Month
- XDW...E HOUR - Hour of Day
- XDWM..E HVTCLID - Cluster ID
- XDWM..E HVTDCI - Device Class ID
- XDWM..E HVTGRID - Grid Composite ID
- XDWM..E HVTNODE - Node ID

XDWM..E HVTPMG - Physical Media Group  
XDWM..E HVTPPOOL - Library GUP Number  
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

XD....E DAYNAME - Name of Day of Week  
XDWM..E DURATION - Recording Interval Time  
XDWM..E ENDTS - End Time Stamp  
XDWM..E HVTDLN - Distributed Library Sequence Number  
X..... HVTLMA - Library Manufacturer  
X..... HVTLMN - Library Model Number  
X..... HVTLMT - Library Machine Type  
X..... HVTLPM - Library Plant of Manufacture  
X..... HVTLN - Library Sequence Number  
X.....E HVTMODEL - Node Machine Model  
X.....E HVTMTYPE - Node Machine Type  
XDWM..E HVTPMI - Physical Media Identifier  
X.....E HVTRVN - Record Version Number  
XDWM..E HVTSN - Node Serial Number  
X.....E HVTVECD - VE Code Level  
XDWM..E INTERVLS - Number of Recording Intervals  
XD....E ORGSYSID - Originating System Identification  
XDWM..E STARTTS - Start Time Stamp

#### Accumulated Data Elements

XDWM..E HGMBPV - Borrowed Private Stacked Volume Count  
XDWM..E HGMBSV - Borrowed Scratch Stacked Volume Count  
XDWM..E HGMPVC - Private Stacked Volume Count  
XDWM..E HGMRRV - Read Only Recovery Volume Count  
XDWM..E HGMSVC - Scratch Stacked Volume Count  
XDWM..E HGMUVC - Volumes in Unavailable Status  
XDWM..E HGMSSE - Stacked Volumes Waiting Security Data

#### Derived Data Elements

XDWM..E HGMAVBPV - Avg Borrowed Private Stacked Volumes  
XDWM..E HGMAVBSV - Avg Borrowed Scratch Stacked Volumes  
XDWM..E HGMAVPVC - Avg Private Stacked Volume Count  
XDWM..E HGMAVSVC - Avg Scratch Stacked Volume Count

### 5.2.4.8.3 HVTHGM Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHGM file.

None.

### 5.2.4.8.4 HVTHGM 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.

No report examples are available at this time for this file.

### 5.2.4.9 Hydra Hnode Activity File (HVTHHA)

The Hydra Hnode Activity file contains a summarized roll-up of statistics from all the above Hnode files to provide a view of all virtual and physical tape activity within the Hnode. This record is produced for every 15-minute measurement interval.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHHA File Organization
- 2 - HVTHHA Data Elements List
- 3 - HVTHHA Usage Considerations
- 4 - HVTHHA Retrieval Examples

### 5.2.4.9.1 HVTHHA 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                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|                                             | MONTH                     | DAY     | HOUR    | ENDTS   |      |  |
|                                             |                           |         |         |         |      |  |
| DAYS                                        | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|                                             | MONTH                     | DAY     | HOUR    |         |      |  |
|                                             |                           |         |         |         |      |  |
| WEEKS                                       | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|                                             | WEEK                      | ZONE    | HOUR    |         |      |  |
|                                             |                           |         |         |         |      |  |
| MONTHS                                      | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|                                             | MONTH                     | ZONE    |         |         |      |  |
|                                             |                           |         |         |         |      |  |
| YEARS                                       | N/A                       |         |         |         |      |  |
|                                             |                           |         |         |         |      |  |
| +-----+-----+-----+-----+-----+-----+-----+ |                           |         |         |         |      |  |
| TABLES                                      | N/A                       |         |         |         |      |  |
| +-----+-----+-----+-----+-----+-----+-----+ |                           |         |         |         |      |  |

Generation Date: Thu, Apr 1, 2010

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 5-34. HVTHHA Sort Sequence and Data Granularity

### 5.2.4.9.2 HVTHHA 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:** Thu, Nov 21, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                     |
|---------|---------|---------------------|
| XD....E | DAY     | - Day of Month      |
| XDW...E | HOURL   | - Hour of Day       |
| XDWM..E | HVTCLID | - Cluster ID        |
| XDWM..E | HVTGRID | - Grid Composite ID |
| XDWM..E | HVTNODE | - Node 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

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | DURATION | - Recording Interval Time             |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | HVTDLSN  | - Distributed Library Sequence Number |
| X.....  | HVTLMA   | - Library Manufacturer                |
| X.....  | HVTLMN   | - Library Model Number                |
| X.....  | HVTLMT   | - Library Machine Type                |
| X.....  | HVTLPM   | - Library Plant of Manufacture        |
| X.....  | HVTLSN   | - Library Sequence Number             |
| X.....E | HVTMODEL | - Node Machine Model                  |
| X.....E | HVTMTYPE | - Node Machine Type                   |
| X.....E | HVTRVN   | - Record Version Number               |
| XDWM..E | HVTSN    | - Node Serial Number                  |
| X.....E | HVTVECD  | - VE Code Level                       |
| XDWM..E | INTERVLS | - Number of Recording Intervals       |
| XD....E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |

#### Retained Data Elements

|         |         |                                           |
|---------|---------|-------------------------------------------|
| XDWM..E | HHAAN   | - Active Node                             |
| XDWM..E | HHABDCT | - Base Deferred Copy Throttle Value (Sec) |
| X.....E | HHACTR  | - Copy Throttle Reason                    |
| X.....E | HHADCTR | - Deferred Copy Throttle Reason           |
| X.....E | HHAHWTR | - Host Write Throttle Reason              |
| XDWM..E | HHAPMT  | - Pre-migration Throttle Threshold (GB)   |
| X.....E | HHASM1  | - Media Type 1 CSP Volume                 |
| X.....E | HHASM2  | - Media Type 2 CSP Volume                 |
| X.....E | HHASM3  | - Media Type 3 CSP Volume                 |
| X.....E | HHASM4  | - Media Type 4 CSP Volume                 |
| X.....E | HHASM5  | - Media Type 5 CSP Volume                 |
| X.....E | HHASM6  | - Media Type 6 CSP Volume                 |
| X.....E | HHASM7  | - Media Type 7 CSP Volume                 |
| X.....E | HHASM8  | - Media Type 8 CSP Volume                 |

#### Accumulated Data Elements

|         |        |                                         |
|---------|--------|-----------------------------------------|
| XDWM..E | HHAALV | - Sum of Active Logical Volumes         |
| XDWM..E | HHABPV | - Borrowed Private Stacked Volume Count |
| XDWM..E | HHABSV | - Borrowed Scratch Stacked Volume Count |
| XDWM..E | HHACHM | - Virtual Cache-Hit Mounts              |
| XDWM..E | HHACMM | - Virtual Recall Mounts                 |

|         |          |                                            |
|---------|----------|--------------------------------------------|
| XDWM..E | HHACPLFS | - CT - Low on Cache Free Space             |
| XDWM..E | HHACPNOT | - CT - No Throttling                       |
| XDWM..E | HHACPPSS | - CT - Pre-migrate Steady State            |
| XDWM..E | HHACPTCT | - Copy Predominate Throttle Count          |
| XDWM..E | HHADCCRU | - DCT - Cluster Resource Usage             |
| XDWM..E | HHADCHIO | - DCT - Preferring Host IO                 |
| XDWM..E | HHADCIMC | - DCT - Immediate Copy Throttling          |
| XDWM..E | HHADCNOT | - DCT - No Throttling                      |
| XDWM..E | HHADCTCT | - Deferred Copy Throttle Count             |
| XDWM..E | HHADRIC  | - Sum of Data Resident in Cache (GB)       |
| XDWM..E | HHADRP   | - Total Data Read from Pool (MB)           |
| XDWM..E | HHADWP   | - Total Data Written to Pool (MB)          |
| XDWM..E | HHAFRM   | - Virtual Fast-Ready Mounts                |
| XDWM..E | HHAFTM   | - Virtual Fast-Ready Mount Time            |
| XDWM..E | HHAHM    | - Virtual Cache-Hit Mount Time             |
| XDWM..E | HHAHWECC | - HWT - Excess Cached Content for Copy     |
| XDWM..E | HHAHWGPS | - HWT - Grid Pre-migrate Steady State      |
| XDWM..E | HHAHWIMC | - HWT - Immediate Copy Throttling          |
| XDWM..E | HHAHWLFS | - HWT - Low on Cache Free Space            |
| XDWM..E | HHAHWNOT | - HWT - No Throttling                      |
| XDWM..E | HHAHWPSS | - HWT - Pre-migrate Steady State           |
| XDWM..E | HHAMAD   | - Sum of Active Logical Volume Data (MB)   |
| XDWM..E | HHAPPM   | - Physical Pre-Migrate Mounts              |
| XDWM..E | HHAPRM   | - Physical Recall Mounts                   |
| XDWM..E | HHAPSM   | - Physical Security Data Erase Mounts      |
| XDWM..E | HHAPVC   | - Private Stacked Volume Count             |
| XDWM..E | HHARCM   | - Physical Reclaim Mounts                  |
| XDWM..E | HHARRV   | - Read Only Recovery Volume Count          |
| XDWM..E | HHARTM   | - Virtual Recall Mount Time                |
| XDWM..E | HHASACT  | - Sum of Avg Copy Throttle Value           |
| XDWM..E | HHASAPD  | - Sum of Available Physical Devices        |
| XDWM..E | HHASAWOT | - Sum of Avg Write Overrun Throttle Value  |
| XDWM..E | HHASCP   | - Sum of Active Cache Partitions           |
| XDWM..E | HHASCPB  | - Sum of Avg CPU Percent Busy              |
| XDWM..E | HHASDCT  | - Sum of Avg Deferred Copy Throttle        |
| XDWM..E | HHASIPD  | - Sum of Installed Physical Devices        |
| XDWM..E | HHASLM   | - Sync Mode Mounts                         |
| XDWM..E | HHASMDU  | - Sum of Average Max Disk Usage Percentage |
| XDWM..E | HHASPDM  | - Sum of Avg Physical Drives Concur Mounts |
| XDWM..E | HHASSV   | - Sum of Common Scratch Pool Volumes       |
| XDWM..E | HHASTM   | - Sync Mode Mount Time                     |
| XDWM..E | HHASTOAT | - Sum of Overall Average Throttle Value    |
| XDWM..E | HHASTUC  | - Sum of Total Used Cache (GB)             |
| XDWM..E | HHASTUFC | - Sum of Total Used Flash Cache (GB)       |
| XDWM..E | HHASVC   | - Scratch Stacked Volume Count             |
| X.....E | HHASV1   | - Media Type 1 CSP Volume Count            |
| X.....E | HHASV2   | - Media Type 2 CSP Volume Count            |
| X.....E | HHASV3   | - Media Type 3 CSP Volume Count            |
| X.....E | HHASV4   | - Media Type 4 CSP Volume Count            |

X.....E HHASV5 - Media Type 5 CSP Volume Count  
 X.....E HHASV6 - Media Type 6 CSP Volume Count  
 X.....E HHASV7 - Media Type 7 CSP Volume Count  
 X.....E HHASV8 - Media Type 8 CSP Volume Count  
 XDWM...E HHATPM - Total Physical Mounts  
 XDWM...E HHATTM - Total Physical Mount Time  
 XDWM...E HHATVC - Sum of Total Cache Size (GB)  
 XDWM...E HHATVM - Total Virtual Mounts  
 XDWM...E HHAUVC - Volumes in Unavailable Status  
 XDWM...E HHAUVIC - Sum of Virtual Volumes in Cache  
 XDWM...E HHAWROCT - W/Overrun Predominate Throttle Count  
 XDWM...E HHAWSE - Stacked Volumes Waiting Security Data

#### Minimum Data Elements

XDWM...E HHAMNMTM - Min Physical Mount Time  
 XDWM...E HHAMNPDM - Min Physical Drives Concur Mounted

#### Maximum Data Elements

XDWM...E HHAMXCPB - Max CPU Usage Percentage  
 XDWM...E HHAMXMDU - Max Disk Usage Percentage  
 XDWM...E HHAMXMTM - Max Physical Mount Time  
 XDWM...E HHAMXPDM - Max Physical Drives Concur Mounted

#### Derived Data Elements

XDWM...E HHAAVACP - Avg Active Cache Partitions  
 XDWM...E HHAVALV - Avg Active Logical Volumes  
 XDWM...E HHAAVAPD - Avg Available Physical Devices  
 XDWM...E HHAABVPV - Avg Borrowed Private Stacked Volumes  
 XDWM...E HHAABSV - Avg Borrowed Scratch Stacked Volumes  
 XDWM...E HHAAVCHM - Avg Virtual Cache-Hit Mounts  
 XDWM...E HHAAVCMM - Avg Virtual Recall Mounts  
 XDWM...E HHAAVCPU - Avg CPU Percent Busy  
 XDWM...E HHAAVCTV - Avg Copy Predominate Throttle Value  
 XDWM...E HHAAVDCT - Avg Deferred Copy Throttle Value  
 XDWM...E HHAAVDRC - Avg Data Resident in Cache (GB)  
 XDWM...E HHAAVFRM - Avg Virtual Fast-Ready Mounts  
 XDWM...E HHAAVFTM - Avg Virtual Fast-Ready Mount Time  
 XDWM...E HHAAVHTM - Avg Virtual Cache-Hit Mount Time  
 XDWM...E HHAVIPD - Avg Installed Physical Devices  
 XDWM...E HHAVMAD - Avg Active Logical Volume Data (GB)  
 XDWM...E HHAVMDU - Avg Max Disk Usage Percentage  
 XDWM...E HHAAVMTM - Avg Physical Mount Time  
 XDWM...E HHAOVOAT - Avg Overall Throttle Value  
 XDWM...E HHAVPDM - Avg Physical Drives Concur Mounted  
 XDWM...E HHAVPVC - Avg Private Stacked Volume Count  
 XDWM...E HHAAVRTM - Avg Virtual Recall Mount Time

|         |          |                                       |
|---------|----------|---------------------------------------|
| XDWM..E | HHAAVSSV | - Avg Common Scratch Pool Volumes     |
| XDWM..E | HHAAVSTM | - Avg Sync Mode Mount Time            |
| XDWM..E | HHAAVSVC | - Avg Scratch Stacked Volume Count    |
| XDWM..E | HHAAVTUC | - Avg Used Cache (GB)                 |
| XDWM..E | HHAAVTVC | - Avg Cache Size (GB)                 |
| XDWM..E | HHAAVTVM | - Avg Virtual Mounts                  |
| XDWM..E | HHAAVUFC | - Avg Used Flash Cache (GB)           |
| XDWM..E | HHAAVVSZ | - Avg Virtual Volume Size (MB)        |
| XDWM..E | HHAAVVVC | - Avg Virtual Volumes in Cache        |
| XDWM..E | HHAAVWOT | - Avg Write Overrun Throttle Value    |
| XDWM..E | HHAPCCHM | - Pct Virtual Cache-Hit Mounts        |
| XDWM..E | HHAPCCMM | - Pct Virtual Recall Mounts           |
| XDWM..E | HHAPCCPT | - Pct Copy Predominate Throttle       |
| XDWM..E | HHAPCCUT | - Pct Cache Utilization               |
| XDWM..E | HHAPCDCT | - Pct Deferred Copy Throttle          |
| XDWM..E | HHAPCFRM | - Pct Virtual Fast-Ready Mounts       |
| XDWM..E | HHAPCVCN | - Pct Virtual Cache-Miss Mounts       |
| XDWM..E | HHAPCWOT | - Pct W/Overrun Predominate Throttle  |
| XDWM..E | HHAPSCHM | - Virtual Cache-Hit Mounts (per/sec)  |
| XDWM..E | HHAPSCMM | - Virtual Recall Mounts (per/sec)     |
| XDWM..E | HHAPSFRM | - Virtual Fast-Ready Mounts (per/sec) |
| XDWM..E | HHAPSTVM | - Total Virtual Mounts (per/sec)      |

### 5.2.4.9.3 HVTHHA Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHHA file.

None.

#### 5.2.4.9.4 HVTHHA 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. Using the most recent DAYS timespan HVTHHA file, display a comparison between the amount of data and volumes in cache and the amount of data and volumes on physical tape.

```
DATA;
SET &pIVTd..HVTHHA01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY HVTCLID ;
  BY HVTCLID DATE ;
ID HOUR ;
VAR HHAAMDRC HHAAMVVC HHAAMMAD HHAAMVALV
    HHAAMBPV HHAAMPVC;
TITLE1
'Data in Cache Compared to Data on Physical Tape' ;
RUN ;
```

### 5.2.4.10 Hydra Cluster Summary File (HVTHCA)

The Hydra Cluster Summary file contains a summarized roll-up of statistics from all the Vnode and Hnode work files to provide a view of all I/O, cache usage, and virtual and physical tape activity at a tape server cluster level. This record is produced for every 15-minute measurement interval.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHCA File Organization
- 2 - HVTHCA Data Elements List
- 3 - HVTHCA Usage Considerations
- 4 - HVTHCA Retrieval Examples

### 5.2.4.10.1 HVTHCA 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                     | HVTGRID | HVTCLID | YEAR | MONTH |
|          | DAY                       | HOURL   | ENDTS   |      |       |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | YEAR | MONTH |
|          | DAY                       | HOURL   |         |      |       |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | YEAR | WEEK  |
|          | ZONE                      | HOURL   |         |      |       |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | YEAR | MONTH |
|          | ZONE                      |         |         |      |       |
| YEARS    | N/A                       |         |         |      |       |
| TABLES   | N/A                       |         |         |      |       |

Generation Date: Thu, Apr 1, 2010

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 5-34. HVTHCA Sort Sequence and Data Granularity





### 5.2.4.10.2 HVTHCA 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:** Thu, Nov 21, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                     |
|---------|---------|---------------------|
| XD....E | DAY     | - Day of Month      |
| XDW...E | HOURL   | - Hour of Day       |
| XDWM..E | HVTCLID | - Cluster ID        |
| XDWM..E | HVTGRID | - Grid Composite 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

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | DURATION | - Recording Interval Time             |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | HVTDLSN  | - Distributed Library Sequence Number |
| XDWM..E | HVTMODEL | - Node Machine Model                  |
| XDWM..E | HVTMTYPE | - Node Machine Type                   |
| XD....E | HVTRVN   | - Record Version Number               |
| XDWM..E | HVTSN    | - Node Serial Number                  |
| XDWM..E | HVTVECD  | - VE Code Level                       |
| XDWM..E | INTERVLS | - Number of Recording Intervals       |
| XD....E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |

### Retained Data Elements

|         |         |                                           |
|---------|---------|-------------------------------------------|
| XDWM..E | HCABDCT | - Base Deferred Copy Throttle Value (Sec) |
| X....E  | HCACTR  | - Copy Throttle Reason                    |
| X....E  | HCADCTR | - Deferred Copy Throttle Reason           |
| X....E  | HCAHWTR | - Host Write Throttle Reason              |
| XDWM..E | HCAMXCT | - Configured Max Channel Throughput       |
| XDWM..E | HCAPMT  | - Pre-migration Throttle Threshold (GB)   |

### Accumulated Data Elements

|         |          |                                         |
|---------|----------|-----------------------------------------|
| XDWM..E | HCAALV   | - Sum of Active Logical Volumes         |
| XDWM..E | HCABPV   | - Borrowed Private Stacked Volume Count |
| XDWM..E | HCABSV   | - Borrowed Scratch Stacked Volume Count |
| XDWM..E | HCACHM   | - Virtual Cache-Hit Mounts              |
| XDWM..E | HCACMM   | - Virtual Recall Mounts                 |
| XDWM..E | HCACPLFS | - CT - Low on Cache Free Space          |
| XDWM..E | HCACPNOT | - CT - No Throttling                    |
| XDWM..E | HCACPPSS | - CT - Pre-migrate Steady State         |
| XDWM..E | HCACPTCT | - Copy Predominate Throttle Count       |
| XDWM..E | HCACR    | - Data Read from Cache (uncomp MB)      |
| XDWM..E | HCACRW   | - Total Data R/W Cache (uncomp MB)      |
| XDWM..E | HCACW    | - Data Written to Cache (uncomp MB)     |
| XDWM..E | HCADCCRU | - DCT - Cluster Resource Usage          |
| XDWM..E | HCADCHIO | - DCT - Preferring Host IO              |
| XDWM..E | HCADCIMC | - DCT - Immediate Copy Throttling       |
| XDWM..E | HCADCNOT | - DCT - No Throttling                   |
| XDWM..E | HCADCTCT | - Deferred Copy Throttle Count          |
| XDWM..E | HCADRIC  | - Sum of Data Resident in Cache (GB)    |
| XDWM..E | HCADRP   | - Total Data Read from Pool (MB)        |

---

|         |          |                                            |
|---------|----------|--------------------------------------------|
| XDWM..E | HCADWP   | - Total Data Written to Pool (MB)          |
| XDWM..E | HCAFRM   | - Virtual Fast-Ready Mounts                |
| XDWM..E | HCAFTM   | - Virtual Fast-Ready Mount Time            |
| XDWM..E | HCAHTM   | - Virtual Cache-Hit Mount Time             |
| XDWM..E | HCAHWECC | - HWT - Excess Cached Content for Copy     |
| XDWM..E | HCAHWGPS | - HWT - Grid Pre-migrate Steady State      |
| XDWM..E | HCAHWIMC | - HWT - Immediate Copy Throttling          |
| XDWM..E | HCAHWLFS | - HWT - Low on Cache Free Space            |
| XDWM..E | HCAHWNOT | - HWT - No Throttling                      |
| XDWM..E | HCAHWPS  | - HWT - Pre-migrate Steady State           |
| XDWM..E | HCALPR   | - Selective Port Resets                    |
| XDWM..E | HCAMAD   | - Sum of Active Logical Volume Data (MB)   |
| XDWM..E | HCANUMBS | - Channel Blocks Written                   |
| XDWM..E | HCAPPM   | - Physical Pre-Migrate Mounts              |
| XDWM..E | HCAPRM   | - Physical Recall Mounts                   |
| XDWM..E | HCAPSM   | - Physical Security Data Erase Mounts      |
| XDWM..E | HCAPVC   | - Private Stacked Volume Count             |
| XDWM..E | HCARCM   | - Physical Reclaim Mounts                  |
| XDWM..E | HCARRV   | - Read Only Recovery Volume Count          |
| XDWM..E | HCARTM   | - Virtual Recall Mount Time                |
| XDWM..E | HCASACT  | - Sum of Avg Copy Throttle Value           |
| XDWM..E | HCASAFCT | - Sum of Times Cluster Ahead of FICON Chnl |
| XDWM..E | HCASAPD  | - Sum of Available Physical Devices        |
| XDWM..E | HCASAWOT | - Sum of Avg Write Overrun Throttle Value  |
| XDWM..E | HCASBFCT | - Sum of Times Cluster Behind FICON Chnl   |
| XDWM..E | HCASCP   | - Sum of Active Cache Partitions           |
| XDWM..E | HCASCPB  | - Sum of Avg CPU Percent Busy              |
| XDWM..E | HCASDCT  | - Sum of Avg Deferred Copy Throttle        |
| XDWM..E | HCASDLY  | - Sum of Avg Throughput Delay Time         |
| XDWM..E | HCASIPD  | - Sum of Installed Physical Devices        |
| XDWM..E | HCASLM   | - Sync Mode Mounts                         |
| XDWM..E | HCASMDU  | - Sum of Average Max Disk Usage Percentage |
| XDWM..E | HCASPCD  | - Sum of Host Throttle Delay Percentage    |
| XDWM..E | HCASPDM  | - Sum of Avg Physical Drives Concur Mounte |
| XDWM..E | HCASPR   | - System Port Resets                       |
| XDWM..E | HCASSV   | - Total Common Scratch Pool Volumes        |
| XDWM..E | HCASTM   | - Sync Mode Mount Time                     |
| XDWM..E | HCASTOAT | - Sum of Overall Average Throttle Value    |
| XDWM..E | HCASTUC  | - Sum of Total Used Cache (GB)             |
| XDWM..E | HCASTUFC | - Sum of Total Used Flash Cache (GB)       |
| XDWM..E | HCASVC   | - Scratch Stacked Volume Count             |
| XDWM..E | HCASVCM  | - Sum of Avg Virtual Drives Concur Mounted |
| XDWM..E | HCASVDC  | - Sum of Virtual Drives Configured         |
| XDWM..E | HCATPM   | - Total Physical Mounts                    |
| XDWM..E | HCATTM   | - Total Physical Mount Time                |
| XDWM..E | HCATVC   | - Sum of Total Cache Size (GB)             |
| XDWM..E | HCATVM   | - Total Virtual Mounts                     |
| XDWM..E | HCAUVC   | - Volumes in Unavailable Status            |
| XDWM..E | HCAVDR   | - Data Read from Cache (comp MB)           |

---

XDWM..E HCAVDW - Data Written to Cache (comp MB)  
XDWM..E HCAVRW - Total Data R/W to Cache (comp MB)  
XDWM..E HCAVVIC - Sum of Virtual Volumes in Cache  
XDWM..E HCAWROCT - W/Overrun Predominate Throttle Count  
XDWM..E HCAWSE - Stacked Volumes Waiting Security Data  
XDWM..E HCA00KB - 0 to 2K Channel Blocks Written  
XDWM..E HCA02KB - > 2K to 4K Channel Blocks Written  
XDWM..E HCA04KB - > 4K to 8K Channel Blocks Written  
XDWM..E HCA08KB - > 8K to 16K Channel Blocks Written  
XDWM..E HCA16KB - > 16K to 32K Channel Blocks Written  
XDWM..E HCA32KB - > 32K to 64K Channel Blocks Written  
XDWM..E HCA64KB - > 64K Channel Blocks Written

### Minimum Data Elements

XDWM..E HCAMNCDS - Min Channel Data per Second (MB)  
XDWM..E HCAMNCR - Min Data Read from Cache (uncomp MB)  
XDWM..E HCAMNCRC - Min Compression Ratio Read from Cache  
XDWM..E HCAMNCW - Min Data Written to Cache (uncomp MB)  
XDWM..E HCAMNCWC - Min Compression Ratio Write to Cache  
XDWM..E HCAMNMTM - Min Physical Mount Time  
XDWM..E HCAMNPDM - Min Physical Drives Concur Mounted  
XDWM..E HCAMNVCM - Min Virtual Drives Concur Mounted  
XDWM..E HCAMNVDR - Min Data Read from Cache (comp MB)  
XDWM..E HCAMNVDW - Min Data Written to Cache (comp MB)

### Maximum Data Elements

XDWM..E HCAMXACT - Max Times Cluster Ahead of FICON Chnl  
XDWM..E HCAMXBCT - Max Times Cluster Behind FICON Chnl  
XDWM..E HCAMXCDS - Max Channel Data per Second (MB)  
XDWM..E HCAMXCPB - Max CPU Usage Percentage  
XDWM..E HCAMXCR - Max Data Read from Cache (uncomp MB)  
XDWM..E HCAMXCRC - Max Compression Ratio Read from Cache  
XDWM..E HCAMXCW - Max Data Written to Cache (uncomp MB)  
XDWM..E HCAMXCWC - Max Compression Ratio Write to Cache  
XDWM..E HCAMXDLY - Max Throughput Delay Time  
XDWM..E HCAMXDTR - Max Data Rate (G-bits)  
XDWM..E HCAMXLPR - Max Selective Port Resets  
XDWM..E HCAMXMDU - Max Disk Usage Percentage  
XDWM..E HCAMXMTM - Max Physical Mount Time  
XDWM..E HCAMXPCD - Max Percent Delay Due to Host Throttle  
XDWM..E HCAMXPDM - Max Physical Drives Concur Mounted  
XDWM..E HCAMXSPR - Max System Port Resets  
XDWM..E HCAMXVCM - Max Virtual Drives Concur Mounted  
XDWM..E HCAMXVDR - Max Data Read from Cache (comp MB)  
XDWM..E HCAMXVDW - Max Data Written to Cache (comp MB)

### Derived Data Elements

XDWM..E HCAAVACP - Avg Active Cache Partitions  
XDWM..E HCAAVACT - Avg Times Cluster Ahead of FICON Chnl  
XDWM..E HCAAVALV - Avg Active Logical Volumes  
XDWM..E HCAAVAPD - Avg Physical Drives Available  
XDWM..E HCAAVBCT - Avg Times Cluster Behind FICON Chnl  
XDWM..E HCAAVBPV - Avg Borrowed Private Stacked Volumes  
XDWM..E HCAAVBSV - Avg Borrowed Scratch Stacked Volumes  
XDWM..E HCAAVBSZ - Avg Estimated Channel Blocksize  
XDWM..E HCAAVCDS - Avg Channel Data per Second (MB)  
XDWM..E HCAAVCHM - Avg Virtual Cache-Hit Mounts  
XDWM..E HCAAVCMM - Avg Virtual Recall Mounts  
XDWM..E HCAAVCPU - Avg CPU Percent Busy  
XDWM..E HCAAVCR - Avg Data Read from Cache (uncomp MB)  
XDWM..E HCAAVCRC - Avg Compression Ratio Read from Cache  
XDWM..E HCAAVCTV - Avg Copy Predominate Throttle Value  
XDWM..E HCAAVCW - Avg Data Written to Cache (uncomp MB)  
XDWM..E HCAAVCWC - Avg Compression Ratio Write to Cache  
XDWM..E HCAAVDCT - Avg Deferred Copy Throttle Value  
XDWM..E HCAAVDLY - Avg Throughput Delay Time  
XDWM..E HCAAVDRC - Avg Data Resident in Cache (GB)  
XDWM..E HCAAVFRM - Avg Virtual Fast-Ready Mounts  
XDWM..E HCAAVFTM - Avg Virtual Fast-Ready Mount Time  
XDWM..E HCAAVHTM - Avg Virtual Cache-Hit Mount Time  
XDWM..E HCAAVIPD - Avg Physical Drives Installed  
XDWM..E HCAAVMAD - Avg Active Logical Volume Data (MB)  
XDWM..E HCAAVMDU - Avg Max Disk Usage Percentage  
XDWM..E HCAAVMTM - Avg Physical Mount Time  
XDWM..E HCAAVOAT - Avg Overall Throttle Value  
XDWM..E HCAAVPCD - Avg Percent Delay due to Host Throttle  
XDWM..E HCAAVPDM - Avg Physical Drives Concur Mounted  
XDWM..E HCAAVPVC - Avg Private Stacked Volume Count  
XDWM..E HCAAVRTM - Avg Virtual Recall Mount Time  
XDWM..E HCAAVSTM - Avg Sync Mode Mount Time  
XDWM..E HCAAVSVC - Avg Scratch Stacked Volume Count  
XDWM..E HCAAVTUC - Avg Used Cache (GB)  
XDWM..E HCAAVTVC - Avg Cache Size (GB)  
XDWM..E HCAAVTVM - Avg Virtual Mounts  
XDWM..E HCAAVUFC - Avg Used Flash Cache (GB)  
XDWM..E HCAAVVCM - Avg Virtual Drives Concur Mounted  
XDWM..E HCAAVVDC - Avg Virtual Drives Configured  
XDWM..E HCAAVVDR - Avg Data Read from Cache (comp MB)  
XDWM..E HCAAVVDW - Avg Data Written to Cache (comp MB)  
XDWM..E HCAAVVSZ - Avg Virtual Volume Size (MB)  
XDWM..E HCAAVVVC - Avg Virtual Volumes in Cache  
XDWM..E HCAAVWOT - Avg Write Overrun Throttle Value  
XDWM..E HCAPCCHM - Pct Virtual Cache-Hit Mounts  
XDWM..E HCAPCCMM - Pct Virtual Recall Mounts  
XDWM..E HCAPCCPT - Pct Copy Predominate Throttle

XDWM..E HCAPCCUT - Pct Cache Utilization  
XDWM..E HCAPCDCT - Pct Deferred Copy Throttle  
XDWM..E HCAPCFRM - Pct Virtual Fast-Ready Mounts  
XDWM..E HCAPCVCN - Pct Virtual Cache-Miss Mounts  
XDWM..E HCAPCWOT - Pct W/Overrun Predominate Throttle  
XDWM..E HCAPC00K - Pct 0 to 2K Channel Blocks Written  
XDWM..E HCAPC02K - Pct > 2K to 4K Channel Blocks Written  
XDWM..E HCAPC04K - Pct > 4K to 8K Channel Blocks Written  
XDWM..E HCAPC08K - Pct > 8K to 16K Channel Blocks Written  
XDWM..E HCAPC16K - Pct > 16K to 32K Channel Blocks Written  
XDWM..E HCAPC32K - Pct > 32K to 64K Channel Blocks Written  
XDWM..E HCAPC64K - Pct > 64K Channel Blocks Written  
XDWM..E HCAPSCHM - Virtual Cache-Hit Mounts (per/sec)  
XDWM..E HCAPSCMM - Virtual Recall Mounts (per/sec)  
XDWM..E HCAPSCR - Data Read from Cache (uncomp MB/s)  
XDWM..E HCAPSCW - Data Written to Cache (uncomp MB/s)  
XDWM..E HCAPSFRM - Virtual Fast-Ready Mounts (per/sec)  
XDWM..E HCAPSTVM - Total Virtual Mounts (per/sec)  
XDWM..E HCAPSVDR - Data Read from Cache (comp MB/s)  
XDWM..E HCAPSVDW - Data Written to Cache (comp MB/s)

### 5.2.4.10.3 HVTHCA Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHCA file.

None.

#### 5.2.4.10.4 HVTHCA 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. Using the most recent DAYS timespan HVTHCA file, display the total megabytes of data written to cache from the attached z/OS hosts, compression ratios, and virtual and physical tape mount counts. Displayed by HOUR by cluster.

```
DATA;
SET &pHVTd..HVTHCA01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY HVTCLID ;
  BY HVTCLID DATE ;
ID HOUR ;
VAR HCACRW HCAVRW HCAAVCWC HCAMXCWC HCATVM HCAFRM HCACHM
  HCACMM HCATPM HCADWP ;
TITLE1
'Daily System Activity Summary HOUR' ;
RUN ;
```

### 5.2.4.11 Hnode Grid Activity File (HVTGRC)

The Hydra Grid Activity file contains statistics at the grid level on the number of clusters in the grid, as well as data scheduled to be copied to another cluster in the grid. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode Grid Historical Record. This record is produced every 15 minutes.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTGRC File Organization
- 2 - HVTGRC Data Elements List
- 3 - HVTGRC Usage Considerations
- 4 - HVTGRC Retrieval Examples



### 5.2.4.11.1 HVTGRC 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                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | DAY     | HOURL   | ENDTS   |      |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | DAY     | HOURL   |         |      |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | WEEK                      | ZONE    | HOURL   |         |      |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | YEAR |  |
|          | MONTH                     | ZONE    |         |         |      |  |
| YEARS    | N/A                       |         |         |         |      |  |
| TABLES   | N/A                       |         |         |         |      |  |

Generation Date: Thu, Apr 1, 2010

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 5-35. HVTGRC Sort Sequence and Data Granularity

### 5.2.4.11.2 HVTGRC 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:** Thu, Nov 21, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                     |
|---------|---------|---------------------|
| XD....E | DAY     | - Day of Month      |
| XDW...E | HOUR    | - Hour of Day       |
| XDWM..E | HVTCLID | - Cluster ID        |
| XDWM..E | HVTGRID | - Grid Composite ID |
| XDWM..E | HVTNODE | - Node 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

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | DURATION | - Recording Interval Time             |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | HVTDLSN  | - Distributed Library Sequence Number |
| XDWM..E | HVTMODEL | - Node Machine Model                  |
| XDWM..E | HVTMTYPE | - Node Machine Type                   |
| XD....E | HVTRVN   | - Record Version Number               |
| XDWM..E | HVTSN    | - Node Serial Number                  |
| XDWM..E | HVTVECD  | - VE Code Level                       |
| XDWM..E | INTERVLS | - Number of Recording Intervals       |
| XD....E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |

### Accumulated Data Elements

|         |          |                                             |
|---------|----------|---------------------------------------------|
| XDWM..E | GRCDFCC  | - Deferred Copies Completed                 |
| XDWM..E | GRCDTC   | - Sum of Scheduled Data to Copy (MB)        |
| XDWM..E | GRCDTIDF | - Data Trans from Cluster Deferred Copy (M  |
| XDWM..E | GRCDTIIM | - Data Trans from Cluster IMMED Copy (MB)   |
| XDWM..E | GRCDTISC | - Data Trans from Cluster Sync Copy (MB)    |
| XDWM..E | GRCIMCC  | - Immediate Copies Completed                |
| XDWM..E | GRCLVC   | - Scheduled Logical Volumes for Copy        |
| XDWM..E | GRCSCCC  | - Sync Copies Completed                     |
| XDWM..E | GRCSDDQA | - Sum of Avg Deferred Copy Queue Age (sec)  |
| XDWM..E | GRCSIQA  | - Sum of Avg Immediate Copy Queue Age (sec) |
| XDWM..E | GRCTDCQ  | - Copies in Time Delay State                |

### Derived Data Elements

|         |          |                                      |
|---------|----------|--------------------------------------|
| XDWM..E | GRCAVDCQ | - Avg Copies in Time Delay State     |
| XDWM..E | GRCAVDQA | - Avg Deferred Copy Queue Age (sec)  |
| XDWM..E | GRCAVDTC | - Avg Scheduled Data to Copy (MB)    |
| XDWM..E | GRCAVIQA | - Avg Immediate Copy Queue Age (sec) |
| XDWM..E | GRCAVLVC | - Avg Logical Volumes to Copy        |

### 5.2.4.11.3 HVTGRC Usage Considerations

This section identifies any special considerations or techniques related to using the HVTGRC file.

None.

### 5.2.4.11.4 HVTGRC 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. Using the most recent DAYS timespan HVTGRC file, display the queue status for data and volumes to be transferred to another cluster, per hour.

```
PROC SUMMARY DATA=&pHVTd.HVTGRC01 NWAY;
  CLASS HVTCLID HOUR ;
  VAR GRCAVDQA GRCAVIQA GRCAVDTC GRCAVLVC;
  OUTPUT OUT=STATS MEAN=;
RUN;
PROC PRINT DATA=STATS LABEL;
  ID HOUR;
  VAR HVTCLID GRCAVDQA GRCAVIQA GRCAVDTC GRCAVLVC;
  TITLE 'Cluster Transfer Queue Status';
run;
```

### 5.2.4.12 Hnode Grid Cluster Activity File (HVTGCC)

The Hydra Grid Cluster Activity file contains statistics on the volume of data copied to and read from another cluster's cache, as well as tape mounts in the remote cluster on behalf of the current cluster. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, Hnode Grid Historical Record. This record is produced every 15 minutes.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTGCC File Organization
- 2 - HVTGCC Data Elements List
- 3 - HVTGCC Usage Considerations
- 4 - HVTGCC Retrieval Examples

### 5.2.4.12.1 HVTGCC 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                     | HVTGRID | HVTCLID | HVTNODE | HVTDCL |  |
|          | YEAR                      | MONTH   | DAY     | HOURL   | ENDTS  |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTDCL |  |
|          | YEAR                      | MONTH   | DAY     | HOURL   |        |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTDCL |  |
|          | YEAR                      | WEEK    | ZONE    | HOURL   |        |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | HVTNODE | HVTDCL |  |
|          | YEAR                      | MONTH   | ZONE    |         |        |  |
| YEARS    | N/A                       |         |         |         |        |  |
| TABLES   | N/A                       |         |         |         |        |  |

Generation Date: Thu, Apr 1, 2010

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. HVTGCC Sort Sequence and Data Granularity



### 5.2.4.12.2 HVTGCC 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:** Thu, Apr 1, 2010

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

#### Sequence/Summary Data Elements

|         |         |                              |
|---------|---------|------------------------------|
| XD...E  | DAY     | - Day of Month               |
| XDW...E | HOURL   | - Hour of Day                |
| XDWM..E | HVTCLID | - Cluster ID                 |
| XDWM..E | HVTDCL  | - Distributed Cluster Number |
| XDWM..E | HVTGRID | - Grid Composite ID          |

XDW..E HVTNODE - Node ID  
XD.M..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

XD....E DAYNAME - Name of Day of Week  
XDW..E DURATION - Recording Interval Time  
XDW..E ENDTS - End Time Stamp  
XDW..E HVTDLN - Distributed Library Sequence Number  
XDW..E HVTMODEL - Node Machine Model  
XDW..E HVTMTYPE - Node Machine Type  
XD....E HVTRVN - Record Version Number  
XDW..E HVTSN - Node Serial Number  
XDW..E HVTVECD - VE Code Level  
XDW..E INTERVLS - Number of Recording Intervals  
XD....E ORGSYSID - Originating System Identification  
XDW..E STARTTS - Start Time Stamp

### Accumulated Data Elements

XDW..E GCCDCP - Total I/O Data Copied (MB)  
XDW..E GCCDTI - Data Trans from Other Cluster (MB)  
XDW..E GCCDTR - Data Trans to Other Cluster (MB)  
XDW..E GCCLMC - Logical Mounts to Other Cluster  
XDW..E GCCRRO - Data Trans Remote Read Operation (MB)  
XDW..E GCCRWO - Data Trans Remote Write Operation (MB)

### Maximum Data Elements

XDW..E GCCMXDCP - Max Data Copied (MB)

### Derived Data Elements

XDW..E GCCAVDCP - Avg Data Copied per Interval (MB)  
XDW..E GCCAVDTI - Avg Data Trans from Other Cluster (MB)  
XDW..E GCCAVDTR - Avg Data Trans to Other Cluster (MB)  
XDW..E GCCAVLMC - Avg Logical Mounts to Other Cluster  
XDW..E GCCAVRRO - Avg Data Trans Remote Read Opr (MB)  
XDW..E GCCAVRWO - Avg Data Trans Remote Write Opr (MB)  
XDW..E GCCPSDCP - Data Copied per Second (MB)

### 5.2.4.12.3 HVTGCC Usage Considerations

This section identifies any special considerations or techniques related to using the HVTGCC file.

None.

### 5.2.4.12.4 HVTGCC 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. Using the most recent DAYS timespan HVTGCC file, display the total megabytes of data transferred between clusters in the grid.

```
DATA;
SET &phVTd..HVTGCC01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC TABULATE ;
  BY DATE;
  CLASS HVTCLID HVTDCCL HOUR ;
  VAR GCCDCP ;
  TABLE HVTCLID, HVTDCCL*GCCDCP /
    RTS=20;
  TITLE 'Total I/O Between Clusters in Grid';
RUN;
```

### 5.2.4.13 - Hydra Hnode Export/Import Activity File (HVTHEI)

The Hydra Hnode Export/Import Activity file contains statistics on the the number of physical and logical volumes and amount of data that was either exported or input in the cluster. It is derived from the IBM Virtualization Engine TS7700 Series Statistical Data, type 31, Hnode Export/Import Historical Record. This record is produced every 15 minutes.

The following sections describe the file's organization, list the data elements maintained, and provide usage hints.

- 1 - HVTHEI File Organization
- 2 - HVTHEI Data Elements List
- 3 - HVTHEI Usage Considerations
- 4 - HVTHEI Retrieval Examples

### 5.2.4.13.1 - HVIHEI 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                     | HVTGRID | HVTCLID | YEAR | MONTH |  |
|          | DAY                       | HOURL   | ENDTS   |      |       |  |
| DAYS     | SYSID                     | HVTGRID | HVTCLID | YEAR | MONTH |  |
|          | DAY                       | HOURL   |         |      |       |  |
| WEEKS    | SYSID                     | HVTGRID | HVTCLID | YEAR | WEEK  |  |
|          | ZONE                      | HOURL   |         |      |       |  |
| MONTHS   | SYSID                     | HVTGRID | HVTCLID | YEAR | MONTH |  |
|          | ZONE                      |         |         |      |       |  |
| YEARS    | N/A                       |         |         |      |       |  |
| TABLES   | N/A                       |         |         |      |       |  |

Generation Date: Wed, Jan 16, 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 5-38. HVTHEI Sort Sequence and Data Granularity

#### 5.2.4.13.2 HVTHEI 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, Jan 16, 2013

**Note:** Essential data elements are identified by an "E" under the Timespan asterisk (\*) column.

| Time-<br>Span * | Data<br>Element | Data Element<br>Description (LABEL) |
|-----------------|-----------------|-------------------------------------|
| -----           | -----           | -----                               |

##### Sequence/Summary Data Elements

|         |         |                     |
|---------|---------|---------------------|
| XD....E | DAY     | - Day of Month      |
| XDW...E | HOURL   | - Hour of Day       |
| XDWM..E | HVTCLID | - Cluster ID        |
| XDWM..E | HVTGRID | - Grid Composite 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

|         |          |                                       |
|---------|----------|---------------------------------------|
| XD....E | DAYNAME  | - Name of Day of Week                 |
| XDWM..E | DURATION | - Recording Interval Time             |
| XDWM..E | ENDTS    | - End Time Stamp                      |
| XDWM..E | HVTDLSN  | - Distributed Library Sequence Number |
| XDWM..E | HVTMODEL | - Node Machine Model                  |
| XDWM..E | HVTMTYPE | - Node Machine Type                   |
| XD....E | HVTRVN   | - Record Version Number               |
| XDWM..E | HVTSN    | - Node Serial Number                  |
| XDWM..E | HVTVECD  | - VE Code Level                       |
| XDWM..E | INTERVLS | - Number of Recording Intervals       |
| XD....E | ORGSYSID | - Originating System Identification   |
| XDWM..E | STARTTS  | - Start Time Stamp                    |

#### Accumulated Data Elements

|         |        |                             |
|---------|--------|-----------------------------|
| XDWM..E | HEIDE  | - Data Exported (MB)        |
| XDWM..E | HEIDI  | - Data Imported (MB)        |
| XDWM..E | HEILVE | - Logical Volumes Exported  |
| XDWM..E | HEILVI | - Logical Volumes Imported  |
| XDWM..E | HEIPVE | - Physical Volumes Exported |
| XDWM..E | HEIPVI | - Physical Volumes Imported |

### 5.2.4.13.3 HVTHEI Usage Considerations

This section identifies any special considerations or techniques related to using the HVTHEI file.

None.

### 5.2.4.13.4 HVTHEI Retrieval Examples

1. Use the most recent DAYS timespan HVTHEI file and display the number of volumes (physical and logical) and the megabytes of data that were exported and imported.

The display is by HOUR by cluster. This may or may not be a routine activity. If not, this data can be trended using longer term data from the weeks or months timespans.

```
DATA;
SET &pHVTd..HVTHEI01;
DATE=DATEPART(ENDTS) ;
FORMAT DATE DATE8. ;
* ;
PROC PRINT LABEL ;
  PAGEBY HVTCLID ;
  BY HVTCLID DATE ;
ID HOUR ;
VAR HEIPVE HEILVE HEIDE HEIPVI HEILVI HEIDE;
TITLE1
'Daily Export-Import Activity by HOUR' ;
RUN ;
```



# Chapter 6: DATA SOURCES

---

This chapter provides information about the raw input data sources used by the two separate components of the CA MICS Tape Analyzer Option.

- o Tape Library Management (TLM Component)

- o Virtual Tape Subsystems (VTS Component)

The following sections explain raw data collection requirements and provide information regarding raw data content by record type:

- 1 - TLM Component Data Sources
- 2 - VTS Component Data Sources

This section contains the following topics:

[6.1 TLM Component Data Sources](#) (see page 401)

[6.2 VTS Component Data Sources](#) (see page 402)

## 6.1 TLM Component Data Sources

The Tape Management Catalog Collector (TMCC) provides the data processed by the TLM component DAY091 daily update step.

The TMCC scans the targeted CA-1, TLMS, or RMM tape management catalog and creates an extract record with a common layout that contains both tape volume and tape data set information. Following the common layout section are data elements specific to the tape management data source.

See Appendix C for information on the setup and execution of the TMCC data collection job.

## 6.2 VTS Component Data Sources

The VTS component DAY096 daily update step inputs SMF data generated for IBM VTS and StorageTek VSM virtual tape and BVIR data generated from IBM TS77xx systems. The architectural implementation of these three virtual tape systems is different, as are the considerations regarding the collection of SMF and BVIR data for input to the VTS component.

The following sections provide information about SMF record content and the data collection requirements for each of the supported virtual tape systems:

- 1 - IBM VTS SMF Data
- 2 - StorageTek VSM SMF Data
- 3 - CA MICS and CA SMF Director Interface
- 4 - IBM Hydra Bulk Volume Information Retrieval (BVIR)

### 6.2.1 IBM VTS SMF Data

The VTS component uses IBM Tape Library Statistics (SMF type 94) records to produce database files that show IBM VTS virtual tape system activity.

#### SMF Type 94 Record Creation

-----

The Library Manager component of each IBM 34xx Self Managed Tape Library creates hourly interval records containing statistics for each VTS attached to the tape library and broadcasts them to all attached z/OS hosts. A z/OS tape error-recovery program reads each statistics record, creates an SMF type 94 record, and writes it to an SMF MANx file or SMF logstream.

In the case of a peer-to-peer VTS, a total of three SMF type 94 records are created each hour:

- o one for the user-interface (UI) VTS
- o one for the secondary VTS
- o one for the composite VTS

To ensure that the Library Manager is creating the statistical records used to create SMF type 94 records, statistics must be enabled on the Library Manager console. Refer to IBM Library Manager documentation for specific instructions on activating statistics for the tape library.

In addition, the SYS1.PARMLIB(SMFPRMnn) member must specify SMF type 94 records for each z/OS system where record collection is desired.

The following sections describe the SMF type 94 record and strategies for collecting the data.

- 1 - SMF Type 94 Record Description
- 2 - Collecting SMF Type 94 Records

### 6.2.1.1 SMF Type 94 Record Description

The SMF Type 94 IBM Tape Library Dataserver Statistics record predated IBM VTS virtual tape systems. Originally, the hourly record statistics generated by IBM 34xx Self Managed tape libraries contained 128 bytes of data with information about real tape drive activity in the tape library.

With the introduction of the IBM VTS, the record was expanded to include an additional 128 bytes of data containing VTS-related information. Over time, the record was further expanded to accommodate the peer-to-peer VTS and then to provide improved DASD cache, physical drive, and physical cartridge pool information.

Each SMF type 94 record subtype shows an hour's worth of VTS activity and status information. The statistics summarize the interaction of all z/OS systems with the VTS. There is no breakdown of information at the individual z/OS system level.

The SMF type 94 record is comprised of two subtypes:

- |           |                                                                                                                                                                                                                                                                                           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subtype 1 | The subtype 1 record is always generated. The basic record contains detailed information about: <ul style="list-style-type: none"><li>o Physical tape drive availability and activity. Statistics for physical mounts, dismounts, ejects, audits, inserts, and imports/exports.</li></ul> |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- o VTS data movement to and from z/OS systems and DASD cache. VTS data movement to and from DASD cache and physical cartridges. Statistics for physical and virtual mounts, DASD cache and physical cartridge utilization buckets. Statistical buckets with counts of data block movement by blocksize ranges. Statistics on various throttle values and compression ratios.
- o For peer-to-peer VTSs, statistics are provided for each virtual tape controller (AXn, up to eight) showing the copy mode, data volume, virtual mounts, compression ratios, and virtual volume copies achieved.

When IBM F/C 4001 is installed and available, the subtype 1 record contains additional VTS information:

- o A breakdown on physical tape device activity by device type, for up to two device types if multiple device types are assigned to the VTS.
- o A breakdown on VTS DASD cache utilization by preference group, if preference groups are used to prioritize one group of virtual volumes over another.

Subtype 2

The subtype 2 record is only generated if IBM F/C 4001 is installed and Outboard Policy Management is enabled.

It provides information about each volume pool associated with the VTS physical cartridges. For each volume pool, counts are provided for scratch and used cartridges. Media types assigned to the pool are identified. For active cartridges, 20 buckets are provided showing how many cartridges are filled at each 5% range.

### 6.2.1.2 Collecting SMF Type 94 Records

SMF Type 94 records reflect activity from the IBM VTS perspective and do not provide information at the z/OS system level. Complete hourly statistics for a particular VTS are available from the SMF type 94 records sent to any attached z/OS system.

Because of the "VTS perspective" of the SMF data, the CA MICS processing of SMF type 94 records filters the data to select one representative hour for each VTS from all z/OS systems reporting on the VTS.

This design simplifies VTS reporting and, when data from multiple z/OS systems is included in the input stream (which is recommended), reduces the chance that intervals will be missed due to downtime for a particular z/OS system.

The SYSID value stored in the CA MICS IVT Information Area database files defaults to SYS1, but may be overridden with a VTSSYSID statement in prefix.MICS.PARMS(VTSOPS). See section 7.2.3.1.3 for more information about the VTSSYSID statement.

A best practice is to collect SMF type 94 records from as many z/OS systems as practical and input all the data to the VTS component daily update step. The primary reason to feed data from multiple z/OS systems is to minimize potential data loss in the CA MICS database files. If only one z/OS system is used as input, any downtime for that system will result in missing data for the VTS in the CA MICS database.

If data from multiple z/OS systems is included in the input, the only time database data will be missing is when all the z/OS systems are down at the same time.

SMF type 94 record data volume is minimal, so inputting data from multiple systems does not significantly impact the VTS component daily update step execution time.

#### VTSUTIL Utility Job

-----

The prefix.MICS.CNTL(VTSUTIL) utility job can be executed to determine which z/OS hosts are attached to each VTS. The primary function of the utility is to determine the association of UI and secondary VTSs with their composite VTS for peer-to-peer VTS implementations. This association must be registered in prefix.MICS.PARMS(VTSCMPID), as described in section 7.2.3.3, if a peer-to-peer VTS is present in the input data.

A secondary use of the utility job is to show which z/OS systems are reporting on each VTS. Using the utility program for this purpose can assist in determining which z/OS systems should be used to collect SMF data for input into the DAY096 daily update step.

To run the utility job update the //INPUTSMF DD statement to include a days worth of SMF type 94 data collected from all z/OS systems.

After execution, examine the //REPORT output. The first report generated, the IBM VTS Overview Report, lists each VTS, the VTS type, and each z/OS system collecting data for the VTS. Here is an example of the overview report:

|       |            | SYSID LISTING |       |       |       |       |       |
|-------|------------|---------------|-------|-------|-------|-------|-------|
| VTS   | VTS        |               |       |       |       |       |       |
| ID    | Type       | SYS1          | SYS2  | PRDA  | PRDB  | TST1  | TST2  |
| ----- | -----      | -----         | ----- | ----- | ----- | ----- | ----- |
| CMP01 | COMPOSITE  |               |       |       |       | XX    | XX    |
| V9401 | -UI        |               |       |       |       | XX    | XX    |
| V9402 | -SECONDARY |               |       |       |       | XX    | XX    |
| CP100 | COMPOSITE  |               |       | XX    | XX    |       |       |
| TND11 | -UI        |               |       | XX    | XX    |       |       |
| TND22 | -SECONDARY |               |       | XX    | XX    |       |       |
| AAAAA | COMPOSITE  | XX            | XX    |       |       |       |       |
| A0002 | -UI        | XX            | XX    |       |       |       |       |
| A0002 | -SECONDARY | XX            | XX    |       |       |       |       |
| 89834 | STANDALONE | XX            | XX    |       |       |       |       |
| 89835 | STANDALONE | XX            | XX    |       |       |       |       |

Figure 6-1. VTSUTIL Sample VTS Overview Report

In the above sample, there are three peer-to-peer VTS configurations and two standalone VTS configurations. Each peer-to-peer consists of a UI, a secondary, and a composite.

The report shows that the SMF data processed provides exactly two sets of data per VTS configuration. The z/OS systems listed would be reasonable choices to use as input for the DAY096 step. With this data, if any single z/OS system was down, SMF data from the second z/OS system would be used to update the CA MICS database for any of the VTS configurations.

Note: Be careful to select z/OS systems that are not likely to be down for maintenance at the same time.

## 6.2.2 StorageTek VSM SMF Data

The VTS Component uses SMF records generated by StorageTek to produce database files that show StorageTek VSM virtual tape system activity.

The default SMF record type for StorageTek VSM records is type 255, but the StorageTek administrator can change the record type to any number in the range 128 to 255.

### SMF Type 255 Record Creation

-----  
The StorageTek Host Software Component (HSC) produces a variety of SMF record subtypes for VTCS events, mounts, dismounts, migrates, recalls, and so on.

The SYS1.PARMLIB(SMFPRMnn) member must specify SMF type xxx records for each z/OS system where record collection is desired, where xxx is the record type specified by the StorageTek administrator.

The following sections describe the StorageTek SMF records and strategies for collecting the data.

- 1 - StorageTek VSM SMF Record Description
- 2 - Collecting StorageTek VSM SMF Records



### 6.2.2.1 StorageTek VSM SMF Record Description

Note: In this section, the StorageTek SMF record type is assumed to be type 255. The actual record type generated is specified by the StorageTek administrator.

The SMF Type 255 StorageTek tape library statistics record predated StorageTek VSM virtual tape systems. Originally, the record contained subtypes that only applied to the host and real tape drive activity in the StorageTek tape silo. With the introduction of StorageTek VSM, additional subtypes were added over time to collect performance and event data for the virtual tape system.

Each SMF type 255 record subtype represents specific events in the virtual tape system or performance statistics collected over an interval. The storage system administrator can selectively specify a subset of the following subtypes. The StorageTek Virtual Tape Control System Installing and Configuring VTCS guide recommends subtypes to collect. There are 17 SMF type 255 record subtypes pertaining to VSM:

|                        |                                                                                                                                                                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subtype 10<br>(SVTSSP) | The subtype 10 record is the VTSS subsystem performance record. This subtype is generated at 15-minute intervals. It provides information on the back-end (disk buffer) capacity and usage.                                                               |
| Subtype 11<br>(SVTCIP) | The subtype 11 record is the VTSS channel interface performance record. This subtype is generated at 15-minute intervals. It provides usage information on the channels defined between the host to the VTSS, and the VTSS to the Real Tape Drives (RTD). |
| Subtype 13<br>(SVTVMR) | The subtype 13 record is the Virtual Tape Volume (VTV) Mount record. This subtype is generated for every VTV mount event. It provides information on the virtual drive, VTV volser, mount types, mount durations, and the job that requested the mount.   |
| Subtype 14<br>(SVTVDR) | The subtype 14 record is the VTV Dismount record. This subtype is generated for every VTV dismount event. It provides information on the virtual drive, VTV volser, VTV size, and the job that requested the mount.                                       |

|                                               |                                                                                                                                                                                                                                                        |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subtype 15<br>(SVTVXR)                        | The subtype 15 record is the VTV Delete record. This subtype is generated for every VTV delete event. It provides information on the VTV volser and VTV age.                                                                                           |
| Subtype 16<br>(SVTRMR)                        | The subtype 16 record is the RTD Mount record. This subtype is generated for every RTD mount event. It provides information on the reason for the mount and the elapsed time for the mount to complete.                                                |
| Subtype 17<br>(SVTRDR)                        | The subtype 17 record is the RTD Dismount record. This subtype is generated for every RTD dismount event. It provides information on the multivolume cartridge (MVC), RTD device, and error sense codes.                                               |
| Subtype 18<br>(SVTVGR)                        | The subtype 18 record is the VTV Migrate record. This subtype is generated for every VTV migrate event. It provides information on the MVC volser, RTD device, VTV volser, the amount of data migrated and the migration duration.                     |
| Subtype 19<br>(SVRVRR)                        | The subtype 19 record is the VTV Recall record. This subtype is generated for every VTV recall event. It provides information on the MVC volser, RTD device, VTV volser, the amount of data migrated and the migrate duration.                         |
| Subtype 20<br>(SVTRPR)                        | The subtype 20 record is the RTD Performance record. This subtype is generated at 15 minute intervals. It provides information on the RTD device, data transferred, and connect times.                                                                 |
| Subtype 21<br>(not supported<br>at this time) | The subtype 21 record is the RTD Vary record. This subtype is generated for every RTD Vary command event. It provides information on the RTD device and its status after a Vary command was issued. This subtype is not processed by the VTS Analyzer. |
| Subtype 25<br>(SVTMVC)                        | The subtype 25 record is the MVC Status record. This subtype is generated for every change to a multivolume cartridge. It provides information on MVC free space,                                                                                      |

how much is usable, and how many holes have been created as a result of VTVs that were deleted or expired.

|                                               |                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subtype 26<br>(SVTVVR)                        | The subtype 26 record is the VTV Movement record. This subtype is generated for every VTV movement event. It provides information on the the MVC where the VTV was originally, the MVC where it currently resides, and the reason for the movement.                                                                                           |
| Subtype 27<br>(SVTVSS)                        | The subtype 27 record is the VTV Scratch Status record. This subtype is generated for every VTV scratch event. It provides information on the reason for scratch. This record is currently not processed by the VTS Analyzer.                                                                                                                 |
| Subtype 28<br>(not supported<br>at this time) | The subtype 28 record is the VTV Replication record. This subtype is generated for every VTV replication event. It provides information on the VTV replicated, how much data was replicated, how long replication took, and the secondary VTSS where the replication took place. This subtype is currently not processed by the VTS Analyzer. |
| Subtype 29<br>(not supported<br>at this time) | The subtype 29 record is the VTV and MVC Unlink record. This subtype is generated for every VTV and MVC unlink event. It provides information on the VTV volser, the MVC volser, and the reason for the unlink. This subtype is currently not processed by the VTS Analyzer.                                                                  |
| Subtype 30<br>(not supported<br>at this time) | The subtype 30 record is the Vary Cluster Link (CLINK) record. This subtype is generated for every Vary CLINK event. It provides information on the primary and partner CLINK names and whether they were varied on or offline. This subtype is currently not processed by the VTS Analyzer.                                                  |

### 6.2.2.2 Collecting StorageTek VSM SMF Records

StorageTek VSM records provide data at the z/OS system level. SMF data from all z/OS systems accessing StorageTek VSMs must be collected in order to account for all virtual tape activity.

For each z/OS system accessing the StorageTek VSM, the StorageTek system administrator updates the SMFPRMxx member in SYS1.PARMLIB with the record type and subtypes that are to be collected. As stated in the StorageTek Installation and Configuration Guide, the administrator should supply parameters similar to the following:

```
SUBSYS(SLS0,INTERVAL(001500),TYPE(255))  
SUBPARM(SLS0(SUBTYPE,(1-8,10,11,13,14-21,25-29)))
```

We recommend that you synchronize the record collection with SMF on the SUBSYS statement, as follows:

```
SUBSYS(SLS0,INTERVAL(SMF,SYNC),TYPE(255))
```

Detailed information about the SMFPRMxx members SUBSYS and SUBPARM parameters can be found in the IBM Systems Management Facilities (SMF) documentation.

### 6.2.3 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)`.

### 6.2.4 IBM Hydra Bulk Volume Information Retrieval (BVIR)

With the new generation of IBM virtual tape servers--the TS77xx series--the statistics are no longer sent to the attached hosts as SMF records. They are written to an internal database within the TS77xx itself. Both point-in-time and historical records are stored. Point-in-time records contain the operations activity over the last 15 seconds for real-time dashboard reporting at the device itself. Historical records contain the operational statistics at 15-minute intervals and are stored for 90 days.

The CA MICS Tape Analyzer Option processes the historical records. The historical data is obtained by a BVIR request to the server to extract the data.

The following sections describe the historical record and strategies for collecting the data.

- 1 - IBM TS7700 BVIR Record Description
- 2 - Collecting Historical BVIR Records

### 6.2.4.1 IBM Hydra BVIR Record Description

The historical BVIR records are produced at 15-minute intervals and stored in an internal database on the tape server for a rolling 90-day period. The historical data contains 6 record types that focus on performance statistics for various aspects of the tape server.

Each record contains a snapshot of the activity in that 15-minute interval. The statistics summarize the interaction of all z/OS systems with the tape server. There is no breakdown of information at the individual z/OS system level.

In addition, the records do not contain any z/OS originating system identification. The ORGSYSID value stored in the CA MICS HVT Information Area database files defaults to SYS1, but may be overridden with a VTSSYSID statement in prefix.MICS.PARMS(VTSOPS). See section 7.2.3.1.3 for more information about the VTSSYSID statement.

The BVIR historical record types are:

- |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type 20 | <p>Vnode Virtual Device Historical Record.<br/>The basic record contains detailed information about:</p> <ul style="list-style-type: none"><li>o Channel blocks written, concurrent virtual tape drive statistics.</li></ul> <p>Contributes to the following files:<br/>HVTVDA - Hydra Vnode Device Activity<br/>HVTHCA - Hydra Cluster Summary</p>                                                                                                                |
| Type 21 | <p>Vnode Adapter Historical Record.<br/>The basic record contains detailed information about:</p> <ul style="list-style-type: none"><li>o Type and status of each Host Bus Adapter (HBA).</li><li>o I/O throughput of each HBA.<br/>Compression ratios are derived from this data.</li></ul> <p>Contributes to the following files:<br/>HVTVAP - Hydra Vnode Adapter Port Activity<br/>HVTVDA - Hydra Vnode Device Activity<br/>HVTHCA - Hydra Cluster Summary</p> |

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type 30 | <p>Hnode HSM Historical Record.<br/>The basic record contains detailed information about:</p> <ul style="list-style-type: none"><li>o Total cache size.</li><li>o I/O throttling activity.</li><li>o Total virtual volumes in cache and average volume size.</li><li>o Mount statistics by cache partition: scratch mounts, cache hit, cache miss, and mount times.</li><li>o Virtual volume age statistics by preference groups.</li></ul> <p>Contributes to the following files:<br/>HVTHHC - Hydra Hnode Cache Activity<br/>HVTHCP - Hydra Hnode Cache Partition Activity<br/>HVTHPG - Hydra Hnode Cache Pref Grp Statistics<br/>HVTHHA - Hydra Hnode Activity<br/>HVTHCA - Hydra Cluster Summary</p> |
| Type 31 | <p>Hnode Export/Import Historical Record.<br/>The basic record contains detailed information about:</p> <ul style="list-style-type: none"><li>o Statistics on the number of physical and logical volumes either exported or imported along with the volume of data.</li></ul> <p>Contributes to the following files:<br/>HVTHHC - Hydra Hnode Export-Import Activity<br/>HVTHHA - Hydra Hnode Activity<br/>HVTHCA - Hydra Cluster Summary</p>                                                                                                                                                                                                                                                            |
| Type 32 | <p>Hnode Library Historical Record.<br/>The basic record contains detailed information about:</p> <ul style="list-style-type: none"><li>o Physical tape drive statistics: mount times, mount types, data volumes written, active logical volumes, and policy settings.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                         |



|         |                                                                                                                                                                                                                                                                                                                                                          |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | Contributes to the following files:<br>HVTHPD - Hydra Hnode Physical Drive Activity<br>HVTHGP - Hydra Hnode G-Use Pool Activity<br>HVTHGM - Hydra Hnode G-Use Pool Media Stats<br>HVTHHA - Hydra Hnode Activity<br>HVTHCA - Hydra Cluster Summary                                                                                                        |
| Type 33 | Hnode Grid Historical Record.<br>The basic record contains detailed information about:<br><br>o Statistics for the amount of data copied from one cluster to another cluster, remote mounts on behalf of another cluster.<br><br>Contributes to the following files:<br>HVTGRC - Hydra Hnode Grid Activity<br>HVTGCC - Hydra Hnode Grid Cluster Activity |

#### 6.2.4.2 Collecting Historical BVIR Records

In a multi-cluster grid configuration, historical statistics for all the clusters can be obtained from any cluster. You only need to run the BVIR facility on one cluster, usually the primary cluster.

The BVIR facility uses a standard label tape to both initiate the request for the statistics and return the results. See "IBM Virtualization Engine TS7700 Series Bulk Volume Information Retrieval Function User's Guide" for the BVIR usage procedures. Also involve your storage administrator in automating the retrieval of this data on a daily basis.

The control statement to extract the Historical Statistics is:

```
HISTORICAL STATISTICS FOR xxx (xxx is the Julian date) or  
HISTORICAL STATISTICS FOR xxx-xxx (for a Julian date range)
```

**Note:** The data is not written to the database on synchronized 15-minute intervals. It is usually written a minute or two after the normal 15-minute boundaries. When automating the retrieval of the BVIR data, it is advisable to schedule the job after the first interval of the day has completed, for example at 12:15 AM.



# Chapter 7: PARAMETERS

---

To define control parameters, you must understand your site configuration and your data analysis objectives. Then you can translate that understanding into parameters.

In this chapter, you must:

- o Make several policy decisions
- o Review the available parameters
- o Update members to meet your site requirements

Use this chapter as a detailed reference when installing or modifying this component. Chapters 2 and 3 of the PIOM describe the mechanics of the CA MICS installation process and include checklists that describe each installation step.

If you have any questions, contact Technical Support at <http://ca.com/support>.

This chapter contains information on the following topics:

- 1 - TLM Component Parameters
- 2 - VTS Component Parameters

This section contains the following topics:

[7.1 TLM Component Parameters](#) (see page 419)

[7.2 VTS Component Parameters](#) (see page 508)

## 7.1 TLM Component Parameters

The parameters needed to define the Tape Library Management (TLM) component are discussed in the following subsections:

- 1 - TLM Component Environmental Considerations
- 2 - TLM Component Complex Level Parameters
- 3 - TLM Component Unit Level Parameters

### 7.1.1 TLM Component Environmental Considerations

In preparation for defining TLM component complex and unit level parameters, do the following:

- o Review the tape library management products used at your site and determine those that will provide input for this component.
- o Review database unit specifications to determine which unit or units should process data from the Tape Management Catalog Collector (TMCC).
- o Refer to Appendix C to install the Tape Management Catalog Collector (TMCC). The output file of the TMCC will be specified as the input in `prefix.MICS.PARMS(INPUTTLM)`.
- o Review the `prefix.MICS.PARMS(SYSID)` member to ensure it contains an entry representing the tape library scanned by each TMCC job. Refer to Appendix C, Tape Management Catalog Collector (TMCC), for more information about `SYSID` specification in the setup of the TMCC collector.
- o Before running the component generation job, `sharedprefix.MICS.CNTL(TLMCGEN)`, edit `sharedprefix.MICS.GENLIB(TLMGENIN)` and update the following statements to reflect the virtual tape system(s) providing input to the component:

`OPTION <keywords>`

This statement customizes the database file content to match the tape library system(s) processed.

Reference: Section 7.1.2.3

- o Examine existing accounting standards for other CA MICS components, if applicable, to ensure that the CA MICS Accounting and Chargeback Option aggregates information consistently.

## 7.1.2 TLM Component Complex Level Parameters

Complex level parameters describe the TLM component to the CA MICS system. These parameters are discussed in the following subsections:

- 1 - Account Code Structure (TLMACCT)
- 2 - Account Code Derivation Exit (TLMACRT)
- 3 - Analyzer Definition Statements (TLMGENIN)

### 7.1.2.1 Account Code Structure (TLMACCT)

Nine levels of account codes are provided to associate users, user groups, or any other groups with tape data set and tape volume ownership. The account codes are used as summarization keys in the following CA MICS files:

TMCTMD - Tape Management Data Sets  
TMCTMV - Tape Management Volumes

To define TLM component account codes, you must modify the sample member `sharedprefix.MICS.PARMS(TLMACCT)`. TLMACCT defines the number of account codes that are to be carried in the above files, and the length and the label associated with each account code. Its definitions apply to these files in all database units that contain TLM components.

#### PREPARATION

-----

Each site determines its own method of associating tape data set allocations and tape volumes with the responsible users, projects, or departments. Before defining TLM component account codes, investigate your site's accounting standards to:

- o Identify the current organizational coding system. For example, your standards may require that billable entities are identified by:
  - Division
  - Department
  - Project
  - User

With these requirements, at least four of your nine available TLMACCTn account codes would be defined to hold these values.

- o Determine how account codes will be assigned:
  - For the Tape Management Volumes file, you can use ranges of tape volume serial numbers to assign specific ownership or overhead account code values.
  - For the Tape Management Data Sets file, the data set name qualifiers (nodes) or the job name of the creating job are often used to assign account codes.

Consider the following suggestions to determine the number of account codes you will need to meet your site's reporting and analysis needs:

- o Account codes are part of the summarization keys for the files that support them. One record is generated for each unique combination of values of the summarization keys.
- o It is a good idea to define all nine account codes even if you currently need fewer. If future requirements call for additional account codes, they are already defined.

### DEFINING ACCOUNT CODES

-----

You can define up to nine levels of account codes. For the TLM component, the account codes are named TLMACT1 to TLMACT9.

The TLMACCT member in sharedprefix.MICS.PARMS contains one statement per account code definition. Each statement contains several parameters, which are free-form (separated by one or more blanks) but positional. Blank statements are not permitted. Comments can be coded by beginning the statement with an asterisk (\*).

The statement format is:

```
level length 'descriptive title'

or

level mask length 'descriptive title'
```

where:

|       |                                                                                                                                     |
|-------|-------------------------------------------------------------------------------------------------------------------------------------|
| level | The hierarchical level of the account code, where level 1 represents the top of the hierarchy, and the largest number (for example, |
|-------|-------------------------------------------------------------------------------------------------------------------------------------|

level 9) represents the most granular level of organizational identity. The levels are defined sequentially, starting with 1 and going up to 9. This parameter is required.

**mask** An optional parameter that can be used to deactivate the account code in specified timespans. Specifying a timespan mask requires coding T(.....) as the second parameter in a statement, where each "." represents a file timespan in this order: DETAIL, DAYS, WEEKS, MONTHS, YEARS, and TABLES. For each timespan, you can specify a Y to indicate that the account code is active or an N to indicate that the account code is inactive.

If this parameter is skipped, it has a default value of T(YYYYYY).

The following rules apply if you code the mask:

- o DETAIL must always be Y. Account codes may not be deactivated in this timespan.
- o If DAYS is N, then WEEKS, MONTHS, and YEARS must also be N. If the account code is inactive in the DAYS timespan, it cannot be active in higher timespans.
- o If MONTHS is N, then YEARS must be N. If the account code is inactive in the MONTHS timespan, it cannot be active in the YEARS timespan.

**length** The length of the account code. The length may range from 1 to 30. This parameter is required.

**descriptive title** The title that describes the account code. The length of the title is 1 to 40 characters. The title is embedded in quotes (''). This is a required parameter.

The following two examples show how all nine account codes can be coded to allow for future expansion with minimal impact on database space utilization. In both examples, the six currently unused account codes use only six bytes of space per database observation, but make it much easier to implement additional account codes if required in the future.

Examples:

This sample TLMACCT has three used and six unused account codes:

```
1 3 'DIVISION'
2 6 'DEPARTMENT'
3 8 'USER'
4 1 'UNUSED TLMACT4'
5 1 'UNUSED TLMACT5'
6 1 'UNUSED TLMACT6'
7 1 'UNUSED TLMACT7'
8 1 'UNUSED TLMACT8'
9 1 'UNUSED TLMACT9'
```

This sample TLMACCT with timespan controls has three used and six unused account codes:

```
1          3 'DIVISION'
2 T(YYNNNN) 6 'DEPARTMENT'
3 T(YYNNNN) 8 'USER'
4 T(YYYYYY) 1 'UNUSED TLMACT4'
5 T(YYYYYY) 1 'UNUSED TLMACT5'
6 T(YYYYYY) 1 'UNUSED TLMACT6'
7 T(YYYYYY) 1 'UNUSED TLMACT7'
8 T(YYYYYY) 1 'UNUSED TLMACT8'
9 T(YYYYYY) 1 'UNUSED TLMACT9'
```

### 7.1.2.2 Account Code Derivation Exit (TLMACRT)

After you use TLMACCT to define the account codes, your next step is to code the Account Code Derivation Exit member `sharedprefix.MICS.PARMS(TLMACRT)`.

TLMACRT assigns values to the account code data elements during the DAY091 step. For example, if you have defined four account codes in TLMACCT, the TLMACRT exit must contain SAS code to assign values to the data elements TLMACT1, TLMACT2, TLMACT3, and TLMACT4 -- for each DETAIL record processed.

Some sample exit coding techniques are provided here to give you ideas for adapting your own routine, but you are responsible for testing the accuracy of the exit routine.



Each data element in the DETAIL timespan of the TLMTLD file can be referenced by the TLMACRT code to assign account code values. Most sites use data set name qualifiers (nodes) to determine organizational ownership, but additional information such as the job name that created the data set and the tape volume serial number are available for account code assignment.

If you currently use the CA MICS Space Analyzer Option to manage DASD data sets, you may already have determined methods to assign organizational ownership based on data set naming conventions. If so, you should review the sharedprefix.MICS.PARMS(VCAACRT) account routine for techniques and conventions that may be applicable to tape data set ownership determination.

For convenience, several temporary variables are created that can be referenced by your routine:

DSNODE1 - First node of the tape data set name  
(often referred to as the high level qualifier)  
DSNODE2 - Second node of the tape data set name  
DSNODE3 - Third node of the tape data set name  
DSNODE4 - Fourth node of the tape data set name  
DSNODE5 - Fifth node of the tape data set name  
DSNODEL - Last node of the tape data set name

Notes:

1. DSNODE1 to DSNODE5 and DSNODEL are not permanent data elements. They are created for your coding convenience to examine the various nodes of the data set name (DSNAME) for the current observation.

DSNODE1 to DSNODE5 contain the first five nodes of the DSNAME. DSNODEL contains the last node of the DSNAME.

A sample DSNAME would be coded as follows:

SYS1.DATA.TELPIN.G0001V00

where:

DSNODE1='SYS1'      DSNODE2='DATA'      DSNODE3='TELPIN'  
DSNODE4='G0001V00' DSNODE5=' '      DSNODEL='G0001V00'

2. The TLMACRT exit may contain any valid SAS statements for a data step except RETURN and DELETE. Coding either of

these two statements may cause unpredictable results in DAILY processing, since the input processing is performed within a loop, and control is not returned to the beginning of the DATA step for each record input.

3. A best practice is to assign default account code values to all account code data elements at the start of the routine. These default values will be over-written with correct values according to your account routine logic. This approach provides you with two benefits.
  - o It groups observations where proper account codes cannot be determined under the same default category and, therefore, requires less DASD space for storing the TLM component files.
  - o It enables you to determine the quantity of uncategorized activity. This quantity can be tracked over time as you refine and update your TLMACRT to correctly categorize all tape data set records.

### TLMACRT Coding Example 1

-----

A site has established the following data set naming conventions:

- o The three characters of the first node of a data set name represent the company division (TLMACT1).
- o The first six characters of the second node of a data set name represent the company department (TLMACT2).
- o The third node of the data set name tells how to derive the userid (TLMACT3).
  - If the third node begins with 'X' or 'Z,' the USERID is the fourth node.
  - Otherwise, the USERID is populated with the overhead value of '\*\*\*\*\*'.

In Example 1, assume that you have defined all nine account code levels in TLMACCT, but are only populating three at this time. You intend to populate TLMACT1-TLMACT3 as follows:

- o TLMACT1 is set to the value of the first three characters of the high-level node of the data set name.

- o TLMACT2 is set to the first six characters of the second node of the data set name.
- o TLMACT3 is set to the value of the fourth node of the data set name if the third node begins with the characters 'X' or 'Z'.

The TLMACCT member for the account definition is as follows:

```
1 3 'DIVISION'
2 6 'DEPARTMENT'
3 8 'USERID'
```

The SAS code defined for the user account code exit is as follows:

```
/*-----*/
/*
/* SAMPLE TLM ACCOUNT CODE DERIVATION EXIT
/*
/* DIVISION IS BUILT FROM POSITIONS 1-3 OF NODE ONE OF
/* THE DATA SET NAME.
/*
/* DEPARTMENT IS BUILT FROM POSITIONS 1-6 OF NODE TWO OF
/* THE DATA SET NAME.
/*
/* USER IS BUILT FROM THE FOURTH NODE IF THE THIRD NODE
/* OF THE DATA SET NAME BEGINS WITH 'X' or 'Z'.
/*
/* DSNODE1-DSNODE5 ARE VARIABLES THAT CONTAIN THE FIRST
/* FIVE NODES OF THE DATA SET NAME RESPECTIVELY.
/*
/*-----*/
/*
/* SET DEFAULT VALUES
/*
/*      TLMACT1 = '***' ;
/*      TLMACT2 = '*****' ;
/*      TLMACT3 = '*****' ;
/*
/* GET DIVISION
/*
/*      TLMACT1 = SUBSTR(DSNODE1,1,3) ;
/*
/* GET DEPARTMENT (MAKE SURE DATA SET HAS A 2ND NODE)
/*
/*      IF DSNODE2 NE ' ' THEN TLMACT2 = SUBSTR(DSNODE2,1,6);
/*
/* GET USERID IF 3RD NODE BEGINS WITH 'X' OR 'Z'
/*
```

```
/*                                                    */
      IF DSNODE3 NE ' ' THEN DO ;
      IF DSNODE3 EQ: 'X' OR DSNODE3 EQ: 'Z' THEN DO ;
      IF DSNODE4 NE ' ' THEN TLMACT3 EQ DSNODE4 ;
      END ;
      END ;
/*                                                    */
```

#### TLMACRT Coding Example 2

-----

In the next example, a PROC FORMAT is used to build a single account code, TLMACT1. This simple example shows how SAS PROC FORMATS can be used to represent a complex mapping scheme, where a variety of different data set naming patterns are associated with the appropriate organizational entity.

The TLMACCT member for the account definition for this example is as follows:

```
1 8 'DIVISION'
```

A FORMAT used to define the data set name to account code mapping could be specified as follows:

```
PROC FORMAT PRINT ;
```

```
VALUE $ACTLIST
  'TS0GP1*'          ' = ACCTGRP1
  'TS0GP2*'          ' = ACCTGRP2
  'TS0GP3*'          ' = ACCTGRP3
  'TS0GP4*'          ' = ACCTGRP4
  'TSO.PRINT.DATA    ' = ACCTPRNT
  'SYS1.VERY.LONG.DATA.SET.NAME' = ACCTPRNT
  ...
  ...
  ...
  ...
  OTHER              = ACCTOVRD ;
```

Once the \$ACTLIST FORMAT is defined, it can be referenced in the TLMACRT. The SAS code defined for the user account code exit would be as follows:

```
/*-----*/
/*                                                    */
/* SAMPLE TLM ACCOUNT CODE DERIVATION EXIT USING FORMATS */
/*                                                    */
/* IN THIS EXAMPLE ONLY ONE ACCOUNT CODE, DIVISION,      */
/*                                                    */
```

```

/* IS DEFINED.                                     */
/*                                                     */
/* DIVISION IS BUILT USING THE $ACTLIST FORMAT THAT WAS */
/* PREVIOUSLY BUILT USING PROC FORMAT.                 */
/*                                                     */
/* $ACTLIST HAS DEFINED AN ACCOUNT CODE FOR ALL DATA SETS */
/* BELONGING TO THE TSO GROUPS. ALL DATA SETS OF THIS */
/* TYPE HAVE THE TSO ID AS THE FIRST LEVEL INDEX OF THE */
/* DATA SET NAME. ANY DATA SET THAT DOES NOT CONFORM */
/* TO THIS CONVENTION HAS A UNIQUE ENTRY IN THE $ACTLIST */
/* TABLE. ANY DATA SET NOT DEFINED IN THE TABLE IS */
/* MAPPED TO THE 'ACCTOVRD' ACCOUNT.                   */
/*                                                     */
/*-----*/
/*                                                     */
/* SET DEFAULT VALUES                                */
/*                                                     */
      TLMACT1 = '*****' ;
/*                                                     */
/* GET DIVISION                                       */
/*                                                     */
      IF (DSNAME= 'TSO') AND (INDEX(DSNAME, '.') EQ 7) THEN
          TLMACT1 = PUT(SUBSTR(DSNAME,1,6) || '*', $ACTLIST.);
      ELSE TLMACT1 = PUT(DSNAME, $ACTLIST);
/*                                                     */

```

#### Notes:

- o Data sets beginning with TSO, whose first level index has a length of six, are mapped to their associated account groups.
- o Data sets that do not conform to this naming convention are assigned unique entries in the \$ACTLIST FORMAT.
- o Data sets that are not covered by the FORMAT definitions are mapped to the overhead account.

### 7.1.2.3 Analyzer Definition Statements (TLMGENIN)

Each component's generation statements is specified in `sharedprefix.MICS.GENLIB(cccGENIN)`, where `ccc` is the three-character component identifier. The TLM component generation definition member is `TLMGENIN`.

Although each component is delivered with default statements, you are allowed to customize these statements based on your needs at your site. In order to activate your new definitions, you must submit `sharedprefix.MICS.CNTL(TLMCGEN)` to complete the updates.

If needed, see chapter 4 of the System Modification Guide for more information about `cccGENIN` member statements.

#### The OPTION Statement

-----

The `TLMGENIN` `OPTION` statement allows you to control the database inclusion or exclusion of specific groups of related data elements. Examine the default definition and change it as appropriate to meet your needs.

Note: The `TLMGENIN` member contains uppercase and lowercase characters. The keywords for the `OPTION` statement should be entered in uppercase.

The statement format is:

```
OPTION keyword keyword ...
```

where the valid keywords are:

```
CA1/NOCA1  - CA1 data elements
RMM/NORMM  - RMM data elements
TLMS/NOTLMS - TLMS data elements
```

The default is:

```
OPTION CA1  RMM  TLMS
```

Keywords are described in detail below. You must specify at least one keyword. If two or more keywords are specified, they may be in any order, separated by one or more blanks.

#### KEYWORD DESCRIPTIONS

-----

##### o CA1/NOCA1

The CA1 keyword activates data elements unique to data collected from CA 1 Tape Management in the component files. If you are processing data collected from CA 1, code CA1. Otherwise, code NOCA1 to deactivate these data elements.

##### o RMM/NORMM

The RMM keyword activates data elements unique to data collected from IBM DFSMS/MVS Removable Media Manager in the component files. If you are processing data collected from IBM DFSMS/MVS Removable Media Manager, code RMM. Otherwise, code NORMM to deactivate these data elements.

##### o TLMS/NOTLMS

The TLMS keyword activates data elements unique to data collected from CA TLMS Tape Management in the component files. If you are processing data collected from CA TLMS, code TLMS. Otherwise, code NOTLMS to deactivate these data elements.

### 7.1.3 TLM Component Unit Level Parameters

Unit level parameters control the processing of the CA MICS Tape Analyzer Option TLM component 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 process.

Note: You must run the generation processes for these options to take effect.

The sections that follow show you how to specify the operational parameters that control how input data is processed by the TLM component. The names in parentheses are the member names within the prefix.MICS.PARMS data set that contain the parameters described in the section.

- 1 - TLM Processing Options (TLMOPS)
- 2 - TLM VOLGROUP Derivation Routine (VOLGPRTE)
- 3 - Input Specification (INPUTTLM)
- 4 - TLM Database Space Modeling (DBMODEL)



### 7.1.3.1 TLM Processing Options (TLMOPS)

This section shows you how to specify the operational statements that control unit level processing of the TLM component.

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(JCLGEND) 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.
*****
```

Review the defaults provided in TLMOPS. If the defaults meet your site's requirements, you do not need to tailor TLMOPS.

#### General Syntax Rules

- o Comments are accepted and signified by an asterisk (\*) as the first non-blank character.
- o Statement names and values can be entered in either

uppercase or lowercase characters.

- o Statements can start anywhere in columns 1-72. Only one statement per line is supported.

The following sections explain each of the option statements that can be specified in prefix.MICS.PARMS(TLMOPS).

### Required Statements

-----

- o None

### Optional Statements

-----

- o DURATIONS Statement
- o ACCOUNTING Statement
- o WORK, MULTWORK, and NOMULT Statements
- o RESTART Statements
- o Incremental Update Statements
- o DETAIL Tape Processing Overview

### 7.1.3.1.1 DURATIONS Statement

The DURATIONS statement is optional. It is used to override the default values used by the TLM component to compute tape data set space-time metrics (for example, megabyte-hours) for both of the following scenarios:

- o The first scan of a tape library by the Tape Management Catalog Collector (TMCC).
- o A TMCC scan of a library where more than nn days have elapsed since the previous TMCC library scan.

#### Scenario 1 - First Scan of the TMCC

-----

The TLM component provides a way to charge each tape data set for tape media occupancy. This is accomplished by computing space-time data elements in the Tape Data Set (TMCTMD) file:

- o TMDKBHR - Amount of Space-Time (KBytes-Hours)
- o TMDMBHR - Amount of Space-Time (MByte-Hours)

During a TMCC scan, these metrics are computed by multiplying the size of the data set by the lesser of these two:

- o The number of hours since the last scan.
- o The number of hours since the data set was created.

If this is the first TMCC scan of a tape library, potentially enormous values could be generated for TMDKBHR and TMDMBHR since there was no previous scan and many data sets could have been created years earlier. Therefore, during the first scan, the TMCC uses the default value of 24 hours for all tape data sets that were created more than 24 hours before the current TMCC scan date and time. Subsequent scans use the difference between the current and previous scan dates and times to compute space-time metrics.

Note: The default value is 24 hours because the expectation is that you will normally schedule daily TMCC scans.

The DURATIONS statement allows you to override the 24 hour default value used in the data set space-time computations for the initial TMCC tape library scan.

#### Scenario 2 - Time Between TMCC Scans

-----

If the TLM component has been active in the past, but, for some reason, has not been used for a long time and then is reactivated, a situation similar to the first TMCC scan will occur. Because the component was used previously, the TMCC scan job will be aware of the last scan date and time, which could have been months or years earlier.

Using the difference between the current TMCC scan time and the previous TMCC scan time would again result in excessively large space-time metrics for older tape data sets.

By default, the TMC component allows a maximum value of seven days between TMCC scans. If more than seven days elapse between TMCC scans, the component reverts back to the first scan scenario and uses 24 hours in the computation of the space-time metrics for older tape data sets.

The DURATIONS statement allows you to override the maximum value allowed between TMCC scans to a value other than the default value of seven days.

The DURATIONS statement has the following format:

DURATIONS sysid hh dd

where:

sysid Is \* or any valid SYSID value (up to four characters). Note that for the TLM component the SYSID data element contains the user-specified tape library name. See Appendix C, TAPE MANAGEMENT CATALOG COLLECTOR (TMCC), for more information on SYSID specification in the setup of the TMCC collector.

hh Is any integer number of hours from 1 to 24.

dd Is any integer number of days from 2 to 99.

The default is:

DURATIONS \* 24 7

where:

\* Means all SYSIDs (tape libraries)

24 Is the number of hours to use in the calculation of the

space-time metrics for the first scan.

- 7 Is the maximum number of days allowed between scans before the calculation of the space-time metrics revert back to the initial hours (default 24) value.

If no DURATIONS statement is specified, the default values are used.

Example:

```
DURATIONS * 24 30
DURATIONS TLM1 24 3
```

In this example, TMCC scan data from all tape libraries will use 24 hours in the calculation of space-time metrics for the first scan. For subsequent scans, the space-time metrics will use the lesser of the two durations (the time since the last scan or the time since data set creation) unless the last scan was more than 30 days ago. If the time between scans exceeds 30 days, the space-time metric calculations will revert to 24 hours for data sets more than 24 hours old.

For tape library TLM1, the same 24 hours will be used to compute the space-time metrics for the first scan. Subsequent scans, however, must occur within 3 days for calculation of the space-time metrics to use the previous scan date and time.

### 7.1.3.1.2 ACCOUNTING Statement

The ACCOUNTING statement is optional. It controls whether tape data set accounting will be invoked at the DETAIL or DAYS timespan level.

The ACCOUNTING statement has the following format:

```
ACCOUNTING timespan
```

where timespan is either DETAIL or DAYS.

The default is:

```
ACCOUNTING DAYS
```

```
Using ACCOUNTING DAYS
```

```
-----
```

ACCOUNTING DAYS causes the TLM component to account for tape data sets at the DAYS summarization level. At the DAYS summarization level, tape data set name, VOLSER, and other detailed information is not available. Instead, each observation represents the total tape/megabyte hours used by a group of tape data sets, aggregated together, using the sequence/summary keys for the TMCTMD file at the DAYS timespan.

DAYS allows reasonable flexibility in qualification pricing in the accounting routine. For example, assume the sequence/summary elements at the DAYS level are as follows:

```
SYSID  
TLMACT1  
TLMACT2  
VOLGROUP  
YEAR  
MONTH  
DAY
```

All data sets that have these values are summarized into one observation.

```
SYSID='TLM1'  
TLMACT1='MKT'  
TLMACT2='DP12'  
VOLGROUP='STANDARD'  
YEAR=08;  
MONTH=07;
```

DAY=24;

Accounting qualification techniques and algorithms allow for pricing of tape data set space by applying rates based on the actual values in these control or sequence elements in the above example.

Note: VOLSER and DSNAME are absent from the list. If you need exception level pricing based on either VOLSER or DSNAME (or any other character data element not in the SORT key of the DAYS timespan), code ACCOUNTING DETAIL instead of ACCOUNTING DAYS.

Using ACCOUNTING DETAIL

-----

DETAIL causes the TLM component to account for each tape data set at the DETAIL timespan. Each data set is examined by the accounting cost algorithms, and all data elements carried at the DETAIL timespan are available for inspection by the accounting code.

VOLSER could be added to the example above, and a special rate could be applied to some DSNAMEs if they appear on a given VOLSER.

The choice of DETAIL versus DAYS on this parameter should be negotiated with those responsible for CA MICS Accounting and Chargeback. Since there will naturally be more observations at the DETAIL timespan than at the DAYS level, using DETAIL will increase the space required for cycles of the accounting journal files.

### 7.1.3.1.3 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 zero (0).  
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.<br>The name can have up to 8 characters. |
| SPACE    | - specifies how much disk space to provide for<br>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.

If you select multiple work files by specifying a WORK statement and do not code a MULTWORK statement, the following files use multiple workfiles by default:

```
TMD  
TMV
```

There are no files defined that avoid use of multiple work files.

The following files are eligible for multiple WORK support:

```
TMD    Data Set File  
TMV    Tape Volume File
```

The following section discusses changing the WORK option:

- 1 - Change the Number of Work Files

### 7.1.3.1.3.1 Change the Number of Work Files

To change the number of work files used in the TLM component DAY091 step, 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.

### 7.1.3.1.4 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 files, create new DETAIL cycles for data set and volume files, create accounting journal files. |
| 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.

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 - Enable Internal Step Restart

#### 7.1.3.1.4.1 Enable Internal Step Restart

To enable internal step restart in the TLM component, 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.

### 7.1.3.1.5 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.

The following section discusses enabling this option:

1 - Implement Incremental Update

### 7.1.3.1.5.1 Implement Incremental Update

To implement incremental update in the TLM component, 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.

### 7.1.3.1.6 DETAIL Tape Processing Overview

For certain high volume files, the CA MICS architecture provides the ability to create optional DETAIL timespan data sets. These optional data sets are separate from the normal CA MICS database and have the following characteristics:

- o They are created during the component step execution: during either an incremental update or the DAILY update run. Each DETAIL tape file has a separate DD statement in the DAILY or incremental update job that specifies the data set name and other data set characteristics.
- o The data set name (DSN) for each DETAIL tape in a component step is:

tapeprefix.tmics.DETAIL.iiiiff(+1)

where:

- tapeprefix is the tape prefix value specified with the TAPEPREFIX statement in prefix.MICS.PARMS(JCLDEF)
- tmics is either null when NOMICSLEVEL is specified, or MICS if MICSLEVEL is specified with the TAPEPREFIX statement in prefix.MICS.PARMS(JCLDEF)
- iii is the three character CA MICS information area associated with the file
- fff is the three character CA MICS file identifier

Example: For the CA MICS DB2 Analyzer, if DETAIL tape processing were activated for the DB2DSU file, the following prefix.MICS.PARMS(JCLDEF) statement:

TAPEPREFIX CPLXA.U1T NOMICSLEVEL

yields the following DETAIL tape DSN:

CPLXA.U1T.DETAIL.DB2DSU(+1)

- o There is no cycle aging associated with these data sets. Instead, each DETAIL tape data set created is an 01 cycle (for example, DB2DSU01), and multiple instances are managed using Generation Data Groups (GDGs).

- o The creation of DETAIL tape data sets is independent of any sharedprefix.MICS.GENLIB customization choices. You can have one or more cycles of a file written to and managed in the unit DETAIL timespan database, and also use the DETAIL tape feature to create independent data sets for that same file.
- o The decision to create DETAIL tape data sets is made at the unit level. You can choose to create DETAIL tape data sets for a component file in unit A, but not in unit B.
- o While the expectation is that these files will be written to tape, you can make JCL choices to target other media such as DASD. Note that the SAS sequential tape engine will be used to write these files for both DASD and tape data sets.
- o Unique output exits are provided to permit manipulation and subsetting of the records written to the DETAIL tape data sets. This manipulation and subsetting, however, has no impact on files written to the standard CA MICS database.

The activation of DETAIL tape data sets is accomplished by specifying a TAPEfff statement in prefix.MICS.PARMS(cccOPS).

Customization of the JCL used to create each data set is accomplished using a cascading hierarchy of parameters beginning with choices made with the TAPEPARM statement in prefix.PARMS(JCLDEF).

The following sections provide the information required to activate DETAIL tape processing:

- 1 - Component Files Supporting DETAIL Tape Activation
- 2 - DETAIL Tape JCL Customization Overview
- 3 - The TAPEfff Statement
- 4 - The DETAILTAPEPARM Statement
- 5 - DETAILTAPESMSPARM and TAPEfffSMS Statements
- 6 - DETAIL Tape User Exits
- 7 - Activating DETAIL Tape Checklist
- 8 - Deactivating DETAIL Tape Checklist

#### 7.1.3.1.6.1 TLM DETAIL Tape Supported Files

The TLM component supports DETAIL tape processing for the following files:

- o TMCTMD - Tape Data Set File
- o TMCTMV - Tape Volume File

### 7.1.3.1.6.2 Overview of JCL Customization Parameters

The JCL for DETAIL tape data sets is constructed using tape-related parameters that are specified in `prefix.MICS.PARMS(JCLDEF)` and `prefix.MICS.PARMS(cccOPS)`.

Each DETAIL tape data set has a unique DD in the component step. The JCL for each DETAIL tape data set is customized according to user-specified JCL parameters such as the number of generation data group (GDG) entries that are maintained, unit names, volume count, retention, and expiration dates, and System Managed Storage (SMS) keywords. For example, `STORCLAS=storclas`.

CA MICS provides a hierarchical means to specify tape-related JCL parameters suitable for each data center.

The hierarchy, as it applies to DETAIL tape specification, is described:

- o Unit Level - `TAPEPARM` and `TAPESMSPARM`

Used for all tape data sets created by all components in the unit. Specified in `prefix.MICS.PARMS(JCLDEF)`

- o Unit DETAIL Tape Level - `DETAILTAPEPARM` and `DETAILTAPESMSPARM`

Used for all DETAIL tape data sets created by all components in the unit. Overrides choices that were made in `TAPEPARM` and `TAPESMSPARM`. Specified in `prefix.MICS.PARMS(JCLDEF)`.

- o Component Level - `DETAILTAPEPARM` and `DETAILTAPESMSPARM`

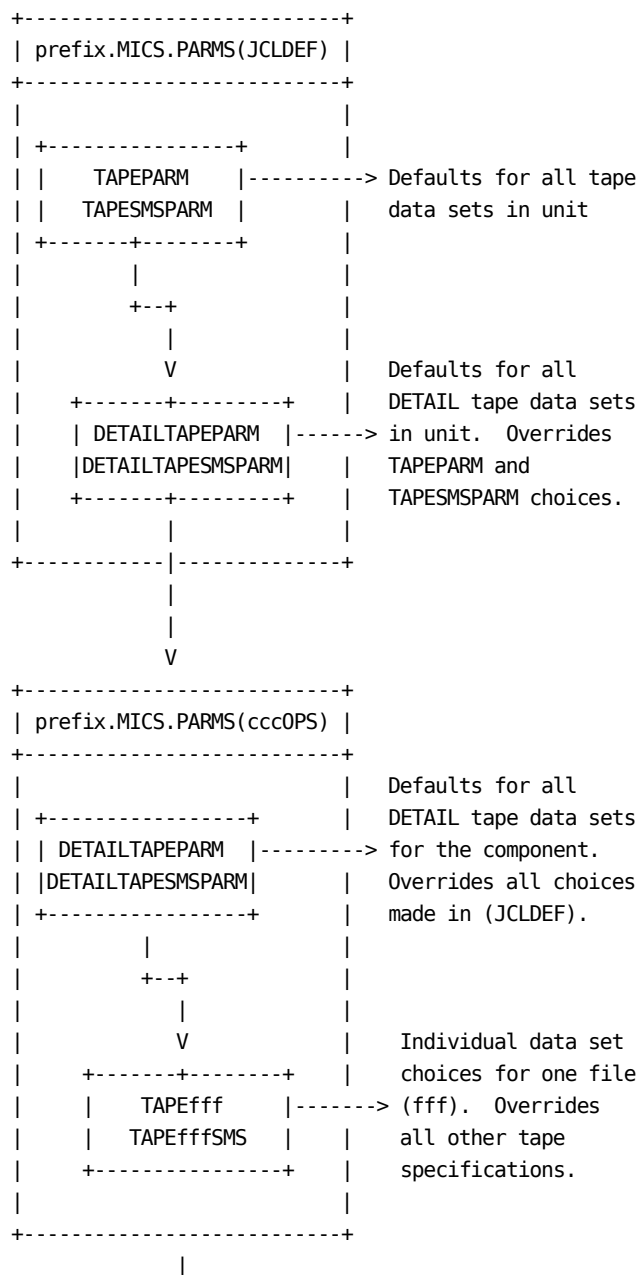
Used for all DETAIL tape data sets created by a particular component. Overrides all choices that were made in `JCLDEF`. Specified in `prefix.MICS.PARMS(cccOPS)`, where `ccc` represents the component.

- o File Level - `TAPEfff` and `TAPEfffsMS`

Used for a particular DETAIL tape data set. The `fff` identifies the specific DETAIL file. Overrides all choices made in `JCLDEF` and choices that were made with `DETAILTAPEPARM` and `DETAILTAPESMSPARM` in `prefix.MICS.PARMS(cccOPS)`. Specified in `prefix.MICS.PARMS(cccOPS)`, where `ccc` represents the component.

The JCL parameter specification hierarchy that is used for DETAIL tape customization is shown graphically in the following diagram:

DETAIL Tape JCL Parameter Hierarchy



```
V  
// DD statements and GDG generation
```



### 7.1.3.1.6.3 The TAPEfff Statement

The TAPEfff statement is used to:

- o Activate DETAIL tape data set creation for the file indicated by fff. The component files eligible for DETAIL tape processing are listed in a previous section.
- o Override, for the indicated file, any JCL-related tape specifications made in prefix.MICS.PARMS(JCLDEF) and prefix.MICS.PARMS(cccOPS) with TAPEPARM or DETAILTAPEPARM statements.

The syntax is as follows:

TAPEfff <optional parameters>

where fff is the unique 3-character file identifier

The optional parameters include both keyword parameters and keyword=value specifications. You can include multiple TAPEfff statements if required in order to specify the desired optional parameters. If you specify a parameter multiple times, the last instance defines the value in effect.

You can specify as many parameters as you want on each statement, but each TAPEfff statement must end by column 72. You may also choose to specify only one parameter per TAPEfff statement. Either approach is acceptable.

The optional parameters available for the TAPEfff statement are listed below:

```
TAPEfff GDG=nnn UNIT=unitname VOLCOUNT=n
TAPEfff EXPDT=expdt / RETPD=nnn / NOEXPDT
TAPEfff COMP/NOCOMP
TAPEfff STACK/NOSTACK AFF/NOAFF
TAPEfff MODEL='modeldsn' / MODEL=NOMODEL
TAPEfff DISK / TAPE SPACE=spacedef
TAPEfff VOLSER=volser
```

The following is a sample TAPEfff statement:

```
TAPEfff GDG=3 VOLCOUNT=7
```

In this sample, only the number of generation data groups (GDGs) and VOLCOUNT parameters are explicitly specified for

the file fff. All other JCL related parameters for the data set will be set according to specifications made with TAPEPARM and DETAILTAPEPARM statements according to the hierarchy described in a previous section.

The optional parameters for the TAPEfff statement are identical to those supported by the DETAILTAPEPARM statement. A detailed description of the optional parameters is presented immediately following the DETAILTAPEPARM statement description.

#### 7.1.3.1.6.4 The DETAILTAPEPARM Statement

In `prefix.MICS.PARMS(cccOPS)`, the optional `DETAILTAPEPARM` statement is used to specify parameters defining processing options for CA MICS DETAIL tape data sets at the component (`ccc`) level.

When specified in `prefix.MICS.PARMS(cccOPS)`, the `DETAILTAPEPARM` parameter specifications override unit level tape data set defaults established by `TAPEPARM` and `DETAILTAPEPARM` statements in `prefix.MICS.PARMS(JCLDEF)`.

Refer to chapter 2 of the CA MICS Planning, Installation, Operations, and Maintenance Guide for unit level `TAPEPARM` and `DETAILTAPEPARM` statements in `prefix.MICS.PARMS(JCLDEF)`.

The primary reason to include a `DETAILTAPEPARM` statement in `prefix.MICS.PARMS(cccOPS)` is to specify unique parameters for the DETAIL tapes created for a particular component (`ccc`).

For example, your site may want to direct the CA MICS DETAIL tapes for a particular component (`ccc`) to a unique tape volume pool, or to a tape device type such as a virtual tape unit, or to a DASD pool backed by an archive facility. If so, this could be accomplished by including the appropriate `DETAILTAPEPARM` statements in `prefix.MICS.PARMS(cccOPS)`.

`DETAILTAPEPARM <parameters>`

Note: In `prefix.MICS.PARMS(cccOPS)`, all `DETAILTAPEPARM` statements must precede any `TAPEfff` or `TAPEfffsms` statements.

The general form of the `DETAILTAPEPARM` statement is the keyword `DETAILTAPEPARM`, followed by one or more `DETAILTAPEPARM` parameters. `DETAILTAPEPARM` parameters include both keyword parameters and keyword=value specifications. You can specify the `DETAILTAPEPARM` statement as many times as you want in order to specify all of the tape data set definitions you require. If you specify a parameter multiple times, the last instance defines the value in effect.

The following summarizes the `DETAILTAPEPARM` parameters:

- o Each parameter is described in detail below.
- o While the following syntax sample shows only one or

two parameters per statement (line), you have the option to specify as many parameters as you want on each statement (limited only by the 72-character-maximum line length).

```
DETAILTAPARM GDG=nnn UNIT=unitname VOLCOUNT=n
DETAILTAPARM EXPDT=expdt / RETPD=nnn / NOEXPDT
DETAILTAPARM COMP/NOCOMP
DETAILTAPARM STACK/NOSTACK AFF/NOAFF
DETAILTAPARM MODEL='modeldsn' / MODEL=NOMODEL
DETAILTAPARM DISK / TAPE SPACE=spacedef
DETAILTAPARM VOLSER=volser
```

The following is a sample DETAILTAPARM statement:

```
DETAILTAPARM GDG=3 VOLCOUNT=7
```

In this example, the default parameter values are used for most of the DETAILTAPARM parameters.

The following describes each of the DETAILTAPARM parameters:

- o GDG=nnn

Defaults to 7.

The number of entries to be created in the GDG for each DETAIL tape data set.

Overrides the TAPARM statement GDG=nnn.

- o UNIT=unitname

Defaults to the value specified on the TAPARM statement or to UNIT=3490 if UNIT=unitname is not specified on the TAPARM statement.

The generic unit name for tape file allocation. The parameter value (unitname) must be a valid 1 to 8 character generic unit name for your installation. The value will be used in generated tape data set JCL DD statement UNIT parameters. CA MICS does not validate the unitname value except to verify that it is non-blank and no more than 8 characters in length.

Overrides the TAPEPARM statement UNIT=unitname Value, the old-style TAPEUNIT statement, or both.

o VOLCOUNT=n

Defaults to the value specified on the TAPEPARM statement. If no VOLCOUNT is specified, the z/OS default volume count of 5 applies.

The volume count JCL parameter for CA MICS tape data sets. Specify a decimal number from 1 to 255.

Overrides the TAPEPARM statement VOLCOUNT=nnn parameter or the old-style VOLCOUNT statement.

o EXPDT=expdt

Defaults to the value specified on the TAPEPARM statement. If no expiration date or retention period is specified, a default retention period is used which equals the GDG=nnn value.

Specify an expiration date definition which replaces the derived default retention period (RETPD) specifications. This facility is specifically intended for use by installations with tape management systems which require specific EXPDT definitions.

Note: For some tape management systems, certain EXPDT values makes the tape available for scratching immediately. Such values are NOT suitable for CA MICS tapes.

The EXPDT=expdt parameter is optional, and, if omitted, CA MICS derives a RETPD=nnn specification as appropriate for the specific CA MICS tape data set being created and the number of GDG entries defined.

Overrides the TAPEPARM statement EXPDT=expdt or NOEXPDT parameter, or the old-style EXPDT statement.

Note: The EXPDT=expdt, RETPD=nnn, and NOEXPDT parameters are mutually exclusive.

- o NOEXPDT

Defaults to the value specified on the TAPEPARM statement.

Specify NOEXPDT if you want CA MICS to omit both the EXPDT=date and RETPD=days JCL parameters from generated JCL statements for new tape data set creation. This option is provided for those installations where the tape management system or SMS specifications automatically control tape expiration dates, retention periods, or both.

Overrides the TAPEPARM statement EXPDT=expdt or NOEXPDT parameters, or the old-style EXPDT statement.

Note: The NOEXPDT, EXPDT=expdt, and RETPD=nnn parameters are mutually exclusive.

- o COMP / NOCOMP

Defaults to the value specified on the TAPEPARM statement. If COMP or NOCOMP is not specified, the z/OS default for the selected tape unit type applies.

This parameter specifies data compaction (COMP) or no data compaction (NOCOMP) for a tape device enabled for hardware compaction. Data compaction is only supported for IBM standard labels. If specified, the value will be coded in the TRTCH subparameter of the DCB JCL parameter. If not specified, no TRTCH subparameter will be generated.

Overrides the TAPEPARM statement COMP/NOCOMP parameter or the old-style IDRC statement.

- o STACK / NOSTACK

Defaults to NOSTACK for DETAIL tapes.

Specify STACK to place multiple CA MICS tape files on a single tape volume. This mode of operation uses a minimum number of tape volumes and tape mounts are minimized. CA MICS

JCL statements are generated with the VOL=REF=ddname construct and unit affinity is enforced (that is, STACK also means AFF).

Specify NOSTACK (the default) to place exactly one CA MICS tape file on a tape volume. With this option the generated CA MICS JCL statements will NOT contain the VOL=REF=ddname construct. This option is useful if your implementation of a virtual tape system prohibits "stacked" tape volumes, or if you are directing CA MICS tape files to a DASD pool backed with an archival facility.

Overrides the TAPEPARM statement STACK/NOSTACK parameter.

o AFF / NOAFF

Defaults to the value specified on the TAPEPARM statement or to AFF.

Specify AFF to use a single tape unit for all related tape files. This is the normal mode of operation where a minimum number of tape units are used and tape mounts are minimized. CA MICS JCL statements are generated with the UNIT=AFF=ddname construct. AFF is required for the STACK option.

Specify NOAFF to enable allocation of different tape units for each CA MICS tape data set. With this option the generated CA MICS JCL statements will NOT contain the UNIT=AFF=ddname construct. You may find this option useful with certain virtual tape system implementations, or where you are directing CA MICS tape files to a DASD pool backed with an archival facility.

Note, if you specify NOAFF, then NOSTACK is automatically set.

Overrides the TAPEPARM statement AFF/NOAFF parameter.

o MODEL='modeldsn' / MODEL=NOMODEL

Defaults to the value specified on the TAPEPARM statement.

The fully qualified name of a cataloged data set to be used when defining or extending GDG entries. Ensure that the data set's DCB characteristics are LRECL=0 and BLKSIZE=0. Coding BLKSIZE=0 causes SAS to use the blocksize defined by the BLKSIZE(TAPE) option defined in the configuration member(s) referenced by the CONFIG DD statement. If this parameter is omitted, a CA MICS generation job will allocate a default model GDG data set.

If NOMODEL is specified as the model dataset name, the use of the model dataset in the DCB specification will be bypassed.

Overrides the TAPEPARM statement MODEL='modeldsn' parameter or the old-style SYSTEMMODEL statement.

- o DISK / TAPE

Defaults to TAPE.

Specify DISK if you want to write the dataset to a disk instead of a tape. Specify TAPE to write the dataset to a tape.

When you specify DISK, make sure that you have both a UNIT parameter with a generic unit name of a disk device and a SPACE parameter defining disk space. You can also define a VOLSER parameter to direct the data to a specific disk.

Overrides the TAPEPARM statement DISK/TAPE parameter.

- o SPACE=spacedef

No default.

Defines the space allocation parameter for a data set defined with the DISK parameter. Specify this parameter according to JCL language syntax.

Overrides the TAPEPARM statement SPACE= parameter.

- o VOLSER=volser

No default.

Defines the volume serial number of a disk for a



data set defined with the DISK parameter. Specify this parameter according to JCL language syntax.

Overrides the TAPEPARM statement VOLSER= parameter.

### 7.1.3.1.6.5 DETAILTAPESMSPARM and TAPEfffsSMS Statements

In `prefix.MICS.PARMS(cccOPS)`, the optional `DETAILTAPESMSPARM` and `TAPEfffsSMS` statements allow you to specify System Managed Storage (SMS) keywords (for example, `STORCLAS=storclass`) for `DETAIL` tape data sets at the component and individual file level, respectively.

#### DETAILTAPESMSPARM

When specified in `prefix.MICS.PARMS(cccOPS)`, the `DETAILTAPESMSPARM` parameter specifications override unit level tape data set SMS defaults established by `TAPESMSPARM` and `DETAILTAPESMSPARM` statements in `prefix.MICS.PARMS(JCLDEF)`.

Refer to chapter 2 of the CA MICS Planning, Installation, Operations, and Maintenance Guide for unit level `TAPESMSPARM` and `DETAILTAPESMSPARM` statements in `prefix.MICS.PARMS(JCLDEF)`.

The primary reason to include a `DETAILTAPESMSPARM` statement in `prefix.MICS.PARMS(cccOPS)` is to specify unique SMS parameters for the `DETAIL` tapes created for a particular component (`ccc`).

For example, your site may want to direct the CA MICS `DETAIL` tapes for a particular component (`ccc`) to a unique storage class.

Sample `DETAILTAPESMSPARM` statement:

```
DETAILTAPESMSPARM STORCLAS=DTPCLASS
```

In this example, the JCL for all `DETAIL` tape data sets for the component will include the SMS `STORCLAS=DTPCLASS` assignment.

#### TAPEfffsSMS

The `TAPEfffsSMS` statement is only permitted in `prefix.MICS.PARMS(cccOPS)`. It is not supported in `prefix.MICS.PARMS(JCLDEF)`. `TAPEfffsSMS` keyword specifications override, for the indicated file, any SMS related tape specifications made in `prefix.MICS.PARMS(JCLDEF)` and `prefix.MICS.PARMS(cccOPS)` with `TAPESMSPARM` or `DETAILTAPESMSPARM` statements.

The primary reason to include a TAPEfffSMS statement in prefix.MICS.PARMS(cccOPS) is to specify unique SMS parameters for a specific DETAIL tape file (fff).

Sample TAPEfffSMS statement:

```
TAPEfffSMS STORCLAS=fffCLASS
```

In this example, the JCL for the DETAIL tape data set for file ffft will include the SMS STORCLAS=fffCLASS assignment.

#### 7.1.3.1.6.6 DETAIL Tape User Exits

A user exit is invoked just prior to the output of each record to a DETAIL tape file. The exits are named \_USRTfff, where fff matches the file identifier for the DETAIL tape file.

Refer to chapter 10 of this guide for a complete description of the DETAIL tape user exits.

### 7.1.3.1.6.7 Activating DETAIL Tape Checklist

- \_\_\_ 1. Add or modify the desired TAPEfff and TAPEfffSMS statements in prefix.MICS.PARMS(cccOPS), where fff is the three-character file identifier for the file to be written to tape.

- \_\_\_ 2. Submit prefix.MICS.CNTL(cccPGEN).

- \_\_\_ 3. Edit prefix.MICS.PARMS(JCLGENU) so that it reads:

cccGDGGM DAILY

If Incremental Update is active, add this:

INCRccc

- \_\_\_ 4. Submit prefix.MICS.CNTL(JCLGENU) to regenerate the JCL for DAILY and cccGDGGM.

Note: If you want to use specific JCL and SMS parameter values for your DETAIL tape data sets, make sure you have coded the appropriate DETAILTAPEPARM and/or DETAILTAPESMPARM statements in prefix.MICS.PARMS(JCLDEF) for unit level, or prefix.MICS.PARMS(cccOPS) for component level DETAIL tape JCL parameters. Refer to the previous sections for a detailed discussion on JCL parameters available for DETAIL tape data sets.

- \_\_\_ 5. Submit prefix.MICS.CNTL(cccGDGGM) to define the tape GDG.

Note: If you want to override the number of entries kept in a GDG with cataloged data sets for a TAPEfff file, you must delete and redefine the index with the new limit for GDG entries. Follow the checklist in section 3.5.6.3 of the PIOM.

- \_\_\_ 6. You have just activated DETAIL tape for one or more database files. As mentioned in the DETAIL Tape Processing Overview section, the choice to create DETAIL tape files is independent of, and does not affect the creation of DETAIL files in the unit database.

If you are currently creating one or more cycles of the files you just activated for DETAIL tape in your

unit prefix.MICS.DETAIL timespan, your DAILY update job will continue to do so.

Now that you are creating DETAIL tape cycles for the files, you may want to deactivate, or limit the number of DETAIL cycles written to the unit DETAIL timespan database.

The CA MICS System Modification Guide contains instructions for changing the number of cycles of a file as well as instructions for deactivation of the DETAIL timespan of a file.

If you deactivate the files in the DETAIL timespan, make sure you delete the existing cycles to free up space in the prefix.MICS.DETAIL database. If you reduce the number of cycles, make sure you delete any existing cycles in prefix.MICS.DETAIL beyond the new cycle limit.

The following JCL can be used to delete specific cycles of a file from the DETAIL timespan. Make sure to replace 'x' with the unit identifier:

a) Delete all cycles for file fff (01-nn)

```
//DELETE EXEC MICSDBx
//SYSIN DD *
PROC DATASETS DDNAME=%DDNx(TS=DETAIL);
  DELETE cccfff01 cccfff02 ... cccfffn ;
  RUN;
```

b) Delete cycles 02, 03, and 04 for file fff:

```
//DELETE EXEC MICSDBx
//SYSIN DD *
PROC DATASETS DDNAME=%DDNx(TS=DETAIL);
  DELETE cccfff02 cccfff03 cccfff04 ;
  RUN;
```

#### 7.1.3.1.6.8 Deactivating DETAIL Tape Checklist

- \_\_\_ 1. Delete the desired TAPEfff and TAPEfffsms statements from prefix.MICS.PARMS(cccOPS).
- \_\_\_ 2. If there are no longer any TAPEfff statements in prefix.MICS.PARMS(cccOPS), delete any DETAILTAPEPARM and DETAILTAPESMSPARM statements.
- \_\_\_ 3. Submit prefix.MICS.CNTL(cccPGEN).
- \_\_\_ 4. Edit prefix.MICS.PARMS(JCLGENU) so that it reads:  
  
DAILY  
  
If Incremental Update is active, add this:  
  
INCRccc
- \_\_\_ 5. Submit prefix.MICS.CNTL(JCLGENU) to regenerate the JCL for the DAILY job.
- \_\_\_ 6. (Optional) Delete the index and the cataloged datasets for each TAPEfff statements deleted in step 1.

### 7.1.3.2 TLM VOLGROUP Derivation Routine (VOLGP RTE)

The VOLGP RTE routine is used to assign values to data element Volume Group (VOLGROUP). The assigned values represent user-defined groups for tape volumes (real or virtual) that have similar characteristics.

The VOLGROUP data element is included as a summarization key in both the Tape Volume (TMCTMV) and Tape Data Set (TMCTMD) files. Assigning meaningful group names to ranges of tape volume serial numbers (VOLSER) can improve the usability of both files at higher timespans because each summarized record will contain metrics for each unique value of VOLGROUP. VOLGROUP can be assigned any character value up to sixteen bytes in length.

VOLGP RTE is found in prefix.MICS.PARMS. If the TLM component is installed in multiple units, a VOLGP RTE routine must be coded for each unit.

Blanks are initially assigned to data element VOLGROUP. After this initial assignment, the VOLGP RTE routine is invoked.

#### Coding Tips

-----

- o If no user code is added to VOLGP RTE, all tape data sets and volumes in the CA MICS database will have a blank value in the VOLGROUP data element.
- o If user code is added to VOLGP RTE but any observations still contain blanks in the VOLGROUP data element, the logic and assignment statements in VOLGP RTE did not override the initial value.
- o The VOLGP RTE routine is entered once per tape data file. For tape volumes containing multiple data sets, the VOLGP RTE routine is invoked multiple times.
- o A best practice is to assign the VOLGROUP data element value based on tape volume level information. Tape volume level metrics are the data elements found in the Tape Volume (TMCTMV) file, and may also exist in the Tape Data set (TMCTMD) file.

Follow this best practice to be certain that all data sets on a tape volume are assigned to the same VOLGROUP. There are cases where the corresponding volume level data element is not yet assigned from the TMD data element, so the TMD

data element must be used in the logic to assign VOLGROUP.

If data set level metrics are used to assign the value of VOLGROUP, the potential exists to assign different VOLGROUP values to each data set on tape volumes containing multiple data sets. Tape data set level metrics are the data elements found in the Tape Data Set (TMCTMD) file. If TMCTMD file data elements are used to determine the VOLGROUP data element value, the VOLGROUP data element value on the volume level observation (TMCTMV file) will be derived from the last data set on the volume.

- o The following are some suggested elements that can be used to derive VOLGROUP:

ALL

---

STORMGTC -- SMS Management Class  
TMDUSER -- User Data  
TMVACTVL -- Actual Volser of Tape  
ACTUAL -- Actual Volser In Use Indicator(TMVACTUL)  
TMVVENDR -- Media Vendor  
VOLSER -- Volume Serial Number  
TMVWORM -- WORM Volume Count  
TMDDEN -- Recording Density  
TMDTRTCH -- Data Set Recording Technique

CA 1

----

TMVSRVIN -- Service Status  
TMDCPUID -- Creation System ID  
TMDVOWNR -- Volume Owner/EDM ID  
TMVROBTY -- Robot Device Type  
TMVROBID -- Robot Device Number  
TMVAGENT -- Tape Agent  
TMDOUTLO -- Location Id

CA TLMS

-----

TMVSRVIN -- Service Status  
STORSTGC -- SMS Storage Class  
STORDATC -- SMS Data Class  
TMDOUTLO -- Location Id

RMM

---

TMVCLOC -- Current Location Name  
TMVMEDTY -- Volume Media Type  
STORNAME -- SMS Storage Group



```
STORSTGC -- SMS Storage Class
STORDATC -- SMS Data Class
TMVLUDEV -- Last Used Drive
TMVMEDIN -- Media Information
```

- o The flag variables CA1, TLMS, and RMM, are available to allow you to provide unique code for each tape management system processed. Here is an example:

```
IF CA1 OR TLMS THEN DO;
    VOLGROUP = TMDOUTLO; /* OUT LOCATION */
END;
ELSE IF RMM THEN DO;
    VOLGROUP = TMVCLOC; /* CURRENT LOCATION */
END;
```

#### VOLGP RTE Coding Example

-----

This example demonstrates the benefit of using VOLGP RTE.

```
IF VOLSER EQ: 'E' THEN VOLGROUP='EXTERNAL' ;
ELSE IF 000001 LE VOLSER LE 018000 THEN VOLGROUP='SILO' ;
ELSE IF VOLSER GE '018001' THEN VOLGROUP='VIRTUAL' ;
ELSE VOLGROUP='OTHER';
```

This code specifies the following:

- o All tape volumes with volume serial numbers beginning with "E" belong to the EXTERNAL group.
- o Volume serial numbers not starting with "E" that are less than 018001 belong to the SILO group.
- o Volume serial numbers greater than 018001 are for virtual tape volumes and are assigned to the VIRTUAL group.
- o Volume serial numbers not meeting the above criteria are assigned to the OTHER group.

With this update to VOLGP RTE, the VOLGROUP summarization key will ensure that external, SILO, and virtual volumes are separated in the database files at summarized timespans.

### 7.1.3.3 Input Specification (INPUTTLM)

The prefix.MICS.PARMS(INPUTTLM) parameter contains the JCL for the input to be included in the daily update processing.

Note: The DAILY job must be regenerated for changes to this member to become effective. Regenerate the DAILY JCL by specifying DAILY in prefix.MICS.PARMS(JCLGENU) and submitting prefix.MICS.CNTL(JCLGENU).

The following is an example of a coded INPUTTLM PARMS member for a site that processes data collected from three separate tape library management systems:

Example:

```
//INPUTTLM DD DSN=SYS.PROD.CA1.TLMP(+0),DISP=SHR
//          DD DSN=SYS.TEST.CA1.TLMD(+0),DISP=SHR
//          DD DSN=SYS.ALPHA.TLMS.FILE(+0),DISP=SHR
```

### 7.1.3.4 TLM 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

#### 7.1.3.4.1 Data Retention Specifications (FILE Statements)

Data retention specifications tell the CA MICS database how many cycles of each file in each supported timespan are to be saved, both in online and archive modes.

The worksheet is organized by information area. Each file in the area is listed by name. For each file, a line is formatted to allow six definitions in the online database and two in the archive database:

- o The online database files quantify the number of cycles of data that is maintained in the DETAIL, DAYS, WEEKS, MONTHS, and YEARS timespans and the TABLES data area.
- o The two definitions for the archive database files quantify the number of cycles of data to be retained, up to the cutoff limit defined. The archive definitions have no impact on the size of the database and can be specified whethert the weekly and/or monthly archive history files have actually been activated (see Section 2.3.3, CA MICS JCL Planning and Parameters, of the PIOM).

The worksheet formats provide an underscored area for the user's definition, followed by the recommended value, shown within parentheses. If the underscored area contains a value of 00, the file is not supported for the indicated timespan. To add support, perform database tailoring as described in Section 6.2, Tailoring the Database, of the System Modification Guide (SMG).

When specifying a retention limit, remember that the number may never be zero if the file has been defined to be active in the timespan.

Example:

The FILE statements listed below illustrate how to enter the information:

```
FILE TLM TMCTMD 10 33 00 06 00 02 000 024
FILE TLM TMCTMV 10 33 00 06 00 02 000 024
```

### 7.1.3.4.2 DBMODEL Input Statements

The DBMODEL member of prefix.MICS.PARMS provides the input to the Database Space Modeling Facility.

Update the DBMODEL member to customize the cycle retention values for each file in units containing the TLM component. To actually perform the space modeling, submit the jobs as described in Section 2.3.4.2 of the PIOM.

## 7.2 VTS Component Parameters

The parameters needed to define the Virtual Tape Subsystem (VTS) component are discussed in the following subsections:

- 1 - VTS Component Environmental Considerations
- 2 - VTS Component Complex Level Parameters
- 3 - VTS Component Unit Level Parameters

## 7.2.1 VTS Component Environmental Considerations

In preparation for defining VTS component complex and unit level parameters, do the following:

- o Review database unit specifications to determine which unit or units should process data from virtual tape subsystems.
- o Review the SYSID parameter to ensure that it correlates to the systems where you plan to collect SMF data for your virtual tape systems. Your site's SYSID definition is located in the prefix.MICS.PARMS data set associated with each database unit.

Reference: Section 6.2.1.2 for IBM VTS  
Section 6.2.2.2 for StorageTek VSM

NOTE: If the VTSUTIL job report, described in section 6.2.1.2, shows the presence of IBM peer-to-peer VTSs, make sure you review Section 7.2.3.3 - VTS Peer-to-peer Libraries (VTSCMPID) in this chapter to familiarize yourself with the required prefix.MICS.PARMS(VTSCMPID) member update.

- o Review the default options for the parameters to determine their applicability to your site.
- o Before running the component generation job, sharedprefix.MICS.CNTL(VTSCGEN), edit sharedprefix.MICS.GENLIB(VTSGENIN) and update the following statements to reflect the virtual tape system(s) providing input to the component:

```
OPTION <keywords>  
INPUTSOURCE SMF <SMF record types>
```

Failure to update these statements will result in inefficient daily update processing.

Reference: Section 7.2.2.1

### 7.2.2 VTS Component Complex Level Parameters

Complex level parameters describe the VTS component to the CA MICS system. These parameters are discussed in the following subsection:

- 1 - Analyzer Definition Statements (VTSGENIN)

### 7.2.2.1 Analyzer Definition Statements (VTSGENIN)

Each CA MICS component's generation statements are defined in `sharedprefix.MICS.GENLIB(cccGENIN)`, where `ccc` is the three-character component identifier. The VTS Component generation definition member is `VTSGENIN`.

Although each component is delivered with default statements, you are allowed to customize these statements that are based on your needs at your particular site. In order to activate your new definitions, submit `sharedprefix.MICS.CNTL(VTSCGEN)` to complete the updates.

If needed, see chapter 4 of the System Modification Guide for more information about the `cccGENIN` member statements described here.

#### The INPUTSOURCE Statement

-----

The `INPUTSOURCE` statement lists the data source (SMF) and record types that are supported by the VTS component. In the event that the unit processing virtual tape data contains a `DAYSMP` step, the SMF record types that are listed after the `INPUTSOURCE` statement are used by `DAYSMP` to subset a raw data file for the VTS component daily update step.

The default statement that is delivered with this component is:

```
INPUTSOURCE SMF 94 255
```

SMF indicates that the data source is SMF data. The SMF record types that are used by the component follow:

- o SMF record type 94 is used by the IBM Virtual Tape System (VTS). If IBM VTS virtual tape system data is not to be processed, remove 94 from the `INPUTSOURCE` SMF statement.
- o SMF record type 255 is the default SMF record type that is used by the Sun StorageTek Virtual Storage Manager (VSM). Although 255 is the default record type, it can be changed to any number from 128 through 255 inclusive. If the StorageTek VSM system generates a record type other than 255, update the `INPUTSOURCE` statement accordingly.

If StorageTek virtual tape systems data is not targeted for processing, remove 255 from the `INPUTSOURCE` SMF statement.

Example for IBM VTS:

```
INPUTSOURCE SMF 94
```

Example for StorageTek VSM:

```
INPUTSOURCE SMF 255 (or other record type that is produced
by STK)
```

If no SMF input data is to be read by a VTS component, omit the INPUTSOURCE statement or specify this statement as follows:

```
INPUTSOURCE NONSMF
```

When changing the record types specified on the INPUTSOURCE statement, submit the following jobs in the order presented. Ensure each job completes successfully.

```
sharedprefix.mics.CNTL(VTSCGEN)
prefix.mics.CNTL(JCLGENx)  <= any JCLGEN job in the unit
                           where VTS is installed
prefix.mics.CNTL(VTSPGEN)
```

The OPTION Statement

-----

The OPTION statement is used to indicate global file tailoring preferences. For the VTS component, the OPTION statement indicates the specific types of virtual tape data to be processed in the CA MICS complex. Check the default definition and change it as needed.

Note: The VTSGENIN member contains uppercase and lowercase characters. Enter the keywords for the OPTION statement in uppercase.

The default statement is:

```
OPTION IBMVTS STK HYDRA
```

Valid keywords are:

```
IBMVTS/NOIBMVTS - IBM Virtual Tape System (VTS)
STK/NOSTK       - Sun StorageTek Virtual Storage Manager
                  (VSM)
HYDRA/NOHYDRA  - IBM TS7700 Series Virtual Tape Servers
```

Keyword descriptions follow. Specify at least one keyword. If two or more keywords are specified, they can be in any order, separated by one or more blanks.

KEYWORD DESCRIPTIONS

-----



- o IBMVTS/NOIBMVTS

The IBMVTS keyword activates the IVT Information Area files. This information area contains all files relating to IBM VTS virtual tape systems.

To process IBM VTS data, code IBMVTS. Otherwise, code NOIBMVTS to deactivate the IVT information area files.

- o STK/NOSTK

The STK keyword activates the files in the SVT information area. This information area contains all files relating to StorageTek VSM virtual tape systems.

To process StorageTek VSM data, code STK. Otherwise, code NOSTK to deactivate the SVT information area files.

- o HYDRA/NOHYDRA

The HYDRA keyword activates the HVT Information Area files. This information area contains all files relating to IBM TS7700 series virtual tape servers.

To process IBM TS7700 data, code HYDRA. Otherwise, code NOHYDRA to deactivate the HVT information area files.

Example for IBM VTS:

```
OPTION IBMVTS NOSTK
```

Example for StorageTek VSM:

```
OPTION NOIBMVTS STK
```

Example for IBM TS7700 virtual tape servers:

```
OPTION NOIBMVTS NOSTK HYDRA
```

### 7.2.3 VTS Component Unit Level Parameters

Unit level parameters control the processing of the CA MICS Tape Analyzer Option VTS component 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 process.

Note: You must run the prefix.MICS.CNTL(VTSPGEN) generation process for these options to take effect.

The sections that follow show you how to specify the operational parameters that control how input data is processed by the VTS component. The names in parentheses are the member names within the prefix.MICS.PARMS data set that contain the parameters described in the section.

- 1 - VTS Processing Options (VTSOPS)
- 2 - Input Specification (INPUTVTS) and (INPUTRDR)
- 3 - VTS Peer-to-peer Libraries (VTSCMPID)
- 4 - VTS Database Space Modeling (DBMODEL)

### 7.2.3.1 VTS Processing Options (VTSOPS)

This section shows you how to specify the operational statements that control unit level processing of the VTS component.

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(JCLGEND) 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.
*****
```

Review the defaults provided in VTSOPS. In general, the defaults have been chosen to provide out-of-the-box operation for most customer environments. If the defaults meet your site's requirements, you do not need to tailor VTSOPS.

#### General Syntax Rules

- o Comments are accepted and signified by an asterisk (\*) as

the first non-blank character.

- o Statement names and values can be entered in either uppercase or lowercase characters.
- o Statements can start anywhere in columns 1-72. Only one statement per line is supported.
- o Statements can appear in any order.

The following sections explain each of the option statements that can be specified in prefix.MICS.PARMS(VTSOPS).

Note: The SMFTYPE, WORK, RESTART, and Incremental Update statements are applicable for all VTS component units regardless of data source.

The UNKNOWNVTSID and VTSSYSID statements are applicable only for units processing IBM VTS data.

The RTDMOUNTTIME and VTMOUNTTIME statements are applicable only for units processing StorageTek VSM data.

### Required Statements

-----

- o None

### Optional Statements

-----

- o SMFTYPE Statement
- o UNKNOWNVTSID Statement
- o VTSSYSID Statement
- o RTDMOUNTTIME and VTMOUNTTIME Statements
- o WORK, MULTWORK, and NOMULT Statements
- o RESTART Statements
- o Incremental Update Statements

### 7.2.3.1.1 SMFTYPE Statement

The SMFTYPE statement is optional. This statement is used to restrict the SMF record types accepted by a unit to a subset of the record types specified on the `sharedprefix.MICS.GENLIB(VTSGENIN) INPUTSOURCE` statement. See Section 7.2.2.1 for more information on the VTSGENIN INPUTSOURCE statement.

By default, any unit containing the VTS component will accept and process all SMF record types in the input data file that match the SMF record types specified by the complex level VTSGENIN INPUTSOURCE statement.

If you need to implement the VTS component in two or more units, use the SMFTYPE statement to ensure that each unit processes a specific set of SMF record types.

The SMFTYPE statement has the following format:

```
SMFTYPE nnn1 nnn2 ... nnn7
```

where:

nnn1-nnn7    Are any subset of the SMF record types specified on the VTSGENIN INPUTSOURCE statement.

There is no default. If a SMFTYPE statement is not coded, all SMF record types specified on the INPUTSOURCE statement will be accepted and processed.

The SMF record types coded with the SMFTYPE statement in `prefix.MICS.PARMS(VTSOPS)` must be a subset of the SMF record types specified on the INPUTSOURCE statement in VTSGENIN. A maximum of seven record types can be coded. Coding or changing SMF record types on the SMFTYPE statement in VTSOPS requires execution of `prefix.MICS.CNTL(VTSPGEN)`.

Example:

A data center has recently consolidated three sites: one with an IBM VTS (SMF type 94), and two with StorageTek VSM systems. One of the sites with StorageTek is creating SMF record type 253 and the other is creating SMF record type 254.

The site has created three separate units for processing data from the consolidated sites, each with a VTS component step:

- o Unit A will process the IBM VTS data.

- o Unit B will process the StorageTek SMF type 253 records.

- o Unit C processes the StorageTek SMF type 254 records.

The complex-level INPUTSOURCE statement must specify ALL record types. The unit level subsetting is achieved using the following SMFTYPE statements.

```
COMPLEX LEVEL
sharedprefix.MICS.GENLIB(VTSGENIN)
...
...
INPUTSOURCE SMF 94 253 254
...
...
```

```
UNIT LEVEL
prefix.MICS.PARMS(VTSOPS)
```

```
UNIT A
...
SMFTYPE 94
...
```

```
UNIT B
...
SMFTYPE 253
...
```

```
UNIT C
...
SMFTYPE 254
...
```

If SMF data is proactively filtered so that the records presented to a VTS component are already restricted to the record types that you want, no SMFTYPE statement is required. The coding of an SMFTYPE statement, however, can act as an insurance policy to protect against the accidental inclusion of unwanted virtual tape SMF record types in the raw data presented to a unit.

### 7.2.3.1.2 UNKNOWNVTSID Statement

The UNKNOWNVTSID statement is optional. This statement is used to control the behavior of the VTS component if an IBM VTS peer-to-peer, composite, UI, or secondary library ID is encountered in the raw SMF data that is not defined in prefix.MICS.PARMS(VTSCMPID).

By default, the daily update DAY096 step will abend when undefined peer-to-peer, composite, UI, or secondary libraries are encountered.

Refer to section 7.2.3.3 for information about updating the prefix.MICS.PARMS(VTSCMPID) and the VTSUTIL utility job that determines peer-to-peer/composite/UI/secondary library relationships.

The UNKNOWNVTSID statement has the following format:

UNKNOWNVTSID ABORT/REJECT

where:

- ABORT - Forces the DAY096 to abend if any peer-to-peer, composite, UI, or secondary library ID is encountered that is not defined in prefix.MICS.PARMS(VTSCMPID). This is the default if UNKNOWNVTSID is not included in prefix.MICS.PARMS(VTSOPS).
- REJECT - Forces the DAY096 to reject SMF type 94 records from any peer-to-peer, composite, UI, or secondary library ID encountered that is not defined in prefix.MICS.PARMS(VTSCMPID).

### 7.2.3.1.3 VTSSYSID Statement

The VTSSYSID statement is optional. This statement is used to assign a specific ORGSYSID value to database observations created when IBM VTS or IBM TS7700 BVIR data is input.

By default, the value assigned to the ORGSYSID data element for all database observations created from IBM VTS data is SYS1.

As explained in section 6.2.1.2, Collecting SMF Type 94 Records, SMF type 94 records reflect activity from the IBM VTS perspective but do not provide information at the z/OS system level. Complete hourly statistics for a particular VTS are available from the SMF type 94 records sent to any attached z/OS system. The VTS component filters all SMF type 94 records processed, and selects one representative hourly record from each IBM VTS represented in the raw data.

The IBM TS7700 BVIR input does not contain an ORGSYSID field in the raw data. The ORGSYSID will be assigned from this VTSSYSID statement. If VTSSYSID is not defined, the default value indicated below will be used.

The VTSSYSID statement has the following format:

VTSSYSID xxxx

where:

xxxx - Is the value to be assigned to the ORGSYSID data element for all IVT Information Area files created from IBM VTS SMF type 94 records and HVT Information Area files created from the IBM TS7700 BVIR records.

The default is SYS1. If a VTSSYSID statement is not included in prefix.MICS.PARMS(VTSOPS), DAY096 will assign SYS1 to the ORGSYSID data element for all IVT and HVT Information area files.



### 7.2.3.1.4 RTDMOUNTTIME and VTVMOUNTTIME Statements

The RTDMOUNTTIME and VTVMOUNTTIME statements are optional and only apply to units processing StorageTek VSM data. These statements define seven mount time threshold limits that are used for real tape (RTDMOUNTTIME) and virtual tape (VTVMOUNTTIME) mount time distribution calculations.

#### RTDMOUNTTIME Statement

-----

The RTDMOUNTTIME statement format is:

```
RTDMOUNTTIME limit1 limit2 limit3 limit4 limit5 limit6 limit7
```

where:

limit1-limit7 = Each mount time threshold limit is defined in seconds. It can be one to four digits, with a maximum value of 3600. Subsecond mount time limits are coded in the form .nnn, although subsecond mount times do not generally apply to real tape drives. The limits can be separated by one or more blanks.

Default RTDMOUNTTIME statement:

```
RTDMOUNTTIME 5 10 30 60 120 180 240
```

With the above real tape drive mount time limits, the TLM component accumulates mount distribution counters for each real tape drive mount, as illustrated below:

| (SVTRDSTx)       |       | (RMRMTM) |        |
|------------------|-------|----------|--------|
| mount counter 1: | 0 <   | mount    | <= 5   |
| mount counter 2: | 5 <   | mount    | <= 10  |
| mount counter 3: | 10 <  | mount    | <= 30  |
| mount counter 4: | 30 <  | mount    | <= 60  |
| mount counter 5: | 60 <  | mount    | <= 120 |
| mount counter 6: | 120 < | mount    | <= 180 |
| mount counter 7: | 180 < | mount    | <= 240 |
| mount counter 8: | 240 < | mount    |        |

Note that the VTS component creates an eighth counter to capture all mount events that are greater than limit7 as defined by the RTDMOUNTTIME statement.

#### VTVMOUNTTIME Statement

-----

The VTVMOUNTTIME statement format is:

```
VTVMOUNTTIME limit1 limit2 limit3 limit4 limit5 limit6 limit7
```

where:

limit1-limit7 = Each mount time threshold limit is defined in seconds. It can be one to four digits, with a maximum value of 3600. Subsecond mount time limits are coded in the form .nnn. The limits can be separated by one or more blanks.

Default VTVMOUNTTIME statement:

```
VTVMOUNTTIME .5 1 2 5 30 60 120
```

With the above virtual tape drive mount time limits, the VTS component accumulates mount distribution counters for each virtual mount, as illustrated below:

| (SVTV DSTx)      |      |   | (VMRMTM) |    |      |
|------------------|------|---|----------|----|------|
| mount counter 1: | 0    | < | mount    | <= | 0.50 |
| mount counter 2: | 0.50 | < | mount    | <= | 1    |
| mount counter 3: | 1    | < | mount    | <= | 5    |
| mount counter 4: | 5    | < | mount    | <= | 10   |
| mount counter 5: | 10   | < | mount    | <= | 30   |
| mount counter 6: | 30   | < | mount    | <= | 60   |
| mount counter 7: | 60   | < | mount    | <= | 120  |
| mount counter 8: | 120  | < | mount    |    |      |

Note that the VTS component creates an eighth counter to capture all mount events that are greater than limit7 as defined by the VTVMOUNTTIME statement.

Tracking mount time distributions can be very useful. The majority of both real and virtual tape mount times tend to be clustered in one to three buckets that represent normal performance. If the count of mounts in the higher buckets is greater during certain hours, there may be an opportunity for workload shifting to alleviate resource contention.

Shifting of the general distribution of mount times towards the higher buckets may signify that the general workload has exceeded the capacity of the existing virtual tape systems.

### 7.2.3.1.5 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 zero (0).  
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.<br>The name can have up to 8 characters. |
| SPACE    | - specifies how much disk space to provide for<br>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.

If you select multiple work files by specifying a WORK statement and do not code a MULTWORK statement, the following files use multiple workfiles by default:

Default MULTWORK files: SSP CIP VMR VDR VXR RMR RDR VGR RVR  
RPR VVR MVC VMV VSS VRP VUN VCE

The following files are eligible for multiple WORK support:

IVT Tape Library Dataserver Information Area files:

None

SVT STK Virtual Tape Control System (VTCS) Information Area files:

|     |                               |
|-----|-------------------------------|
| SSP | Subsystem Performance Request |
| CIP | Channel Interface Performance |
| VMR | VTV Mount Request             |
| VDR | VTV Dismount Request          |
| VXR | VTV Delete Request            |
| RMR | RTD Mount Request             |
| RDR | RTD Dismount Request          |
| VGR | VTV Migrate Request           |
| RVR | Recall VTV Request            |
| RPR | RTD Performance Request       |
| VVR | Vary RTD                      |
| MVC | MVC Status                    |
| VMV | VTV Movement                  |
| VSS | VTV Scratch Status            |
| VRP | VTV Replication               |
| VUN | VTV And MVC Unlink            |
| VCE | Vary Clink Event              |

The following section discusses changing the WORK option:

1 - Change the Number of Work Files

### 7.2.3.1.5.1 Change the Number of Work Files

To change the number of work files used in the VTS component processing DAY096, 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.

### 7.2.3.1.6 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 | Merge data across optional multiple work files, enhance data content, and create the new DETAIL cycles.      |
| 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.

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 - Enable Internal Step Restart

### 7.2.3.1.6.1 Enable Internal Step Restart

To enable the internal step restart in the VTS component, 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.



### 7.2.3.1.7 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.

The following section discusses enabling this option:

1 - Implement Incremental Update

### 7.2.3.1.7.1 Implement Incremental Update

To implement incremental update in the VTS component, 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.

### 7.2.3.2 Input Specification (INPUTVTS) and(INPUTRDR)

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 SMFDRCRTR specifications in prefix.MICS.PARMS(JCLDEF). Consider the following table and comments for the row:

| ROW | PARAMETER<br>IN JCLDEF | INPUTRDR<br>WHERE USED | INPUTccc<br>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 - INPUTVTS PARMS Member JCL Definition



### 7.2.3.2.1 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.

```
+-----+
| 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=_____ |
+-----+
```

Figure 7-1. INPUTRDR JCL Definition Worksheet

### 7.2.3.2.2 INPUTVTS PARMS Member JCL Definition

The INPUTVTS member of prefix.MICS.PARMS contains the DD statements to specify the input data for the VTS component. It contains the input SMF data sets when ANY of the following JCLDEF options is used:

- o DAYSMF OFF is specified
- o SMFDRCTR/SMFDIRECTOR VTS is specified
- o DAYSMF EXCLUDE VTS 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.

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 feature, see Section 6.2.3, CA MICS and CA SMF Director Interface.

If you change the contents of the INPUTVTS member, you must regenerate the DAILY job using either JCLGENU or JCLGEND in prefix.MICS.CNTL.

The INPUTVTS member can contain JCL definitions for non-SMF input such as data from the new generation of IBM VTS systems, the Tape Server TS77xx series, or data from independent sequential data sets. Instead it can contain JCL definitions for SMF input if you do not specify SMFRECORDING VTS in prefix.MICS.PARMS(JCLDEF). If SMFRECORDING VTS is specified in JCLDEF, it must be defined in the input JCL in the INPUTRDR member in prefix.MICS.PARMS.

- o If you specified HYDRA on the OPTION statement in sharedprefix.MICS.GENLIB(VTSGENIN), supply the data sets extracted from the TS77xx using the Bulk Volume Information Retrieval (BVIR) facility in INPUTVTS using the INPUTBVR ddname.

```
//@ IBM BVIR Input
//INPUTBVR DD DISP=SHR,DSN=hlq.BVIR.data(0)
```

### 7.2.3.3 VTS Peer-to-peer Libraries (VTSCMPID)

This section is applicable for sites that have IBM VTS peer-to-peer systems. It explains how to populate `prefix.MICS.PARMS(VTSCMPID)` and how to use the `VTSUTIL` utility job to assist in updating `VTSCMPID`.

If you use any IBM composite peer-to-peer VTS libraries, you must explicitly define the relationship between each composite library and the corresponding UI and secondary distributed VTS libraries.

- o A utility job, `prefix.MICS.CNTL(VTSUTIL)` is provided that processes SMF type 94 records, determines the composite/UI/secondary library relationships, and updates a temporary member: `prefix.MICS.PARMS(VTSTMPID)`.
- o The CA MICS administrator reviews `VTSTMPID`, and can copy the composite/UI/secondary library ID values to the working member: `prefix.MICS.PARMS(VTSCMPID)`.
- o After updating `prefix.MICS.PARMS(VTSCMPID)`, the component generation job, `prefix.MICS.PARMS(VTSPGEN)` must be executed to create the SAS FORMATS used during daily update processing to update data elements related to peer-to-peer VTS associations.

By default, the VTS Component DAY096 daily update step will abend if an IBM composite, UI, or secondary library is encountered in the raw data that is not listed in the `VTSCMPID` member. Alternatively, if an `UNKNOWNVTSID REJECT` statement is specified in `prefix.MICS.PARMS(VTSOPS)`, data from unknown IBM VTS composite/UI/secondary libraries will be rejected rather than forcing an abend.

Units that only process StorageTek data or only process data from IBM standalone distributed VTS libraries can execute without updating the sample `VTSCMPID` member found in `prefix.MICS.PARMS`. It is not necessary to execute the `VTSUTIL` utility job if IBM peer-to-peer composite VTS libraries are not used at your site.

The following sections describe how to use the `VTSUTIL` utility job and how to customize the `VTSCMPID` member.

- 1 - Executing the `VTSUTIL` Utility Job
- 2 - Customizing the `VTSCMPID` Member

### 7.2.3.3.1 Executing the VTSUTIL Utility Job

The VTSUTIL utility job processes raw SMF data containing SMF type 94 IBM Tape Library Dataserver Statistics records. From these records, the job does the following:

- o Determines the five-digit serial number (data element Library Sequence Number (VTSVLS)) of any composite peer-to-peer VTS libraries represented in the data
- o Determines the most likely associated UI and secondary libraries
- o Generates a //REPORT output listing that shows:
  - All VTSs encountered and the recording SMF SYSIDs
  - Composite/UI/secondary VTSVLS associations
- o Updates temporary member prefix.MICS.PARMS(VTSTMPID) with the composite/UI/secondary VTSVLS associations

To execute the VTSUTIL utility job, do the following:

- o Update the //INPUTSMF DD with SMF data files from at least one z/OS system that interacts with each IBM VTS library.
- o Submit the job

Examine the //REPORT DD output. The final report shows the VTS composite/UI/secondary VTSVLS associations if any composite libraries are found in the raw data.

Examine prefix.MICS.PARMS(VTSTMPID). This member records the date and time that the VTSUTIL utility job executed. The VTSVLS composite library associations, if any, will be found at the bottom of the member.

**\*\* IMPORTANT NOTES \*\***

- o You must execute the VTSUTIL utility job prior to running the first daily update if IBM SMF type 94 records containing data from composite peer-to-peer VTS libraries are to be processed. Even if no composite peer-to-peer VTS libraries are encountered, the first report will show which z/OS systems are collecting data for each standalone library.
- o When executed, the VTSUTIL utility job updates the temporary member prefix.MICS.PARMS(VTSTMPID). If the VTSUTIL job //INPUTSMF datasets do not contain SMF type 94

records from all IBM VTS libraries that will be present during actual DAY096 daily update processing, the composite/UI/secondary library associations in prefix.MICS.PARMS(VTSTMPID) will only represent a partial list.

- o The VTSUTIL utility job should be executed whenever a new peer-to-peer composite library is added to a site, or in the event that a reconfiguration causes the VTS serial numbers of the composite, UI, or secondary libraries to change.

### 7.2.3.3.2 Customizing the VTSCMPID Member

Prefix.MICS.PARMS(VTSCMPID) is created when the VTS component is installed in a unit. The distributed member is shown below:

```

* * * * *
* DISTRIBUTED SAMPLE VTSCMPID MEMBER *
* * * * *
* TO GENERATE VTSTMPID MEMBER, EXECUTE prefix.MICS.CNTL(VTSUTIL). *
* * * * *
* REVIEW VTSTMPID. UPDATE COMP/UI/SEC LIBRARY ID'S AT BOTTOM OF *
* THIS VTSCMPID MEMBER. *
* * * * *
* NOTE: ACTUAL LIBRARY ID'S MUST NOT BE COMMENTED *
* * * * *
* * * * *
* Composite   UI   Secondary
* Library     Library Library
* ID          ID   ID
* -----
* CMP01      UI001 SEC01
* CMP02      UI002 SEC02
* CMP03      UI003 SEC03

```

The component generation job, prefix.MICS.CNTL(VTSPGEN) parses prefix.MICS.PARMS(VTSCMPID) and creates a SAS FORMAT used to populate data element composite Library Association (VTSCMPID) in the IVT Information Area data base files.

#### \*\* IMPORTANT NOTES \*\*

- Use the VTSUTIL job to build temporary member prefix.MICS.PARMS(VTSTMPID). If any composite/UI/secondary relationships are found, copy the library ID lines from VTSTMPID to the bottom of VTSCMPID.
- All lines in prefix.MICS.PARMS(VTSCMPID) must start with an '\*' except for the lines containing the five digit composite, UI, and secondary VTS library serial numbers.
- In the event that the VTSUTIL utility job fails to correctly associate composite libraries with their related UI and secondary libraries, the VTSCMPID member must be manually updated to show the correct association.
- Each run of the VTSUTIL utility job replaces prefix.MICS.PARMS(VTSTMPID). In the utility job is executed several times against partial sets of SMF data, copy the composite/UI/secondary entries to VTSCMPID after each run until VTSCMPID contains the entire list of

composite/UI/secondary associations.

### 7.2.3.4 VTS 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



#### 7.2.3.4.1 Data Retention Specifications (FILE Statements)

Data retention specifications tell the CA MICS database how many cycles of each file in each supported timespan are to be saved, both in online and archive modes.

The worksheet is organized by information area. Each file in the area is listed by name. For each file, a line is formatted to allow six definitions in the online database and two in the archive database:

- o The online database files quantify the number of cycles of data that is maintained in the DETAIL, DAYS, WEEKS, MONTHS, and YEARS timespans and the TABLES data area.
- o The two definitions for the archive database files quantify the number of cycles of data to be retained, up to the cutoff limit defined. The archive definitions have no impact on the size of the database and can be specified whethert the weekly and/or monthly archive history files have actually been activated (see Section 2.3.3, CA MICS JCL Planning and Parameters, of the PIOM).

The worksheet formats provide an underscored area for the user's definition, followed by the recommended value, shown within parentheses. If the underscored area contains a value of 00, the file is not supported for the indicated timespan. To add support, perform database tailoring as described in Section 6.2, Tailoring the Database, of the System Modification Guide (SMG).

When specifying a retention limit, remember that the number may never be zero if the file has been defined to be active in the timespan.

Example:

The FILE statements listed below illustrate how to enter the information:

```
FILE VTS IVTTCA 00 33 52 24 00 02 000 024
FILE VTS IVTVDL 00 33 52 24 00 02 000 024
FILE VTS IVTVTC 00 33 52 24 00 02 000 024
FILE VTS IVTVCL 00 33 52 24 00 02 000 024
FILE VTS IVTIEX 00 33 52 24 00 02 000 024
FILE VTS IVTCU 00 33 52 24 00 02 000 024
FILE VTS IVTPTU 00 33 52 24 00 02 000 024
FILE VTS IVTVPS 00 33 52 24 00 02 000 024
```

### 7.2.3.4.2 DBMODEL Input Statements

The DBMODEL member of prefix.MICS.PARMS provides the input to the Database Space Modeling Facility.

Update the DBMODEL member to customize the cycle retention values for each file in units containing the VTS component. To actually perform the space modeling, submit the jobs as described in Section 2.3.4.2 of the PIOM.

# Chapter 8: INSTALLATION

---

The CA MICS Tape Analyzer Option (TAP) is comprised of two separately deployable CA MICS components:

- o Tape Library Management (TLM) component
- o Virtual Tape Subsystems (VTS) component

After specifying the parameters documented in Chapter 7 of this guide, you can install either or both of these components using the checklists in Section 3.8 of the PIOM.

Note: When the PIOM refers to the product in terms of its "component identifier" or "ccc," this means either TLM or VTS, depending on the component currently being installed.



# Chapter 9: PROCESSING

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This chapter provides a processing overview for the CA MICS Tape Analyzer Option (TAP), which provides IT management information for both tape library management systems and virtual tape subsystems in two separate components:

- o Tape Library Management Systems (TLM)
- o Virtual Tape Subsystems (VTS)

One or both of these components can be used, based on data center requirements.

The following sections provide processing overviews for each component:

- 1 - TLM Component Processing
- 2 - VTS Component Processing

This section contains the following topics:

- [9.1 TLM Component Processing](#) (see page 581)
- [9.2 VTS Component Processing](#) (see page 585)

## 9.1 TLM Component Processing

The processing information in this section provides an overview of how raw data input to the TLM component becomes an integrated part of the CA MICS database.

The chapter discusses the following information:

- 1 - TLM Component Processing Overview
- 2 - TLM Component Daily Update Processing Flow

### 9.1.1 TLM Component Processing Overview

The TLM component makes use of the standard database update and summarization facilities of CA MICS to maintain its data in the online and offline databases. The TLM component processes tape library data that was collected using the TMCC Collector, described in Appendix C.

The Tape Management Catalog Collector (TMCC) extracts tape library data set and volume information from tape management catalogs for CA TLMS, CA 1, and IBM DFSMS/rmm systems.

While the TMCC is extracting the tape information from your Tape Management Catalog, new tape volumes and tape data sets are being created. These new tape volumes and datasets are deemed 'Future' activity. Tape volumes created after the TMCC Collector starts are flagged as scratch volumes in the Tape Volume (TLMTMV) file, and the data set records targeted for the Tape Data Set (TLMTMD) file are deleted. These newly created volumes and datasets will be selected on the next run of TMCC.

The data collected by TMCC is input into the DAY091 step of a DAILY database update job.

The daily update step:

- o Reads and formats the raw data
- o Maintains data integrity by eliminating duplicate data
- o Summarizes activity
- o Adds new cycles to the DETAIL and DAYS timespans
- o Updates the week-to-date and month-to-date cycles

A more detailed description of DAY091 processing of TMCC extracted data is presented in the next section.

Weekly processing is performed by the WEEK091 and WEEK300 steps:

- o The WEEK091 step splits the week-to-date files into a new week-to-date and a new weekly '01' cycle.
- o The WEEK300 step creates the weekly offline database files.

Monthly processing is performed by the MONTH091 and MONTH300 steps:

- o The MONTH091 step splits the month-to-date file into a new month-to-date and a new monthly '01' cycle. It also appends the data to the year-to-date file.

- o The MONTH300 step creates the monthly offline database files.

The optional yearly processing is performed by the YEAR091 step, which splits the year-to-date files into a new year-to-date and a new yearly '01' cycle.

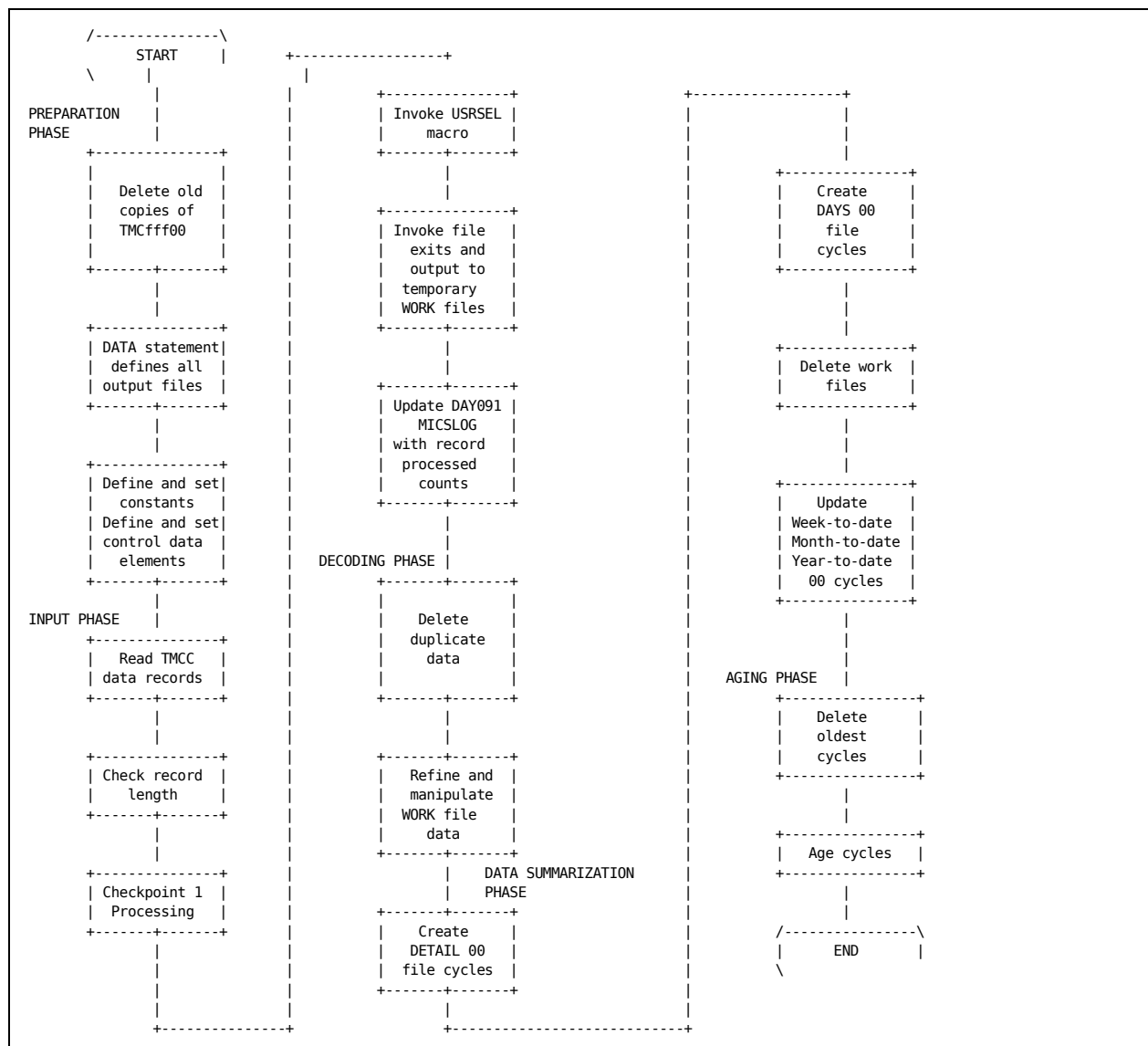


Figure 9-1. TLM Component Processing

### 9.1.2 TLM Component Daily Update Processing Flow

The DAY091 step of the DAILY job processes the data file created by the Tape Management Catalog Collector (TMCC).

The specific record types and contents are discussed in section 6.1, TLM Component Data Sources.

Step DAY091 consists of the following phases:

- 1 - Preparation Phase
- 2 - Input Phase
- 3 - Decoding Phase
- 4 - Data Summarization Phase
- 5 - File Aging Phase

#### 9.1.2.1 Preparation Phase

During the preparation phase, the TLM component defines its output files with a DATA statement. Data elements, formats, and constants are defined and set to their initial values.

#### 9.1.2.2 Input Phase

During the input phase, the TLM component reads the TMCC data records and produces work files that are further processed in the decoding phase.

At the end of the TMCC data input, a count of statistics is printed. The counts indicate the total records kept from each tape library processed.

The input phase also provides counts of the number of short records deleted, records that were "option-deleted," and records that were deleted because of an invalid date range.

#### 9.1.2.3 Decoding Phase

During the decoding phase, the TLM component performs numerous manipulations and refinements of the work files created from the raw data.



#### 9.1.2.4 Data Summarization Phase

In this phase, the DAY091 outputs 00 cycles for active DETAIL and DAYS timespan files. It also appends data to the 00 "to-date" cycles for active WEEKS, MONTHS, and YEARS timespan files. In addition, if accounting and chargeback is active for tape data set accounting, the accounting journal files are produced during this phase.

#### 9.1.2.5 File Aging Phase

At the end of DAY091 step processing, an aging process is invoked to delete the oldest cycle for files that have reached their cycle limit, and the just-created 00 cycle DETAIL and DAYS files become the most current 01 cycles.

## 9.2 VTS Component Processing

The processing information in this section provides an overview of how raw data input to the VTS component becomes an integrated part of the CA MICS database.

The chapter discusses the following information:

- 1 - VTS Component Processing Overview
- 2 - VTS Component Daily Update Processing Flow

### 9.2.1 VTS Component Processing Overview

The VTS component uses the standard database update and summarization facilities of CA MICS to maintain its data in the online and offline databases. The VTS component processes SMF data from IBM VTS and StorageTek VSM virtual tape systems, and BVIR extract data from the IBM TS7700 systems which are input into the DAY096 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 Summarizes activity
- o Adds new cycles to the DETAIL and DAYS timespans
- o Updates the week-to-date and month-to-date cycles

A more detailed description of DAY096 processing of IBM VTS data is presented in the next section.

Weekly processing is performed by the WEEK096 and WEEK300 steps:

- o The WEEK096 step splits the week-to-date files into a new week-to-date and a new weekly '01' cycle.
- o The WEEK300 step creates the weekly offline database files.

Monthly processing is performed by the MONTH096 and MONTH300 steps:

- o The MONTH096 step splits the month-to-date file into a new month-to-date and a new monthly '01' cycle. It also appends the data to the year-to-date file.
- o The MONTH300 step creates the monthly offline database files.

The optional yearly processing is performed by the YEAR096 step, which splits the year-to-date files into a new year-to-date and a new yearly '01' cycle..

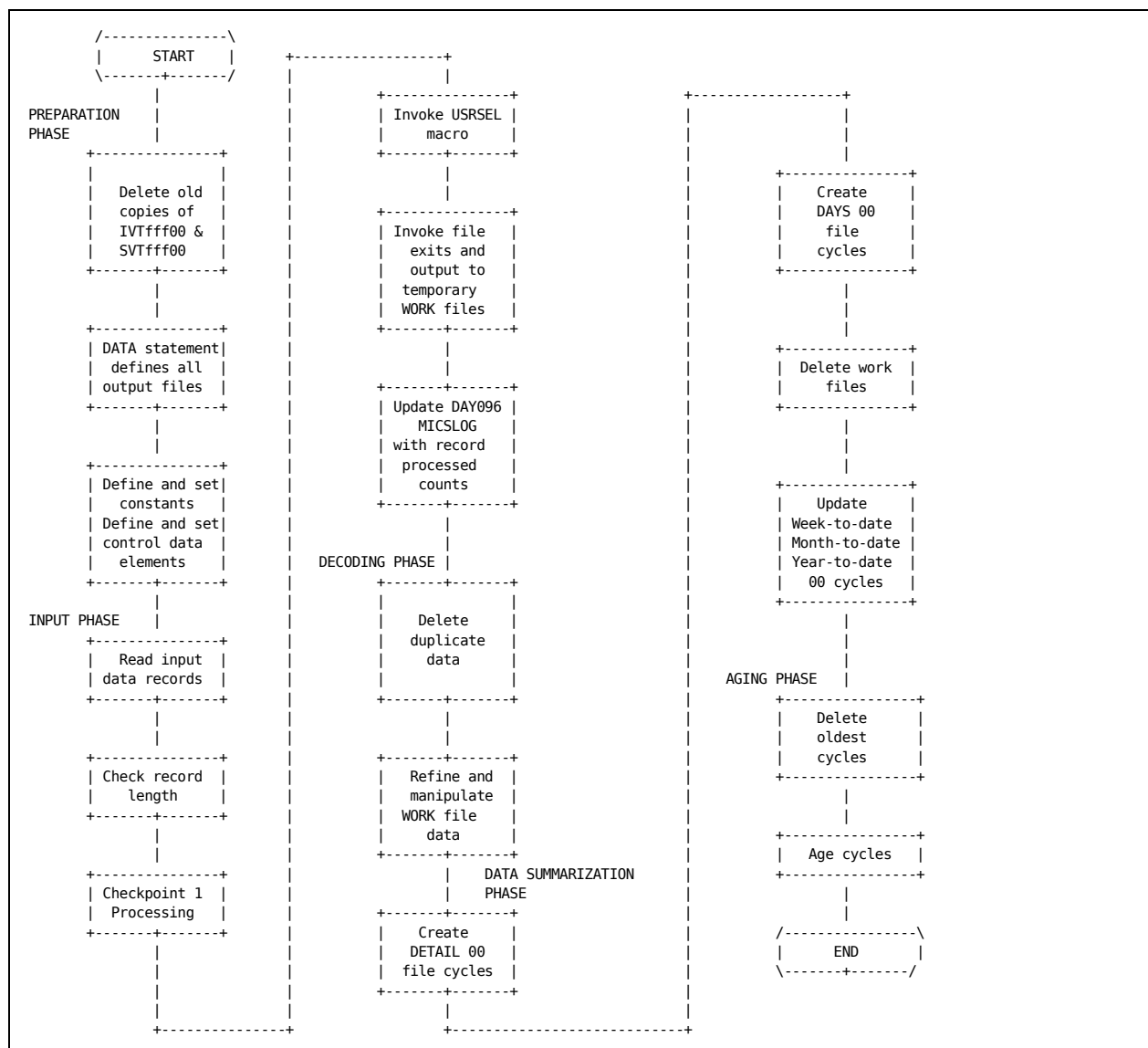


Figure 9-2. VTS Component Processing

### 9.2.2 VTS Component Daily Update Processing Flow

The DAY096 step of the DAILY job processes SMF type 94 records from IBM VTS, the user-specified record type (default 255) from StorageTek VSM virtual tape systems, and records from IBM TS77xx systems extracted with the Bulk Volume Information Retrieval (BVIR) facility.

The specific record types and contents are discussed in section 6.2, VTS Component Data Sources.

Step DAY096 consists of the following phases:

- 1 - Preparation Phase
- 2 - Input Phase
- 3 - Decoding Phase
- 4 - Data Summarization Phase
- 5 - File Aging Phase

#### 9.2.2.1 Preparation Phase

During the preparation phase, the VTS component defines its output files with a DATA statement. Data elements, formats, and constants are defined and set to their initial values.

#### 9.2.2.2 Input Phase

During the input phase, the VTS component reads the SMF data and produces work files that are further processed in the decoding phase.

At the end of the data input, a count of record type statistics is printed in the MICSLOG. The counts indicate the total records kept from IBM VTS, StorageTek VSM, and IBM TS77xx BVIR raw data.

The input phase also provides counts of the number of short records deleted, records that were "option-deleted," and records that were deleted because of an invalid date range.

### 9.2.2.3 Decoding Phase

During the decoding phase, the VTS component performs numerous manipulations and refinements of the work files created from the raw data. For example, if data for a particular IBM VTS system was provided from the SMF data files from multiple z/OS hosts, the data is reduced to a single representative record, per interval, to prevent redundant data from populating the database files.

### 9.2.2.4 Data Summarization Phase

In this phase, the DAY096 outputs 00 cycles for active DETAIL and DAYS timespan files. It also appends data to the 00 "to-date" cycles for active WEEKS, MONTHS, and YEARS timespan files.

### 9.2.2.5 File Aging Phase

At the end of DAY096 step processing, an aging process is invoked to delete the oldest cycle for files that have reached their cycle limit, and the just-created 00 cycle DETAIL and DAYS files become the most current 01 cycles.



# Chapter 10: MODIFICATIONS

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There are four ways CA MICS can be augmented, changed, and enhanced:

- o CA MICS Standard Option and Parameter Definitions

The diverse installation and definition options provide most users with adequate provisions for customizing CA MICS.

- o Modification through User Exits

If there are site-dependent requirements that are not adequately addressed through the standard options, one or more of the user exits may be used to code user-written routines that satisfy these requirements.

- o Extension through Field Developed Applications

The development of field-developed applications may be the most sensible method of addressing the need to modify a CA MICS product. For example, it may be better to write an application to handle additional SMF record types than to attempt to modify the logic of the VTS component.

- o System Code Modification

If component options and user exits cannot be used to meet a requirement, the component source code may be modified. Source code modifications are not recommended, but if made, you must be sure that the changes are documented.

This chapter describes the user exits available for the CA MICS Tape Analyzer Option (TAP). Each of these exits is strategically located at a processing point where user modification:

- o Is likely to occur, based on experience
- o Is relatively easy to document and understand
- o Presents minimal possibility of compromising CA MICS database or operational integrity

Note: Before coding user exits, determine if the component requirements can be satisfied through standard parameter options or database tailoring. The design, coding, testing, and implementation of CA MICS user exit routines should be approached with caution as errors may result, resulting in data corruption. Exits should be extensively validated to ensure that system integrity and performance have not been adversely affected.

Before attempting to activate an exit, review the information in Section 4.3 of the System Modification Guide, User Exit Facilities. The information in this chapter is intended to supplement, not replace, that discussion.

This section contains the following topics:

[10.1 TLM Component User Exits](#) (see page 592)

[10.2 VTS Component User Exits](#) (see page 607)

## 10.1 TLM Component User Exits

The following sections identify the user exits available for the Tape Library Management component of the CA MICS Tape Analyzer Option. Guidelines for the use of each exit are provided:

- 1 - TLM Available User Exits
- 2 - TLM Additional Fields Available to Exits
- 3 - TLM General Exits
- 4 - TLM Output Exits
- 5 - Overriding Default BLKSIZE



### 10.1.1 TLM Available User Exits

Two types of user exits are provided for use in modifying CA MICS processing logic:

#### o General Exits

All installed product components can invoke the general exits. They support the insertion of user code that extends CA MICS processing logic.

#### o Product Component Exits

These exits apply only to specific components. They are classified as to their purpose:

- Output exits are used when data is being written to either temporary work files or CA MICS database files.
- Parameter-related exits are also user exits, but are coded as part of the standard CA MICS installation process and are normally associated with other parameters or options. For example, the Account Code Derivation Routine is a user exit where values for component account codes are assigned.
- Special exits are those that are classified as neither general, output, nor parameter-related. The calculation of a user-defined variable is an example of a special exit.

User exits available for the TLM component are listed below:

#### General Exits

-----

USRSEL - File Processing Selection  
USRIHL - Checkpoint File Inspection

#### TLM Component Output Exits

-----

USRSTMD - Exit prior to output of WORK.TMCTMD  
USRSTMV - Exit prior to output of WORK.TMCTMV

USRXTMD - Exit prior to output of DETAIL.TMCTMD  
USRXTMV - Exit prior to output of DETAIL.TMCTMV

USRTTMD - Exit prior to output of DETAIL tape TMCTMD  
USRTTMV - Exit prior to output of DETAIL tape TMCTMV

USRDTMD - Exit prior to output of DAYS.TMCTMD

USRDTMV - Exit prior to output of DAYS.TMCTMV

TLM Component Parameter-Related Exits

-----

TLMACRT - Account Code Derivation Routine

TLMACRT is discussed in Section 7.1.2.2, Account Code Derivation Exit (TLMACRT)

TLM Component Special Exits

-----

VOLGPRTE - VOLGROUP Derivation Routine

VOLGPRTE is discussed in Section 7.1.3.2, TLM VOLGROUP Derivation Routine (VOLGPRTE)

## 10.1.2 TLM Additional Fields Available to Exits

Data elements available for use by the user exits vary according to the processing phase and the particular user exit. Useful temporary data elements created in the component update process but not stored in the CA MICS database are described below. Exits where these temporary data elements are available are listed below. They are also identified in the individual user exit descriptions.

### DSNODE1 to DSNODE5 - Data Set Node Name Fields

The elements DSNODE1 to DSNODE5 contain the tape data set name qualifiers. DSNODE1 contains the highest level qualifier, DSNODE2 contains the next highest level qualifier, and so on. These fields are created by parsing the data set name and are not stored in the database. They are available for use by the Account Derivation Exit Routine (TLMACRT) as well as the Tape Data Set (TMCTMD) file USRSTMD exit.

### LLQ - Low Level Qualifier

The element LLQ contains the lowest level qualifier in a data set name. This field is created by parsing the data set name and is not stored in the database. It is available for use by the Account Derivation Exit Routine (TLMACRT) as well as the Tape Data Set (TMCTMD) file USRSTMD exit.

### HLQ - High Level Qualifier

The element HLQ contains the highest level qualifier in a data set name and is equivalent to temporary element DSNODE1. This field is created by parsing the data set name and is not stored in the database. It is available for use by the Account Derivation Exit Routine (TLMACRT) as well as the Tape Data Set (TMCTMD) file USRSTMD exit.

Example - Data Set Name: SYS1.PROD.CONTROL.TEST.DATA.G0001V00

```
DSNODE1 = 'SYS1'
DSNODE2 = 'PROD'
DSNODE3 = 'CONTROL'
DSNODE4 = 'TEST'
DSNODE5 = 'DATA'
LLQ      = 'G0001V00'
HLQ      = 'SYS1'
```

### 10.1.3 TLM General Exits

All product components invoke general exits. They are presented here to identify potential uses available for the TLM component.

Each exit description includes the name and title, a description of its purpose, when it is invoked, and whether it has an interface to the CA MICS Accounting and Chargeback Option. It also shows which data elements are available, and any special considerations.

```
+-----+
| U S R S E L | File Processing Selection Exit
+-----+
```

**DESCRIPTION:** The \_USRSEL exit allows access to each raw data record processed by any component. The primary use of the \_USRSEL exit is to select or exclude specific records.

**INVOCATION:** This exit gains control after a raw data input record has been read, but before significant parsing of the record has occurred.

**ACCOUNTING INTERFACE:** No interface is provided.

**USES:** This exit is generally used to delete records before processing or to alter the content of data elements that have already been populated, such as ORGSYSID.

**ELEMENTS AVAILABLE:**

- ROUTINE** - The name of the routine that invoked this exit. To use this exit in the TLM component, test for ROUTINE = 'DYTLMFMT'.
- ORGSYSID** - Tape library name from the TMCC tape\_library\_name execution parameter.
- TLMPROD** - The tape management system name: 'CA1', 'TLMS', or 'RMM'.
- ENDTS** - Timestamp when the TMCC scan started.
- COMPT** - The 8-character value representing the TLM component ID 'TLM', concatenated with the specific tape management system name; 'TLM CA1', 'TLM TLMS', or 'TLM RMM'.

SKIP\_REC - A temporary data element always set to zero (0) prior to invocation of the exit. To drop a record, set SKIP\_REC to one (1) using exit code.

CODING RESTRICTIONS: Refer to the System Modification Guide, Section 4.3.2.2.

SPECIAL NOTES:

- o This exit is part of the CA MICS base platform and is located in sharedprefix.MICS.SOURCE(#BASEXIT). However, if unit specific code is required, \_USRSEL in prefix.MICS.USER.SOURCE(#BASEXIT) should be modified. A more detailed description of this routine is provided in the System Modification Guide, Section 4.3.2.2.
- o Because this exit is invoked by all components, it is necessary to qualify all coding in this exit by using the name of the routine in which the exit was invoked. Data element ROUTINE exists for this purpose and is used in the example below.

SAMPLE USER EXIT:

In this example, the user wants to drop all CA TLMS data from the input stream. This data is generated in a test system and is not ready for inclusion in the CA MICS database files.

```
MACRO _USRSEL
IF ROUTINE = 'DYTLMFMT' THEN DO;
  IF TLMPROD = 'TLMS' THEN SKIP_REC=1 ;
END;
%
```

```
+-----+
| U S R I H L | Examine Input History Log
+-----+
```

DESCRIPTION: The \_USRIHL exit 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 user inspection of the file's contents.

ACCOUNTING INTERFACE: No interface is provided.

USES: This exit is normally not useful for TLM component processing.

ELEMENTS AVAILABLE: All elements in the ADMIHL file.

CODING RESTRICTIONS: None

SPECIAL NOTES: None

## 10.1.4 TLM Output Exits

This section provides descriptions of the TLM component standard user output exits that are invoked during the output phase of daily update processing.

### General Information for Output Exits

-----

Each exit description includes the user exit 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.

Exit code must not issue either RETURN or DELETE statements since their invocation assumes the entire DATA step will be executed.

Exit code can set SKIP\_REC = 1 to prevent the current observation from being written to the output file.

All TLM component output exits use the indirect form of exit invocation. For general information on indirect exits, refer to Section 4.3.1.2, Indirect Exit Points, of the System Modification Guide.

### Output Exits for the TLM Component

-----

Four forms of output exits are available for the TLM component files:

- o USRSfff WORK file exits
- o USRXfff DETAIL timespan exits
- o USRTfff DETAIL tape exits
- o USRDfff DAYS timespan exits

### USRSfff WORK file Exits

-----

The USRSfff exits for the TLM component are invoked while the TMCC raw data record is still in the input buffer, and just before being output to the TMCfff WORK file.

The USRSfff exits generally have access to DETAIL timespan data elements for their respective files, regardless of the element activation status (on or off). Data elements turned off in the DETAIL timespan are not kept in the file, but in most cases have been populated during the input record parsing. The exception is data elements unique to specific

tape management systems. Refer to the data dictionary entries to determine if an element is populated for the tape management system data processed.

To minimize WORK space requirements, derived data elements are not computed prior to output to the WORK files. If USRSfff exit code must examine derived data element values, the %fffDERV(TS=DETAIL) macro can be used to compute the derived data element values within the USRSfff exits. If the %fffDERV macro is invoked, the derived data elements will be computed, but not kept in the WORK file.

All modifications made in the USRSfff exits are propagated from the WORK files to the CA MICS database files.

+-----+

| U S R S T M D | Exit Prior to Output of WORK.TMCTMD

+-----+

DESCRIPTION: The USRSTMD exit allows access to the data elements used to create Tape Data Set (TMCTMD) WORK file observations. This file contains an observation for each tape data set segment, where a data set segment is the portion of a data set that resides on a specific VOLSER. Only multivolume tape data sets have multiple data set segments.

INVOCATION: This exit gains control immediately before the record is output to the WORK.TMCTMD file, and just after the invocation of the sharedprefix.MICS.PARMS(TLMACRT) Account Code Derivation exit. At the point where this exit is invoked, the TMCC raw data record is still in the input buffer.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.TMCTMD file. In addition, individual TMCTMD observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan TMCTMD file data elements specified in sharedprefix.MICS.GENLIB(TLMGENIN). Additionally, temporary data elements are available, such as DSNODE1, described in section 10.1.2.

CODING RESTRICTIONS: None

+-----+

| U S R S T M V | Exit Prior to Output of WORK.TMCTMV

+-----+

DESCRIPTION: The USRSTMV exit allows access to the data



elements used to create Tape Volume (TMCTMV) WORK file observations. This file contains an observation for each tape volume.

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.TMCTMV file. At the point where this exit is invoked, the raw TMCC data record is still in the input buffer.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.TMCTMV file. In addition, individual TMCTMV observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan TMCTMV file data elements specified in sharedprefix.MICS.GENLIB(TLMGENIN).

CODING RESTRICTIONS: None  
USRXfff DETAIL Timespan Exits

-----  
USRXfff exits are provided for certain high volume files that are turned off, by default, in the DETAIL timespan. For the TLM component, USRXfff exits are available for the Tape Data Set (TMCTMD) and Tape Volume (TMCTMV) files.

User code in the USRXtMD and USRXtMV exits only modifies observations that are output to the DETAIL timespans for the TMCTMD and TMCTMV files. Data element modifications and record deletions are not propagated to the DAYS and higher timespans.

The USRXfff exits can be used to exclude observations from these high volume files, reducing the data written to the DETAIL timespan to a manageable size without affecting the DAYS and higher timespans.

Unlike the USRSfff exits, in the USRXfff exits, only data elements active (turned on) in the DETAIL timespan file are available.

If derived data elements are kept in the database, they are available for examination in the USRXfff exit.

USRXfff Exits for the TLM Component

-----  
+-----+  
| U S R X T M D | Exit Prior to Output of DETAIL.TMCTMD  
+-----+

**DESCRIPTION:** The USRXTMD exit allows access to the data elements used to create Tape Data Set (TMCTMD) DETAIL file observations. This file contains an observation for each tape data set segment, where a data set segment is the portion of a data set that resides on a specific VOLSER. Only multivolume tape data sets have multiple data set segments.

**INVOCATION:** This exit gains control immediately before the record is output to the DETAIL.TMCTMD file. Exit code only affects observations written to the DETAIL level file.

**USES:** This exit can be used to examine, modify, or assign values to data elements prior to output to the DETAIL.TMCTMD file. Setting data element SKIP\_REC = 1 in this exit will prevent the current observation from being output to the DETAIL timespan, but will not affect the DAYS and higher timespans.

**ELEMENTS AVAILABLE:** All TMCTMD file data elements turned on in the DETAIL timespan.

**CODING RESTRICTIONS:** None

**SPECIAL NOTES:** To implement this exit at the unit level, code it in prefix.MICS.USER.SOURCE(\$TLMEXIT).

**SAMPLE USER EXIT:**

The user wants to restrict output to the DETAIL TMCTMD file to those observations where the tape data set name begins with SYS1. The USRXTMD exit is used to restrict output to the targeted tape data sets:

In prefix.MICS.USER.SOURCE(\$TLMEXIT):

```
%LET USRXTMD = TMDXXIT ;
```

In prefix.MICS.USER.SOURCE(TMDXXIT):

```
IF DSNAME NE: 'SYS1' THEN SKIP_REC=1 ;
```

```
+-----+
```

```
| U S R X T M V | Exit Prior to Output of DETAIL.TMCTMV
```

```
+-----+
```

**DESCRIPTION:** The USRXTMV exit allows access to the data elements used to create Tape Volume (TMCTMV) DETAIL timespan file observations. This file contains an observation for each tape volume.

INVOCATION: This exit gains control immediately before the record is output to the DETAIL.TMCTMV file. Exit code only affects observations written to the DETAIL level file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DETAIL.TMCTMV file. Setting data element SKIP\_REC = 1 in this exit will prevent the current observation from being output to the DETAIL timespan, but will not affect the DAYS and higher timespans.

ELEMENTS AVAILABLE: All TMCTMV file data elements turned on in the DETAIL timespan.

CODING RESTRICTIONS: None

SPECIAL NOTES: To implement this exit at the unit level, code it in prefix.MICS.USER.SOURCE(\$TLMEXIT).

SAMPLE USER EXIT:

The user wants to create a DETAIL TMCTMV file, but only requires observations for active tape volumes. Scratch tape volumes are not wanted on the DETAIL timespan TMCTMV file.

In prefix.MICS.USER.SOURCE(\$TLMEXIT):

```
%LET USRXTMV = TMVXXIT ;
```

In prefix.MICS.USER.SOURCE(TMVXXIT):

```
IF SCRATCH THEN SKIP_REC=1 ; /* exclude */
```

NOTE: This sample code only deletes observations from the standard DETAIL timespan TMCTMV file. If it is also creating a DETAIL tape TMCTMV file, a USRTTMV exit must be coded to eliminate the same observations from the DETAIL tape file. Otherwise the DETAIL tape file will contain all volume records, including those in scratch and delete status.

USRTfff DETAIL Tape Exits

-----  
USRTfff exits are provided for high volume files eligible for DETAIL tape output. The activation of DETAIL tape files is discussed in section 7.1.3.1.6, DETAIL Tape Processing Overview. TLM component USRTfff exits are available for the Tape Data Set (TMCTMD) file and the Tape Volume (TMCTMV)

files.

The same restrictions and usage considerations discussed previously for USRXfff exits apply to the USRTfff exits. The only difference is that a USRTfff exit is invoked prior to output to a DETAIL tape file, while the USRXfff exit is invoked prior to output to a standard DETAIL database file. Refer to the previous USRXfff exit discussion for guidelines regarding the coding of USRTfff exits for the TMCTMD and TMCTMV files.

NOTE: The USRXfff and USRTfff exits for the TLM component files are invoked in the same processing routine. If both DETAIL and DETAIL tape are active for a particular file, modifications to data element values made in the USRXfff exit impact observations written to the USRTfff exit because the USRXfff exit code is entered prior to the USRTfff exit code.

Preventing records from being output using SKIP\_REC, however, is evaluated separately in each exit. For example, exit code in USRXtMD could use SKIP\_REC=1 to prevent records from being output to the DETAIL.TMCTMD file without having any impact on records written to the DETAIL tape TMCTMD file.

USRdfff DAYS Timespan Exits

-----  
USRdfff exits are provided for the Tape Data Set (TMCTMD) file and the Tape Volume (TMCTMV) files. These exits are invoked immediately prior to output to the DAYS timespan files.

Any changes made in the USRDfff exits impact observations in the DAYS and higher timespan database files.

+-----+  
| U S R D T M D | Exit Prior to Output of DAYS.TMCTMD  
+-----+

DESCRIPTION: The USRDtMD exit allows access to the data elements used to create Tape Data Set (TMCTMD) DAY timespan file observations. In this exit, file observations are summarized according to the DAYS timespan summarization keys.

INVOCATION: This exit gains control immediately prior to output of a record to the DAYS.TMCTMD file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to being output to the DAYS.TMCTMD file. Setting data element SKIP\_REC = 1 in this exit will prevent the current observation from being output to the DAYS timespan, and also prevent the observations from

contributing to the WEEKS and higher timespans.

ELEMENTS AVAILABLE: All TMCTMD file data elements turned on in the DAYS timespan.

CODING RESTRICTIONS: None

SPECIAL NOTES: None

+-----+

| U S R D T M V | Exit Prior to Output of DAYS.TMCTMV

+-----+

DESCRIPTION: The USRDTMV exit allows access to the data elements used to create Tape Volume (TMCTMV) DAY timespan file observations. In this exit, file observations are summarized according to the DAYS timespan summarization keys.

INVOCATION: This exit gains control immediately before a record is output to the DAYS.TMCTMV file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the DAYS.TMCTMV file. Setting data element SKIP\_REC = 1 in this exit will prevent the current observation from being output to the DAYS timespan, and also prevent the observations from contributing to the WEEKS and higher timespans.

ELEMENTS AVAILABLE: All TMCTMV file data elements turned on in the DAYS timespan.

CODING RESTRICTIONS: None

SPECIAL NOTES: None

### 10.1.5 Overriding Default BLKSIZE

The count of bytes used by a tape data set are computed by multiplying data blocks by block size. In some cases, the tape management system records an invalid block size of zero for particular tape data sets.

For these data sets, if a zero block size value was accepted by CA MICS, the TMCTMD Tape Data Set file observations would show zero for the bytes used and space-time data elements. If cost accounting was active, these data sets would not be charged.

To deal with this problem, the TLM component uses a default BLKSIZE value of 32760 when the raw data block size value is zero. This default value is specified in `sharedprefix.MICS.SOURCE($TLMSTR)`.

The default value can be overridden at the complex or unit level as described below:

Changing the default BLKSIZE at the COMPLEX level

-----

To change the default BLKSIZE value at the complex level, update `sharedprefix.MICS.SOURCE($TLMEXIT)`. Insert a line with a valid sequence number in columns 73-80 as follows:

```
%LET DEFBLKSZ = nnnnn ;
```

where nnnnn is the value desired for the default block size.

This statement, inserted in `sharedprefix.MICS.SOURCE($TLMEXIT)` will override the TLM component default value of 32760 and be used by all units running the TLM component.

Changing the default BLKSIZE at the UNIT level

-----

To change the default BLKSIZE value at the unit level, update `prefix.MICS.USER.SOURCE($TLMEXIT)`. Insert a line with a valid sequence number in columns 73-80 as follows:

```
%LET DEFBLKSZ = nnnnn ;
```

where nnnnn is the value desired for the default block size.

This statement, inserted in `prefix.MICS.USER.SOURCE($TLMEXIT)` will override the TLM component default value of 32760 only for the unit associated with the prefix value.

TMCTMD observations where the raw data block size value was initially zero, and subsequently overridden by the default or user specified DEFBLKSZ value can be identified by examining data element Invalid Blocksize Count (TMDNOBLK). TMDNOBLK is set to 1 for each observation where the raw data blocksize value was zero.

## 10.2 VTS Component User Exits

The following sections identify the user exits available for the Virtual Tape Subsystem component of the CA MICS Tape Analyzer Option. Guidelines for the use of each exit are provided:

- 1 - VTS Available User Exits
- 2 - VTS Additional Fields Available to Exits
- 3 - VTS General Exits
- 4 - VTS Output Exits

### 10.2.1 VTS Available User Exits

Two types of user exits are provided for use in modifying CA MICS processing logic:

#### o General Exits

All installed product components can invoke the general exits. They support the insertion of user code that extends CA MICS processing logic.

#### o Product Component Exits

These exits apply only to specific components. They are classified as to their purpose:

- Output exits are used when data is being written to either temporary work files or CA MICS database files.
- Parameter-related exits are also user exits, but are coded as part of the standard CA MICS installation process and are normally associated with other parameters or options. For example, the Account Code Derivation Routine is a user exit where values for component account codes are assigned.
- Special exits are those that are classified as neither general, output, nor parameter-related. The calculation of a user-defined variable is an example of a special exit.

User exits available for the VTS component are listed below:

#### General Exits

-----

USRSEL - File Processing Selection  
USRIHL - Checkpoint File Inspection

#### VTS Component Output Exits

-----

#### o IVT Information Area Files (IBM VTS)

USRSIEX - Exit prior to output of WORK.IVTIEX  
USRSPTU - Exit prior to output of WORK.IVTPTU  
USRSTCA - Exit prior to output of WORK.IVTTCA  
USRSVCL - Exit prior to output of WORK.IVTVCL  
USRSVCU - Exit prior to output of WORK.IVTVCU  
USRSVDL - Exit prior to output of WORK.IVTVDL  
USRSVPS - Exit prior to output of WORK.IVTVPS  
USRSVTC - Exit prior to output of WORK.IVTVTC



USRDIEX - Exit prior to output of DAYS.IVTIEX  
USRDPTU - Exit prior to output of DAYS.IVTPTU  
USRDTCA - Exit prior to output of DAYS.IVTTCa  
USRDVCL - Exit prior to output of DAYS.IVTVCL  
USRDVCU - Exit prior to output of DAYS.IVTVCU  
USRDVDL - Exit prior to output of DAYS.IVTVDL  
USRDVPS - Exit prior to output of DAYS.IVTVPS  
USRDVTC - Exit prior to output of DAYS.IVTVTC

o SVT Information Area Files (StorageTek VSM)

USRSCIP - Exit prior to output of WORK.SVTCIP  
USRSMVC - Exit prior to output of WORK.SVTMVC  
USRSRDR - Exit prior to output of WORK.SVTRDR  
USRSRMR - Exit prior to output of WORK.SVTRMR  
USRSRPR - Exit prior to output of WORK.SVTRPR  
USRSSSP - Exit prior to output of WORK.SVTSSP  
URSSVS - Exit prior to output of WORK.SVTSVS  
URSVDR - Exit prior to output of WORK.SVTVDR  
URSVGR - Exit prior to output of WORK.SVTVGR  
URSVMR - Exit prior to output of WORK.SVTVMR  
URSVMV - Exit prior to output of WORK.SVTVMV  
URSVRR - Exit prior to output of WORK.SVTVRR  
URSVSS - Exit prior to output of WORK.SVTVSS  
URSVUN - Exit prior to output of WORK.SVTVUN  
URSVXR - Exit prior to output of WORK.SVTVXR

o HVT Information Area Files (IBM Hydra)

URSVDA - Exit prior to output of WORK.HVTVDA  
URSVAP - Exit prior to output of WORK.HVTVAP  
URSHHEI - Exit prior to output of WORK.HVTHEI  
URSHHC - Exit prior to output of WORK.HVTHHC  
URSHCP - Exit prior to output of WORK.HVTHCP  
URSHPG - Exit prior to output of WORK.HVTHPG  
URSHPD - Exit prior to output of WORK.HVTHPD  
URSHGP - Exit prior to output of WORK.HVTHGP  
URSHGM - Exit prior to output of WORK.HVTHGM  
URSHHA - Exit prior to output of WORK.HVTHHA  
URSGRC - Exit prior to output of WORK.HVTGRC  
URSGCC - Exit prior to output of WORK.HVTGCC

VTS Component Parameter-Related Exits

-----  
None

VTS Component Special Exits

-----  
VTSCMPID - VTS Peer-to-peer Libraries (see Section 7.2.3.3)

### 10.2.2 VTS Additional Fields Available to Exits

There are no additional data elements available for use in the VTS component exit routines. All data elements available for use are those defined for the file associated with the exit routine.

### 10.2.3 VTS General Exits

All product components invoke general exits. They are presented here to identify potential uses available for the VTS component.

Each exit description includes the name and title, a description of its purpose, when it is invoked, and whether it has an interface to the CA MICS Accounting and Chargeback Option. It also shows which data elements are available, and any special considerations.

```
+-----+
| U S R S E L | File Processing Selection Exit
+-----+
```

**DESCRIPTION:** The \_USRSEL exit allows access to each raw data record processed by any component. The primary use of the \_USRSEL exit is to select or exclude specific records.

**INVOCATION:** This exit gains control after a raw data input record has been read, but before significant parsing of the record has occurred.

**ACCOUNTING INTERFACE:** No interface is provided.

**USES:** This exit is generally used to delete records before processing or to alter the content of data elements that have already been populated, such as ORGSYSID.

**ELEMENTS AVAILABLE:**

- ROUTINE** - The name of the routine that invoked this exit.  
To use this exit in the VTS component, test for  
ROUTINE = 'DYVTSFMT'.
- ORGSYSID** - The original four character SYSID value found  
in bytes 11-14 of the SMF record.
- SMFRTYPE** - The record type of the current SMF record.
- ENDTS** - For IBM VTS data, a constructed timestamp where  
the time is set to xx:59:59.99 for the hour (xx)  
represented by data.

For StorageTek VSM data, the timestamp when the  
SMF record was written to the SMF buffer.

COMPT - The 8-character value representing the VTS component ID "VTS".

SKIP\_REC - A temporary data element always set to zero (0) prior to invocation of the exit. To drop a record, set SKIP\_REC to (1) one using exit code.

CODING RESTRICTIONS: Refer to the System Modification Guide, Section 4.3.2.2.

SPECIAL NOTES:

- o This exit is part of the CA MICS base platform and is located in sharedprefix.MICS.SOURCE(#BASEXIT). However, if unit specific code is required, \_USRSEL in prefix.MICS.USER.SOURCE(#BASEXIT) should be modified. A more detailed description of this routine is provided in the System Modification Guide, Section 4.3.2.2, Standard CA MICS Exits.

- o Because this exit is invoked by all components, it is necessary to qualify all coding in this exit by using the name of the routine in which the exit was invoked. Data element ROUTINE exists for this purpose and is used in the example below.

SAMPLE USER EXIT:

In this example, the user wants to drop all IBM VTS data for hours 0 through 6, inclusive.

```
MACRO _USRSEL
IF ROUTINE = 'DYVTSFMT' THEN DO;
  IF 0 LE HOUR(TIMEPART(ENDTS)) LE 6 THEN SKIP_REC=1 ;
END;
%
```

```
+-----+
| U S R I H L | Examine Input History Log
+-----+
```

DESCRIPTION: The \_USRIHL exit 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 user inspection of the file's contents.

ACCOUNTING INTERFACE: No interface is provided.

USES: This exit is normally not useful for VTS component processing.

ELEMENTS AVAILABLE: All elements in the ADMIHL file.

CODING RESTRICTIONS: None

SPECIAL NOTES: None

### 10.2.4 VTS Output Exits

The output exits for the different VTS component information areas are discussed in the following sections:

- 1 - IBM IVT Information Area Output Exits
- 2 - StorageTek SVT Information Area Output Exits
- 3 - IBM Hydra HVT Information Area Output Exits

### 10.2.4.1 IBM IVT Information Area Output Exits

This section provides descriptions of the VTS component standard user output exits that are invoked during the output phase of daily update processing for the IBM Virtual Tape Subsystem Information Area (IVT) files.

#### General Information for Output Exits

-----

Each exit description includes the user exit 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.

Exit code must not issue either RETURN or DELETE statements since their invocation assumes the entire DATA step will be executed.

Exit code can set SKIP\_REC = 1 to prevent the current observation from being written to the output file.

All VTS component output exits use the indirect form of exit invocation. For general information on indirect exits, refer to Section 4.3.1.2, Indirect Exit Points, of the System Modification Guide.

#### Output Exits for the IVT Information Area Files

-----

Two types of output exits are available for each IVT Information Area file:

USRSfff exits - invoked prior to output to WORK.IVTfff  
USRDfff exits - invoked prior to output to DAYS.IVTfff

#### IVT Information Area USRSfff Exits

-----

All IVT Information Area USRSfff exits are invoked when the raw data record is still in the input buffer. They generally have access to DETAIL timespan data elements for their respective files, regardless of the element activation status (on or off). Data elements turned off in the DETAIL timespan are not kept in the file, but in most cases were populated during the input record parsing. The exception is data elements for IBM VTS data associated with IBM microcode level F/C 4001 and Outboard Policy Management. Refer to the data dictionary entries to determine if an element is dependent on microcode levels or Outboard Policy Management.

For IBM VTS data, the VTS component processing logic selects a representative hour for each VTS from all z/OS systems reporting on the VTS. This is not done, however, until after the initial IVTfff WORK files have been created. If data elements are modified, changed, or added, the USRSfff exit code must not rely on SYSID as a criteria for selecting elements to update.

For example, the following USRSfff exit code would yield unpredictable results because the VTS observation generated by z/OS system 'SYSA' may not be the representative record chosen for VTSID 'VTS01' by the component processing logic:

```
IF SYSID='SYSA' and VTSID='VTS01' THEN ELEMENT=ELEMENT*2 ;
```

The next example would work correctly because all observations for VTSID 'VTS01' would be updated without regard to the z/OS system ID. The representative hourly record for VTSID 'VTS01' chosen by the component processing logic would not matter because all records are updated by the exit code:

```
IF VTSID='VTS01' THEN ELEMENT=ELEMENT*2 ;
```

To minimize WORK space requirements, derived data elements are not computed prior to output to the WORK files. If USRSfff exit code must examine derived data element values, the %fffDERV(TS=DETAIL) macro can be used to compute the derived data element values within the USRSfff exits. If the %fffDERV macro is invoked, the derived data elements will be computed, but not kept in the WORK file.

All modifications made in the USRSfff exits are propagated from the WORK files to the CA MICS database files.

```
+-----+
| U S R S I E X | - Exit Prior to Output of WORK.IVTIEX
+-----+
```

**DESCRIPTION:** The USRSIEX exit allows access to the data elements used to create VTS Import/Export Statistics (IVTIEX) WORK file observations. At the point where this exit is invoked, the observation contains the hourly import/export statistics for a VTS distributed library (UI, secondary, or standalone).

**INVOCATION:** This exit gains control immediately prior to the output of a record to the WORK.IVTIEX file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTIEX file. In addition, individual IVTIEX observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTIEX file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S P T U | - Exit Prior to Output of WORK.IVTPTU
+-----+
```

DESCRIPTION: The USRSPTU exit allows access to the data elements used to create VTS Physical Drive Activity (IVTPTU) WORK file observations. At the point where this exit is invoked, the observation contains the hourly physical tape drive statistics for the device type indicated by data element Physical Tape Drive Type (IVTDCI) for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.IVTPTU file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTPTU file. In addition, individual IVTPTU observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTPTU file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S T C A | - Exit Prior to Output of WORK.IVTTC A
+-----+
```

DESCRIPTION: The USRSTCA exit allows access to the data elements used to create VTS Tape Library Config and Activity (IVTTCA) WORK file observations. At the point where this exit is invoked, the observation contains the hourly physical tape drive statistics for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.IVTTC A file.



USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTTCA file. In addition, individual IVTTCA observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTTCA file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V C L | - Exit Prior to Output of WORK.IVTVCL
+-----+
```

DESCRIPTION: The USRSVCL exit allows access to the data elements used to create VTS Composite Library Activity (IVTVCL) WORK file observations. At the point where this exit is invoked, the observation contains the hourly activity statistics for a peer-to-peer composite VTS library.

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.IVTVCL file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTVCL file. In addition, individual IVTVCL observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTVCL file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V C U | - Exit Prior to Output of WORK.IVTVCU
+-----+
```

DESCRIPTION: The USRSVCU exit allows access to the data elements used to create VTS Cache Usage Preference Level (IVTVCU) WORK file observations. At the point where this exit is invoked, the observation contains the hourly cache usage statistics for the preference ID represented by data element Cache Usage Preference Level Identifier (IVTCUPL) for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.IVTVCU file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTCU file. In addition, individual IVTCU observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTCU file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V D L | - Exit Prior to Output of WORK.IVTVDL
+-----+
```

DESCRIPTION: The USRSVDL exit allows access to the data elements used to create VTS Distributed Library Activity (IVTVDL) WORK file observations. At the point where this exit is invoked, the observation contains statistics for the hourly activity for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.IVTVDL file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTVDL file. In addition, individual IVTVDL observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTVDL file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V P S | - Exit Prior to Output of WORK.IVTVPS
+-----+
```

DESCRIPTION: The USRSVPS exit allows access to the data elements used to create VTS Volume Pool Statistics (IVTVPS) WORK file observations. At the point where this exit is invoked, the observation contains the hourly volume pool statistics for the volume pool represented by data element Volume Pool Identifier (IVTVPN) for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.IVTVPS file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTVPS file. In addition, individual IVTVPS observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTVPS file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V T C | - Exit Prior to Output of WORK.IVTVTC
+-----+
```

DESCRIPTION: The USRSVTC exit allows access to the data elements used to create VTS VTC Controller Detail (IVTVTC) WORK file observations. At the point where this exit is invoked, the observation contains the hourly controller statistics for the VTC controller represented by data element VTS VTC Number (IVTVTCNO) for a VTS peer-to-peer composite library.

INVOCATION: This exit gains control immediately prior to the output of a record to the WORK.IVTVTC file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the WORK.IVTVTC file. In addition, individual IVTVTC observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan IVTVTC file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

#### IVT Information Area USRDfff Exits

-----  
All IVT Information Area USRDfff exits are invoked prior to output to the DAYS.IVTfff database file. Data elements active (turned on) in the DAYS timespan for the file (fff) are available for exit code manipulation. If derived data elements are kept on the file, they are also available in the exit.

The exception is data elements for IBM VTS data associated with IBM microcode level F/C 4001 and Outboard Policy Management. Refer to the data dictionary entries to determine if an element is dependent on microcode levels or Outboard Policy Management.

For IBM VTS data, the VTS component processing logic selects a representative hour for each VTS from all z/OS systems reporting on the VTS. At the point where the USRDfff exit is invoked, the representative hour has been selected. The SYSID of each observation is either 'SYS1' or the value specified using the VTSSYSID statement in prefix.MICS.PARMS(VTSOPS). Refer to section 7.2.3.1.3 for more information about the VTSSYSID statement.

All modifications made in the USRDfff exits are propagated from the DAYS files to the WEEKS and higher summarization level files.

```
+-----+
| U S R D I E X | - Exit Prior to Output of DAYS.IVTIEX
+-----+
```

**DESCRIPTION:** The USRDIEX exit allows access to the data elements used to create VTS Import/Export Statistics (IVTIEX) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with import/export statistics for a VTS distributed library (UI, secondary, or standalone).

**INVOCATION:** This exit gains control immediately prior to the output of a record to the DAYS.IVTIEX file.

**USES:** This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTIEX file. In addition, individual IVTIEX observations can be prevented from output by setting element SKIP\_REC=1 ;

**ELEMENTS AVAILABLE:** All DAYS timespan IVTIEX file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

**CODING RESTRICTIONS:** None

```
+-----+
| U S R D P T U | - Exit Prior to Output of DAYS.IVTPTU
+-----+
```

**DESCRIPTION:** The USRDPTU exit allows access to the data elements used to create VTS Physical Drive Activity (IVTPTU) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with physical tape drive statistics, for the device type indicated by data element Physical Tape Drive Type (IVTDCT), for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the DAYS.IVTPTU file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTPTU file. In addition, individual IVTPTU observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DAYS timespan IVTPTU file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R D T C A | - Exit Prior to Output of DAYS.IVTTC
+-----+
```

DESCRIPTION: The USRDTCA exit allows access to the data elements used to create VTS Tape Library Config and Activity (IVTTCA) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with physical tape drive statistics for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the DAYS.IVTTCA file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTTCA file. In addition, individual IVTTCA observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DAYS timespan IVTTCA file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R D V C L | - Exit Prior to Output of DAYS.IVTVCL
+-----+
```

DESCRIPTION: The USRDVCL exit allows access to the data elements used to create VTS Composite Library Activity (IVTVCL) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with activity statistics for a peer-to-peer composite VTS library.

INVOCATION: This exit gains control immediately prior to the output of a record to the DAYS.IVTVCL file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTVCL file. In addition, individual IVTVCL observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DAYS timespan IVTVCL file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R D V C U | - Exit Prior to Output of DAYS.IVTVCU
+-----+
```

DESCRIPTION: The USRDVCU exit allows access to the data elements used to create VTS Cache Usage Preference Level (IVTVCU) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with cache usage statistics, for the preference ID represented by data element Cache Usage Preference Level Identifier (IVTCUPL), for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the DAYS.IVTVCU file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTVCU file. In addition, individual IVTVCU observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DAYS timespan IVTVCU file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R D V D L | - Exit Prior to Output of DAYS.IVTVDL
+-----+
```

DESCRIPTION: The USRDVDL exit allows access to the data elements used to create VTS Distributed Library Activity (IVTVDL) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with activity statistics for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the DAYS.IVTVDL file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTVDL file. In addition, individual IVTVDL observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DAYS timespan IVTVDL file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R D V P S | - Exit Prior to Output of DAYS.IVTVPS
+-----+
```

DESCRIPTION: The USRDVPS exit allows access to the data elements used to create VTS Volume Pool Statistics (IVTVPS) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with volume pool statistics, for the volume pool represented by data element Volume Pool Identifier (IVTVPN), for a VTS distributed library (UI, secondary, or standalone).

INVOCATION: This exit gains control immediately prior to the output of a record to the DAYS.IVTVPS file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTVPS file. In addition, individual IVTVPS observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DAYS timespan IVTVPS file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R D V T C | - Exit Prior to Output of DAYS.IVTVTC
+-----+
```

DESCRIPTION: The USRDVTC exit allows access to the data elements used to create VTS VTC Controller Detail (IVTVTC) DAYS file observations. At the point where this exit is invoked, the observation is a representative hour with controller statistics, for the VTC controller represented by data element VTS VTC Number (IVTVTCNO), for a VTS

peer-to-peer composite library.

INVOCATION: This exit gains control immediately prior to the output of a record to the DAYS.IVTVTC file.

USES: This exit can be used to examine, modify, or assign values to data elements prior to output to the DAYS.IVTVTC file. In addition, individual IVTVTC observations can be prevented from output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DAYS timespan IVTVTC file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None



### 10.2.4.2 StorageTek SVT Information Area Output Exits

This section provides descriptions of the VTS component standard user output exits that are invoked during the output phase of daily update processing for the StorageTek VSM Virtual Tape Subsystem Information Area (IVT) files.

#### General Information for Output Exits

-----

Each exit description includes the user exit 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.

Exit code must not issue either RETURN or DELETE statements since their invocation assumes the entire DATA step will be executed.

Exit code can set SKIP\_REC = 1 to prevent the current observation from being written to the output file.

All VTS component output exits use the indirect form of exit invocation. For general information on indirect exits, refer to Section 4.3.1.2, Indirect Exit Points, of the System Modification Guide.

#### Output Exits for the SVT Information Area Files

-----

One type of output exit is available for each SVT Information Area file:

USRSfff exits - invoked prior to output to WORK.SVTfff

#### SVT Information Area USRSfff Exits

-----

All SVT Information Area file USRSfff exits, except USRSSVS, are invoked when the raw data record is still in the input buffer. They generally have access to DETAIL timespan data elements for their respective files, regardless of the element activation status (on or off). Data elements turned off in the DETAIL timespan are not kept in the file, but in most cases were populated during the input record parsing.

To minimize WORK space requirements, derived data elements are not computed prior to output to the WORK files. If USRSfff exit code must examine derived data element values, the %fffDERV(TS=DETAIL) macro can be used to compute the derived data element values within the USRSfff exits. If the %fffDERV macro is invoked, the derived data elements will be

computed, but not kept in the WORK file.

All modifications made in the USRSfff exits are propagated from the WORK files to the CA MICS database files.

```
+-----+
| U S R S C I P | - Exit Prior to Output of WORK.SVTCIP
+-----+
```

DESCRIPTION: The USRSCIP exit allows access to the data elements used to create Channel Interface Performance (SVTCIP) WORK file observations. At the point where this exit is invoked, the observation contains the 15-minute interval channel statistics for a VTSS ID (VTSSID). The specific channel is identified by Channel Interface Name (CIPINM) and Type of Link (CIPTOL).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTCIP file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTCIP file. In addition, individual SVTCIP observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTCIP file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S M V C | - Exit Prior to Output of WORK.SVTMVC
+-----+
```

DESCRIPTION: The USRSMVC exit allows access to the data elements used to create multivolume Cartridge Activity (SVTMVC) WORK file observations. At the point where this exit is invoked, the observation contains statistics relating to an event where there was VTV movement on a multivolume cartridge. The specific cartridge is identified by MVC ID (VTSSMID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTMVC file.

USES: This exit can be used to examine, modify, or assign values to data elements before being output to the WORK.SVTMVC file. In addition, individual SVTMVC

observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTMVC file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S R D R | - Exit Prior to Output of WORK.SVTRDR
+-----+
```

DESCRIPTION: The USRSRDR exit allows access to the data elements used to create Real Tape Drive Dismount Activity (SVTRDR) WORK file observations. At the point where this exit is invoked, the observation contains statistics relating to the dismount of a multivolume cartridge with current status of space used and free space on the cartridge. The specific cartridge is identified by MVC ID (VTSSMID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTRDR file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTRDR file. In addition, individual SVTRDR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTRDR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S R M R | - Exit Prior to Output of WORK.SVTRMR
+-----+
```

DESCRIPTION: The USRSRMR exit allows access to the data elements used to create Real Tape Drive Mount Activity (SVTRMR) WORK file observations. At the point where this exit is invoked, the observation contains statistics relating to the mount of a multivolume cartridge on a real tape drive. The specific cartridge is identified by data element MVC ID (VTSSMID) and the tape drive by data element RDT ID (VTSSRID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTRMR file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTRMR file. In addition, individual SVTRMR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTRMR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S R P R | - Exit Prior to Output of WORK.SVTRPR
+-----+
```

DESCRIPTION: The USRSRPR exit allows access to the data elements used to create Real Tape Drive Performance (SVTRPR) WORK file observations. At the point where this exit is invoked, the observation contains the 15-minute interval statistics for a real tape drive attached to a VTSS (VTSSID). The tape drive id identified by data element RTD ID (VTSSRID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTRPR file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTRPR file. In addition, individual SVTRPR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTRPR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S S S P | - Exit Prior to Output of WORK.SVTSSP
+-----+
```

DESCRIPTION: The USRSSP exit allows access to the data elements used to create VTSS Subsystem Performance (SVTSSP) WORK file observations. At the point where this exit is invoked, the observation contains the 15-minute interval statistics for a virtual tape subsystem identified by data element VTSS ID (VTSSID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTSSP file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTSSP file. In addition, individual SVTSSP observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTSSP file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S S V S | - Exit Prior to Output of WORK.SVTSVS
+-----+
```

DESCRIPTION: The USRSSVS exit allows access to the data elements used to create StorageTek VTSS Summary (SVTSVS) WORK file observations. At the point where this exit is invoked, the observation contains a 15-minute interval summary for the overall activity of a virtual tape subsystem, identified by data element VTSS ID (VTSSID) for a specific z/OS system (SYSID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTSVS file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTSVS file. In addition, individual SVTSVS observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTSVS file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V D R | - Exit Prior to Output of WORK.SVTVDR
+-----+
```

DESCRIPTION: The USRSVDR exit allows access to the data elements used to create Virtual Tape Volume Dismount Activity (SVTVDR) WORK file observations. At the point where this exit is invoked, the observation contains statistics relating to the dismount of a virtual tape volume. The specific

volume and virtual tape drive are identified by data elements VTV VOLSER ID (VTSSVID) and VTD Device ID (VTSSDID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVDR file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTVDR file. In addition, individual SVTVDR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVDR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V G R | - Exit Prior to Output of WORK.SVTVGR
+-----+
```

DESCRIPTION: The USRSVGR exit allows access to the data elements used to create Virtual Tape Volume Migrate Activity (SVTVGR) WORK file observations. At the point where this exit is invoked, the observation contains statistics for a virtual tape volume migration event. The virtual tape volume is identified by data element VTV Volser ID (VTSSVID). The real tape drive and the multivolume cartridge used for the migration are identified by data elements RTD ID (VTSSRID) and MVC ID (VTSSMID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVGR file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTVGR file. In addition, individual SVTVGR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVGR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V M R | - Exit Prior to Output of WORK.SVTVMR
+-----+
```

DESCRIPTION: The USRSVMR exit allows access to the data elements used to create Virtual Tape Volume Mount Activity (SVTVMR) WORK file observations. At the point where the exit is invoked, the observation contains statistics relating to the mount of a virtual tape volume. The specific volume and virtual tape drive are identified by data elements VTV VOLSER ID (VTSSVID) and VTD Device ID (VTSSDID). The job and step name of the address space requesting the mount are identified by data elements Job Identification (JOB) and Program Step Name (STEPNAME).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVMR file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTVMR file. In addition, individual SVTVMR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVMR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V M V | - Exit Prior to Output of WORK.SVTVMV
+-----+
```

DESCRIPTION: The USRSVMV exit allows access to the data elements used to create Virtual Tape Volume Movement (SVTVMV) WORK file observations. At the point where this exit is invoked, the observation contains statistics related to an event where a virtual tape volume was moved from one multivolume cartridge to another. The specific virtual volume is identified by data element VTV VOLSER ID. The old and new multivolume cartridges are identified by data elements Old MVC Volser ID (VMVOMI) and New MVC Volser ID (VMVNMI).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVMV file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTVMV file. In addition, individual SVTVMV observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVMV file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V R R | - Exit Prior to Output of WORK.SVTVRR
+-----+
```

DESCRIPTION: The USRSVRR exit allows access to the data elements used to create Virtual Tape Volume Recall Activity (SVTVRR) WORK file observations. At the point where this exit is invoked, the observation contains statistics for a virtual tape volume recall. The specific virtual volume is identified by data element VTV VOLSER ID. The real tape drive and the multivolume cartridge used for the recall are identified by data elements RTD ID (VTSSRID) and MVC ID (VTSSMID).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVRR file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTVRR file. In addition, individual SVTVRR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVRR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V S S | - Exit Prior to Output of WORK.SVTVSS
+-----+
```

DESCRIPTION: The USRSVSS exit allows access to the data elements used to create Virtual Tape Volume Scratch Status (SVTVSS) WORK file observations. At the point where this exit is invoked, the observation contains statistics for a scratched virtual tape volume. The specific virtual volume is identified by data element VTV VOLSER ID.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVSS file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the



WORK.SVTVSS file. In addition, individual SVTVSS observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVSS file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+  
| U S R S V U N | - Exit Prior to Output of WORK.SVTVUN  
+-----+
```

DESCRIPTION: The USRSVUN exit allows access to the data elements used to create VTV - MVC Unlink Activity (SVTVUN) WORK file observations. At the point where this exit is invoked, the observation contains reason a specific virtual tape volume (VTV) is unlinked from a Multi-Volume Cartridge (MVC).

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVUN file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.SVTVUN file. In addition, individual SVTVUN observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVUN file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+  
| U S R S V X R | - Exit Prior to Output of WORK.SVTVXR  
+-----+
```

DESCRIPTION: The USRSVXR exit allows access to the data elements used to create Virtual Tape Volume Delete Activity (SVTVXR) WORK file observations. At the point where this exit is invoked, the observation contains statistics for a deleted virtual tape volume. The specific virtual volume is identified by data element VTV VOLSER ID.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.SVTVXR file.

USES: This exit can be used to examine, modify, or assign

values to data elements before they are output to the WORK.SVTVXR file. In addition, individual SVTVXR observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan SVTVXR file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

### 10.2.4.3 IBM Hydra HVT Information Area Output Exits

This section provides descriptions of the VTS component standard user output exits that are invoked during the output phase of daily update processing for the IBM TS7700 Hydra Virtual Tape Subsystem Information Area (HVT) files.

#### General Information for Output Exits

-----

Each exit description includes the user exit 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.

Exit code must not issue either RETURN or DELETE statements since their invocation assumes the entire DATA step will be executed.

Exit code can set SKIP\_REC = 1 to prevent the current observation from being written to the output file.

All VTS component output exits use the indirect form of exit invocation. For general information on indirect exits, refer to Section 4.3.1.2, Indirect Exit Points, of the System Modification Guide.

#### Output Exits for the HVT Information Area Files

-----

Two types of output exits are available for each HVT Information Area file:

USRSfff exits - invoked prior to output to WORK.HVTfff

#### HVT Information Area USRSfff Exits

-----

All HVT Information Area USRSfff exits are invoked when the raw data record is still in the input buffer. They generally have access to DETAIL timespan data elements for their respective files, regardless of the element activation status (on or off). Data elements turned off in the DETAIL timespan are not kept in the file, but in most cases were populated during the input record parsing.

Note: The HVTHCA file is the only file not produced directly from reading raw data and, as a result, has no user exit. It is created by merging the HVTVDA and HVTHHA files. Any user exit processing in the HVTVDA or HVTHHA files will also affect the HVTHCA file.

To minimize work space requirements, derived data elements are not computed before being output to the work files. If USRSfff exit code must examine derived data element values, the %fffDERV(TS=DETAIL) macro can be used to compute the derived data element values within the USRSfff exits. If the %fffDERV macro is invoked, the derived data elements will be computed, but not kept in the work file.

All modifications made in the USRSfff exits are propagated from the work files to the CA MICS database files.

```
+-----+
| U S R S V D A | - Exit Prior to Output of WORK.HVTVDA
+-----+
```

DESCRIPTION: The USRSVDA exit allows access to the data elements used to create Hydra Vnode Device Activity (HVTVDA) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval channel I/O statistics and concurrent virtual drive activity for the cluster's Vnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTVDA file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTVDA file. In addition, individual HVTVDA observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTVDA file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S V A P | - Exit Prior to Output of WORK.HVTVAP
+-----+
```

DESCRIPTION: The USRSVAP exit allows access to the data elements used to create Hydra Vnode Adapter Port Activity (HVTVAP) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval I/O statistics for each Host Bus Adapter (HBA) at the port level for this cluster's Vnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTVAP file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTVAP file. In addition, individual HVTVAP observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTVAP file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H H C | - Exit Prior to Output of WORK.HVTHHC
+-----+
```

DESCRIPTION: The USRSHHC exit allows access to the data elements used to create Hydra Hnode Cache Activity (HVTHHC) WORK file observations. At the point where this exit is invoked, the observation contains the 15-minute interval disk cache utilization and virtual tape mount activity for this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHHC file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTHHC file. In addition, individual HVTHHC observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHHC file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H C P | - Exit Prior to Output of WORK.HVTHCP
+-----+
```

DESCRIPTION: The USRSHCP exit allows access to the data elements used to create Hnode Cache Partition Activity (HVTHCP) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval disk cache utilization and virtual tape mount activity within each cache partition for this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHCP file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTHCP file. In addition, individual HVTHCP observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHCP file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H P G | - Exit Prior to Output of WORK.HVTHPG
+-----+
```

DESCRIPTION: The USRSHPG exit allows access to the data elements used to create Hydra Hnode Cache Pref Grp Statistics (HVTHPG) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval age statistics of virtual volumes in each preference group within each cache partition for this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHPG file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTHPG file. In addition, individual HVTHPG observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHPG file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H P D | - Exit Prior to Output of WORK.HVTHPD
+-----+
```

DESCRIPTION: The USRSHPD exit allows access to the data elements used to create Hydra Hnode Physical Drive Activity (HVTHPD) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval statistics on physical tape drive activity by device class for this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHPD file.

USES: This exit can be used to examine, modify, or assign

values to data elements before they are output to the WORK.HVTHPD file. In addition, individual HVTHPD observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHPD file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H G P | - Exit Prior to Output of WORK.HVTHGP
+-----+
```

DESCRIPTION: The USRSHGP exit allows access to the data elements used to create Hydra Hnode G-Use Pool Activity (HVTHGP) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval statistics for each of the possible 32 general use pools that can be defined in this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHGP file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTHGP file. In addition, individual HVTHGP observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHGP file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H G M | - Exit Prior to Output of WORK.HVTHGM
+-----+
```

DESCRIPTION: The USRSHGM exit allows access to the data elements used to create Hydra Hnode G-Use Pool Media Activity (HVTHGM) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval statistics for each of the 8 possible media types in each of the general use pools defined in this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHGM file.

USES: This exit can be used to examine, modify, or assign

values to data elements before they are output to the WORK.HVTHGM file. In addition, individual HVTHGM observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHGM file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H H A | - Exit Prior to Output of WORK.HVTHHA
+-----+
```

DESCRIPTION: The USRSHHA exit allows access to the data elements used to create Hydra Hnode Activity (HVTHHA) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval statistics on all node level statistics in this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHHA file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTHHA file. In addition, individual HVTHHA observations can be prevented from being output by setting element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHHA file data elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

```
+-----+
| U S R S H E I | - Exit Prior to Output of WORK.HVTHEI
+-----+
```

DESCRIPTION: The USRSHEI exit allows access to the data elements used to create Hydra Hnode Export/Import Activity (HVTHEI) work file observations. At the point where this exit is invoked, the observation contains the 15-minute interval statistics on the export/import activity in this cluster's Hnode.

INVOCATION: This exit gains control immediately before the output of a record to the WORK.HVTHEI file.

USES: This exit can be used to examine, modify, or assign values to data elements before they are output to the WORK.HVTHEI file. In addition, individual HVTHEI



observations can be prevented from being output by setting  
element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTHEI file data  
elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

+-----+

| U S R S G R C | - Exit Prior to Output of WORK.HVTGRC

+-----+

DESCRIPTION: The USRSGRC exit allows access to the data  
elements used to create Hnode Grid Activity (HVTGRC) work  
file observations. At the point where this exit is invoked,  
the observation contains the 15-minute interval statistics on  
end-of-interval snapshot statistics on the queue depth for  
data and virtual volumes that are still scheduled to be  
copied to another cluster in the grid from this cluster.

INVOCATION: This exit gains control immediately before the  
output of a record to the WORK.HVTGRC file.

USES: This exit can be used to examine, modify, or assign  
values to data elements before they are output to the  
WORK.HVTGRC file. In addition, individual HVTGRC  
observations can be prevented from being output by setting  
element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTGRC file data  
elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

+-----+

| U S R S G C C | - Exit Prior to Output of WORK.HVTGCC

+-----+

DESCRIPTION: The USRSGCC exit allows access to the data  
elements used to create Hnode Grid Cluster Activity (HVTGCC)  
work file observations. At the point where this exit is  
invoked, the observation contains the 15-minute interval  
statistics on the amount of data transferred to other  
clusters in the grid during the interval from this cluster.

INVOCATION: This exit gains control immediately before the  
output of a record to the WORK.HVTGCC file.

USES: This exit can be used to examine, modify, or assign  
values to data elements before they are output to the  
WORK.HVTGCC file. In addition, individual HVTGCC

observations can be prevented from being output by setting  
element SKIP\_REC=1 ;

ELEMENTS AVAILABLE: All DETAIL timespan HVTGCC file data  
elements specified in sharedprefix.MICS.GENLIB(VTSGENIN).

CODING RESTRICTIONS: None

# Appendix A: Messages

---

MICSL0G messages for the CA MICS Tape Analyzer are documented in the following sections:

- 1 - TLM Component Messages
- 2 - VTS Component Messages

This section contains the following topics:

[A.1 TLM Component Messages](#) (see page 644)

[A.2 VTS Component Messages](#) (see page 652)

## A.1 TLM Component Messages

This section lists all MICSLOG messages generated by the TLM component of the CA MICS Tape 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.

The following type codes are used to categorize the messages:

|             |                                                                                                                                                                                             |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Information | designates a note that documents a CA MICS option or potentially important feature in the data.                                                                                             |
| Warning     | designates a condition in either the data or the control statements that does not affect the CA MICS System Reliability Analyzer's operation, but that may lead to unexpected results.      |
| Error       | designates that a problem has been encountered with a control statement that will prevent a successful run of the product. 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 values of permanent or temporary variables 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 TLM00004 reads as follows:

```
TEXT: ACCOUNTING option '%KEYWORD2' must be either
      DETAIL or DAYS.
```

A possible version of the printed message in the MICSLOG might be:

```
TEXT: ACCOUNTING option 'MONTHS' must be either
      DETAIL or DAYS.
```

```
+-----+
| TLM00001 |
+-----+
```

TEXT: TLM Parameter Generation Starting...

TYPE: Informational

REASON: This message is produced by TLMPGEN at the start of the validation of prefix.MICS.PARMS(TLMOPS).

ACTION: None

REFERENCES: Section 7.1.3.1

```
+-----+  
| TLM00002 |  
+-----+
```

TEXT: %LINE

TYPE: Informational

REASON: This message is produced by TLMPGEN for each line processed in prefix.MICS.PARMS(TLMOPS). The contents of each line are listed with the %LINE variable.

ACTION: None

REFERENCES: Section 7.1.3.1

```
+-----+  
| TLM00004 |  
+-----+
```

TEXT: ACCOUNTING option '%KEYWORD2' must be either  
DETAIL or DAYS.

TYPE: Error

REASON: The option specified by KEYWORD2 is invalid.  
REASON: This message is produced when TLMPGEN detects a  
an invalid ACCOUNTING statement option in  
prefix.MICS.PARMS(TLMOPS). The invalid option  
is listed with the %KEYWORD2 variable.

ACTION: Correct the invalid keyword.

REFERENCES: Section 7.1.3.1.2

```
+-----+
```

```
| TLM00005 |
+-----+

TEXT:      Extraneous keyword '%KEYWORD' is ignored.

TYPE:      Informational

REASON:    Additional keywords have been specified for
           the statement and have been ignored.

ACTION:    None

REFERENCES: None

+-----+
| TLM00006 |
+-----+

TEXT:      Duration '%KEYWORD' is invalid.

TYPE:      Error

REASON:    Specified keyword for the DURATIONS statement
           in prefix.MICS.PARMS(TLMOPS) is not valid.

ACTION:    Correct the value and rerun the TLMPGEN.

REFERENCES: Section 7.1.3.1.1

+-----+
| TLM00007 |
+-----+

TEXT:      Duration specified as %KEYWORD, but must be
           between 1 and 999.

TYPE:      Error

REASON:    The value specified is not within the acceptable
           range.

ACTION:    Correct the error and rerun TLMPGEN

REFERENCES: Section 7.1.3.1.1

+-----+
| TLM00008 |
+-----+
```

TEXT: Tape Library Name '%KEYWORD2' is not defined.

TYPE: Error

REASON: The tape library name has not been specified  
for the DURATIONS statement in  
prefix.MICS.PARMS(TLMOPS).

ACTION: Correct the tape library name and rerun the  
TLMPGEN

REFERENCES: Section 7.1.3.1.1

```
+-----+  
| TLM00012 |  
+-----+
```

TEXT: '%KEYWORD1' is an unrecognized statement.

TYPE: Error

REASON: The statement specified for %KEYWORD1 is not  
a valid statement.

ACTION: Remove or correct the statement and rerun  
TLMPGEN

REFERENCES: Section 7.1.3.1

```
+-----+  
| TLM00013 |  
+-----+
```

TEXT: End of Input for TLMOPS.

TYPE: Informational

REASON: All statements in prefix.MICS.PARMS(TLMOPS) have  
been processed.

ACTION: None

REFERENCES: Section 7.1.3

```
+-----+  
| TLM00014 |  
+-----+
```

TEXT: %INERR errors have been encountered.

TYPE: Error

REASON: This message is produced if any errors were detected in TLMPGEN processing of prefix.MICS.PARMS(TLMOPS). The number of errors detected is displayed with the %INERR variable.

ACTION: Correct the errors and resubmit TLMPGEN. Each detected error has a separate messages describing the problem.

REFERENCES: Section 7.1.3.1

```
+-----+
| TLM00016 |
+-----+
```

TEXT: Duration must be an integer value.

TYPE: Error

REASON: The DURATION statement in prefix.MICS.PARMS(TLMOPS) was not followed by an integer argument.

ACTION: Correct the error and rerun TMPGEN.

REFERENCES: Section 7.1.3.1.1

```
+-----+
| TLM00099 |
+-----+
```

TEXT: %LINE

TYPE: Informational

REASON: This message is produced during MICF inquiry processing. It is used to print lines to the MICSLOG.

ACTION: None

REFERENCES: None

```
+-----+
| TLM00198 |
+-----+
```



TEXT: TLMPGEN has completed with errors.

TYPE: Informational

REASON: This message is produced by TLMPGEN if errors were detected during execution.

ACTION: Any errors detected will have produced individual error messages in the MICSLOG. Correct the problems and re-execute TLMPGEN.

REFERENCES: Section 7.1.3.1

+-----+  
| TLM00199 |  
+-----+

TEXT: \$TLMMSTR has been generated successfully.

TYPE: Informational

REASON: This message is produced during the execution of TLMPGEN after it has generated the prefix.MICS.USER.SOURCE(\$TLMMSTR) module.

ACTION: None

REFERENCES: Section 7.1.3

+-----+  
| TLM00999 |  
+-----+

TEXT: TLMPGEN has completed successfully.

TYPE: Informational

REASON: This message is produced at the end of a successful execution of TLMPGEN.

ACTION: None

REFERENCES: Section 7.1.3

+-----+  
| TLM01000 |  
+-----+

TEXT: TLM Processing Summary

-----

TLMS Records : %TLM\_RECS  
 CA-1 Records : %TMS\_RECS  
 RMM Records : %RMM\_RECS  
 Non-TMCC Records : %BAD\_TMCC  
 Unknown Records (Deleted)  
     Product Code : %BAD\_PROD  
     Record Type : %BAD\_RTYP

TYPE: Informational

REASON: Provides a summary of records processed  
by the Tape Library Management component.

ACTION: None

REFERENCES: None

+-----+  
 | TLM01001 |  
 +-----+

TEXT: Out-of-service (Deleted)  
     Data sets : %OUTSRV\_D  
     Volume : %OUTSRV\_V  
 Future (Deleted) :  
     Volumes : %FUTURE\_V  
     Data Sets : %FUTURE\_D  
 TLMS Crash Protected: %TLMS\_CRASH

TYPE: Informational

REASON: This is a continuation of message TLM01000 and  
completes the summary of records processed by  
the Tape Library Management component.

ACTION: None

REFERENCES: Sections 5.1.2.1 and 5.1.2.2

+-----+  
 | TLM02001 |  
 +-----+

TEXT: No data has passed through initial selection.  
     Check file and selection criteria validity.  
     Run terminates with a USER 998 ABEND code.

REASON: The selection criteria specified for this MICF inquiry excluded all data.

ACTION: Review data selection criteria; rerun inquiry.

REFERENCES: Section 3

+-----+  
| TLM02010 |  
+-----+

TEXT: The lines per page was set to less than 30.  
This report requires a minimum  
page size of 30. Page size set to 30

TYPE: Informational

REASON: To correctly format this report, the page size  
must be at least 30. The page size was  
automatically reset.

ACTION: None

REFERENCES: None

## A.2 VTS Component Messages

This section lists all MICSLLOG messages generated by the VTS component of the CA MICS Tape Analyzer Option. 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.

The following type codes are used to categorize the messages:

|             |                                                                                                                                                                                             |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Information | designates a note that documents a CA MICS option or potentially important feature in the data.                                                                                             |
| Warning     | designates a condition in either the data or the control statements that does not affect the CA MICS Tape Analyzer Option's operation, but that may lead to unexpected results.             |
| Error       | designates that a problem has been encountered with a control statement that will prevent a successful run of the product. 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 values of permanent or temporary variables 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 VTS00003 reads as follows:

TEXT: '%KEYWORD' is an invalid option.

A possible version of the printed message in the MICSLLOG might be:

TEXT: 'XMFTYPE' is an invalid option.

```
+-----+
| VTS00001 |
+-----+
```

TEXT: VTS Parameter Generation Starting...  
Parsing prefix.MICS.PARMS(VTSOPS)

TYPE: Informational

REASON: This message is produced by VTSPGEN at the start  
of the validation of prefix.MICS.PARMS(VTSOPS).

ACTION: None

REFERENCES: Section 7.2.3.1

+-----+  
| VTS00002 |  
+-----+

TEXT: VTSOPS--> %LINE

TYPE: Informational

REASON: This message is produced by VTSPGEN for each  
line processed in prefix.MICS.PARMS(VTSOPS).  
The contents of each line are listed with the  
%LINE variable.

ACTION: None

REFERENCES: Section 7.2.3.1

+-----+  
| VTS00003 |  
+-----+

TEXT: '%KEYWORD' is an invalid option.

TYPE: Error

REASON: This message is produced when VTSPGEN detects an  
invalid option statement in  
prefix.MICS.PARMS(VTSOPS). The invalid option  
is listed with the %KEYWORD variable.

ACTION: Correct the invalid keyword.

REFERENCES: Section 7.2.3.1

+-----+  
| VTS00004 |  
+-----+

TEXT: Multiple '%DUPKEY' statements found.  
Only one '%DUPKEY' statement allowed, %DECOUNT found.

TYPE: Error

REASON: This message is produced for each duplicate VTS component option statement detected in prefix.MICS.PARMS(VTSOPS). The duplicate option statement is displayed with the %DUPKEY variable. The number of duplicate statements is displayed with the %DECOUNT variable.

ACTION: Only one of each VTS component option statement is allowed. Determine which of the multiple statements is correct, and delete the others.

REFERENCES: Section 7.2.3.1

+-----+  
| VTS00005 |  
+-----+

TEXT: '%KEYWORD' is not a valid number.

TYPE: Error

REASON: This message is produced when VTSPGEN detects a non-numeric SMF record type following a SMFTYPE option statement in prefix.MICS.PARMS(VTSOPS). The non-numeric value is displayed with the '%KEYWORD' variable.

ACTION: Correct the SMF record type to a numeric value.

REFERENCES: Section 7.2.3.1.1

+-----+  
| VTS00006 |  
+-----+

TEXT: Record number '%KEYWORD' is outside of acceptable range (94, 128-255).

TYPE: Error

REASON: This message is produced when VTSPGEN detects an invalid SMF record type following a SMFTYPE option statement in prefix.MICS.PARMS(VTSOPS).

The invalid SMF record type, displayed with the '%KEYWORD' variable, is outside of the accepted range of 94, or 128-255.

ACTION: Update the SMF record type to a value in the acceptable range.

REFERENCES: Section 7.2.3.1.1

```
+-----+  
| VTS00007 |  
+-----+
```

TEXT: Requested record number %KEYWORD is not defined on the INPUTSOURCE statement in sharedprefix.MICS.GENLIB(VTSGENIN).

TYPE: Error

REASON: This message is produced when VTSPGEN is processing an SMFTYPE statement in prefix.MICS.PARMS(VTSOPS), and one of the SMF record types, displayed with the '%KEYWORD' variable, is not specified in the sharedprefix.MICS.GENLIB(VTSGENIN) INPUTSOURCE statement. The SMF record types specified with an SMFTYPE statement must be a subset of those specified with the INPUTSOURCE statement. The INPUTSOURCE statement record types are displayed with MICSLOG message VTS00008.

ACTION: Either change the SMFTYPE statement record type(s) to be a subset of the INPUTSOURCE statement record types, or update the INPUTSOURCE statement to include the additional record type. If the sharedprefix.MICS.GENLIB(VTSGENIN) INPUTSOURCE statement is updated, the sharedprefix.MICS.CNTL(VTSCGEN) job must be executed, followed the execution of prefix.MICS.CNTL(JCLGENU) for any JCL member, before re-execution of VTSPGEN.

REFERENCES: Section 7.2.3.1.1

```
+-----+  
| VTS00008 |  
+-----+
```

TEXT: Defined SMF records for VTS on the INPUTSOURCE statement in sharedprefix.MICS.GENLIB(VTSGENIN) are '%VTSRECS'.

TYPE: Informational

REASON: This is the second message produced at the start of VTSPGEN processing of prefix.MICS.PARMS(VTSOPS). The %VTSRECS variable is the list of SMF record types found on the sharedprefix.MICS.PARMS(VTSGENIN) INPUTSOURCE statement. The SMF record types listed are the only record types that will be accepted on a VTSOPS SMFTYPE statement.

ACTION: None

REFERENCES: Section 7.2.3.1.1

+-----+  
| VTS00009 |  
+-----+

TEXT: ==> End of input

TYPE: Informational

REASON: This message is written after VTSPGEN has completed processing all statements in prefix.MICS.PARMS(VTSOPS).

ACTION: None

REFERENCES: Section 7.2.3.1

+-----+  
| VTS00010 |  
+-----+

TEXT: %INERR error(s) encountered.

TYPE: Error

REASON: This message is produced if any errors were detected in VTSPGEN processing of prefix.MICS.PARMS(VTSOPS). The number of errors detected is displayed with the %INERR variable.

ACTION: Correct the errors and resubmit VTSPGEN. Each



detected error has a separate message describing the problem.

REFERENCES: Section 7.2.3.1

```
+-----+  
| VTS00011 |  
+-----+
```

TEXT: Less than seven mount time values specified

TYPE: Error

REASON: This message is produced when VTSPGEN detects fewer than seven mount-time values following either a RTDMOUNTTIME or VTMOUNTTIME option statement in prefix.MICS.PARMS(VTSOPS).

ACTION: Both the RTDMOUNTTIME and VTMOUNTTIME option statements require that seven numeric mount times be specified. Make sure that all seven are specified.

REFERENCES: Section 7.2.3.1.4

```
+-----+  
| VTS00012 |  
+-----+
```

TEXT: Mount time value number %WRKINX2 is not numeric

TYPE: Error

REASON: This message is produced when VTSPGEN detects a non-numeric mount-time value following either a RTDMOUNTTIME or VTMOUNTTIME option statement in prefix.MICS.PARMS(VTSOPS).

ACTION: Both the RTDMOUNTTIME and VTMOUNTTIME option statements require that seven numeric mount times be specified. Correct the values so that all seven are numeric.

REFERENCES: Section 7.2.3.1.4

```
+-----+  
| VTS00013 |  
+-----+
```

TEXT: Mount time value number %WRKINX2 is > 3600

TYPE: Error

REASON: This message is produced when VTSPGEN detects a mount-time value greater than 3600 following either a RTDMOUNTTIME or VTMOUNTTIME option statement in prefix.MICS.PARMS(VTSOPS).

ACTION: Both the RTDMOUNTTIME and VTMOUNTTIME option statements require that the specified mount times be fewer than 3600 seconds. Correct the excessive value to a number less than or equal to 3600.

REFERENCES: Section 7.2.3.1.4

```
+-----+  
| VTS00014 |  
+-----+
```

TEXT: Mount time values not ascending - See mount time value %WRKINX2

TYPE: Error

REASON: This message is produced when VTSPGEN detects a mount-time value less than a preceding one.

ACTION: Both the RTDMOUNTTIME and VTMOUNTTIME option statements require that the seven specified mount times be listed in ascending order. Correct the value displayed with the %WRKINX2 variable, to a number greater than the preceding value.

REFERENCES: Section 7.2.3.1.4

```
+-----+  
| VTS00015 |  
+-----+
```

TEXT: More than 7 mount time values specified

TYPE: Error

REASON: This message is produced when VTSPGEN detects more than seven mount-time values following either a RTDMOUNTTIME or VTMOUNTTIME option

statement in prefix.MICS.PARMS(VTSOPS).

**ACTION:** Both the RTDMOUNTTIME and VTVMOUNTTIME option statements require that seven numeric mount times be specified. Reduce the specified times to exactly seven.

**REFERENCES:** Section 7.2.3.1.4

```
+-----+  
| VTS00016 |  
+-----+
```

**TEXT:** VTSSYSID statement SYSID value cannot exceed four characters.  
SYSID specified is too long: %KEYWORD

**TYPE:** Error

**REASON:** This message is produced when VTSPGEN detects a VTSSYSID statement SYSID value exceeding four characters in length in prefix.MICS.PARMS(VTSOPS). The SYSID value in error is displayed with the %KEYWORD variable.

**ACTION:** Update the SYSID value to a character string of up to four characters in length.

**REFERENCES:** Section 7.2.3.1.3

```
+-----+  
| VTS00017 |  
+-----+
```

**TEXT:** VTSSYSID statement requires that a SYSID value is specified.  
No SYSID value found after VTSSYSID keyword

**TYPE:** Error

**REASON:** This message is written when VTSPGEN detects a VTSSYSID statement without a SYSID value in prefix.MICS.PARMS(VTSOPS). A SYSID value must follow the VTSSYSID statement.

**ACTION:** Add a SYSID value after the VTSSYSID statement.

**REFERENCES:** Section 7.2.3.1.3

```
+-----+  
| VTS00018 |  
+-----+
```

**TEXT:** Extraneous data found after SYSID value on VTSSYSID statement.  
Extraneous data ignored

**TYPE:** Warning

**REASON:** This message is written when VTSPGEN detects more than a single argument following a VTSSYSID statement in prefix.MICS.PARMS(VTSOPS). The VTSSYSID statement should only be followed by a SYSID value.

**ACTION:** No action necessary. The extraneous values were ignored.

**REFERENCES:** Section 7.2.3.1.3

```
+-----+  
| VTS00019 |  
+-----+
```

**TEXT:** SMFTYPE statement indicates type 94 record but VTSGENIN OPTION statement is NOIBMVTS. SMFTYPE 94 not allowed with VTSGENIN OPTION NOIBMVTS

**TYPE:** Error

**REASON:** This message is produced when VTSPGEN is processing an SMFTYPE statement in prefix.MICS.PARMS(VTSOPS) and one of the record types specified is type 94, but NOIBMVTS was specified on the OPTION statement in sharedprefix.MICS.GENLIB(VTSGENIN).

The NOIBMVTS OPTION statement value prevents VTS component processing of IBM VTS data. But the SMF type 94 data is the record type produced by IBM VTS.

**ACTION:** If IBM VTS data is to be processed, the OPTION statement in VTSGENIN must be changed to IBMVTS. Then the sharedprefix.MICS.CNTL(VTSCGEN) job must be executed before re-executing VTSPGEN.

If IBM VTS data is not to be processed, remove the 94 from the VTSOPS SMFTYPE statement.

REFERENCES: Sections 7.2.2.1 and 7.2.3.1.1

```
+-----+  
| VTS00020 |  
+-----+
```

TEXT: SMFTYPE statement indicates STK record type(s) but VTSGENIN OPTION statement is NOSTK  
STK record types not allowed with VTSGENIN OPTION NOSTK

TYPE: Error

REASON: This message is produced when VTSPGEN is processing an SMFTYPE statement in prefix.MICS.PARMS(VTSOPS) and one of the record types specified is a StorageTek record. NOSTK was specified on the OPTION statement in sharedprefix.MICS.GENLIB(VTSGENIN).

The NOSTK OPTION statement value prevents VTS component processing of StorageTek VTS data. But the SMF type following the SMFTYPE statement is a StorageTek record type.

ACTION: If StorageTek VSM data is to be processed, the OPTION statement in VTSGENIN must be changed to STK. Then the sharedprefix.MICS.CNTL(VTSCGEN) job must be executed before re-executing VTSPGEN.

If StorageTek VSM data is not to be processed, remove the StorageTek record types from the VTSOPS SMFTYPE statement.

REFERENCES: Sections 7.2.2.1 and 7.2.3.1.1

```
+-----+  
| VTS00026 |  
+-----+
```

TEXT: INPUTVTS---> %LINE',  
%KEYWORD1 DD specified, but OPTIONS %DATASRC not specified in GENLIB(VTSGENIN)

TYPE: Error

**REASON:** This message is produced when VTSPGEN is processing prefix.MICS.PARMS(INPUTVTS) and finds an INPUTxxx DD statement coded, however the data source was not specified in sharedprefix.MICS.GENLIB(VTSGENIN).

See below for the matching INPUTxxx DD statements and the corresponding VTSGENIN options.

**ACTION:** Determine the source of the raw data and set the VTSGENIN OPTION and INPUTVTS statements according to the following table:

| VTSGENIN OPTION | PARMS(INPUTVTS) |
|-----------------|-----------------|
| -----           | -----           |
| IBMVTS          | //INPUTSMF      |
| STK             | //INPUTSMF      |
| HYDRA           | //INPUTBVR      |

If VTSGENIN is updated, run sharedprefix.MICS.CNTL(VTSCGEN). Rerun prefix.MICS.CNTL(VTSPGEN).

**REFERENCES:** Sections 7.2.2.1 and 7.2.3.2.2

```
+-----+
| VTS00027 |
+-----+
```

**TEXT:** INPUTVTS---> Input DD statement missing . . .  
Option %DATASRC specified in GENIN(VTSGENIN),  
DDNAME %DDNM required in prefix.PARMS(INPUTVTS)

**TYPE:** Error

**REASON:** This message is produced when VTSPGEN is processing prefix.MICS.PARMS(INPUTVTS) and does not find the required DDNAME statements, based on the OPTION parameters specified in sharedprefix.MICS.GENLIB(VTSGENIN)

**ACTION:** Determine the source of the raw data and set the VTSGENIN OPTION and INPUTVTS statements according to the following table:

| VTSGENIN OPTION | PARMS(INPUTVTS) |
|-----------------|-----------------|
| -----           | -----           |

|        |            |
|--------|------------|
| IBMVTS | //INPUTSMF |
| STK    | //INPUTSMF |
| HYDRA  | //INPUTBVR |

If VTSGENIN is updated, run  
sharedprefix.MICS.CNTL(VTSCGEN). Rerun  
prefix.MICS.CNTL(VTSPGEN).

REFERENCES: Sections 7.2.2.1 and 7.2.3.2.2

```
+-----+
| VTS00028 |
+-----+
```

TEXT: INPUTVTS---> %LINE',  
DDNAME %KEYWRD01 length not 1 to 8

TYPE: Error

REASON: Invalid ddname is specified in  
prefix.MICS.PARMS(INPUTVTS). The ddname must  
be one to eight characters in length.

ACTION: Review and correct the ddname specification in  
prefix.MICS.PARMS(INPUTVTS). Duplicate DDNAMES  
are not allowed in JCL.

Rerun the job.

REFERENCES: Sections 7.2.3.2.2

```
+-----+
| VTS00029 |
+-----+
```

TEXT: INPUTVTS---> %LINE',  
Duplicate DDNAME, %KEYWRD01 previously specified

TYPE: Error

REASON: A ddname is specified twice in  
prefix.MICS.PARMS(INPUTVTS).

ACTION: Eliminate the duplicate ddname from  
prefix.MICS.PARMS(INPUTVTS). Rerun job.

REFERENCES: Section 7.2.3.2.2

```
+-----+
```

| VTS00030 |

+-----+

TEXT: No IBM SMF type 94 records found in INPUTSMF  
data stream  
VTSUTIL execution aborting

TYPE: Error

REASON: This message is produced when the VTSUTIL  
utility job does not find any SMF type 94  
records in the data specified on the //INPUTSMF  
DD statement. The VTSUTIL job cannot produce  
any output unless SMF type 94 records are  
processed.

ACTION: Provide a data set on the //INPUTSMF DD  
statement that contains SMF type 94 records.

REFERENCES: Sections 6.2.1.2 and 7.2.3.3

+-----+

| VTS00051 |

+-----+

TEXT: Processing Summary: %VENDOR

| Data   | Record  |             |
|--------|---------|-------------|
| Source | Subtype | Count Notes |
| -----  | -----   | -----       |

TYPE: Informational

REASON: This message is produced in the DAY096 MICSLOG  
after all SMF input data has been processed. It  
identifies the virtual tape vendor (displayed  
with the %VENDOR variable), and prints the  
headings for the data source (IBM or STK), SMF  
record subtype, count, and processing notes.  
This message is followed by messages VTS00052  
and VTS00053.

ACTION: None

REFERENCES: Section 6.2

+-----+

| VTS00052 |

+-----+



TEXT:       %DATASRC   %LIT %CNT %STAT

TYPE:       Informational

REASON:     This message is produced in the DAY096 MICSLOG after all SMF input data has been processed. It immediately follows message VTS00051, and is repeated once for every record subtype supported by the VTS component. The variables %DATASRC, %LIT, %CNT, and %STAT contain the source (IBM or STK), SMF record subtype, count, and processing notes for each record subtype.

ACTION:     None

REFERENCES: Section 6.2

```
+-----+  
| VTS00053 |  
+-----+
```

TEXT:       -----  
             Total            %TOT1

TYPE:       Informational

REASON:     This message is produced in the DAY096 MICSLOG after all SMF input data has been processed. It immediately follows message VTS00052, and displays the total number of record subtypes processed using variable %TOT1.

ACTION:     None

REFERENCES: Section 6.2

```
+-----+  
| VTS00054 |  
+-----+
```

TEXT:       >>>>> Unknown release encountered on input,  
             xxxx records rejected.  
Record Details: TS7700 Grid = %XGRID  
                 TS7700 SN   = %XSN  
                 TS7700 VE   = %XVECD  
Check SASLOG for record dump.  
Contact CA MICS Product Support.

TYPE: Error

REASON: This message is produced in the DAY096 MICSLOG if there were records found in the input that were from an unsupported version (%XVECD).

ACTION: Check the SASLOG for a dump of the first unsupported record. Contact Technical Support at <http://ca.com/support> for the maintenance required to process this TS7700 release.

REFERENCES: Section 6.2

```
+-----+  
| VTS00099 |  
+-----+
```

TEXT: %LINE

TYPE: Informational

REASON: This message is produced during MICF inquiry processing. It is used to print lines to the MICSLOG.

ACTION: None

REFERENCES: None

```
+-----+  
| VTS00198 |  
+-----+
```

TEXT: VTSPGEN has completed with errors.

TYPE: Error

REASON: This message is produced by VTSPGEN if errors were detected during execution.

ACTION: Any errors detected will have produced individual error messages in the MICSLOG. Correct the problems and re-execute VTSPGEN.

REFERENCES: Section 7.2.3.1

```
+-----+  
| VTS00199 |  
+-----+
```

TEXT: \$VTSMSTR has been generated successfully.

TYPE: Informational

REASON: This message is produced during the execution of VTSPGEN after it has generated the prefix.MICS.USER.SOURCE(\$VTSMSTR) module.

ACTION: None

REFERENCES: Section 7.2.3

+-----+  
| VTS00999 |  
+-----+

TEXT: VTSPGEN has completed successfully.

TYPE: Informational

REASON: This message is produced at the end of a successful execution of VTSPGEN.

ACTION: None

REFERENCES: Section 7.2.3

+-----+  
| VTS02001 |  
+-----+

TEXT: No data has passed through initial selection.  
Check file and selection criteria validity.  
Run terminates with a USER 998 ABEND code.

REASON: The selection criteria specified for this MICS inquiry excluded all data.

ACTION: Review data selection criteria; rerun inquiry.

REFERENCES: Section 3

+-----+  
| VTS02010 |  
+-----+

TEXT: The lines per page was set to less than 30.  
This report requires a minimum

page size of 30. Page size set to 30

TYPE: Informational

REASON: To correctly format this report, the page size must be at least 30. The page size was automatically reset.

ACTION: None

REFERENCES: None

+-----+  
| VTS03001 |  
+-----+

TEXT: VTS Composite Library UI/SEC FORMAT Generation.  
Parsing prefix.MICS.PARMS(VTSCMPID).

TYPE: Informational

REASON: This message is produced by VTSPGEN when it begins parsing prefix.MICS.PARMS(VTSCMPID).

ACTION: None

REFERENCES: Section 7.2.3.3

+-----+  
| VTS03002 |  
+-----+

TEXT: prefix.MICS.PARMS(VTSCMPID) member format  
generation problem.  
Composite/UI/Secondary values cannot exceed 5  
chars in length.  
At least one value exceeded 5 characters:  
COMPVAL=%COMPIN, UIVAL=%UIIN, SECVAL=%SECI

TYPE: Error

REASON: This message is produced by VTSPGEN when it is  
parsing prefix.MICS.PARMS(VTSCMPID) and detects  
an invalid VTS library ID value. Each  
non-commented line in VTSCMPID must contain  
three alphanumeric character values separated by  
at least one blank. Each value must be five  
characters or fewer in length. All three values  
are displayed in the final line of the error

message.

**ACTION:** Correct the value that exceeds five characters in length. The prefix.MICS.CNTL(VTSUTIL) utility job can assist in determining the correct VTS library ID values.

**REFERENCES:** Section 7.2.3.3

```
+-----+  
| VTS03003 |  
+-----+
```

**TEXT:** prefix.MICS.PARMS(VTSCMPID) member format generation problem.  
Each non-comment line must have three VTS ID values.  
At least one value missing:  
COMPVAL=%COMPIN, UIVAL=%UIIN, SECVAL=%SECIN

**REASON:** This message is produced by VTSPGEN when it is parsing prefix.MICS.PARMS(VTSCMPID) and detects fewer than three VTS library ID values. Each non-commented line in VTSCMPID must contain three alphanumeric character values that are separated by at least one blank. Each value must be five characters or fewer in length. All values found are displayed in the final line of the error message.

**ACTION:** Ensure that each non-commented line contains three VTS library ID values. The prefix.MICS.CNTL(VTSUTIL) utility job can help in determining the correct VTS library ID values.

**REFERENCES:** Section 7.2.3.3

```
+-----+  
| VTS03004 |  
+-----+
```

**TEXT:** prefix.MICS.PARMS(VTSCMPID) errors detected.  
Correct and resubmit VTSPGEN.

**TYPE:** Error

**REASON:** This message is produced if VTSPGEN detected any errors while parsing

prefix.MICS.PARMS(VTSCMPID).

**ACTION:** The specific errors that are found produce separate error messages. Correct the problems and resubmit VTSPGEN.

**REFERENCES:** Section 7.2.3.3

```
+-----+  
| VTS03005 |  
+-----+
```

**TEXT:** Encountered Composite, UI, or Secondary library that is not defined in prefix.MICS.PARMS(VTSCMPID)  
Each composite library ID must be defined with the associated UI and Secondary library IDs.  
Run the prefix.MICS.CNTL(VTSUTIL) job or manually update the VTSCMPID member.  
Unknown lib/type encountered: %IVTVLS/%IVTTYPE

**TYPE:** Error

**REASON:** This message is produced when the daily update DAY096 step encountered a VTS library ID for a member of a VTS peer-to-peer configuration that was not defined in prefix.MICS.PARMS(VTSCMPID). All peer-to-peer composite library VTS ID associations must be listed in prefix.MICS.PARMS(VTSCMPID).

**ACTION:** Execute the prefix.MICS.CNTL(VTSUTIL) job using the SMF data for the failed DAY096 step. prefix.MICS.PARMS(VTSTMPID) is updated with the peer-to-peer composite library VTS ID associations. Use these associations to update prefix.MICS.PARMS (VTSCMPID), then execute prefix.MICS.CNTL(VTSPGEN) before resubmitting the failed DAY096 daily update job.

**REFERENCES:** Section 7.2.3.3

```
+-----+  
| VTS03006 |  
+-----+
```

**TEXT:** Encountered Composite, UI, or Secondary library not defined in prefix.MICS.PARMS(VTSCMPID).  
VTSOPS UNKNOWNVTSID argument set to REJECT.

Current SMF type 94 record rejected.  
Unknown lib/type encountered: %IVTVLS/%IVTTYPE

TYPE: Warning

REASON: This message is produced when the daily update DAY096 step encountered a VTS library ID for a member of a VTS peer-to-peer configuration that was not defined in prefix.MICS.PARMS(VTSCMPID). The UNKNOWNVTSID option is set to REJECT in prefix.MICS.PARMS(VTSOPS), so the SMF record is rejected and processing continues.

ACTION: If data for the unknown VTS library ID should be rejected, no action is necessary.

If the data should be processed, use the prefix.MICS.CNTL(VTSUTIL) utility program to determine the peer-to-peer VTS library associations. Use these associations to update prefix.MICS.PARMS (VTSCMPID). Then execute prefix.MICS.CNTL(VTSPGEN) before resubmitting the failed DAY096 daily update job.

REFERENCES: Section 7.2.3.3





# Appendix B: DATA DICTIONARY

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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.



# Appendix C: Tape Management Catalog Collector (TMCC)

---

The Tape Management Catalog Collector (TMCC) is the raw data collection feature for the Tape Library Management (TLM) component of the CA MICS Tape Analyzer Option. It processes the tape volume and data set information from supported tape management systems.

The output of TMCC is a file of SMF-formatted records containing information for each volume and data set for a specific tape management system. This file is input to the daily update DAY091 step for a CA MICS unit.

In order to provide precise calculations of megabyte-hours for each tape data set, TMCC maintains a record of the last time it scanned a tape management system. Although the best practice is to execute TMCC once a day, it can be run multiple times a day or you can skip days between executions.

TMCC obtains its data from the following data sources:

- o CA 1 Tape Management Catalog
- o CA TLMS Volume Master File
- o Extract file created by the EDGHSKP utility of the DFSMSrmm Control Data Set

The records that TMCC generates are segmented in structure. All TMCC records have a standard SMF header section. The record layout is presented below, segment by segment, as a box diagram.

### TMCC Record Structure:

```
+-----+
|SMF HDR-BASE SEGMENT |
+-----+
| TMCC SCAN INFO SEGMENT |
+-----+
| CA 1 / TLMS / RMM      |
| COMMON TAPE MANAGEMENT (CMT) SEGMENT |
+-----+
| CA 1 ONLY SEGMENT      |
+-----+
OR | TLMS ONLY SEGMENT    |
+-----+
OR | RMM ONLY SEGMENT     |
+-----+
```

The following topics are discussed in detail in these sections:

- 1 - Tape Library Definition
- 2 - Software Requirements
- 3 - JCL Samples
- 4 - Considerations
- 5 - Installation Checklist
- 6 - Messages

This section contains the following topics:

- [C.1 Tape Library Definition](#) (see page 677)
- [C.2 Software Requirements](#) (see page 678)
- [C.3 JCL Samples](#) (see page 678)
- [C.4 Considerations](#) (see page 687)
- [C.5 Installation Checklist](#) (see page 688)
- [C.6 Messages](#) (see page 690)

## C.1 Tape Library Definition

Within CA MICS and the Tape Analyzer Option, a tape library is defined as the inventory tracked by a tape management system (TMS). Multiple z/OS systems may share a single tape library, and a data center may have multiple tape libraries. Each tape library is given a unique name by the installation when the TMCC is run (See Section C.4.3.)

Each execution of TMCC scans a single tape library for a tape management system. However, TMCC can execute on any z/OS system sharing a tape library.

For example, here is a sample configuration:

| TAPE    |            |                   |
|---------|------------|-------------------|
| TMS     | Library ID | Connected systems |
| +-----+ |            |                   |
| TLMS    | TAP1       | SYS1, SYS1, SYS3  |
| -----+  |            |                   |
| RMM     | TAP2       | SYS4              |
| -----+  |            |                   |
| CA-1    | TAP3       | SYS5, SYS6        |
| +-----+ |            |                   |

Three unique tape libraries (TAP1, TAP2, and TAP3) are defined.

Additionally:

- o For TAP1, TMCC can execute on SYS1, SYS2, or SYS3.
- o For TAP2, TMCC can execute on SYS4.
- o For TAP3, TMCC can execute on SYS5 or SYS6.

## C.2 Software Requirements

TMCC runs as a non-authorized program on z/OS 1.4 and above, and supports the following tape management systems:

- o CA 1 Tape Management release 5.5 or higher
- o CA TLMS Tape Management release 5.5 or higher
- o DFSMS/MVS Removable Media Manager (RMM) at z/OS 1.4 or higher

The TMCC must execute on a system where the targeted tape management system and its catalog reside. This is illustrated in section C.1.

If the TMC resides on an LPAR that does not have access to sharedprefix.MICS.LOAD, you must copy three TMCC-related programs to a load library accessible to that LPAR. Then after running the TMCC on that LPAR, you must send the TMCC output data set to the LPAR with access to the MICS complex. The three load library members to be copied are TMCC, TMCMSG and RMMEARL. You must also define a TMCC control data set on that LPAR (see step 1 of the checklist in section C.5).

## C.3 JCL Samples

The following sections provide samples of JCL for various data center configurations and instructions for updating the various TMCC JCL execution parameters:

- 1 - JCL Sample for CA 1
- 2 - JCL Sample for CA TLMS
- 3 - JCL Sample for RMM
- 4 - TMCC Execution Parameters

### C.3.1 JCL Sample for CA 1

```
// ... JOB ...
//TMCCCA1 EXEC PGM=TMCC,PARM='execution_parameters'
//*
//STEPLIB DD DISP=SHR,DSN=sharedprefix.MICS.LOAD
//TAPEDB DD DISP=SHR,DSN=ca1.tmc.data.set
//TMCCNTL DD DISP=OLD,DSN=tmcc.control.dataset
//TMCCOUT DD DISP=(NEW,CATLG,DELETE),
//          UNIT=????, <---(tape or disk)
//          DSN=tmcc.output.dataset(+1)
//*          SPACE=(CYL,(1000,1000),RLSE) <--(if disk)
//MICSLOG DD SYSOUT=*
```

JCL statements

'execution\_parameters': See section C.3.4 below.

**STEPLIB** (Required) Defines the data set containing the TMCC program.

**TAPEDB** (Required) Provides the data set name of the targeted CA 1 tape management catalog.

**TMCCNTL** (Required) The TMCC control data set is used to retain the last execution date and time of TMCC. This information is stored in the output record and is used by the TLM component to determine the age and duration of tape volumes and data sets.

The DCB attributes of the control data set must be as follows:

RECFM=F,LRECL=80,BLKSIZE=80

Note: this dataset is created in Step 1 of the Installation checklist in section C.5.

**TMCCOUT:** (Required) specifies the output of TMCC. The data set can reside on disk or tape.

The recommended DCB attributes are as follows:

RECFM=VB,LRECL=4096,BLKSIZE=optimal

Note that the block size should be optimized for the particular device. If no DCB is specified in

the JCL, TMCC will use the attributes listed above and set the block size to an optimal size for the storage device.

The data extracted from the tape library catalog can be voluminous. If the TMCCOUT file is written to DASD, specify a large JCL SPACE parameter value such as shown below:

```
SPACE=(CYL,(1000,1000),RLSE)
```

After the initial file is written, check the actual space used and adjust the SPACE parameter accordingly. Allow for some growth, but as a practical matter, the amount of data collected should be relatively constant from day to day.

MICSLOG (Required) Provides information about execution, and logs diagnostic messages.



### C.3.2 JCL Sample for CA TLMS

```
// ... JOB ...
//TMCCTLMS EXEC PGM=TMCC,PARM='execution_parameters'
//STEPLIB DD DISP=SHR,DSN=sharedprefix.MICS.LOAD
//TMCCCNTRL DD DISP=OLD,DSN=tmcc.control.dataset
//TMCCOUT DD DISP=(NEW,CATLG,DELETE),
//          UNIT=?????, <---(tape or disk)
//          DSN=tmcc.output.dataset(+1)
//*          SPACE=(CYL,(1000,1000),RLSE) <--(if disk)
//MICSLOG DD SYSOUT=*
```

JCL statements

'execution\_parameters': See section C.3.4 below.

**STEPLIB** (Required) Defines the data set containing the TMCC program.

**TMCCCNTRL** (Required) The TMCC control data set is used to retain the last execution date and time of TMCC. This information is stored in the output record and is used by the TLM component to determine the age and duration of tape volumes and data sets.

The DCB attributes of the control data set must be as follows:

RECFM=F,LRECL=80,BLKSIZE=80

Note: this dataset is created in Step 1 of the Installation checklist in section C.5.

**TMCCOUT:** (Required) specifies the output of TMCC. The data set can reside on disk or tape.

The recommended DCB attributes are as follows:

RECFM=VB,LRECL=4096,BLKSIZE=optimal

Note that the block size should be optimized for the particular device. If no DCB is specified in the JCL, TMCC will use the attributes listed above and set the block size to an optimal size for the storage device.

The data extracted from the tape library catalog

can be voluminous. If the TMCCOUT file is written to DASD, specify a large JCL SPACE parameter value such as shown below:

```
SPACE=(CYL,(1000,1000),RLSE)
```

After the initial file is written, check the actual space used and adjust the SPACE parameter accordingly. Allow for some growth, but as a practical matter, the amount of data collected should be relatively constant from day to day.

MICSLOG (Required) Provides information about execution, and logs diagnostic messages.

### C.3.3 JCL Sample for RMM

For DFSMSrmm installations, the EDGHSKP utility must be run to extract data from the control data set (CDS). DATEFORM(J) must be specified in the PARM= field. If any other value is used or if it is not specified, TMCC will reject the data.

```
// ... JOB ...
//EXTRACT EXEC PGM=EDGHSKP,
//          PARM='DATEFORM(J) RPTEXT'
//SYSPRINT DD SYSOUT=*
//MESSAGE DD SYSOUT=*
//XREPTTEXT DD DSN=extract.data.set.name,
//            DISP=(NEW,CATLG,DELETE),AVGREC=U,
//            SPACE=(CYL,(1000,500)),
//            UNIT=unit
//*
//TMCCRMM EXEC PGM=TMCC,PARM='execution_parameters'
//STEPLIB DD DISP=SHR,DSN=sharedprefix.MICS.LOAD
//INPUTRMM DD DISP=SHR,DSN=extract.data.set.name
//TMCCCNTRL DD DISP=OLD,DSN=tmcc.control.dataset
//TMCCOUT DD DISP=(NEW,CATLG,DELETE),
//          UNIT=unit, <-----tape or disk)
//          DSN=tmcc.output.dataset(+1)
//*          SPACE=(CYL,(1000,500),RLSE) <--(if disk)
//MICSLOG DD SYSOUT=*
//*
//DELETE EXEC IEFBR14,COND=(4,LT,TMCCTLMS)
//INPUTRMM DD DISP=(SHR,DELETE),DSN=extract.dataset.name
```

JCL statements

=====

#### o EXTRACT STEP

XREPTTEXT (Required) Specifies the data set name for the EDGHSKP utility output.

#### o TMCCRMM STEP

'execution\_parameters': See section C.3.4 below.

STEPLIB (Required) Defines the data set containing the TMCC program.

INPUTRMM: (Required) extract.data.set.name must match the value specified on the XREPTTEXT DD.

TMCCCNTRL: (Required) The TMCC control data set retains the

last execution date and time of TMCC. This information is stored in the output record and is used by the TLM component to determine the age and duration of tape volumes and data sets.

The DCB attributes of the control data set must be as follows:

```
RECFM=F,LRECL=80,BLKSIZE=80
```

Note: This data set is created in Step 1 of the installation checklist in section C.5.

TMCCOUT: (Required) Specifies the output of TMCC. The data set can reside on disk or tape.

The recommended DCB attributes are as follows:

```
RECFM=VB,LRECL=4096,BLKSIZE=optimal
```

Note that the block size should be optimized for the particular device. If no DCB is specified in the JCL, TMCC will use the attributes listed above and set the block size to an optimal size for the storage device.

The data extracted from the tape library catalog can be voluminous. If the TMCCOUT file is written to DASD, specify a large JCL SPACE parameter value such as shown below:

```
SPACE=(CYL,(1000,1000),RLSE)
```

After the initial file is written, check the actual space used and adjust the SPACE parameter accordingly. Allow for some growth, but as a practical matter, the amount of data collected should be relatively constant from day to day.

MICSLOG: (Required) Provides information about execution, and logs diagnostic messages.

#### o DELETE STEP

INPUTRMM: (Required) extract.data.set.name must match the value specified on the XREPTTEXT DD.

Note that the data set created by the EXTRACT step could be defined as a GDG if you want to keep a number of raw data

extract files. If this is done, the //DELETE step should be removed from the job to allow IDCAMS management of the GDG.

### C.3.4 TMCC Execution Parameters

All execution parameters for TMCC are specified on the PARM= keyword of the EXEC statement.

For example:

```
//TMCC      EXEC PGM=TMCC,PARM='CA-1 SYS1'
```

The format for the execution parameter is:

```
'AAAA BBBB'  
|      |  
|      +----- tape_library_name (4 bytes)  
+----- tms_name (4 bytes)
```

tms\_name: (Required) The tape management system name.

TMCC supports the following values:

```
CA-1 -- CA 1 Tape Management  
RMM  -- DFSMSrmm  
TLMS -- CA TLMS Tape Management
```

tape\_library\_name: (Required) This parameter is used to assign a unique name to a specific tape library. The value chosen is user specified, and should be a name that easily identifies the specific tape library. The name specified here is stored in the database files in data element TAPELIB, the highest sort/summary key in the TLM component database files. TAPELIB will be used frequently in reporting to identify the tape library, and in analysis code to select observations for a particular tape library.

The tape library name is also used as the value for ORGSYSID during the DAILY job step DAY091 processing. The tape library name must be defined in sharedprefix.MICS.PARMS(CPLXSID) or prefix.MICS.PARMS(SYSID). See the PIOM section 2.3.1.9 for more information on the CPLXSID and SYSID members.

Sites with multiple tape management systems must specify a different tape\_library\_name for each TMCC scan job. This value is not only used by the TLM component during checkpoint processing; it also serves to keep data for each tape library separated in the summarized timespans if multiple TMCC scan files are input into the same TLM component step.

## C.4 Considerations

### o TMCC Output Data Set

The output from TMCC is a data set with the following recommended DCB attributes:

LRECL=4096, BLKSIZE=multiple of LRECL, RECFM=VB, DSORG=PS

If no DCB information is specified, TMCC will assign the above information and set the block size to an optimal size for the device.

The TMCC output data set can reside on DASD or TAPE. This data set can be voluminous and the space requirements are proportional to the number of volumes and data sets managed by the tape library. A tape library with a million tape data sets requires approximately 1000 cylinders of DASD storage.

It is recommended that the TMCC output data set is created as a GDG (Generation Data Set Group) to simplify the daily update step DAY091 JCL.

Sample JCL for creating a GDG can be found in sharedprefix.MICS.CNTL(TMCCGDG). See Step 2 in the installation checklist in section C.5.

### o DFSMSrmm Collection

The EDGHSKP utility is first used to extract data from the DFSMSrmm control data set. The data set is then processed by TMCC. In the JCL examples provided, EDGHSKP and TMCC execute in a single job.

By splitting the EDGHSKP and TMCC into separate jobs, additional flexibility in restart and scheduling can be achieved.

### o Collection Intervals

We recommend that TMCC be run once per day, but it is up to you to determine the collection frequency. Daily collection provides a day-to-day picture of tape library usage metrics for performance, capacity planning, and accounting and chargeback.

## C.5 Installation Checklist

The TMCC is automatically installed into an existing CA MICS complex as part of the installation of the CA MICS Tape Analyzer Option.

This checklist is used to create required data sets and execution JCL.

### \_\_\_ 1. Create the TMCC Control Data Set

The TMCC control data set maintains a record of the last execution of TMCC for a given tape library. This information is used by CA MICS to compute space-time metrics for tape data sets.

Edit `sharedprefix.MICS.CNTL(TMCCCNTL)` and modify the JCL to data center standards.

- Supply a valid JOB card
- Specify the UNIT parameter
- Update the DSN

Submit the JCL and review the output. The job should complete with a return code of 0.

### \_\_\_ 2. Create TMCC GDGs

It is recommended that the TMCC output be written to a GDG for simplified management.

Edit `sharedprefix.MICS.CNTL(TMCCDEFG)` and modify the JCL to meet data center standards.

- Supply a valid JOB card
- Update the IDCAMS parameters
  - o NAME (TMCC output data set name)
  - o LIMIT(xx) Number of GDG's to keep

Submit the JCL and review the output. The job should complete with a return code of 0.

### \_\_\_ 3. Create the TMCC operational JCL

CA MICS provides example JCL that can be modified to meet data center requirements.

Create member `sharedprefix.MICS.CNTL(TMCC)` and copy



one of the following sample members:

- TMCCCA1 if using CA 1
- TMCCTLMS if using CA-TLMS
- TMCCRMM if using IBM DFSMSrmm

Edit sharedprefix.MICS.CNTL(TMCC)

- Supply a valid JOB statement.
- Update the execution parameter on the EXEC PGM=TMCC that matches your environment (reference Section C.3.4).
- Update the data set name for the //TMCCNTL DD to match the data set created with the TMCCNTL job in Step 1.
- Update the //TMCCOUT DD:
  - o Update the DSN to match the data set created with the TMCCDEFG job in Step 2.
  - o Specify the UNIT parameter.
  - o Optionally supply DCB and SPACE parameters depending on data center standards.

For RMM, modify the JCL specification for the XREPTXT DD and the TMCCOUT DD to meet data center requirements. (Reference Section C.3.3)

For CA-1 and TLMS, review JCL Samples for specific JCL requirements in Section C.3.1 and C.3.2.

- \_\_\_ 4. Schedule the TMCC job to run daily (best practice), or at another time. The TMCC scan must complete before execution of the daily update routine DAY091 step.

## C.6 Messages

This appendix lists all messages generated by the CA MICS Tape Management Catalog Collector (TMCC). Some messages are generated during the processing of the control statements, while others are caused by various conditions in the data found during 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.

The following type codes are used to categorize the messages:

|             |                                                                                                                                                                                                    |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Information | Designates a note that documents an option or a potentially important feature in the data.                                                                                                         |
| Warning     | Designates a condition in the data or the control statements that does not affect operation, but may lead to unexpected results.                                                                   |
| Error       | Designates that a problem has been encountered with a control statement, which will prevent a successful run of the CA MICS TMCC. 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 values of permanent or temporary variables created during CA MICS TMCC processing. In the descriptions 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 TMC00007 reads as follows:

PARAMETERS SPECIFIED ARE '%PSTRING'.

Assume the following invalid statement is found in the PARM= keyword of the EXEC statement:

PARM='echoed value'

The printed message would be written in this form:

PARAMETERS SPECIFIED ARE 'echoed value'.

```
+-----+
| TMC00001 |
```

+-----+

TEXT: CA MICS Tape Management Catalog Collector  
%ONE(%REG1/%REG15)  
COPYRIGHT (C) 2008 CA. All Rights Reserved.

TYPE: Information

REASON: TMCC copyright and version information

ACTION: None

REFERENCES:

+-----+

| TMC00005 |

+-----+

TEXT: Beginning collection for %TMSTYPE.

TYPE: Information

REASON:

ACTION: None

REFERENCES:

+-----+

| TMC00006 |

+-----+

TEXT: OBS= option will restrict output to %MAXOBS  
records.

TYPE: Information

REASON: The OBS= has been specified and only %MAXOBS  
records will be written to TMCCOUT.

ACTION: None

REFERENCES: None

+-----+

| TMC00007 |

+-----+

TEXT: Parameters specified are '%PSTRING'.

TYPE: Information

REASON: Echoes parameters specified on the PARM= keyword  
of the EXEC statement for this run.

ACTION: None

REFERENCES:

+-----+

| TMC00008 |

+-----+

TEXT: Tape management system is set to %TMSTYPE.

TYPE: Information

REASON:

ACTION: None

REFERENCES:

+-----+

| TMC00015 |

+-----+

TEXT: No options were entered.

TYPE: Error

REASON:

ACTION: Specify the options via the PARM= keyword on the  
EXEC statement.

REFERENCES: Appendix C.4.3

+-----+

| TMC00016 |

+-----+

TEXT: Tape management system specified as '%WORD' but must be TLMS, CA-1 or RMM.

TYPE: Error

REASON: An invalid tape management system has been specified.

ACTION: Specify a valid tape management name.

REFERENCES: Appendix C.3

```
+-----+  
| TMC00020 |  
+-----+
```

TEXT: Tape library name has not been specified.

TYPE: Error

REASON: The required tape library name option is missing.

ACTION: Add the tape library name option and rerun.

REFERENCES: Appendix C.3, C.1

```
+-----+  
| TMC00021 |  
+-----+
```

TEXT: Tape library name of '%WORD' is invalid. It must be 1 to 4 characters.

TYPE: Error

REASON: The tape library name has been specified but the syntax is not correct.

ACTION: None

REFERENCES: Appendix C.3

```
+-----+  
| TMC00022 |  
+-----+
```

TEXT: '%WORD' is an invalid option and will be ignored.

TYPE: Error

REASON:

ACTION: Remove or correct the option and rerun.

REFERENCES: Appendix C.3

```
+-----+  
| TMC00023 |  
+-----+
```

TEXT: Option '%WORD' contains invalid syntax and will be ignored.

TYPE: Error

REASON:

ACTION: Remove or correct the option and rerun.

REFERENCES: Appendix C.3

```
+-----+  
| TMC00024 |  
+-----+
```

TEXT: Tape library name is '%TLIBNAME'.

TYPE: Information

REASON:

ACTION: None

REFERENCES:

```
+-----+  
| TMC00025 |  
+-----+
```

TEXT: %RECOUNT records written to %OUTDD.

TYPE: Information

REASON:

ACTION: None

REFERENCES:

```
+-----+  
| TMC00027 |  
+-----+
```

TEXT: Errors have been encountered in parameters.

TYPE: Error

REASON:

ACTION: Correct previous errors and rerun.

REFERENCES: Appendix C.3

```
+-----+  
| TMC00030 |  
+-----+
```

TEXT: Unable to load module %MODNAME. R1='%REG1'x;  
R15='%REG15'x.

TYPE: Error

REASON: TMCC attempted to load external module %MODNAME,  
but LOAD service routine failed. %R15 is the  
return code and %R1 is the reason code. In some  
cases, this may be caused by attempting  
collection for an uninstalled tape management  
system.

ACTION: Requested

REFERENCES:

```
+-----+  
| TMC00031 |  
+-----+
```

TEXT: An unexpected return code ('%REG15'x) has been returned from %MODNAME.

TYPE: Error

REASON:

ACTION: None

REFERENCES:

```
+-----+  
| TMC00032 |  
+-----+
```

TEXT: No records have been written and no apparent cause can be found. Please review the MICSLOG and JESLOG for additional information.

TYPE: Error

REASON: Although collection was performed, no records were written to TMCCOUT. This may be caused by a problem with the tape management system.

ACTION: Review the JESLOG, MICSLOG, and SYSLOG for for additional messages as to the cause of TMC0032.

REFERENCES:

```
+-----+  
| TMC00033 |  
+-----+
```

TEXT: GETDSAB service for ddname %DDNAME failed with return code '%REG15'x and reason code '%REG1'x.

TYPE: Error

REASON: The GETDSAB service is used to determine whether or not a DD exists in the JCL. The above message indicates a severe problem with GETDSAB.

ACTION: Contact Technical Support at <http://ca.com/support>.



## REFERENCES:

```
+-----+  
| TMC00034 |  
+-----+
```

TEXT: Required DDNAME %DDNAME not found.

TYPE: Error

REASON: The DD name specified by %DDNAME is required and is not in the JCL.

ACTION: Add the DD name to the JCL.

REFERENCES: C.3

```
+-----+  
| TMC00036 |  
+-----+
```

TEXT: Unable to obtain 24-bit storage. R15='%REG15'.

TYPE: Error

REASON: GETMAIN service for 24 bit storage request failed %R15 is the return code.

ACTION: Contact Technical Support at <http://ca.com/support>.

## REFERENCES:

```
+-----+  
| TMC00037 |  
+-----+
```

TEXT: Open failed for %OUTDD. Return code='%REG15'.

TYPE: Error

REASON: A failure occurred when attempting to open the DD name referred by %OUTDD.

ACTION: Contact Technical Support at

<http://ca.com/support>.

REFERENCES:

```
+-----+  
| TMC00038 |  
+-----+
```

TEXT: Unable to release 24-bit storage. R15='%REG15'.

TYPE: Error

REASON: Freemain service requested for 24 bit storage failed. %REG15 is the return code.

ACTION: Contact Technical Support at <http://ca.com/support>.

REFERENCES:

```
+-----+  
| TMC00039 |  
+-----+
```

TEXT: The TMCC control data (%DDNAME) does not have the proper DCB Attributes. DCB must be DSORG=PS, LRECL=80, BLKSIZE=80, and RECFM=F.

TYPE: Error

REASON: The TMCC control data set has incorrect DCB attributes

ACTION: Reallocate the control data set with proper DCB attributes.

REFERENCES: Appendix C.2

```
+-----+  
| TMC00040 |  
+-----+
```

TEXT: Tape Library Name %TLIBNAME has not been found in %DDNAME. Last run date and time are set to zero.

%TLIBNAME will be added to %DDNAME at the end of this execution.

TYPE: Warning

REASON: The TMCC Control Data Set does not contain an entry for the specified Tape Library.

ACTION: If this is the first execution or the Control Data Set is empty, this is normal and no action is required.

REFERENCES:

```
+-----+  
| TMC00041 |  
+-----+
```

TEXT: TMCC last executed for %TLIBNAME on %WORD at %ONE.

TYPE: Information

REASON:

ACTION: None

REFERENCES:

```
+-----+  
| TMC00042 |  
+-----+
```

TEXT: Open failed for %DDNAME. Return code='%REG15'.

TYPE: Error

REASON: A failure occurred when attempting to open the DD name referred by %OUTDD.

ACTION: Contact Technical Support at <http://ca.com/support>.

### REFERENCES:

```
+-----+  
| TMC00043 |  
+-----+
```

TEXT: Record length for %DDNAME is %NUM2 and must be at least %NUM1.

TYPE: Error

REASON: The data set specified by %DDNAME must have a minimum LRECL of %NUM1.

ACTION: Correct the LRECL and rerun

### REFERENCES:

```
+-----+  
| TMC00044 |  
+-----+
```

TEXT: Control record for %TLIBNAME has been updated.

TYPE: Information

REASON:

ACTION: None

### REFERENCES:

```
+-----+  
| TMC00045 |  
+-----+
```

TEXT: Control record for %TLIBNAME has not been found. Attempting to add control record.

TYPE: Warning

REASON:

ACTION: None

### REFERENCES:

```
+-----+  
| TMC00046 |  
+-----+
```

TEXT: Control record for %TLIBNAME has been added.

TYPE: Information

REASON:

ACTION: None

REFERENCES:

```
+-----+  
| TMC00047 |  
+-----+
```

TEXT: Control record for %TLIBNAME has not been added.

TYPE: Error

REASON:

ACTION: None

REFERENCES:

```
+-----+  
| TMC00048 |  
+-----+
```

TEXT: DCB attributes for %DDNAME are not valid.

TYPE: Error

REASON:

ACTION: None

REFERENCES:

```
+-----+  
| TMC00049 |
```

+-----+

TEXT: Block size for %DDNAME is %NUM2 and must be at least %NUM1.

TYPE: Error

REASON:

ACTION: None

REFERENCES:

+-----+

| TMC00056 |

+-----+

TEXT: Default DCB attributes have been assigned to DD %DDNAME:

RECFM=%ONE, LRECL=%NUM1, BLKSIZE=%NUM2

TYPE: Information

REASON: For DDNAME, no DCB information was specified. TMCC reports the default DCB assignment.

ACTION: None

REFERENCES:

+-----+

| TMC00057 |

+-----+

TEXT: Control record time '%WORD' is invalid. Format is hh:mm:ss.th.

TYPE: Error

REASON: Time value in the control record is invalid.

ACTION: Edit the TMCC Control data set and correct the time value.

REFERENCES:

```
+-----+
| TMC00058 |
+-----+
```

TEXT: Control Record date '%WORD' is invalid. Format is mm/dd/yyyy.

TYPE: Error

REASON: Date in control data set record is invalid.

ACTION: Edit the TMCC Control data set and correct the date value.

REFERENCES:

```
+-----+
| TMC00059 |
+-----+
```

TEXT: The control record date (%WORD) and time (%ONE) have invalid datetime values.

TYPE: Error

REASON: The timestamp in a control record has invalid date and time values. This may be caused by an invalid date (e.g. 12/32/1999) or an invalid time (e.g. 25:61:23.40).

ACTION: Edit the TMCC control data set and correct either the invalid date or time value.

REFERENCES:

```
+-----+
| TMC00060 |
+-----+
```

TEXT: Assigned DCB attributes for %DDNAME are:

RECFM=%RECFM, LRECL=%NUM1, BLKSIZE=%NUM2

TYPE: Information

REASON: Echoes DCB attributes in effect for %DDNAME.

ACTION: None

REFERENCES:

```
+-----+  
| TMC01000 |  
+-----+
```

TEXT: RMMEARL(%CHAR1/CHAR2)  
COPYRIGHT (C) 2008 CA. All Rights Reserved.

TYPE: Information

REASON: Copyright and version information for RMMEARL  
interface module.

ACTION: None

REFERENCES:

```
+-----+  
| TMC01001 |  
+-----+
```

TEXT: RMMEARL: TMCC requires that dates in RMM  
extended file be formatted as Julian.

RMMEARL: The DATEFORM(J) option must be  
specified for the EDGHSKP utility.

TYPE: Error

REASON: The extract file created by EDGHSKP was not  
run with the DATEFORM(J) option.

ACTION: Rerun the EDGHSKP utility with specifying  
DATEFORM(J), then re-execute TMCC.

REFERENCES: C.3

```
+-----+  
| TMC01002 |  
+-----+
```

TEXT: RMMEARL: DD name %DDNAME not found in JCL.



TYPE: Error

REASON: Required %DDNAME is not included in the JCL

ACTION: Add required DD name and rerun TMCC.

REFERENCES:

+-----+  
| TMC01004 |  
+-----+

TEXT: RMMEARL: Unable to open %DDNAME.

TYPE: Error

REASON: A failure occurred when attempting to open the DD name referred to by %DDNAME.

ACTION: Contact Technical Support at <http://ca.com/support>.

REFERENCES:

+-----+  
| TMC01006 |  
+-----+

TEXT: RMMEARL: Unable to allocate 24 bit storage.

TYPE: Error

REASON: GETMAIN service request for 24 storage failed.

ACTION: Contact Technical Support at <http://ca.com/support>.

REFERENCES:

+-----+  
| TMC01008 |  
+-----+

TEXT: RMMEARL: 'X' record encountered before a header record was processed.

TYPE: Error

REASON: During the EDGHSKP extract, a header record is written providing information about the extract. This message is issued when a non-header record is read before a header record is read. This can occur if the EDGHSKP data is damaged or sorted

ACTION: Rerun the EDGHSKP utility and re-execute TMCC.

REFERENCES:

```
+-----+
| TMC01010 |
+-----+
```

TEXT: RMMEARL Processing Statistics

-----

Header Records : %NUM1

Extract Records: %NUM2

Other Records : %NUM3

Total Records : %NUM4

TYPE: Information

REASON: Provides summary statistics when processing RMM data.

ACTION: None

REFERENCES:

```
+-----+
| TMC90005 |
+-----+
```

TEXT: Ending collection for %TMSTYPE.

TYPE: Information

REASON: Collection as completed for the specified tape management system.

ACTION: None

## REFERENCES:

```
+-----+  
| TMC99995 |  
+-----+
```

TEXT: TMCC completed with errors. Return Code=%RETCODE

TYPE: Error

REASON: Errors have been encountered that prevented the successful completion of TMCC.

ACTION: Scan the MICSLOG for additional messages, review the messages, and correct the errors.

## REFERENCES:

```
+-----+  
| TMC99998 |  
+-----+
```

TEXT: TMCC abending with U998.

TYPE: Error

REASON: Errors have been encountered that prevented the successful completion of TMCC.

ACTION: Scan the MICSLOG for additional messages, review the messages, and correct the errors.

## REFERENCES:

```
+-----+  
| TMC99999 |  
+-----+
```

TEXT: TMCC completed successfully. Return code=%RETCODE

TYPE: Information

REASON:

ACTION: None

REFERENCES: