CA Vtape™ Virtual Tape System

Administration Guide

Release 12.6.00, Second Edition

CA Technologies Product References

The CA Vtape™ Virtual Tape System guides refer to the following CA products and components:

- CA 1® Tape Management (CA 1)
- CA Allocate™ DASD Space and Placement (CA Allocate)
- CA Compress™ Data Compression (CA Compress Data Compression)
- CA Earl® (CA Earl)
- CA Graphical Management Interface (CA GMI)
- CA Chorus Software Manager™ (CA CSM)
- CA MIM™ Resource Sharing (CA MIM)
- CA Sort® (CA Sort)
- CA Tape Encryption
- CA TLMS® Tape Management (CA TLMS)
- CA Vantage™ Storage Resource Manager (CA Vantage)
- CA Vtape™ Virtual Tape System (CA Vtape)
- CA Vtape™ Virtual Tape System Peer-To-Peer Option (CA Vtape P2P)

Contact CA Technologies

Contact CA Support

For your convenience, CA Technologies provides one site where you can access the information that you need for your Home Office, Small Business, and Enterprise CA Technologies products. At http://ca.com/support, you can access the following resources:

- Online and telephone contact information for technical assistance and customer services
- Information about user communities and forums
- Product and documentation downloads
- CA Support policies and guidelines
- Other helpful resources appropriate for your product

Providing Feedback About Product Documentation

If you have comments or questions about CA Technologies product documentation, you can send a message to techpubs@ca.com.

To provide feedback about CA Technologies product documentation, complete our short customer survey which is available on the CA Support website at http://ca.com/docs.

Contents

Chapter 1: Overview

This guide provides an overview of the CA Vtape system and provides product administration information. Review the information in this guide to help you administer the product.

This section contains the following topics:

Audience

This guide provides system programmers and storage administrators the information needed to administrate the system.

Users of this guide should be experienced mainframe technicians with knowledge of their mainframe tape systems, tape related software, and security configuration.

How to Use this Guide

The following conventions are used throughout this guide to document features, functions, and other aspects of the system:

- Variable text is entered in italics. This is most commonly used for dataset names and console commands.

  For example, VVE_SCRATCH=*volser* where *volser* is the Virtual Volume VOLSER.

- Features, functions, and components of [set to your product name] are capitalized. These include, for example: Virtual Volumes and Virtual Devices.

Chapter 2: Introduction

This product allows you to use your existing hardware to create a virtual tape solution in the cloud. For system requirements, see the *Release Notes* that are on the Bookshelf.

This section contains the following topics:

CA Vtape Features

Using CA Vtape, you can create a virtual tape environment from any combination of mainframe disk and tape hardware, including resources you already own. You can add or upgrade resources as needed to take advantage of advancements in capacity and performance, regardless of manufacturer. Since CA Vtape is software, you can scale your installation by one virtual device or by one DASD volume without the high incremental costs of a hardware solution.

CA Vtape is an automated virtual tape system or server that provides you with the following capabilities and benefits:

- It allows you to greatly reduce costs by using Virtual Devices in place of real ones, which:
  - Helps to reduce the need for new tape hardware
  - Reclaims valuable floor space
  - Helps save energy
- It fully automates tape stacking, which:
  - Reduces wasted capacity on each cartridge
  - Helps you more efficiently use robotic tape hardware

Virtual Tape Drives are simulated within the operating system using address spaces, data spaces, and VSAM linear data sets. These Virtual Tape Drives use Virtual Volumes, which are simulated by allocating data sets on DASD. Collectively, these data sets act as a large Virtual Volume DASD buffer or cache.

The Virtual Volume DASD buffer is completely managed by CA Vtape. When a Virtual Volume is mounted, its data sets are allocated and accessed on DASD using high-performance data access methods. At dismount, modified Virtual Volumes are queued for stacking onto tape cartridges. After being copied to tape, the DASD space is marked as reusable for other Virtual Volumes.

Until a Virtual Volume's DASD space is reused, a mount for the Virtual Volume can typically occur almost immediately. Once its DASD space has been reused, a mount for a Virtual Volume will trigger an automatic recall from its stacked location on tape.

A *least recently used* (LRU) algorithm is used to manage DASD space occupied by Virtual Volumes. Virtual Volumes that are not remounted have their DASD space reused before Virtual Volumes that are remounted. This minimizes mount delays due to tape recalls.

Recall performance is generally equal to or better than native tape performance. Because CA Vtape recalls the entire Virtual Volume, subsequent access to any data set on the Virtual Volume occurs without having to perform another recall.

Each Virtual Volume is assigned to a stacking group based on the first data set written to the volume. Each stacking group is broken down into three subgroups by customizable retention periods.

How the stacking groups are used is completely customizable. Groups can be used to stack:

- By expiration date
- By location
- By a forced separation requirement such as that required by paired log or transaction data sets
- By application
- By classification of the data (for example; production, test, system, or disaster recovery)
- With an optional duplex copy to be used for Disaster Recovery or local recovery if a physical cartridge is lost or damaged
- With an optional export copy to send user-format tapes to sites not using CA Vtape

This intelligent stacking function allows you to group your data so you can assign the appropriate amount of system resources to managing its vaulting and recovery.

When the stacking function should be active is also customizable. You can decide to:

- Let CA Vtape decide
- Set up customizable cache thresholds
- Set up customizable time periods

- Perform it manually
- Combine the above

Automatic Tape Stacking Impact

Most mainframe tape environments use only a small portion of their total tape capacity. For example, if a site has 3490 class, 36-track drives installed, each standard cartridge has an average capacity of 1.2 gigabytes (assuming an average of 3:1 compression capability for these drives). Most sites find that the average tape contains only 300 MB of data. Only 25% of the total tape storage capacity is being utilized. Increasing utilization to 75% would free up robotic tape library slots, reduce ejects, and inserts, and increase available scratch tapes.

Tape capacity utilization can be increased by implementing tape stacking or a technique called Tape Mount Management (TMM). However, a lot of extra management resources are consumed to aggressively stack tape data or to implement TMM. Not every application can utilize TMM. Job cancellations or extended delays can be experienced with stacked tapes. Some applications do not support certain data sets being changed from tape to DASD.

CA Vtape provides automatic tape stacking without the need for extra management resources and without job cancellations or extended delays due to concurrent access to the same tape. By emulating tape hardware, no limitations exist as to which applications can be changed to use CA Vtape.

CA Vtape maximizes the effectiveness of tape automation and minimizes tape library slot management.

Multisystem Considerations

In a multisystem environment, physical tape data sets may not be concurrently accessed by more than one system at a time. A tape created on one system can only be read or modified on a different system after the first system has released it. CA Vtape fully supports this environment. Each CA Vtape subsystem can access a specific Virtual Volume as often as required, but only one subsystem can access a specific Virtual Volume at a time.

You can run up to eight CA Vtape subsystems within a single Logical Partition (LPAR) at the same time. Each subsystem runs in its own set of address spaces and must be assigned a unique range of Virtual Device addresses. Once assigned and varied online by one of the subsystems, the Virtual Device addresses cannot be used by other subsystems in the same LPAR.

The same Virtual Device address range can be defined on multiple LPARs for the use of a single CA Vtape subsystem on each LPAR. These devices should not be defined as shared in the operating system hardware configuration definitions or in an automatic tape switching product such as CA MIA or IBM's Tape Auto Switch. Virtual Devices 0100-010F on LPAR A are not the same Virtual Devices as 0100-010F on LPAR B since they are controlled by separate subsystems. Each of these devices can be on-line and actively servicing virtual tape mounts on both LPARs at the exact same time. The only restriction is that they cannot mount the same Virtual Volume at the same time.

A CA Vtape Complex is created when multiple CA Vtape subsystems in the same LPAR or in different LPARs share the same DASD buffer and control data sets. Virtual Volumes written to the DASD buffer by a subsystem participating in a CA Vtape Complex can be read or written by any other subsystem participating in the same CA Vtape Complex.

If all the subsystems on all LPARs in a CA Vtape Complex have access to the same physical tape, any subsystem in those LPARs can recall a Virtual Volume from physical tape to the DASD buffer. If all the LPARs do not have access to the same physical tape, a subsystem with access to the physical tape can be configured as a Recall Server. The Recall Server will perform all recalls for its client subsystems.

The same is true for Externalization (automatic stacking). If all the LPARs have access to physical tape, each subsystem can perform its own externalizations. If all the LPARs do not have access to physical tape, one subsystem can be configured as the Primary Externalization Server. The Primary Externalization Server will perform Externalization for all subsystems in the complex. Secondary or Failover Externalization Servers can also be configured.

The Externalization and Recall Servers exploit some SYSPLEX capabilities but can also run in a non-SYSPLEX environment. The main benefit of this feature is to lower the physical drive requirements and to concentrate their use to a single subsystem in a single LPAR.

A SYSPLEX is not required to support a CA Vtape Complex. Some CA Vtape features will not be fully exploited unless CA MIM or IBM's GRS is able to propagate enqueues across all the LPARs where CA Vtape is implemented.

System Capabilities

CA Vtape supports the following specifications:

- Maximum number of CA Vtape subsystems per LPAR: 8
- Maximum Virtual Devices per subsystem: Up to 512 (256 recommended)
- Maximum Virtual Devices per LPAR: 2,048
- Tape emulation: IBM's 3480 or 3490
- Maximum DASD buffer per complex: No limit

- Maximum number of Virtual Volumes per complex: 1,000,000
- Maximum number of stacked physical tapes: No limit
- For the CA Vtape Peer-to-Peer Option (CA Vtape P2P), maximum number of Remote connections: 16
- For the USS Backstore feature, maximum number of file system mount points: 33

Chapter 3: Using the Basic Components

This section contains the following topics:

Overview

CA Vtape builds Virtual Devices in the operating system. Although the devices do not physically exist, they appear to the operating system as if they do. The CA Vtape Virtual Device Engine responds as if a real device is attached. The Virtual Device Engine has functionality equivalent to the microcode that normally controls a hardware tape device.

The Virtual Devices are defined to the operating system as a part of the CA Vtape installation. IBM's Hardware Configuration and Definition (HCD) software is used to create the definitions required. These are software, not hardware, definitions requiring only an HCD activation to use. An IPL is not necessary.

These devices are defined to one or more Virtual Device Controller address spaces within a CA Vtape Subsystem. A CA Vtape Subsystem consists of between four and eleven address spaces. These address spaces are:

- Primary address space – SVTS
- 1-8 Virtual Device Controllers – SVTSAS.SVT*n*V*m*.
- Backstore Engine – SVTSAS.SVT*n*PT.
- Utility address space – SVTSAS.SVT*n*UT.

  Where *n* is the subsystem number of 1-8 and *m* is the controller number of 1-8.

The Virtual Device Engine supports up to eight Virtual Control Units, each one running in a separate address space. Because the Virtual Device tasks and service routines are in separate subaddress spaces, CA Vtape closely resembles a multiple control unit implementation. Just as physical device problems are localized to a single control unit, Virtual Device internal bottlenecks and outages will be isolated to those drives within a single subaddress space.

Individual devices or an entire controller and all of its devices can be restarted just like physical tape drives.

The Virtual Device Engine uses buffers, dataspaces, and VSAM Linear Data Sets (LDS) to provide data movement. When an application issues reads or writes to a Virtual Volume, data movement occurs between buffers used by the application and those of the Virtual Device. Data movement between the Virtual Device buffer and the Virtual Volume data set occurs asynchronously and independently of the I/O process running in the application. This provides high throughput for applications reading or writing to a Virtual Volume because the block size used by the application has very little impact on the asynchronous logic used to perform physical I/O to DASD.

When the Virtual Volume is dismounted, a process called Externalization, managed by the Backstore Engine, will automatically copy the Virtual Volume to a tape in stacked format. After the Virtual Volume has been Externalized, its space in the DASD buffer can be automatically reclaimed when needed.

When an application dismounts a Virtual Volume and releases a Virtual Device, the Virtual Volume and Virtual Device are immediately available for other requests. Subsequent requests made for this Virtual Volume are satisfied from the DASD buffer unless the Virtual Volume's space has been reused. If the Virtual Volume is no longer in the DASD buffer, the Backstore Engine will automatically start a process called Recall to move the data back into the DASD buffer.

Virtual Volumes

Before using CA Vtape for the first time, an exclusive range of Volume Serial (VOLSER) numbers must be defined as new scratch tapes to the tape management system. These same Virtual VOLSERs are also added to CA Vtape. Most tape management systems support the definition of these new scratch tapes as Virtual Volumes or as residing in a nonexistent location. Consult your tape management system manuals for details.

The tape management system manages the Virtual Volumes as if they are real tape volumes. The only communication required between CA Vtape and the tape management system is to synchronize which volumes are in scratch status. This synchronization process is accomplished by adding a CA Vtape utility to the tape management system scratch process. Some tape management systems, like CA 1, have an automatic scratch notification feature that can be used instead of the utility program

All the protection, management, and control services normally provided by tape management systems for real tape processing are also provided for CA Vtape Virtual Volume processing.

An optional CA Vtape interface to CA 1 and CA TLMS provides enhanced stacking by expiration date and stacking location reporting. CA 1 and CA TLMS also automatically prestage Virtual Volumes into cache by issuing recall commands for the next volume in a multi-volume set.

Virtual Volume Dataspace

When a mount is requested for a Virtual Volume, a dataspace is created to process that unique combination of device and volume. These Virtual Volume dataspaces are built using 4 KB virtual storage pages or frames as units of data.

Virtual Volume performance is independent of the application data format or block size. Applications creating small block size data sets are typically not very efficient users of tapes and experience longer run times. When redirected to Virtual Volumes, CA Vtape will mask the inefficiencies of the small block size and reduce the application run time. However, these applications may require more Virtual Volumes and CA Vtape will use more CPU cycles to process them when compared with other applications writing the same amount of data with an optimized block size.

DASD Buffer

The DASD buffer or cache is defined as a DFSMS storage group or a list of DASD volumes. We recommend devices that provide many concurrent high-performance sequential operations and DASD control units with large numbers of channel paths.

You can share the DASD volumes with other applications, but we do not recommend it. Other applications accessing these volumes can cause significant contention when the DASD buffer is supporting high activity tape emulation.

The DASD buffer is where VSAM linear data sets (LDSs) are defined to hold the application data that is written to a Virtual Volume.

VSAM Linear Data Sets (LDS)

The DASD buffer volumes contain the cache linear data sets (LDSs) into which the application data is written by CA Vtape. These LDSs can be predefined, initialized, and added to CA Vtape with batch jobs and reused as needed or they can be dynamically defined and deleted by CA Vtape as needed. The predefined and reused-as-needed LDSs are known as static cache or static LDSs. The dynamically defined and deleted LDSs are known as dynamic cache or dynamic LDSs.

Static LDSs

Static LDSs are defined using a standard naming convention of *prefix*.VVE.LDS*nnnnn*, where *prefix* is a DSN prefix defined to CA Vtape during the Customization Process and *nnnnn* is a sequence number.

Static LDSs are all 40 MB, 80 MB, or 200 MB depending on the 400 MB, 800 MB, or 2000 MB, Virtual Volume size chosen during the Customization Process. The Customization Process generates the JCL required to define and format the appropriately sized LDSs based on the chosen Virtual Volume size.

Ten LDSs are used to support a Virtual Volume mount request. After the application data set on the Virtual Volume is closed and the Virtual Volume is dismounted, unused LDSs are released for use with other Virtual Volume mount requests.

Any subsequent opening of the Virtual Volume causes the originally used LDSs to be opened, plus enough free LDSs to restore the total LDS count back to 10. This allows any modifying process to use the full 400 MB, 800 MB, or 2000 MB Virtual Volume capacity.

Dynamic LDSs

Dynamic LDSs are defined using a standard naming convention of *prefix*.VVE.V*volser*.MM.CACHE where *prefix* is a DSN prefix defined to CA Vtape during the Customization Process and *volser* is the Virtual VOLSER.

These LDSs are dynamically defined using customized parmlib attributes whenever a Virtual Volume scratch mount or a recall from tape is processed.

A Virtual Volume always resides in a single LDS. If the application MODs to a Virtual Volume, the LDS containing that Virtual Volume will take secondary extents and span to another DASD volume if required. Alternatively, the current Virtual Volume is kept and a scratch Virtual Volume is mounted, causing a new LDS to be defined. After the application data set is closed and the Virtual Volume is dismounted, any control areas (CAs) within the LDS that do not contain data will be freed.

The dynamic LDSs can vary from 12 MB in size up to the chosen Virtual Volume Size depending on the amount of application data written. The Virtual Volume Size chosen is used as a maximum size limit. When the chosen size is reached, the current Virtual Volume is kept and another scratch Virtual Volume is mounted, creating a multiple volume tape data set.

Dynamic LDSs support Virtual Volume Sizes of 400, 800, 2000, 4000, 8000, and 16000 MBs.

Finding an LDS

Because they are VSAM data sets, the LDSs must be cataloged. It is through the catalog that CA Vtape finds its static or dynamic LDSs. The CA Vtape control data sets do not contain DASD volume names or addresses for the LDSs. This allows the LDSs to be moved to different DASD volumes with standard storage management utilities without requiring a control data set update or a proprietary utility.

Cache Monitor

The CA Vtape Cache Monitor is a set of subtasks running in the SVTS or primary address space. These subtasks monitor DASD space or cache occupied by Virtual Volumes queued for Externalization, free-able DASD space occupied by Virtual Volumes previously Externalized, and available DASD space within the DASD buffer.

When Dynamic Cache Management is active, the subtasks invoke the DFSMS ACS routines to determine the storage groups assigned to the dynamic cache storage class. The storage groups returned by DFSMS are then processed using IDCAMS DCOLLECT to determine the available DASD space.

These subtasks determine when the automated Externalization or stacking subgroup queues should be released or held and when Virtual Volumes should be deleted from the cache.

In a CA Vtape Complex where multiple subsystems are sharing the same DASD buffer, a flag is set in the control data set to inform all the subsystems in the complex when one subsystem is doing space management. This prevents multiple subsystems from performing space management at the same time on the shared DASD buffer.

Virtual Volume Compression

Virtual Volume compression lets you simulate Improved Data Recording Capability (IDRC) for CA Vtape Virtual Volumes by compressing the data as soon as the Virtual Device Engine receives it from the application and prior to writing it to a cache LDS.

There are multiple advantages to compression:

- Compressed Virtual Volumes occupy less DASD buffer space.
- The effective increase in Virtual Volume capacity allows CA Vtape to manage more application data.
- Compressed data requires fewer I/Os to read or write at the expense of some additional CPU overhead needed to perform the actual compression or expansion of that data.
- The Backstore Engine and the RECYCLE function do not expand or compress the copied data. Their runtimes and resource consumption are reduced correspondingly by the percentage of compression achieved.

Note: The additional CPU overhead required as well as the compression rate achieved is a function of the data. While it was common during our own benchmarks to see 2-to-1 compression rates, you may not get the same amount of compression.

The CA Vtape compression routines use a combination of techniques including the run length limited (RLL) processing facility, the hardware compression facility as described in the IBM publication *Enterprise* Systems *Architecture/390 Data Compression, SA22-7208*, and LZ compression through hardware instructions, software instructions, or both. When Virtual Volume Compression is enabled, the Virtual Device Engine periodically analyzes the data written to a Virtual Volume to dynamically select the most efficient compression technique.

Volume Count

A volume count parameter is required by the operating system when more than five tape volumes are mounted for a single Data Definition (DD) name. An application that writes a full 3490E tape that was compressed with IDRC will require a volume count parameter when it is switched to write to uncompressed 400 MB or 800 MB Virtual Volumes.

Virtual Volume Compression reduces the need to code volume count parameters in application JCL.

Using 2000, 4000, 8000, and 16000 MB Virtual Volumes reduces the need to use Virtual Volume Compression and increase CPU usage, while also reducing the need to code a volume count parameter in application JCL.

Externalization to Tape

When a Virtual Volume is dismounted, it is queued to a stacking group that is processed by the Backstore Engine. The stacking group chosen is the one assigned by the filter that caused CA Vtape to intercept the tape mount request.

If an application data set goes to multiple volumes, the previous Virtual Volume will be queued for Externalization while the next Virtual Volume is being written. This allows the Backstore Engine to Externalize large data sets more quickly to keep the percentage of reusable space in the DASD buffer as high as possible.

After the Virtual Volume is Externalized, it is placed on a queue so its DASD space can be reused when needed to support a new virtual mount request.

The tapes written to by the Backstore Engine during Externalization are collectively referred to as the Backstore Tapes. These tapes can be any mainframe virtual or physical tapes, but not CA Vtape tapes. In other words, CA Vtape will not Externalize its Virtual Volumes to itself.

Externalization Groups and Subgroups

The Externalization Groups, assigned by the mount interception filters, are a way to associate data with similar storage management objectives. Test, production, and system data can be assigned to different groups, like they are assigned to different storage groups or pools on DASD.

The different groups can be customized to meet the storage management requirements of the data. Test may not be encrypted and may have only a single copy created when Externalized. Production may be encrypted and have two copies created when Externalized.

Each group is automatically broken down into three subgroups: Short, Medium, and Long. The expiration date of the data written to the Virtual Volume determines which subgroup is assigned. The expiration dates and retention periods used for the breakdown can be customized in the Group Definitions.

The group definitions also contain prioritization and cache residence attributes which allow you to influence which group is Externalized first and how long to keep one group's Externalized Virtual Volumes in cache versus another. This allows you to fine tune the Externalization process and which Virtual Volumes remain available in cache for immediate reuse.

Note: For a complete description of the Group Definitions, see the chapter "The Parameter Library (PARMLIB)" in the *Configuration Guide*.

Virtual Volume Free Queue

As the number of Virtual Volumes written increases, a point is reached where little or no unused DASD space exists in the DASD buffer to support new mounts. When this happens, space is automatically freed for reuse.

To determine which space can be safely reused, CA Vtape maintains a queue of all Virtual Volumes that have been Externalized to tape, called the free queue. Virtual Volumes that have not been Externalized are not queued because their LDSs contain the only copy of the application data written.

When an Externalized Virtual Volume is read from the DASD buffer, it is removed from the free queue in case the data is modified, which would require that it be Externalized again. When closed, an unmodified Virtual Volume is requeued at the bottom of the free queue. When closed, a modified Virtual Volume is queued for Externalization. After being Externalized, the Virtual Volume will be queued at the bottom of the free queue.

As a result, Virtual Volumes that are remounted migrate to the bottom of the queue, while Virtual Volumes that are never remounted migrate to the top of the queue. It is these least-recently used Virtual Volumes at the top of the queue that have their space reused to support new virtual tape mounts.

By maintaining the most frequently used Virtual Volumes in the DASD buffer, CA Vtape eliminates the tape mounts required to read the Externalized version of the Virtual Volumes.

Creating Tape Data Sets

When allocation processing for a new data set occurs at the operating system tape selection exit (Subsystem Interface 78), CA Vtape decides whether or not to intercept the allocation by accessing Data Set Name Filters and Data Class Filters.

Note: For more information about filters, see the chapter "Tape Mount Intercept Filters" in the *Configuration Guide*.

If the data set to be written matches an entry in the selection filters, CA Vtape marks all devices, except the Virtual Devices, ineligible in the Eligible Device List (EDL). If no matching entry is found in the selection filters, the Virtual Devices are marked ineligible. The System Resources Manager (SRM) then selects an eligible device from the modified EDL to service the allocation request.

If the esoteric or generic specified in the UNIT parameter does not contain Virtual Device addresses, CA Vtape leaves the EDL unmodified.

If the UNIT parameter contains a specific device address defined as a CA Vtape Virtual Device, this device address will be used whether or not the data set matches an entry in the selection filters. CA Vtape is forced to service the mount request.

Note: Oracle's HSC, CSC, and SMC software also modify the EDL to influence tape allocation requests. If this software is not modified for the presence of CA Vtape, it can prevent CA Vtape from intercepting any allocation request by always marking the Virtual Devices ineligible. For the appropriate Oracle software changes, see the chapter “System Setup” in the *Configuration Guide*.

After SRM selects a Virtual Device for a new tape data set, the Virtual Device Engine detects the actual mount request, acquires the necessary space from the DASD buffer pool, and creates the Virtual Volume dataspace.

Using Existing Tape Data Sets

When allocation processing occurs at the operating system tape selection exit (Subsystem Interface 78) for an existing data set residing on a CA Vtape Virtual Volume, all devices except the CA Vtape Virtual Devices are marked ineligible in the Eligible Device List (EDL).

Note: The esoteric or generic specified in the UNIT JCL parameter or in the device type field of the data set catalog entry must contain Virtual Device addresses. If not, CA Vtape will not be able to intercept the mount request.

SRM selects the actual device from this list and requests a mount for a specific Virtual Volume on the selected Virtual Device. The Virtual Device Engine initiates the allocation process by checking where the Virtual Volume resides. If it is found in the DASD buffer, it is mounted. If not, the Virtual Device Engine sends a request to the Backstore Engine to start the Recall process from a Backstore tape.

To locate the appropriate Backstore tape, the Backstore Engine searches the ICF catalog for the standard name used for Externalized Virtual Volumes. The standard name is *prefix*.VVE.V*volser*.*type*, where *prefix* is the DSN prefix defined for CA Vtape use, *volser* is the required Virtual Volume, and *type* can be PRIMARY or DUPLEX. If no entry is found, an EOV is written to the cache LDS and the mount is completed.

Note: A PRIMARY Backstore tape will be selected by default. A DUPLEX tape will be automatically requested when cataloged if a PRIMARY tape is not cataloged. You can change the selection order in the Backstore Engine by issuing the SET RECALL console command. For more information about the SET RECALL console command, see the chapter “Console Commands.”

Note: If the USS Backstore feature is active, the mounted file systems are also used as recall sources. The SET RECALL console command can be used for these recall sources also.

After the ICF catalog entry is found, the corresponding Backstore tape is mounted and positioned to the requested physical block. After the Virtual Volume is opened and the Recall process has begun, the Virtual Volume mount request is satisfied and data begins passing to the Virtual Device and the application.

Note: The Virtual Volume mount is delayed until the Virtual Volume is fully restored to the DASD buffer if the subsystem the Virtual Device belongs to is configured as a Recall client.

Close Processing

All data is written to the Virtual Volume LDSs before allocation close or any tape mark processing is allowed. This ensures data integrity and tape position synchronization between the application and the Virtual Volume LDSs at the appropriate times.

Sense Processing

CA Vtape provides sense and error recovery information emulating a simple 3480 or 3490 device. The sense data emulates multi-path, non-automated drives without autoloaders.

Multivolume Output Processing

CA Vtape forces an End-of-Volume condition during output processing for the following conditions:

- At the end of a Virtual Volume.
- When the number of physical blocks written to the Virtual Volume exceeds 500,000.
- When the number of files written to a 400 MB or 800 MB Virtual Volume reaches 256 or reaches 9999 for all higher capacity Virtual Volumes.

Multiple File Processing to Virtual Volumes

Multiple file processing or stacking to Virtual Volumes is supported, but not normally needed for application data sets. Media is not wasted since CA Vtape provides automatic stacking of the Virtual Volumes on Backstore Tapes.

Stacking to Virtual Volumes make sense when running backup jobs which write a data set for each data set or table being backed up. A job backing up 100 data sets or tables writing one data set or table per Virtual Volume would need to have 100 cache LDSs defined, 100 scratch VOLSERs selected, 100 VOLSERs updated in the Global VCAT, and so on. If the data sets or tables would fit on five full Virtual Volumes if stacked, the time spent performing these tasks would be reduced by 95%. These types of jobs will run faster when stacking versus when they are not stacking.

CA Vtape limits the number of files per Virtual Volume to 256 for 400 MB and 800 MB Virtual Volumes to avoid recall performance and recovery implications. When file 256 is written, an end of volume condition is presented by CA Vtape and a volume switch is done. The higher capacity Virtual Volumes have a limit of 9999 files per Virtual Volume.

If more than one data set is written to a Virtual Volume, all of them will assume the same Externalization group as the first data set on the volume. This occurs for the second and subsequent data sets regardless of the Externalization group assigned by the Data Set Filter List or Data Class Filter List. The subgroup for all the files residing in the same Virtual Volume is determined by information returned by the tape management system or the file with the longest retention period within the first 32 files.

Uncataloged Data Sets

Uncataloged data sets written to Virtual Volumes are supported in the same way as all uncataloged tape data sets. To mount this volume again, a VOL=SER reference is required in your JCL or dynamic allocation.

Temporary Data Sets

Temporary data sets can be written to Virtual Volumes, whether dynamically allocated or explicitly specified by the user. Create a Data Set Filter or a Data Class Filter for the system-generated data set name.

Unit Affinity and GDG Base Referral Processing

Unit Affinity and GDG base referral processing are supported.

In situations where unit affinity, explicitly coded or implied, mixes CA Vtape Virtual Devices and non-CA Vtape devices, the affinity is broken but maintained within the device type. For example if a GDG has some generations on 3490E physical tape and some generations on Virtual Volumes, one physical drive and one Virtual Device will be required to read all generations with a GDG base referral.

Reference Backward Processing (Refer Backs)

Refer back processing is the referencing of a previous DD and is supported if all of the data set names reside on CA Vtape Virtual Volumes.

Concatenation Processing

Concatenation processing can have references in the same step to a data set both serviced and not serviced by CA Vtape. We recommend that you use Unit Affinity when concatenating Virtual Volumes to minimize the number of Virtual Devices allocated and avoid conflicts during the tape allocation process.

Special Processing Conditions

The following special processing conditions exist:

OPTCD=W

Specified in JCL; causes *Tape Write Immediate*, which, on physical 3480s and 3490s, forces a physical write to tape before returning channel end and device end to the host. CA Vtape processes OPTCD=W if requested; however, some records may be in flight and not yet saved in the DASD buffer when channel end and device end are returned to the host.

OPTCD=C

Specified in JCL; forces *channel command chaining* and is accepted by CA Vtape.

OPTCD=Z

Specified in JCL; indicates shortened error recovery for physical tapes. This OPTCD is accepted by CA Vtape but does not affect processing.

LABEL=n

Use of tape label types not supported by the Tape Management System (that is, LABEL=AL) may result in the Tape Management System exhausting all available virtual tapes. Use of unsupported label types, whether for a specific or a nonspecific volume request, should be avoided.

Backstore Engine for Externalization and Recalls

All processes related to stacking on and recalling from the Backstore Tapes are controlled by the Backstore Engine running in its own address space (default name SVTSAS.SVT1PT). The Backstore Engine can be restarted without impacting Virtual Device processing.

The Backstore Engine can be configured in the following different ways:

- Perform Externalization just for its owning subsystem
- Perform Recalls just for its owning subsystem
- Perform Externalization and Recalls for its owning subsystem
- Perform Externalization and Recalls for all subsystems in a CA Vtape Complex
- Not perform Externalization and Recalls.

Backstore Engines that perform Externalization are referred to as Externalization Servers. Backstore Engines that perform Recalls are referred to as Recall Servers. Backstore Engines that perform Externalization and Recalls are referred to as Externalization and Recall Servers. Backstore Engines that cannot perform these functions are referred to as Clients.

Note: For more information, see the chapter “The Backstore Engine” in the *Configuration Guide*.

Recalls are independent of the requestor, meaning utilities such as IEFBR14 will finish processing and release the initiator even when all or part of the recalls generated during its execution are still in progress. Canceled or failing jobs will finish and the Recall process will continue. When the job is executed again, the Virtual Volume will be found in the DASD buffer.

When a mount requires the Virtual Volume to be recalled, depending on the CA Vtape Recall Server configuration, applications may need to wait until the Virtual Volume is fully recalled to the DASD buffer. If the CA Vtape Subsystem which mounted the Virtual Volume is performing the Recall, the application can access the data while it is being recalled. If the CA Vtape Subsystem which mounted the Virtual Volume is not performing the Recall, the application can access the data when the Virtual Volume is fully recalled to the DASD buffer.

Recalls, for Virtual Volumes opened for update, stop when the block to be read has been Recalled. Data or tape marks beyond the block to be updated are not recalled because they will be rewritten.

When a Recall is in progress by the Recall Server, all of the other subsystems in the CA Vtape Complex will be notified. Incoming Recalls for the same Virtual Volume on any of those subsystems will be queued and automatically completed when the first Recall completes.

The Backstore Engine provides support for shops managing their tape devices through CA MIM or IBM GRS in a sysplex or a non-sysplex environment and also to nonshared implementations where tape devices are dedicated to each LPAR. CA Vtape will query the operating system for the status of the desired devices and drive an allocation request depending on the setting of the BypassOfflinePhysicalDevices parameter in the VTPARMS parmlib member.

You can safely and immediately stop Externalization and Recall tasks using console commands. Using these commands, tasks will stop even when hardware errors are impeding the proper access to tape devices or output media. If all active tasks must be immediately stopped, you can restart the Backstore Engine. In all these scenarios, CA Vtape Virtual Devices are not affected.

Note: For more information about stopping tasks and restarting the Backstore Engine, see the SVT*n* STOP PTaskid and Restart Backstore console commands in the chapter “Console Commands.”

Recall Sources

The Backstore Engine can stack the Virtual Volumes on a Primary tape, a Duplex tape, and a Triplex Unix System Services (USS) File System. When the Peer-To-Peer Option is licensed and configured, the Remote Backstore Engine can create the same copies. All of these Backstore Copies of Virtual Volumes are Recall Sources, copies of the Virtual Volumes that can be used by a Recall Server.

When running with Dynamic Cache Management, CA Vtape maintains counters for Recall Sources, and establishes a hierarchy for automatically moving through these sources should a recall attempt fail. Recall works in conjunction with the SET RECALL command, and the RecallAttemptsThreshold and OffsiteBackstoreCopy definitions to determine when a Recall Source change should occur and what Recall Sources are eligible.

RecallAttemptsThreshold limits the number of times a Recall is attempted from any one Recall Source. Once the threshold is exceeded, if another Recall Source is available, Recall will attempt to use it. Once all Recall Sources have exceeded the threshold, the Virtual Volume will be mounted as an empty volume and the application will take an sx13 ABEND.

OffsiteBackstoreCopy determines if any Recall Source should be excluded from Recall processing. A Recall Source that has been sent off-site and vaulted can be excluded from Recall processing.

Setting or defaulting RecallAttemptsThreshold to zero disables this feature and Recall will always use the Backstore copy specified by the SVT*n* SET RECALL console command or the default of Primary, after applying the OffsiteBackstoreCopy exclusion rule.

Each time a recall is required, the user catalog defined for CA Vtape data sets is interrogated for Backstore Copies.

To minimize network traffic, local Recall Sources are always preferred over remote Recall Sources (Peer-To-Peer).

Multiple Volume Data Set Recall Support

When an application opens a data set that resides on a CA Vtape Virtual Volume, CA Vtape checks to see if the volume being mounted is in cache. If the volume is not in cache, it is recalled.

When an application is reading a multiple CA Vtape Virtual Volume data set, a recall may be generated for each Virtual Volume in the chain as each volume is mounted. This results in a series of short delays after each volume is mounted for the volume to be recalled.

These delays can be eliminated if CA 1 r11.5 SP5 or above or CA TLMS r11.5 SP3 or above is installed. With this support in place, when an application opens the first volume of a multiple CA Vtape Virtual Volume data set that is not in cache, a recall request will be generated for the first volume and the CA tape management system will check to see if the next two Virtual Volumes in the chain are in cache. If the volumes are not in cache, recall requests will be generated for them. When the second volume is mounted, the tape management system will check to see if volumes three and four are in cache. If not, recall requests will be generated for them.

Since the application will no longer experience the series of short delays, job run-times will be reduced.

Automated Tape Data Set Stacking

To improve the utilization of Backstore Tape volumes, CA Vtape automatically stacks Virtual Volume data. A Backstore Tape that is not filled, has its VOLSER saved so that it can be remounted when more Virtual Volumes need to be stacked.

Stacking Groups

The stacking groups are designed to provide a vehicle that allows data sets with similar characteristics and requirements to be stacked together. These groups are predefined with various attributes and are selected by Data Set Name Filters or DFSMS Data Class Filters. These filters are controlled by the CA Vtape administrator and require minimal ongoing management when using stable naming conventions.

Each group is broken down automatically by expiration date into three subgroups to minimize fragmentation and the need to consolidate fragmented tapes. The expiration date breakdown is controlled by customizable attributes in the Group Definitions.

You can use the stacking groups to organize data by different categories. For example,:

- Copy requirements:
  - A primary copy for local use.
  - A duplex copy for Disaster Recovery.
  - A triplex tapeless copy for either local or Disaster Recovery use.
  - An export copy for shipment to a business partner.
- A separation requirement:
  - Ensure compliance with a shop standard that production and test data are not written to the same Backstore Tape.
  - Ensure that duplicate copies of a database log file are not written to the same Backstore Tape.

- Data type, so temporary volumes and sort work files remain in cache and can be deleted when they expire without being Externalized.

Note: Each group and subgroup combination uses separate Backstore Tapes during the Externalization process.

Thirty-two customizable groups are available. You can modify and refresh the group settings dynamically so that any combination of primary, duplex, triplex, and export copies can be written or not written by any group.

Duplex Copies

Duplexing provides a second copy of the data sets processed by that group. This provides 100 percent redundancy for media and Disaster Recovery.

Duplex copies can also be used with a different system, such as an off-site location, using another copy of CA Vtape.

We recommend the use of Duplex copies when the Primary copy is a high-capacity cartridge.

Note: Duplex copies are automatically accessed for Recalls if the primary copy is not cataloged or after the execution of the SET RECALL=DUPLEX console command.

Triplex Copies

Triplex can also provide a copy of the data sets processed by a group. The Triplex copy writes Virtual Volumes as individual files to the USS file system. The Network File System (NFS) is the intended file system for the Triplex copy, however zFS and HFS are also supported.

The Triplex copy can be the only copy or can be combined with primary and duplex copies to allow for up to three copies of a Virtual Volume. When specified alone, the Triplex copy allows for an installation to become tapeless for a given group.

Any NFS server supported by z/OS can be used. CA Vtape does not provide replication or data de-duplication directly but can exploit these features if provided by the NFS server.

Note: Triplex and Export copies are mutually exclusive.

Export Copies

Exporting creates a native format copy of the tape data sets. This format is directly readable by users. Original data set names are kept so these data sets are not cataloged to avoid catalog conflicts.

These copies are not managed by CA Vtape. They are created for sending to business partners or government entities that do not use CA Vtape.

The Stacking Process

As Virtual Volumes are stacked, CA Vtape catalogs the location of the primary and duplex copies using a generated data set name that contains the virtual VOLSER.

The stacking is performed by one or more Externalization tasks, each one processing a subgroup queue. Each task is dedicated to a subgroup queue. When that queue is empty the task stops. A new task is started to process a different subgroup queue. Multiple tasks can be started to process the same subgroup queue, depending on the amount of data in that queue. The maximum number of tasks that can be active for a subgroup queue is eight.

You can control the number of concurrent tasks for a subgroup by setting a threshold parameter for the corresponding group. The total number of concurrent tasks can also be controlled by limiting the number of drives Externalization is allowed to use.

Note: When writing to a USS file system the number of concurrent tasks may also be controlled.

Limiting the number of concurrent tasks that can be active increases the amount of time it takes for Externalization to stack a given amount of Virtual Volume data. This limits the amount of DASD buffer space that Externalization can make available for reuse to support new virtual mount requests.

When a subgroup queue is empty and a task stops, its drive or drives and the corresponding tapes are released. The VOLSERs and the last-used file sequence numbers are saved for use when new work is queued for this subgroup. At that time, a task is started, the tapes are remounted, and the next file sequence number is used. This pattern is repeated until the tapes are full.

The parameters that control the Externalization tasks can be found in the Group Definitions in parmlib. These parameters can be modified and refreshed dynamically.

Stacking to Virtual Volumes

If more than one data set is written to a Virtual Volume, all data sets on the volume are assigned to the same group as the first data set on the volume. The data set name or Data Class filter lists may indicate that these data sets should be assigned to different groups, but this will be overridden.

The override is required because Externalization works at the Virtual Volume level. It is a Virtual Volume that is queued for externalization and stacked, not the individual data sets.

Subgroup assignment is also overridden when multiple data sets are written to a Virtual Volume. The data set with the longest retention period determines which subgroup is assigned to the Virtual Volume.

Split Maintenance-Level Protection

CA Vtape allows its subaddress spaces to be restarted to clear error conditions that might otherwise cause a product outage. When this feature is active, the PTF levels of all modules will be reviewed when any subaddress space is restarted.

This ability also presents a challenge when applying maintenance. A subaddress space could be restarted using a different maintenance level than that of the other subaddress spaces. This is particularly problematic when PTFs have inter-module dependencies.

This problem is addressed by the Split Maintenance-Level Protection feature. Except when this feature is specifically disabled, during the restart of any subaddress space the PTF levels of all modules will be reviewed for any incompatibilities. If any discrepancies are found, warning messages will be displayed. Further, if Automatic or Library modes are selected to permit CA Vtape to manage the runtime loadlib, during startup the CA Vtape load modules will be copied at subsystem startup to a private library. This library will be used to start and restart the subaddress spaces. This effectively freezes the PTF level of the runtime code to prevent any changes from being introduced until CA Vtape is restarted.

System Logger

The System Logger was introduced in the operating system to centrally collect data generated by transactional applications and databases. CA Vtape creates log records for internal events. You can copy these log records to the system logger and use them for statistical reports and problem analysis. The CA Vtape Logger consists of two customizable components: the Internal and the External Logger.

Internal Logger

The CA Vtape Internal Logger uses a dataspace created at startup as a repository for the logger data. The size of the dataspace is determined by a parmlib attribute in the VTPARMS member. The default value is 8 MB. Any CA Vtape automatically generated dump or any manually requested dump generated by executing the CA Vtape STV*n* DUMP console command will include the Internal Logger data.

External Logger

The CA Vtape External Logger allows you to optionally offload the internal logger data to a system logger log stream. By implementing the External Logger, logged events can be kept for several days in the system logger log stream and copied to physical sequential data sets for archival. This feature is required for statistical reports and strongly recommend for use in diagnosing problems.

Volume Pool Definitions

Volume Pool Definitions make it possible to associate Virtual Volser ranges with specific pool names. The pool name can then be used to associate any of the defined ranges with specific data sets utilizing the Group and Filter Definitions.

Up to eight pools can be defined. Seven of the pools (POOL 1 through POOL7) are for your use and can be modified and refreshed dynamically. The eighth pool is reserved for CA Vtape use with the Peer-To-Peer option.

The Group Definitions are updated with the defined pools names. When a scratch mount is intercepted, the filter which caused the intercept assigns a group number and by association a pool name. The Volume Pool Definitions are then used to assign a scratch VOLSER from that pool to the mount.

Note: Volume Pooling is required when using control data sets that allow more than 510,800 Virtual Volumes to be defined.

Note: Multiple pool definitions are not supported under JES3. Under JES3 only one volume pool can be defined.

USS Backstore

USS Backstore allows a Triplex copy of a Virtual Volume to be written to or read from USS files instead of Backstore Tapes. The Network File System (NFS) is the intended file system for the Triplex copy but HFS and zFS file systems work as well.

The Triplex copy can be the only copy or it can be combined with Primary and Duplex copies to allow for up to three copies of a Virtual Volume. When specified alone, the Triplex copy allows an installation to become tapeless for a given Backstore Group. Any NFS server supported by z/OS can be used. CA Vtape does not provide replication or data de-duplication directly but can exploit these features if provided by the NFS server.

The NFS servers can be located locally or in a cold Disaster Recovery (DR) site. When the NFS servers offer replication we recommend one be located as close to the z/OS host as possible and the other in the DR site. If the NFS servers also offer data de-duplication then only unique data is sent across the wide area network decreasing network bandwidth requirements and shortening the synchronization window for when the data is available at the DR site.

CA Vtape P2P Option

The CA Vtape P2P Option is a separately licensed component which uses TCP/IP to provide real time remote duplexing of Virtual Volumes. TCP/IP is used to provide a geoplex environment where you can dynamically create the same Virtual Volume in independent CA Vtape Subsystems synchronously or asynchronously. The only thing shared between the two subsystems is a subset of the Virtual VOLSERs. Each subsystem can create its own Backstore Copies of the shared Virtual VOLSERs. One application of P2P would be to create Virtual Volumes for critical applications at a disaster recover site in real time without the need to physically transport tapes.

The CA Vtape P2P Option activates several subtasks that are not part of a non-P2P subsystem. These subtasks manage communications between the local (sending) and remote (receiving) subsystems and provide the following functions:

P2P Listener

This subtask manages remote TCP/IP connection requests. The P2P Listener routes connection requests to an appropriate P2P Server.

P2P Server

This subtask analyzes and processes remote transaction requests. P2P Servers handle transactions such as remote Virtual Volume file transfers, Client Drive connection requests (dial requests), issues remote commands and displays remote responses, and processes local commands which initiate or manage remote connections.

P2P Client Drives

These are local subtasks which provide real time duplexing for Virtual Volumes running on remote systems..

P2P EMCS (Extended Management Console)

This subtask establishes an EMCS console which is used to transmit remote console command responses back to the appropriate Remote System.

Chapter 4: ISPF Interface

This section contains the following topics:

Using the Main Menu

To start the CA Vtape ISPF Interface, execute the SVTSMON member from the CCUUEXEC library.

The Main Menu displays as follows:

```
---------------------------   CA Vtape   ---------------------

     Subsystem ID......... SVT1  (SVTn, where n is 1-8)
     Select one of the following:


     1  Group List         Display output group information
     2  Tape Devices       Display SVTS related tape devices
     3  Virtual Volumes    Manage virtual volumes
     4  Dataset List       Manage the dataset filter list
     5  Dataclass List     Manage the Dataclass filter list



     Enter PF3 to exit



  Option ===>
```

From the Main Menu, you can select the following items:

1 Group List

Shows information about the CA Vtape Externalization subgroup queues.

2 Tape Device

Shows information about the Virtual Tape Devices and physical tape drives in use by CA Vtape.

3 Virtual Volumes

Shows information about Virtual Volumes.

4 Dataset List

Shows information that you can use to display and manage the data set list filters. This option is deactivated when you use the parmlib-based enhanced filters.

5 Dataclass List

Shows information that you can use to display and manage the data class entries. This option is deactivated when you use the parmlib-based enhanced filters.

Using the Group Display Panel

By selecting option 1 from the Main Menu, information about the CA Vtape Externalization groups is displayed. These groups control whether Virtual Volumes are compressed when written to the DASD buffer and how they are Externalized to physical tape.

The following panel will be displayed:

```
Menu  Functions  Confirm  Utilities  Help

   File  Help
                    CA Vtape Group Display                 Row 1 to 13 of 32
 Command ===>       Line Commands: D=Detail S=Subgroups
                                   Q=Externalization Queue
  Display of defined Groups.           Max Drives:  5    In Use:  0
   Grp W Loc  Vol  Comp       ----- Backstore Unit ----- --- Sub Group ----
   ID# Q Rmt Pool# OPT        Primary  Duplex   Exp/Tri  Short   Med   Long
_    1 N Loc    1   N         T10PF    T10PF                15    60    >60
_    2 N Loc    1   N         T10PF    T10PF                15    60    >60
_    3 N Loc    1   N         T10PF             3490        15    60    >60
_    4 N Loc    1   N         T10PF    T10PF    3490        15    60    >60
_   11 N Loc    1   N         T10PF                         30    60    >60
_   12 N Loc    1   N         T10PF    T10PF                30    60    >60
_   13 N Loc    1   N         T10PF             3490        30    60    >60
_   14 N Loc    1   N         T10PF    T10PF    3490        30    60    >60
_   21 N Loc    1   N         T10PF                          7    60    >60
_   22 N Loc    1   N         T10PF    T10PF                 7    60    >60
_   23 N Loc    1   N         T10PF             3490         7    60    >60
_   24 N Loc    1   N         T10PF    T10PF    3490         7    60    >60
_   31 N Loc    1   N         SL859840                       0     7     >7
```

The information shown includes the following:

Max Drives

Maximum number of drives that the Backstore Engine can use concurrently.

In Use

Number of drives currently in use.

MAX USS

Maximum number of UNIX files that the Backstore Engine can use concurrently.

In Use

Number of UNIX files currently in use.

Grp ID#

Group number.

WQ

Whether or not work is presently queued for Externalization.

Loc Rmt

Indicates whether the Group is defined for local or remote (P2P) use.

Vol Pool#

Shows the assigned Volume Pool definition for the Group.

Comp Opt

Displays the HardwareCompressionOption parmlib attribute setting. Options are as follows:

Y

Yes (compression is active).

N

No (compression is not active).

JCL

The TRTCH parameter in your JCL or the default drive setting determines whether compression is used (compression is optional).

Primary

Device type or esoteric to use when creating a primary tape.

Duplex

Device type or esoteric to use when creating a duplex tape.

Exp/Tri

Device type or esoteric to use when creating the Export tape or USS when creating a Triplex copy.

Sub Group

Groups are broken down into three subgroups based on the ShortRetention, MediumRetention, CatalogControlSubgroup, NeverExpireSubgroup, and SpecialRetention parmilb attributes. The values for the ShortRetention and MediumRetention attributes are displayed. Options are as follows:

Short

Expiration dates less than or equal to this number of days.

Medium

Expiration dates greater than the Short number of days and less than or equal to this number of days.

Long

Expiration dates greater than the Medium number of days.

You can issue the following line commands in this panel:

D

Shows another panel listing the parmlib attributes defined for the selected Group.

Q

Shows another panel listing the Virtual Volumes waiting to be Externalized in the subgroup queues for this group.

S

Shows another panel listing the partially full Backstore Tapes used for this group that Externalization will remount for filling.

Cache Management and Scratch Pool Header Information

Multiple panels have the following common information displayed beneath the command line:

```
                        Panel Title        Row 1 to nn of mm

Command ===> _____________________________________________________

Cache Limit(MB)  76149     Cache Inuse(MB)  46578     MB Freeable 1604

Scratch  Pool1=161     Pool2=485     Pool3=1296    Pool4=n/a

         Pool5=n/a     Pool6=n/a     Pool7=n/a     Pool8=163
```

The information shown includes the following:

Panel Title

The title line of the page.

nn* of *mm

nn indicates the number of rows of information displayed on this panel and *mm* indicates the total number of displayable rows.

Cache Limit (MB)

Displays the total useable DASD buffer space.

Cache Inuse (MB)

Displays the total amount of space in the DASD buffer that is currently occupied by Virtual Volumes.

MB Freeable

Displays the total amount of space occupied by Virtual Volumes that have been Externalized and can be freed for reuse.

Scratch Pool*n*

Displays the number of Virtual Volumes in scratch status in Pool1 through Pool8. "N/A" is displayed for a pool that is not defined.

Using the Tape Device Status Display Panel

By selecting option 2 from the Main Menu, you can view information about all the Virtual Devices owned by this Subsystem and any tape devices in use by this Subsystem's Backstore Engine.

The following panel would be displayed for a Subsystem with nine Virtual Devices (3513-3517 and 3504-3506) that is currently Externalizing to physical drive (3702):

```
   Menu  Functions  Confirm  Utilities  Help
--------------------------------------------------------------------------------
   File  Help
--------------------------------------------------------------------------------
               CA Vtape Tape Device Status Display    Row 1 to 10 of 10
Command ===>
Cache Limit(MB)  76149     Cache Inuse(MB)  46578     MB Freeable 1604

Scratch  Pool1=161     Pool2=485     Pool3=1296    Pool4=n/a
         Pool5=n/a     Pool6=n/a     Pool7=n/a     Pool8=163
The following device list contains information on virtual tape and
physical devices allocated to CA-Vtape.
Volume  Dev#  Status      Devt  Jobname   # SIOs  SEQ#   Phy/Virt  %
n/a     3702  Mount Pd    349S  SVTSAS     11      0     Physical  0
n/a     3513              349S             14      0     Virtual   0
n/a     3514              349S             4       0     Virtual   0
n/a     3515              349S             14      0     Virtual   0
n/a     3516              349S             14      0     Virtual   0
n/a     3517              349S             4       0     Virtual   0
n/a     3518              349S             14      0     Virtual   0
n/a     3504              349S             14      0     Virtual   0
n/a     3505              349S             14      0     Virtual   0
n/a     3506              349S             14      0     Virtual   0
+-----------------------------------------------+-------------------------
|The cross-system information has been refreshed |
+-----------------------------------------------+
```

The information shown includes the following:

Note: For more information about Cache Limit (MB), Cache Inuse (MB), MB Freeable, and Scratch Pools, see Cache Management and Scratch Pool Header Information (see page 47).

Volume

Displays the volume serial number associated with the device.

Dev#

Displays the device number or unit address.

Status

Displays the status of the device.

Devt

Displays the device type.

Jobname

Displays the jobname that has the device allocated.

 # SIOs

Displays the number of Start I/Os to the device.

Seq#

Displays the file sequence number.

Phy/Virt

Displays "Virtual" for CA Vtape Virtual Devices and "Physical" for devices in use by the Backstore Engine.

%

For Virtual Devices always indicates zero. For devices used by the Backstore Engine, indicates how much of a Virtual Volume has been copied to the Backstore Tape.

Using the Volume Pool Display Panel

By selecting option 3 from the Main Menu, you can view the Virtual Volume information.

The following panel would be displayed for a Subsystem with Virtual VOLSERs 100000-131999 defined in its parmlib and split between Pool1, Pool2, Pool3, and Pool8:

```
                  CA Vtape Volume Pool Display        Row 1 to 6 of 32
Command ===>

Cache Limit(MB)  76149     Cache Inuse(MB)  61809     MB Freeable 0

Scratch  Pool1=127     Pool2=485     Pool3=1296    Pool4=n/a
         Pool5=n/a     Pool6=n/a     Pool7=n/a     Pool8=163

Virtual Volume Pool defined volume ranges. Use 'S' to show volumes
within the selected range. Scratch volumes are not displayed.

    1st Volid  Last Volid  Pool#
_   100000     100099        3
_   100100     100199        3
_   100200     100299        3
_   100300     100399        3
_   100400     100499        1
_   100500     100599        1
```

VOLSERs are displayed in sets of 100, *xxxx*00-*xxxx*99, from the lowest VOLSER defined to the highest VOLSER defined. The number of the pool the set of 100 VOLSERs is defined to is also displayed.

You can page up and down the list of 100 VOLSER sets with the ISPF Up and Down PF keys. If your paging default is cursor, you can reposition in the list by typing the number of lines to move on the command line and using the Up and Down PF keys. To display an individual Virtual Volume, type an (S)elect in front of the range of 100 Virtual Volumes containing the desired VOLSER.

The information shown in the Volume Pool Display panel includes the following:

Note: For more information about Cache Limit (MB), Cache Inuse (MB), MB Freeable, and Scratch Pools, see Cache Management and Scratch Pool Header Information (see page 47).

1st Volid

Displays the starting VOLSER in a set of 100 VOLSERs. A set always starts with vvvv00.

Last Volid

Displays the last VOLSER in a set of 100 VOLSERs. A set always ends with vvvv99.

Pool#

Displays the number of the pool in the parmlib Volume Pool Definitions Section that this set of VOLSERs is defined to.

Using the Virtual Volume Display Panel

The Virtual Volume Display Panel includes information about the compressed and uncompressed Virtual Volume size, and whether the Virtual Volume is resident in the DASD buffer. Only Virtual Volumes that are not in scratch status will be displayed.

The following panel would be displayed if an (S)elect was typed in front of range 100100-100199 and all VOLSERs in that range were in scratch status except VOLSERs 100171 and 100187:

```
                  CA Vtape Virtual Volume Display Panel     Row 1 to 2 of 2
Command ===>

Cache Limit(MB)  76149     Cache Inuse(MB)  47225     MB Freeable 2374

Scratch  Pool1=127     Pool2=485     Pool3=1296    Pool4=n/a
         Pool5=n/a     Pool6=n/a     Pool7=n/a     Pool8=163              R
Use S to display additional virtual volume data                           E
  Volid   Tape DSN                                VRM Cmp%  #MB Size Allo S
_ 100171+ ZOBKU01.SVTS61.P1802$W1                    2    0    8    8    0 N
_ 100187  SVTS120.QASVT4.G5197.PASS                  0    0  324  324    0 N
***************************** Bottom of data ******************************

The cross-system information has been refreshed
```

The information shown includes the following:

Note: For more information about Cache Limit (MB), Cache Inuse (MB), MB Freeable, and Scratch Virtual Volumes, see Cache Management and Scratch Pool Header Information (see page 47).

Volid

Virtual VOLSER number.

Tape DSN

Data set name associated with the Virtual Volume. If the volume contains multiple DSNs, a plus sign is shown next to its VOLSER. To view these additional DSNs, select the entry by placing an S next to the entry.

VRM

Stands for Version Release Maintenance. It is a value assigned to a level of code where a significant new feature or function was introduced. As Virtual Volumes are created, they are assigned the lowest VRM value required to properly support them. The assigned value is used during subsystem start up to ensure that the level of code being used can properly support the existing Virtual Volumes.

Cmp%

Percentage the Virtual Volume was compressed in the DASD buffer.

#MB

Uncompressed size of the Virtual Volume tracked in 4 MB segments.

Size

Compressed size of the Virtual Volume rounded to 4 MB.

Allo

Amount of DASD space allocated by the Virtual Volume.

Res

A flag that indicates if the Virtual Volume resides in the DASD buffer.

The (S)elect line command can be used to display additional information about individual Virtual Volumes. The following panel will be displayed:

```
Menu  List  Mode  Functions  Utilities  Help
  File  Help
------------------------------------------------------------------------------
                CA Vtape Virtual Volume Display Panel      Row 1 to 1 of 1
Command ===>  ____________________________________________________________


Volser . . . : 102246    Flags  . . . : 24800000  Number of TMs   5
Label Type . . . : 02    Group ID . . : 11  S     Dev Type . . : 78048081

Tape DSN                                          Rec Sz  BLK Sz  FM   Seq #
 SVTS.TGRP51.RETPD022                              100    22000   FB    1
****************************** Bottom of data ******************************
```

The information shown in the panel includes the following:

Volser

Virtual Volume being displayed.

Flags

A four-byte hexadecimal field comprised of the FLAG1, FLAG2, FLAG3, and FLAG4 fields. For more information about the flag settings and their meanings, see Virtual Volume Flag Fields (see page 53).

Number of TMs

Number of Tape Marks written to the Virtual Volume.

Label Type

For more information about Label Type settings, see Label Types (see page 54).

Group ID

Externalization group and subgroup.

Dev Type

The Virtual Volume device type.

Tape DSN

The first forty-four DSNs written to the Virtual Volume.

Rec Sz

Record size of the data set.

BLK Sz

Block size of the data set.

FM

Format type of the data set.

Seq #

File sequence number of the data set on the Virtual Volume.

Virtual Volume Flag Fields

The following table shows the Virtual Volume flag fields and their meanings:

Byte #	Binary	Hex	Meaning
VVEFLAG1	1000 0000	80	CANNOT BE FREED
	0100 0000	40	MUST BE EXTERNALIZED
	0010 0000	20	VVE IN CACHE
	0001 0000	10	DATACLASS LIST
	0000 1000	08	BYPASS BSDS
	0000 0100	04	PRIMARY
	0000 0010	02	DUPLEX
	0000 0001	01	EXPORT

Byte #	Binary	Hex	Meaning
VVEFLAG2	1000 0000	80	NOT SCRATCH
	0100 0000	40	NL SL LABELED
	0010 0000	20	MULTI VOLUME DSN
	0001 0000	10	GRR MANUALLY DEQUEUED
	0000 1000	08	WRITE PROTECT
	0000 0100	04	MORE THAN 44 DATA SETS
	0000 0010	02	HW COMPRESSION
VVEFLAG3	1000 0000	80	VVE SAVE REQUIRED
	0100 0000	40	RECALLING VVE
	0010 0000	20	VVE INITIALIZED
	0001 0000	10	RETRY LDS
VVEFLAG4	1000 0000	80	LDS ALLOCATED
	0100 0000	40	DIV INDENTIFIED
	0010 0000	20	DIV ACCESSED
	0001 0000	10	DATA SPACE CREATED
	0000 1000	08	MOUNTED
	0000 0100	04	RECALL ACTIVE
	0000 0001	01	MAPPED

Label Types

The following table lists the label types, settings, and meanings:

Label Name	Binary	Hex	Meaning
JFCDSEQN	1000 0000	80	DATA SET SEQUENCE NUMBER Specified
JFCBAL	0100 0000	40	AL: ISO/ANSI (ver 1) ISO/ANSI/FIPS (ver 3)
	0100 1000	48	AUL User labels and AL type labels
JFCBLTM	0010 0000	20	LTM LEADING TAPE MARK **Note:** OPEN/CLOSE/EOV and RESTART must space over a tape mark if one exists.

Label Name	Binary	Hex	Meaning
JFCBLP	0001 0000	10	BLP BYPASS LABEL PROCESSING
JFCSUL	0000 1010	0A	SUL STANDARD and USER LABELs
JFCNSL	0000 0100	04	NSL NONSTANDARD LABEL
JFCSL	0000 0010	02	SL STANDARD LABEL (default)
JFCNL	0000 0001	01	NL NO LABEL

Filter Modes

CA Vtape supports the following two filter modes:

- Basic
- Enhanced

In Basic mode, only one wildcard character is supported for data set names, a filter parmlib member is not implemented, and filter modifications are accomplished using the CA Vtape ISPF Interface.

Note: If you are running with Basic Mode, see the section Migrating from Basic to Enhanced Filters (see page 226).

In Enhanced mode, multiple wildcard characters are supported, allowing greater flexibility when defining Data Set Name Filter List entries. A filter parmlib member is used to implement Enhanced mode and filter modifications are accomplished using TSO edit and the SVT*n* REFRESH=FILTERS command.

Note: We recommend you use Enhanced mode.

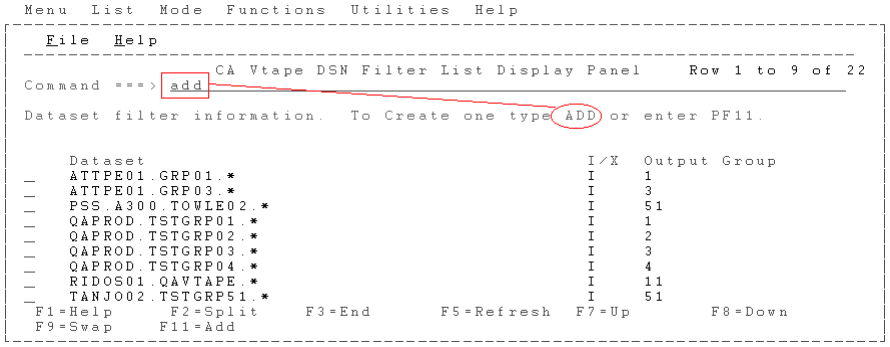
To avoid confusion, Enhanced mode deactivates the ISPF Interface Main Menu options 4 and 5.

Using the Data Set Filter List Display Panel

When you select option 4 from the Main Menu, the panel that allows you to manage the CA Vtape Data Set Filter List displays.

Note: If Enhanced filter mode is active, the Data Set Filter List Display Panel is disabled. To view the Data Set Filters, browse the appropriate filter list member in the parmlib. For more details about CA Vtape parmlib support and Enhanced filter mode, see the *Configuration Guide*.

The following illustration shows the DSN Filter List Display Panel:



The information shown includes the following:

Data set

The partial or fully qualified DSN used for filtering. Partial names must end with an asterisk (*).

I/X

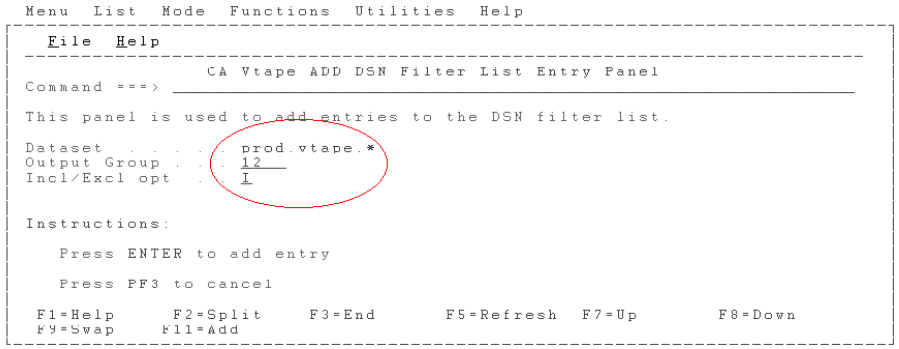
Specifies if the data set is included (I) or excluded (X).

Output Group

The associated Externalization group for the data set.

When you type the ADD command on the command line, the ADD DSN Filter List Entry Panel appears.

The following illustration shows the ADD DSN Filter List Entry Panel:



The information shown includes the following:

Dataset

The partial or fully qualified DSN used for filtering. Partial names must end with an asterisk (*).

Output Group

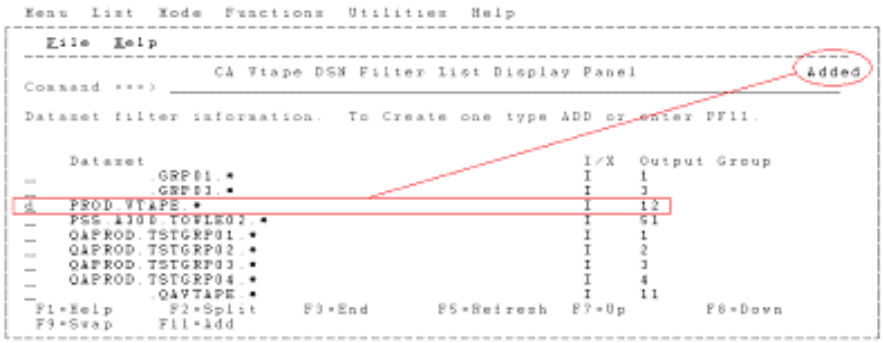
The associated Externalization group for the data set. The default is 1.

Incl/Excl opt

Specifies if the data set is included (I) or excluded (X). The default is to include the entry.

After you are done entering information, press Enter to accept the DSN filter into CA Vtape and the DSN Filter List Display Panel displays.

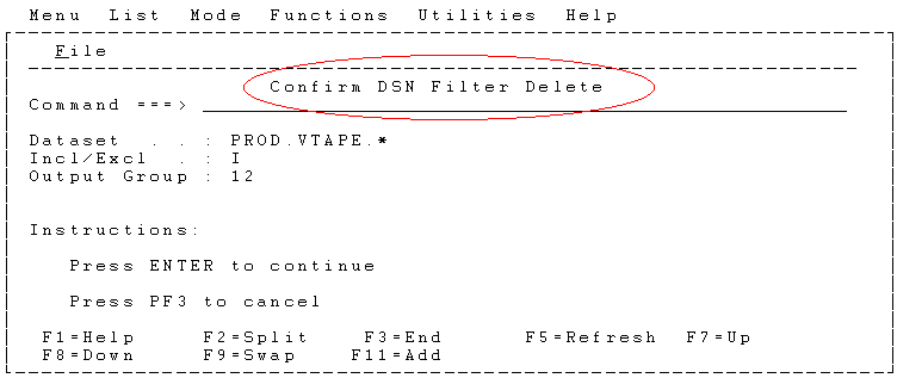
The following illustration shows the DSN Filter List Display Panel:



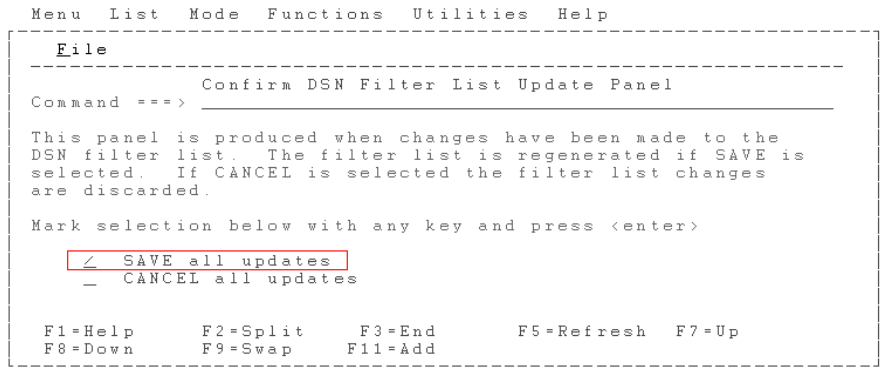
In the upper-right corner, the results of the ADD line command are shown. The Output Group for the new entry is shown as *12*.

To change a filter entry, you must delete the entry and then issue the ADD line command again. An example of the **d** or delete line command, to delete the DSN filter just added, is shown in the DSN Filter List Display Panel displayed above.

Pressing Enter in the DSN Filter List Display Panel (shown in the preceding illustration) opens the following Confirm DSN Filter Delete panel:



After you are done adding or deleting filters from CA Vtape, a final confirmation panel displays the following Confirm DSN Filter List Update Panel:



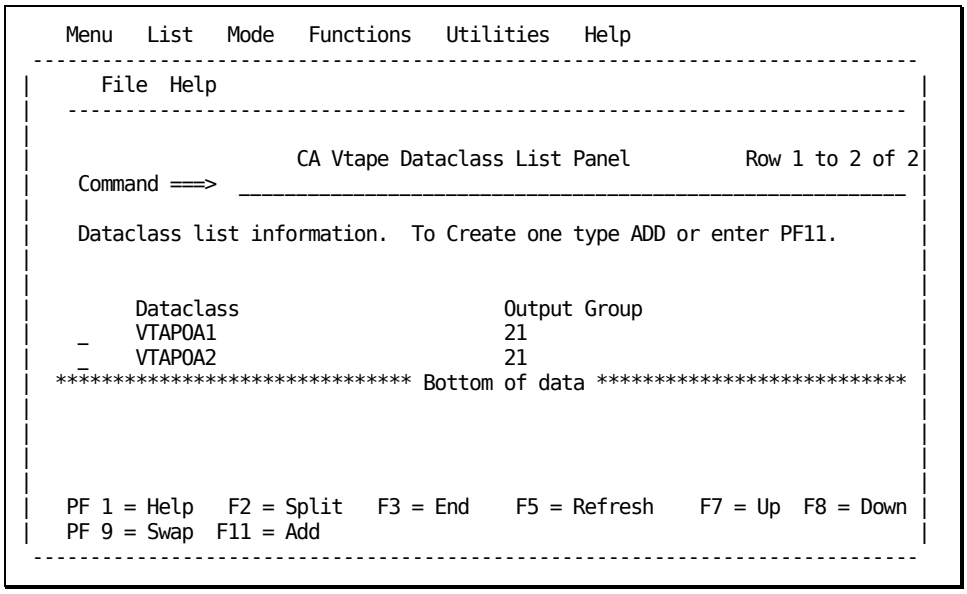
Select the SAVE option to save all the updates to the VCAT or select the CANCEL option to discard all changes during this session. A help panel is also available by pressing PF1.

Using the Dataclass List Panel

You can use IBM's DFSMS data classes to control CA Vtape tape mount interception. A one-to-one relationship is built between a data class and an output group. This relationship is defined by using the Dataclass List Panel. This also moves all of the filtering and selection process to the data class ACS (Automatic Class Selection) routines. This function allows a common point of control for storage management and these ACS routines allow for management by unit type, job name, program name, data set name, esoteric, and so on.

Note: If Enhanced filter mode is active, the Dataclass List Panel is disabled. To view the Data Class Filters, browse the appropriate filter list member in the parmlib. For more details about CA Vtape parmlib support and Enhanced filter mode, see the *Configuration Guide*.

To use a data class to select a CA Vtape group, select the Dataclass List by selecting option 5 from the Main Menu. The following Dataclass List Panel displays:



You can add or delete Data Class Filter entries using the same process as the DSN filter entries. A confirmation screen displays after changes are made to allow you to save or cancel the changes.

Wildcard characters and patterning are not allowed for Data Class Filters.

Chapter 5: Console Commands

This section contains the following topics:

Overview

This chapter describes the CA Vtape console commands to start and stop the product, set various operational parameters, display or monitor the product, and control the operation of the product.

All parameter settings are maintained across IPLs unless specifically noted.

Important! All of the examples in this chapter use the console command prefix SVT*n* where *n* is the appropriate CA Vtape subsystem number (that is, SVT1-8). If SVTS is used as the console command prefix, it will automatically be converted to SVT1. When issuing a console command to a CA Vtape subsystem other than SVT1, you must use the appropriate prefix. For example, to display Virtual Device activity for subsystem 3, SVT3 Display Active would be issued.

The following syntax conventions are used throughout this chapter:

Braces

{A | B}

Braces represent a set of multiple parameter values, one of which must be selected.

Brackets

[A] [B]

Brackets represent optional parameters that may be selected or ignored.

Single bar

A | B

A single bar is used to separate multiple values for the same parameter.

Underlining

A|B|C

Underlines are used to indicate the default value of a parameter.

Italics

nn

Text in italics represents a variable, for example Group=*nn* where *nn* is a number.

Uppercase

AAaaa

Uppercase characters indicate abbreviations or the minimum number of characters that must be entered to identify the parameter or value.

Start and Stop CA Vtape

Use these commands to start and stop CA Vtape.

START SVTS

The START command starts the CA Vtape subsystem which consists of one SVTS and multiple SVTSAS address spaces. The multiple SVTSAS address spaces consist of a utility address space (SVTSAS.SVT1UT), the Backstore Engine (SVTSAS.SVT1PT), and the Virtual Control Units (SVTSAS.SVT1V*n* where *n* is from 1-8).

Syntax

```
Start SVTS
```

There are two types of initializations that are automatically done, COLD and WARM. A COLD start is always done after an IPL. A WARM start is always done when CA Vtape is stopped and started when an IPL has not been done. In this situation CA Vtape detects that part of the subsystem is already initialized and reuses what is already in place. For a WARM start, fewer modules will be printed in the SVTS JOBLOG Resident Module List (RML) since some modules are found in memory and will not be loaded during the initialization.

After the subsystem is initialized, if the ONLINE attribute is coded in the VTDRIVE parmlib member, the Virtual Devices are varied online automatically. If the OFFLINE attribute is coded, the Virtual Devices must be varied online by issuing the following standard operating system device vary command:

```
Vary xxxx-yyyy,ONLINE
```

Where *xxxx-yyyy* is the range of Virtual Devices.

STOP SVTS

The STOP command stops the CA Vtape address spaces and brings down the subsystem.

If the Backstore Engine has an active subtask with a physical drive allocated, the subtask stops gracefully and the physical drive is released before the SVTSAS.SVT1PT address space is shutdown. If an application job or a started task has a Virtual Device allocated, the shutdown is delayed until the application job or started task completes its use of the Virtual Device and releases it. When the Virtual Device is released, the corresponding SVTSAS.SVT1V*n* address space will complete its shutdown.

During the shutdown, the Virtual Devices are automatically varied offline.

Syntax

```
stoP SVTS
```

Console Commands

The following CA Vtape console commands can be used to display CA Vtape parameter settings and activity, change the parameter settings, or initiate new CA Vtape activity.

The SVT*n* HELP console command displays the syntax for all valid commands.

Quick Reference List

The following list provides a quick reference of all the console commands with a brief description. Each command is discussed in greater detail following the list.

Note: In the following list, if the command description is prefixed by *BACKSTORE:, P2P:, PARMLIB***:,** or *USS Backstore*, then that command is for the Backstore, P2P, parmlib, or USS Backstore function.

ADD VVP=

Adds a set of 100 to 100,000 scratch Virtual Volumes to CA Vtape.

CHECK BACKstore

BACKSTORE: Overrides the five-minute internal timer and causes an immediate check of the Externalization subgroup queues for pending work.

DELETE VVP=

Deletes a set of 100 to 100,000 Scratch Virtual Volumes from CA Vtape.

Display Active | Backstore | Cache | CSA | FreeQ | Groups | Logger | Parmlib | PIN | POOLS | Status | Unit |

Display Virtual Device activity, Backstore activity, CSA utilization, Free Queue information, group information, logging information, parmlib information, buffer area information, Volume Pooling,status of non-parmlib options, and Virtual Control Unit and device information.

Display P2P

P2P: Displays the activities of the P2P Listener.

Display REMOTES

P2P: Displays remote system connectivity, transmits, receives, and file transfer activities.

Display USS

USS Backstore: Displays UNIX mount point information used by USS Backstore.

DUMP

Dumps all the address spaces that make up a CA Vtape subsystem and their dataspace information.

FreeQ Reset

Resets and reinitializes the cache free space queue used to monitor reusable space within the storage class.

HELP

Displays the syntax of all console commands on the console and system log.

MIHclear=

Used to interrupt a pending I/O for one Virtual Device.

MOUNT=

Redrives a mount request for one Virtual Device in mount pending status to reinitiate a Recall from Backstore Copies.

QUEUE Init | Reset

Initializes or resets the Externalization Server subgroup queues (GRRs).

REFRESH=FiLTers | GROUP | OPTION | POOLS

PARMLIB: Used to dynamically activate filter changes, group changes, Dynamic Options changes, or pool changes.

REFRESH=REMOTES

P2P: Used to dynamically activate parmlib changes for CA Vtape P2P Remotes.

REFRESH=USS

USS Backstore: Causes the SVTS address space to reload the USS Mount Point Section of parmlib.

Restart Backstore

BACKSTORE: Allows the Backstore Engine to be restarted to free all tape drive allocations and physical tape and tape enqueues, and any USS mount points.

Restart CMDmgr

Restarts the Command Manager.

Restart CU=

Stops all Virtual Device activity for the specified Virtual Control Unit, shuts down the corresponding SVTSAS subaddress space and automatically starts it again.

Restart Timermgr

Reset and restart all timer-related events.

Restart Unit=

Stops the activity for the specified Virtual Tape Unit (VTU), terminates the VTU task, and restarts the VTU without varying the device offline.

SET BACKstore=

BACKSTORE: Used to modify Backstore Engine processing.

SET CONSOLE=

P2P: Allows unsolicited console output produced by SVTS to be routed for display on a remote system.

SET CPU=

Allows the CPU mode to be changed from Standard to Isolation.

SET HSOPEN=

BACKSTORE: Activates or deactivates the high-speed open option used to open a Backstore Tape to the starting block ID of a stacked Virtual Volume.

SET IDRC=

BACKSTORE: Activates and deactivates IDRC compression support for Externalization.

SET MAXDRIVES=

BACKSTORE: Allows dynamic changes to the number of drives CA Vtape is able to use for Externalization.

SET MAXUSS=

USS Backstore: Changes the maximum number of concurrent UNIX files that the Backstore Engine can use to read or write Triplex USS files.

SET RECALL=

BACKSTORE: Overrides the default order during Recalls so that the Primary, Duplex, or Triplex source is selected first even if another catalog entry exists.

SET RECALL VVE=

BACKSTORE: Overrides the default order for the identified Virtual Volume so that during Recalls the specified source (Primary/Duplex/Triplex/P2P) is selected first regardless of the default Recall order or Group offsite rules.

SET THRESHOLD

This command temporarily overrides one of the Cache*Threshold parmlib attributes.

SET USS=UNMOUNT

USS Backstore: Causes the CA Vtape to dismount all the UNIX mount points defined to USS Backstore.

SET WRITPROT=

Allows Virtual Volumes to be placed in *read only* status.

SHUTDOWN

Stops the CA Vtape address spaces and brings down the SVTS subsystem.

START Group=

BACKSTORE: Allows Externalization to be started for a released group or subgroup.

START RECALL=

BACKSTORE: Allows a Recall to be started for a specific Virtual Volume.

STOP GROUP=

BACKSTORE: Allows Externalization to be stopped for a group or subgroup.

STOP PTaskid=

BACKSTORE: Allows a specific Backstore task to be stopped gracefully.

STOP RECALL=

BACKSTORE: Allows a Recall for a specific Virtual Volume to be stopped.

Xrecall Notify

This is an internal command used by the Recall Server to look for Recall requests and the Virtual Control Units waiting for a recall to complete the mount request. This command is not part of the SVT1 HELP display and is documented here for your information only.

Xrecall Reset

Reinitializes the common Recall Server area in the Global VCAT.

ADD VVP=

This command adds a range of scratch volume serial numbers in multiples of 100 from 100 up to 100,000.

The Virtual Volumes added by this command should be those that are reserved within the Tape Management System for CA Vtape use.

Note: This command is disabled when Volume Pooling is in effect. Volume Pooling is required if your control data sets can index more than 510,800 Virtual Volumes.

Syntax

SVT*n* ADD VVP=*xyyy*00-*xzzz*99
 Beginning VOLSER must end in 00.
 Ending VOLSER must end in 99

Where:

x

Is the first digit of the VOLSER range to be added and must always be the same character in the beginning and ending VOLSERs.

yyy* and *zzz

Are the remaining three characters of the range of VOLSERs to be added.

Note: If alpha characters are used in the beginning VOLSER, all digits to the left of and including the right-most alpha character must be duplicated in the ending VOLSER.

Examples of Valid Serial Numbers

SVT*n* ADD VVP=800000-899999

Adds 100,000 Virtual Volumes starting with 800000 and ending with 899999

SVT*n* ADD VVP=V00000-V29999

Adds 30,000 Virtual Volumes starting with V00000 and ending with V29999.

SVT*n* ADD VVP=VT0000-VT9999

Adds 10,000 Virtual Volumes starting with VT0000 and ending with VT9999.

Examples of Invalid Serial Numbers

SVT*n* ADD VVP=V00001-V99999

This is invalid because the starting VOLSER does not end in 00.

SVT*n* ADD VVP=850000-949999

This is invalid because the starting and ending VOLSERs do not have the same first character.

SVT*n* ADD VVP=VT0000-VZ9999

This is invalid because the right-most alpha character in the starting VOLSER is a T, making VT that portion of the starting VOLSER that must be duplicated in the ending VOLSER.

CHECK BACKSTORE

This command checks the Externalization subgroup queues for any Virtual Volumes requiring Externalization. The order in which the queues are scanned is determined by priority, subtask thresholds, cache utilization and drive usage.

The CA Vtape subsystem automatically checks for new work by executing this command when Virtual Volumes are dismounted, each time the SVT*n*D0908I cache warning threshold message is issued, when an Externalization subgroup queue is released, and every five minutes. Issuing the command manually causes an immediate check for new work.

To start Externalization for a specific group or subgroup, see the START GROUP (see page 108) command.

Syntax

```
SVTn CHECK BACKstore
```

DELETE VVP=

This command deletes a range of scratch volume serial numbers in multiples of 100 from 100 up to 100,000.

The Virtual Volumes to be deleted by this command must be in scratch status in the CA Vtape Global VCAT. If any of the volumes are not in scratch status, none of the volumes will be deleted and the following message is issued:

```
SVTnD1612E  Not all volumes in the range are in scratch status
```

Note: This command is disabled when Volume Pooling is in effect. Volume Pooling is required if your control data sets can index more than 510,800 Virtual Volumes.

Syntax

```
SVTn DELETE VVP=xyyy00-xzzz99
 Beginning VOLSER must end in 00.
 Ending VOLSER must end in 99.
```

See the ADD VVP= (see page 67) console command for the syntax to use when coding a range of VOLSERs.

DISPLAY ACTIVE

This command displays Virtual Device activity for all devices that are online.

Syntax

```
SVTn Display Active
```

Example of information displayed by the DISPLAY ACTIVE= command

```
SVT2 D A
SVT2X0200I Display Active Status Information 532
    Dynamic cache space 00064269/00033558/00006679 InUse=41%
    Static cache lds(s) 00013320/00006160/00005920 InUse=1%
 Dasd cache utilization 00077589/00039718/00012599 InUse=34%
 Scratch Virtual Volumes:
   Pool1=1121    Pool2=400     Pool3=301     Pool4=n/a
   Pool5=n/a     Pool6=n/a     Pool7=n/a     Pool8=864
     P Rmt  Volser Cua  ----Status---- Ds   Type Jobname  #I/O  Last
     0 n/a   n/a   3510                0    349S          147   100022
     1 n/a  100030 3511   I / O        211  349S DB2PR123 3758
     0 n/a   n/a   3512                0    349S          12    100019
     3 n/a  200102 3513  mounted       9    349S          401
     0 n/a   n/a   3514                0    349S          14    200010
     0 n/a   n/a   3515                0    349S          917
     0 n/a   n/a   3516                0    349S          18
     0 n/a   n/a   3517                0    349S          141
     0 Idle        R200 Idle
     0 Idle        R201 Idle
     0 Idle        R202 Idle
     0 Idle        R203 Idle
SVT2X0100I Command Complete
```

The example display documents that the SVT2 Subsystem is being converted from Static Cache Management to Dynamic Cache Management since both static and dynamic cache detail lines are displayed along with a total line. When a Subsystem is running with a single type of cache, only the total line (DASD cache utilization) is displayed.

The Subsystem has four Virtual Volume Pools defined, pools 1, 2, 3 and 8. The number of available scratch volumes available in the pools are 1121, 400, 301, and 864 respectively.

The Subsystem has eight local drives (3510-3517) and four remote client drives (R200-R203) currently online. The presence of a pool 8 definition and the remote drives indicates that this Subsystem is running with the CA Vtape P2P Option activated and will transmit certain Virtual Volumes to a remote Subsystem running in a different CA Vtape Complex.

Only two Virtual Volumes are currently mounted. VOLSER 100030 from pool 1 is mounted on device 3511. Data set number 211 is currently being written to 100030 by job DB2PR123. A total of 3758 I/O's have been performed by this job to this Virtual Volume.

VOLSER 200102 from pool 3 is currently mounted on device 3513. Nine data sets were written to 200102 in 401 I/O's. Since the Jobname field is blank, this VOLSER is not currently in use. The job that last used it retained it on the device instead of dismounting it. Just like a physical tape drive, when this device is needed again, the operating system will automatically dismount the retained Virtual Volume.

DISPLAY BACKSTORE

This command displays details about active Backstore tasks. The information includes work in progress, status, work queued for a task, and tape devices in use.

Syntax

```
SVTn Display Backstore
```

Example of information displayed by the DISPLAY BACKSTORE command

```
SVT2 D B
SVT2X0100I Command Complete
SVT2A1600I 331
Task Module TCB LDS Description
01 SVTSPTU 007F9110 01 Writing   100001
                       Status:  Opening Tape
                       Queued:  Writing    - Group=62 Subgroup=S
                       Dataset  DDname   Devn Volser Seq  SIOs  %
                     (E)PRIMARY  SYS00001 3725 540572 0001 00050 000
                       DUPLEX   SYS00002 3706        0000 00013 000
SVT2A1603I Tasks(01) Drives Inuse(02) Max Drives(12) 332
           Bypass Offline(Y) FullMaxdrivesEnforcement(N)
           RecallServer(Client)

SVTn D B
SVTnX0101I Command Scheduled in SVTS
SVTnX0100I Command Complete
SVTnA1600I 219
Task Module TCB LDS Description
01 SVTSPTU 006E5878 01 Writing 104918
                       Status: Export IO
                       Queued: Writing - Group=12 Subgroup=S
                       Dataset DDname Devn Volser Seq SIOs %
                     (E)PRIMARY SYS00021 074B 509521 0009 00166 100
                     (E)DUPLEX  SYS00022 0750 502920 0010 00166 100
                       EXPORT  SYS00023 0748 505157 0001 01635 087
SVT2A1603I Tasks(01) Drives Inuse(02) Max Drives(12) 332
           Bypass Offline(Y) FullMaxdrivesEnforcement(N)
           RecallServer(Client)
```

Notable facts about the sample output:

- Only one task, task 01, is currently active. Up to 99 tasks can be active and displayed. Once assigned a task number the task number is kept through the life of the task. If task 01 is for Externalization, task 02 is for Recall, and task 03 is for Externalization, when the Recall task completes, the command will display tasks 01 and 03.
- The purpose of the displayed task is to Externalize Virtual Volume 100001 which is assigned to Group 62, Subgroup Short.
- Duplexing is active for this group since PRIMARY and DUPLEX tape lines are being displayed.
- The tape line display includes the DD name, device number, tape VOLSER, tape file sequence number, number of Start I/O's, and percent of the Virtual Volume that has been externalized. If half of the Virtual Volume had been externalized when the Display Backstore command was issued, the percent displayed would be 50.
- The tape currently being opened by the task is for the DUPLEX since the DUPLEX VOLSER is not filled in, yet.
- The **(E)** at the start of the PRIMARY and DUPLEX lines indicates that these tapes will be encrypted.
- The display is completed with an environmental summary of the total active tasks, the number of tape drives in use, and various parmlib attribute settings that directly relate to the Backstore Engine.
- Since the Backstore Engine being displayed has RecallServer=Client set, it will normally not display a Recall task since Recalls will be performed by the Backstore Engine running with RecallServer=Server.

DISPLAY CACHE

This command displays cache usage within the storage groups associated with the storage class used to dynamically allocate space for Virtual Volume data sets. If the optional command parameter is not specified and the total space defined in the storage groups used for the CA Vtape cache is less than one terabyte, the space will be displayed in megabytes. If the space is equal to or greater than one terabyte, the display will be in gigabytes.

Syntax

```
SVTn Display Cache [,{Gb | Mb}]
```

Gb

Specifying the optional command parameter Gb displays all cache values in gigabytes regardless of the total space defined in the storage class.

Mb

Specifying the optional command parameter Mb displays all cache values in megabytes regardless of the total space defined in the storage class.

Example of information displayed by the DISPLAY CACHE command

```
SVT7 D C
SVT7X2004I Cache Information Display  199
 Cache free space threshold... 90%
 Cache DSN prefix.............. SVTS120.VT3
 Dynamic cache (SMS constructs defined in Global):
     Data class................ DCLOANV
     Storage class............. SCLOANV
 Dynamic cache (SMS constructs returned by ACS):
     Data class................ DCLOANV
     Storage class............. SCLOANV

 Storage Groups                   MB.Alloc    MB.Free   MB.InUse Use%
 ------------------------------------------------------------------------
 SGLOANV1                           75,790     29,646     46,144  60%
 ------------------------------------------------------------------------
 Total: 16 cache volumes            75,790     29,646     46,144  60%

 Useable Storage Recap            MB.Alloc    MB.Free   MB.InUse Use%
 ------------------------------------------------------------------------
 Dynamic cache space                64,269     25,139     39,130  60%
   Not Freeable                        n/a        n/a     27,454  42%
   7 Unexpired Volumes                 n/a        n/a      9,175  14%
   5 Expired Volumes                   n/a        n/a      2,501   3%
 ------------------------------------------------------------------------
 Total: Cache utilization           64,269     25,139     39,130  60%

SVT7X0100I Command Complete
```

The *Storage Groups* section of the display is composed of totals determined by using an IDCAMS DCOLLECT for the CA Vtape Storage Group. The amounts returned are track-based or raw storage totals.

The *Useable Storage Recap* section of the display is composed of totals determined by taking the track-based amounts and adjusting them for the actual VSAM Linear Data Set (LDS) allocations. The Dynamic LDSs are allocated in 16 KB blocks. Three blocks will fit on each 3390 DASD track for a total of 49512 bytes. Because each track is 56664 bytes in size, an LDS only uses 86.7% of the track ((49512/56664) * 100).

Partial space-release also requires an adjustment to the track-based amounts. Idle space can be released only at the VSAM Control Area (CA) boundary. Only empty CAs can be released.

The LDSs have a CA of one cylinder or 15 tracks. If one data record is written to a CA, the 14 empty tracks cannot be released. Testing has determined that unreleased, empty tracks account for approximately another 1.9% of the available space.

Adding these two factors indicates that available space should be adjusted to 84.8% to ensure that adequate free space is maintained to support virtual mount activity. By internally adjusting the cache figures, CA Vtape triggers the CacheFreespaceThreshold, CacheWarningThreshold, and CacheAutoReleaseHighThreshold actions before a true or operational cache shortage can occur. Relying on the track-based amounts could cause the thresholds to be triggered too late.

The adjustment will not cause Dynamic Cache Management to require more DASD volumes than Static Cache Management. Dynamic Cache Management increases DASD storage usage per volume, which should reduce the total amount of DASD required to keep the same quantity of Virtual Volumes resident in cache for the same period of time.

Not Freeable indicates the amount of dynamic cache space being utilized by Virtual Volumes that are yet to be Externalized or are in use as well as any other non SVTS space. *Unexpired Volumes* indicates the amount of dynamic cache space being utilized by Virtual Volumes that have been Externalized but that have not reached their cache expiration date (not to be confused with tape expiration date). *Expired Volumes* refers to Virtual Volumes that have been Externalized and have also reached or exceeded their cache expiration date.

DISPLAY CSA

This command reports CSA usage by the CA Vtape address spaces and any lost (unowned) CSA storage attributed to subsystem restarts. The default SVT*n* D CSA command provides a summary report, while the Detail keyword adds information showing each allocated CSA area. This command will not provide any information unless VSM TRACK CSA(ON) SQA(ON) is specified in the DIAG*xx* member of SYS1.PARMLIB or SYS*x*.IPLPARM member.

Syntax

```
SVTn Display CSA [,Detail}
```

Example of information displayed by the DISPLAY CSA command

```
SVT1 D CSA
SVT1D1000I - CSA/SQA Utilization Summary Report
                              ECSA       CSA
Jobname           Asid      Usage      Usage
SVTS1087          00D8       935K       17K
SVTSAM.SVT1PT     0138       952B        0B
SVTSAM.SVT1UT     00F7       952B        0B
SVTSAM.SVT1V1     0041         1K        0B
SVTSAM.SVT1V2     00D5       952B        0B
SVTSAM.SVT1V3     00E6       952B        0B
SVTSAM.SVT1V4     00F9         1K        0B
SVTSAM.SVT1V5     00FA         2K        0B
SVTSAM.SVT1V6     00FB       952B        0B
SVTSAM.SVT1V7     00FC       952B        0B
SVTSAM.SVT1V8     00FD       952B        0B
UNOWNED           0000       643K        0B
SVT1X0100I Command Complete
```

DISPLAY FREEQ

This command displays up to the first 99 Virtual Volumes residing on the Free Queue. This is a queue of Virtual Volumes that have been backstored and can now be released from cache to free space for other Virtual Volumes. The expiration date and time is assigned based on when the Virtual Volume was backstored plus the CacheResidencyHours setting in the Group Definitions.

Syntax

```
SVTn Display FreeQ     [,Volser=nnnnnn}]
```

You may optionally limit the display of Virtual Volumes on the Free Queue to those that match the supplied volume prefix. The prefix can be 4 or 5 characters in length, or a full 6 character volume serial can be supplied, in which case only the specific Virtual Volume will be displayed.

Example of information displayed by the DISPLAY FREEQ command

```
SVT3 D FQ
SVT3X2008I Display Freeable VOLSERS  731
  Volser Expiration Time   #MB   Group Entry#
  ------ ---------- ----- ------ ----- ------
  101314  9/20/2008 15:00  2,001   41       1
  101310  9/20/2008 15:00  1,213   41       2
  101315  9/20/2008 15:01    421   41       3
  101325  9/20/2008 15:05  1,289   41       4

  Volser  Recalled  Time   #MB   Group Entry#
  ------ ---------- ----- ------ ----- ------
  101322  9/22/2008 12:19     69   52       5
```

DISPLAY GROUPS

This command displays information about the total amount of space available in the DASD buffer, percentage in use and how much DASD buffer space each Externalization Server subgroup queue is holding for not yet Externalized Virtual Volumes. Only subgroups with Virtual Volumes queued for Externalization will be displayed by default.

Syntax

```
SVTn Display Groups [,{Detail | All}]
```

Detail

Display information by queued location, Global VCAT and Local VCAT.

All

Display detailed information for all groups regardless of whether they have Virtual Volumes queued for Externalization.

Example of information displayed by the DISPLAY GROUPS command

```
SVT5 D G
SVT5X0300I Display Group Information
 Max Drives=0008, Thresholds Warning=099%, Hold=030%, Release=050%
 Schedule=(00:00-23:59), Active
 Dasd cache utilization 00029775/00028303/00002001 InUse=088%

  Group Status  Queue  #Vols  MB.Used MB.Alloc Dasd% MB.Thold Prty
  ----- ------- ------ ----- -------- -------- ----- -------- ----
   11.L *Act(3) All        5     8984     8989   30%     1000  1.0
   33.L *Act(2) All        2     4000     4002   13%     1000  2.0
   51.S *Rlse   All        2     4000     4002   13%     1000  1.0
   Totals:                 9    16984    16993   57%
   An asterisk (*) in the Status column indicates an automated queue


SVT5X0100I Command Complete
```

Example of information displayed by the DISPLAY GROUPS,Detail command

```
SVT5 D G,D
SVT5X0300I Display Group Information
 Max Drives=0008, Thresholds Warning=099%, Hold=030%, Release=050%
 Schedule=(00:00-23:59), Active
 Dasd cache utilization 00029775/00028871/00004002 InUse=083%

  Group Status  Queue  #Vols  MB.Used MB.Alloc Dasd% MB.Thold Prty
  ----- ------- ------ ----- -------- -------- ----- -------- ----
   11.L *Act(3) Local      3     5100     5103   17%     1000  1.0
                Global     1     1884     1885    6%
   33.L *Act(2) Local      2     4000     4002   13%     1000  2.0
   51.S *Rlse   Local      1     2000     2001    7%     1000  1.3
                Global     1     2000     2001    7%
  Totals:                  8    14984    14992   50%
```

The following list describes the information displayed in examples above:

Max Drives=

The maximum number of drives the Backstore Engine can use concurrently.

Thresholds Warning=

The cache InUse percentage at which to start and stop issuing the SVT*n*D0908I warning message. This percentage value is defined in parmlib using the CacheWarningThreshold attribute.

Hold=

The cache InUse percentage at which the Automated Subgroup queues are held. This percentage value is defined in parmlib using the CacheAutoHoldLowThreshold attribute.

Release=

The cache InUse percentage at which the Automated Subgroup queues should be released. This percentage value is defined in parmlib using the CacheAutoReleaseHighThreshold attribute.

Schedule=

The times when the Automated Subgroup queues can be released followed by a state value. The schedule is defined in parmlib using the CacheAutomationSchedule attribute.

Disabled | Active | Stopped

The current state of Externalization Subgroup Automation as follows:

Disabled

Means it is not configured.

Active

Means it is configured and within a configured time period that allows automated subgroup queues to be released and held.

Stopped

Means it is configured, but not in a configured time period that allows automated subgroup queues to be released and held.

DASD Cache Utilization

Megabytes of total shared DASD buffer space defined to CA Vtape (*Total Cache*).

Megabytes of DASD buffer space populated with Virtual Volumes (*Populated Cache*).

Megabytes of DASD buffer space that have been Externalized and can therefore be freed for reuse (*Freeable Cache*).

InUse=

Percentage of shared DASD buffer space that cannot be freed for reuse because it has not been Externalized. The percentage is calculated as follows:

$$\text{InUse} = \frac{\text{Populated Cache} - \text{Freeable Cache}}{\text{Total Cache}} \times 100$$

Group

Describes the group and subgroup associated with an Externalization Server queue as *nn.x*, where *nn* is the group number while *x* is the subgroup (S=short, M=medium, L=long). Group 255 is not included because it does not have an Externalization Server queue.

Status

Describes the current status of the Externalization queue as seen by the Externalization Server running on this system as follows:

Hold

Indicates that the queue is currently held.

Rlse

Indicates that the queue has been released but that no active tasks are running.

Warn

Indicates that no drives are available for the esoteric or generic defined for this group.

Act(*n*)

Indicates that the Externalization Server started (n) tasks for this queue.

A leading asterisk indicates a queue associated with an automated subgroup whose status is automatically controlled by parmlib settings. In the preceding example, *Act(3) is an active queue associated with the automated subgroup 11.L with three active tasks. Queues not associated with Automated Subgroups are manually controlled by the operator using the SVT*n* SET BACKSTORE command.

Queue

Describes where the work element is currently queued. A Virtual Volume that needs to be Externalized is first queued in the Local VCAT. After a waiting period of 30 to 60 seconds to ensure that the Virtual Volume is not mounted by the next application job step or job, the queue element is moved to the Global VCAT. When the Virtual Volume is about to be Externalized, the queue element is moved back to the Local VCAT of the subsystem doing the Externalization.

For *SVTn D G*, the subgroup's local and global queues are combined into a single line and the queue is shown as *All*.

For *SVTn D G,A | D*, the subgroup's local queues are always displayed. The global queues are only displayed if there are Virtual Volumes waiting to be Externalized.

#Vols

Describes the number of Virtual Volumes needing to be Externalized. The global queue holds one entry for each Virtual Volume. The local queue, however, temporarily holds one entry each time a Virtual Volume that was updated is dismounted. If the same Virtual Volume is updated by mounting and dismounting it three times, #Vols for the local queue will be incremented three times, once for each update.

MB.Used

Describes the actual number of megabytes written to DASD for Virtual Volumes needing to be Externalized.

MB.Alloc

Describes the number of megabytes allocated on DASD to hold the data written to the Virtual Volumes needing to be Externalized.

Dasd%

Describes the percentage of DASD buffer occupied by the Virtual Volumes needing to be Externalized.

MB.Thold

Describes the subgroup megabyte threshold defined in Parmlib with the MB_Threshold attribute. It is used to determine how many Externalization subtasks need to be started to service a subgroup queue.

Prty

Describes the Externalization priority for the subgroup as *X.Y*, where *X* is a user priority value between 0 to 9 (lowest to highest) as established in parmlib with the BackstorePriority attribute. *Y* is a value between 0 and 8, which is a dynamically calculated priority based on MB.Used/MB.Thold to determine the number of subtasks required to service this queue. Assuming enough tape drives are available, the Externalization queue with the highest priority is serviced first.

DISPLAY LOGGER

This command reports the Logger status and activity level.

Syntax

```
SVTn Display Logger
```

Example of information displayed by the DISPLAY LOGGER command

```
SVT1 D L
SVT1D1400I Logger Status Display 596

     Field               Current State
     ------------------- ----------------------------------
     LogDetailLevel      3
     Log Stream          Vtape.XE61.LOG
     LogDataspaceSize    8M
     LogCSAsize          8K
     Bytes Logged        15,095,058
     Events Logged       556,096
     Events needing CSA  539,083
     Calls to IXGLOGR    615
```

DISPLAY PARMLIB

This command shows the run-time or active values for all CA Vtape parmlib attributes. At startup and after a REFRESH console command, all or part of the parmlib attributes are loaded into the Local VCAT. This command displays the loaded values.

Syntax

```
SVTn Display Parmlib [,{Short|Medium|Long}] [,{Hardcopy|Console}]
```

Short

Displays the active attributes defined in the Parmlib Directory, Startup Options, Dynamic Options, Volume Pool Definitions*, PeerToPeer Options*, and PeerToPeer Remotes*. Items marked with an asterisk (*) are only displayed if activated.

SHORT is the default value.

Medium

Displays Short plus the active attributes defined in the Virtual Device List, Startup Commands, Shutdown Commands, and Group Definitions.

Long

Displays Medium plus the active attributes defined in Data Set Filters.

The following are the Output options:

Hardcopy

Directs the output to the system log and the SVTS JOBLOG. This is the default output option.

Console

Directs the command response to the system log, SVTS JOBLOG, and the operator console.

Note: By adding the SVT*n* D P,L console command to the Startup Commands section in the parmlib, the complete set of active parmlib attributes can be automatically documented in the SVTS JOBLOG during CA Vtape initialization.

DISPLAY PIN

This command displays state information about the buffer pool used by a CA Vtape Subsystem to access Virtual Volume Entries (VVEs) in the Global VCAT.

Syntax

```
SVTn Display PIN
```

Example of information displayed by the DISPLAY PIN command

```
SVT5 D PIN
SVT5VV120I Display Pinned Volumes:
Volser  Date  Time     Asid Tcb      Owner
------- ----- -------- ---- -------- ---------------
104200  02/02 14:34:50 0100 007F7340 SVTSSRV.SCRGET
Total Pinned=1 of 1536
SVT5X0100I Command Complete
```

DISPLAY POOLS

This command shows the run-time or active Volume Pool values. The output of the command shows all active Pools defined to CA Vtape, the number of Virtual Volumes assigned to the respective pool, the number of Virtual Scratch Volumes remaining in the pool, and the associated Virtual Volume serial numbers assigned to the pool. Virtual Volumes are displayed in consolidated ascending range order (for example, *vvvvvv-vvvvvv)* by pool number.

Syntax

```
SVTn Display POOLS
```

Note: By adding the SVT*n* Display POOLS console command to the Startup Commands section in the parmlib, the Volume Pools can be automatically documented at startup.

When the display of non-contiguous volume pool ranges exceeds 40 lines of output the Display Pool Command appends a plus sign {+} at the end of the last volume range. The plus sign (+) indicates that a complete list of volumes has not been displayed. To obtain a complete volume pool range list, submit the HLQ.CCUUJCL (GENVOLPL) member.

DISPLAY P2P

This command displays status information for the P2P Listener.

Note: The CA Vtape P2P Option requires separate licensing; this command will only work if the appropriate CA LMP license key is installed.

Syntax

```
SVTn Display P2P
```

Example of information displayed by the DISPLAY P2P command

```
SVT1 D P2P
SVT1TP0120I Display PeerToPeer Tasks: 706
Module   @'TCB    Status
-------- -------- ---------------------------------------
P2P@EMCS 007ED588 SVT5XE61(01000069) waiting
P2P@LSTN 007ED720 Listening on 141.202.65.61:11005
P2P@SSRV 007ED368 Waiting for work

SVT1TP100I Command complete
```

DISPLAY REMOTES

This command displays P2P remote system connectivity, transmits, receives and file transfer activities.

Note: The CA Vtape P2P Option requires separate licensing; this command will only work if the appropriate CA LMP license key is installed.

Syntax

```
SVTn Display REMOTES
```

Example of information displayed by the DISPLAY REMOTES command

```
SVT5 D R
SVT5TP403I Display Remote Statistics 975
Rmt  Status       AsOf   #Receive     #MB Files #Transmit     #MB Files
---- ------------ ----- --------- ------- ----- --------- ------- -----
S411*ConnRefused  13:12         0       0     0         0       0     0
S431 Active       13:20    709257   87587    43      3607       3     0
---------------------- --------- ------- ----- --------- ------- -----
2 Remote System(s)         709257   87587    43      3607       3     0
SVT5X0100I Command Complete
```

DISPLAY STATUS

This command displays internal configuration and licensing information, CA Vtape Complex Subsystems, and non-parmlib parameter settings.

Syntax

```
SVTn Display Status
```

Example of information displayed by the DISPLAY STATUS command

```
SVT1 D S
SVT1X0224I Subsystem Status Display 778
Field                 State
--------------------- --------------------------------
Release               r12.0
Subsystem             Active
System id             XE61,1
IDRC                  Default
Highspeed open        On
CPU isolation         Off
DSN prefix            VTAPE
Recall Order          Primary
Console               S311, CA11.SVT3
P2P VCAT Signature    B50D64E9
Global Vcat Buffers   #Free=1, #InUse=0, HiUsed=1
Control Data Sets     Enhanced Capacity

Licensed Status       --Local Drives-- -Remote Drives--
Sysplex  Sysname  SVTS Defined   Active Defined   Active
-------- -------- ---- --------------- ---------------
PLEXC1   CA11     SVT1      40       3       0       0
         CA31     SVT1      40       0       0       0
         XAD1     SVT1      40       5       0       0
         XE61     SVT1      40       2       4       1
-------------------- --------------- ---------------
4 Active Subsystem(s)      160      10       4       1
Drive License(s)                    160               4
SVT1X0100I Command Complete
```

The System ID in the display is an internal value created by CA Vtape and used to differentiate between two CA Vtape subsystems running on the same LPAR. The value is created by taking the eight-digit system name and overlaying the last two digits with a comma and the CA Vtape subsystem number and removing any blanks that precede the comma. For example, when CA Vtape subsystem SVT1 is started on a LPAR with a system name of CAIPROD, the internal system ID will be “CAIPRO,1.” If the system name is PROD, the internal system ID will be “PROD,1.”

The Console in the display is for a CA Vtape P2P remote subsystem defined in the parmlib Peer To Peer Remotes Section. All console output from this subsystem will be echoed on the console of the remote P2P subsystem. A value of Local indicates that no echoing is being performed. This value can be changed with the SET CONSOLE Console Command.

The P2P VCAT Signature is a unique 4 byte value created by CA Vtape to identify a CA Vtape Complex. It is primarily used by the CA Vtape P2P Option to identify remote systems.

Note: For additional information concerning the P2P option and the P2P VCAT Signature, see the chapter “CA Vtape Peer-To-Peer (P2P) Option” in the *Configuration Guide*.

DISPLAY UNIT

This command displays Virtual Control Unit and specific Virtual Device activity information for the Virtual Devices defined in the VTDRIVE parmlib member.

Syntax

SVT*n* `Display Unit [,Active|=`*nnnn*`]`

Active

Display information only for active devices.

nnnn

Display information for only the selected device.

Example of information displayed by the DISPLAY UNIT command

```
SVT4 D U
SVT1X1200I Display Unit Information
 Dasd cache utilization 01222892/00867094/00530274 InUse=27%

 Scratch Virtual Volumes:
   Pool1=44763    Pool2=41879    Pool3=n/a      Pool4=n/a
   Pool5=n/a      Pool6=n/a      Pool7=n/a      Pool8=n/a
SS CU P Rmt  Volser Unit ----Status---- Seq  Jobname  #I/O  Size  Pos
1  1  0 n/a   n/a   3400                0             4
1  1  0 n/a   n/a   3401                0             4
1  1  0 n/a   n/a   3402                0             4
1  1  0 n/a   n/a   3403                0             4
1  1  0 n/a   n/a   3404                0             4
1  1  0 n/a   n/a   3405                0             4
1  1  0 n/a   n/a   3406                0             4
1  1  0 n/a   n/a   3407                0             4
1  2  1 n/a  166146 3408   I / O        2    ABCDET00 1647  112M  109M
1  2  0 n/a   n/a   3409                0             4
1  2  0 n/a   n/a   340A                0             4
1  2  2 n/a  266148 340B   I / O        1    ABCDE11S 28948 1504M 1501M
1  2  0 n/a   n/a   340C                0             4
1  2  0 n/a   n/a   340D                0             4
1  2  0 n/a   n/a   340E                0             4
1  2  0 n/a   n/a   340F                0             4
SVT1X0100I Command Complete
```

The display contains the following information:

Dasd cache utilization

Total cache size/Cache populated with virtual data/Externalized (free able) cache.

InUse

Percent of cache that has not been Externalized.

Scratch Virtual Volumes

Number of available scratch volumes in each defined pool. “N/a” indicates an undefined pool.

SS

The last digit of the CA Vtape Subsystem Number (SVT1-8).

CU

The last digit of the control unit address space stepname (SVTSAS.SVT1V1-8).

P

The CA Vtape pool number from which the Virtual VOLSER was chosen (1-8).

RMT

Indicates whether or not the Virtual Device is used for the CA Vtape Peer-To-Peer (P2P) Option. “N/a” indicates a local or non-P2P device. Any other value indicates that the drive is used by the P2P option.

Volser

The Virtual VOLSER currently mounted on the device.

Unit

The Virtual Device address or number.

Status

The current status of the device.

Seq

The file sequence number in use on a mounted Virtual VOLSER.

Jobname

The job using the mounted Virtual VOLSER.

#I/O

The number of I/Os that have been performed by the device for the mounted Virtual VOLSER.

Size

The current size of the cache linear data set for the mounted Virtual VOLSER.

Pos

Where the Virtual Device is currently positioned in the cache linear data set.

DISPLAY USS

This command displays UNIX mount point information used by USS Backstore. By default, the command normally displays each mount point followed by only the directories within those mount points contain files.

Syntax

SVT*n* `Display USS [,ALL|,DIR|,MNT]`

ALL

Display all directories within each mount point.

DIR

Display only directories.

MNT

Display only mount point information.

Example of information displayed by the DISPLAY USS command

```
SVT4 D USS
SVT4X2105I Unix File System Information
Data Set   OMVSUSR.LEELA02
Type       HFS,R/W,Active
MountPoint /a/leela02
Statistics           Capacity(gb) Use%
InUse                        .00   0%
Free                         .16 100%
Total                        .16
Directories         Allocated(gb) Use%    #Files   FileSize(gb)
..                           .00   0%         2           .00
.                            .00   0%         1           .00
Total                        .00   0%         3           .00
Data Set   VTAPEQA.TRIPLEX
Type       NFS,R/W,Active
MountPoint /a/leela02/svts/FF43F397/triplex
Parms      10.130.42.54:"/nas/vtapeqa/fds/QA",hard,llock(y),proto(tcp),
           xlat(N),attrcaching(y),datacaching(y),delaywrite(32),readahe
           ad(8)
Statistics           Capacity(gb) Use%
InUse                       4.12   1%
Free                      389.22  99%
Total                     393.34
Directories         Allocated(gb) Use%    #Files   FileSize(gb)
./triplex                    .00   0%        35           .00
./triplex/group31            .00   0%        23           .95
./triplex/group32            .00   0%         5           .51
./triplex/group33            .00   0%         2           .14
./triplex/group61            .20   0%        98         26.34
./triplex/group63            .23   0%       107         30.24
./triplex/volumes            .00   0%       235           .00
Total                        .43   0%       505         58.18
SVT4X0100I Command Complete
```

DUMP

This command takes a system dump of the SVTS and SVTSAS address spaces and the VCAT dataspace. Whenever a problem is encountered, issue this command to document the current settings, control information, and status of internal processes for the multiple address spaces.

When Dynamic Dump Dsname is active in the operating system, the address space requesting the dump is built into the dump data set name. Because the SVT*n* DUMP console command is executed from the operating system console, the generated dump data set name will contain the console id.

The QUE subparameter causes the dump command to be executed from the SVTS address space. The SVTS address space name will then appear in the dump data set name. The only drawback to using the QUE subparameter is that if the CA Vtape command processor or scheduler is hung, the command may not execute. In this case, the SVT*n* DUMP format of the command is required to produce the dump.

The dump produced by using this command will contain an internal title of "Dump Requested – *subsystem-id sysname*".

Syntax

```
SVTn DUMP [,Que]
```

FREEQ RESET

This command can be used to manually reinitialize the cache free space queues which are used to monitor reusable space within the cache DASD volumes.

Syntax

```
SVTn FreeQ Reset
```

Example of information displayed by the FREEQ RESET command

```
SVT7 FQ R
SVT7VQ501I Initializing free queue
SVT7VQ502I Scanning storage class statistics
SVT7VQ503I Scanning catalog for free queue data sets
SVT7VQ504I Free queue rebuilt, saving changes
SVT7X0100I Command Complete
```

HELP

This command displays the syntax of all SVT*n* console commands in the system log.

Syntax

```
SVTn HELP
```

MIHCLEAR =

This command conditionally turns off the device busy bit so that IBM's Missing Interrupt Handler (MIH) can initiate recovery action for a Virtual Device. Issue the command once for each pending I/O against the Virtual Device. If there are five pending I/Os, issue the command five times. Because you cannot easily determine the number of pending I/Os waiting on a device, issue the command until the SVT*n*R3424E message is issued. The following example shows the commands:

```
SVT1 MIH=343F
SVT1X0100I Command Scheduled in SVTS
SVT1X0101I Command Complete
SVT1R3424E 343F,Device not busy
```

When the command is issued, the application job using the affected Virtual Device gets I/O errors and abnormally terminates.

You can use the optional DUMP parameter to generate a dump of all related areas. The dump is the same as the dump that the SVT*n* DUMP command takes.

Syntax

SVT*n* MIHclear=*nnnn* [,DUMP]

Where *nnnn* is the address of the Virtual Device.

MOUNT=

This command redrives a mount for a Virtual Volume on a Virtual Device that is in mount pending status. If the Virtual Device is waiting for a Recall to complete and the RESTART BACKSTORE command is issued or CA Vtape is forced down, when the Backstore Engine is restarted, the Virtual Device will be active with a status of mount pending. The mount will be redriven automatically after a short delay. You can use the MOUNT command to eliminate the delay and immediately remount the previously requested Virtual Volume, and the Recall will be redriven.

Syntax

SVT*n* MOUNT=*nnnn*

Where *nnnn* is the address of the Virtual Device.

QUEUE

You can use this command to correct a corrupted pointer in the Externalization Server subgroup queues or blank all the subgroup queues. The Externalization Server subgroup queues hold one entry for each Virtual Volume waiting for Externalization.

A bad pointer could cause a circular queue reference, leading to an endless loop. This would be detected and result in an error message. This error can be corrected with the RESET option. CA Vtape scans the existing subgroup queues' entries sequentially and rebuilds the pointers causing the problem.

If RESET is unable to resolve the problem, INIT may be used to reinitialize the Externalization Server subgroup queues. In this case no entries are added back and the queues remain empty until the batch utility GRRJCL is run to dynamically rebuild the queues.

Syntax

```
SVTn QUEUE {Init|Reset}
```

REFRESH=FILTERS

This command causes the SVTS address space to reload the Dataset Filters Section of the parmlib when Enhanced filter mode is active.

Syntax

```
SVTn REFRESH=FiLTers[,Extend]
```

EXTEND

Extends the refresh to include the Group Definitions Section of the parmlib.

Example of information displayed by the REFRESH=FILTERS command

```
SVT1 REFRESH=FLT
SVT1X0100I Command Scheduled in SVTS
IEE252I MEMBER VTPARMS FOUND IN QAPROD.VTAPE.SMP120.PARMLIB
IEE252I MEMBER FILTERS FOUND IN QAPROD.VTAPE.SMP120.PARMLIB
SVT1R3500I <IncludeDataSets> entries in Enhanced Filter List 14
SVT1R3501I <IncludeDataSets> entries in Enhanced Filter List 2
SVT1S2600I DatasetFilterLst refresh complete
```

REFRESH=GROUP

This command causes the SVTS address space to reload the Group Definitions Section of the parmlib.

Syntax

SVT*n* REFRESH=GRP [,Extend]

EXTEND

Extends the refresh to include the Dataset Filters Section of the parmlib.

Example of information that the REFRESH=GROUP command displays

```
SVT1 REFRESH=GROUP
SVT1X0100I Command Scheduled in SVTS
IEE252I MEMBER VTPARMS FOUND IN QAPROD.VTAPE.SMP120.PARMLIB
IEE252I MEMBER VTGROUP FOUND IN QAPROD.VTAPE.SMP120.PARMLIB
SVT1S2400I GroupDefinitions refresh complete
```

REFRESH=OPTION

This command causes the SVTS address space to reload the Dynamic Options Section of the parmlib.

Syntax

SVT*n* REFRESH=OPTION

Example of information displayed by the REFRESH=OPTION command

```
SVT1 REFRESH=OPTIONS
SVT1X0100I Command Scheduled in SVTS
IEE252I MEMBER  VTPARMS FOUND IN  QAPROD.VTAPE.SMP120.PARMLIB
IEE252I MEMBER  VTPARMS FOUND IN  QAPROD.VTAPE.SMP120.PARMLIB
SVT1S2500I SystemOptions refresh complete
```

REFRESH=POOLS

This command causes the SVTS address space to reload the Volume Pool Definitions Section of parmlib. This allows you to add to or change the pool assignment of Virtual Volumes. It can also be used to delete Virtual Volume from CA Vtape.

Since the Virtual Volumes are stored in the Global VCAT, this command only needs to be issued once in a CA Vtape complex. The CA Vtape subsystem that processes the command makes the necessary changes to the Global VCAT to add new VOLSER ranges, change the pool assignment of VOLSER ranges, or delete VOLSER ranges. The other CA Vtape subsystems sharing this Global VCAT will automatically pick up the changes.

For example, if your CA Vtape complex is composed of SVT1 and SVT2 running on SYSA and SVT1 running on SYSB and you issue the console command SVT1 REFRESH=POOLS on SYSA, SVT1 on SYSA will update the Global VCAT. SVT2 on SYSA and SVT1 on SYSB will automatically pick up those changes. The same is true if the SVT1 REFRESH=POOLS,DELETE command was issued on SYSA.

Syntax

SVT*n* REFRESH=POOLS [,DELETE]

DELETE

Specify DELETE if you want to remove Virtual Volumes which are not defined in the <VolumePoolDefinition> from CA Vtape.

Note: If you do not specify DELETE, the REFRESH=POOLS command will not delete Virtual Volumes that are no longer defined or are assigned to the wrong Pool. This is to guard against accidental deletion of Virtual Volumes.

Example of information displayed by the REFRESH=POOLS command

```
SVT5 REFRESH=POOLS
IEE252I MEMBER XE61SVT5 FOUND IN hlq.PARMLIB
IEE252I MEMBER  VTPSVT5 FOUND IN hlq.PARMLIB
SVT5S1600I Scratch Pool(1) #Cells(3900) #Free(3898) Extents(39)
SVT5S1600I Scratch Pool(2) #Cells(700) #Free(700) Extents(7)
SVT5S1600I Scratch Pool(8) #Cells(1000) #Free(440) Extents(10)
SVT5S2500I VolumePoolOptions refresh complete
SVT5X0100I Command Complete
```

REFRESH=REMOTES

This command causes the SVTS address space to reload the PeerToPeer Remotes Section of parmlib.

Note: The CA Vtape P2P Option requires separate licensing; this command will only work if the appropriate CA LMP license key is installed.

Syntax

SVT*n* REFRESH=REMOTES

Example of information displayed by the REFRESH=REMOTES command

```
SVT5 REFRESH=REMOTES
IEE252I MEMBER XE61SVT5 FOUND IN hlq.PARMLIB
IEE252I MEMBER P2PRSVT5 FOUND IN hlq.PARMLIB
SVT5S2500I PeerToPeerRemotes refresh complete
SVT5X0100I Command Complete
```

REFRESH=USS

This command causes the SVTS address space to reload the USS Mount Point Section of parmlib.

This command can change the mount points used by USS Backstore.

Note: Before issuing this command, we recommend stopping all USS Backstore and Recall activity. For a detailed description of how to change mount points, see the section File System Reconfiguration in the *Configuration Guide*.

Syntax

SVT*n* REFRESH=USS

Example of information displayed by the REFRESH=USS command

```
SVT4 REFRESH=USS
IEE252I MEMBER XE61SVT4 FOUND IN QAPROD.VTAPE.SMP120.PARMLIB
IEE252I MEMBER XE614USS FOUND IN QAPROD.VTAPE.SMP120.PARMLIB
SVT4S2500I USSMountPoints refresh complete
SVT4X0100I Command Complete
```

RESTART BACKSTORE

This command is used to gracefully stop and release all acquired Backstore resources.

When this command is issued, CA Vtape does the following:

- Gracefully stops all Externalization tasks in progress, releasing the Backstore Tape Devices, USS mount points, or both.
- Gracefully stops all Recall tasks in progress, releasing the Backstore Tape Devices, USS mount points, or both.
- Holds all Externalization Groups
- Restarts the affected SVTSAS.SVT*n*PT address space

The Backstore Engine might not respond to a restart command if it is waiting for communication from the operating system or a Backstore Tape Device. In these situations, the Backstore Engine can be unconditionally interrupted by reissuing the Restart command with the optional Cancel parameter, that is, SVT*n* Restart Backstore,Cancel.

Syntax

```
SVTn Restart Backstore [,Cancel]
```

Example of information displayed by the RESTART BACKSTORE command

```
SVT1 R B
SVT1X0101I Command Scheduled in SVTS
SVT1X0100I Command Complete
SVT1A0001I SVT1PT   Stopping
CTS014  IEF234E K 0752,508039,PVT,SVTSAS,SVT1PT
IEF234E K 0752,508039,PVT,SVTSAS,SVT1PT
IEF170I 1 SVTSAS   CAJR250I STEPNAME STEP   PGM=   CCODE  EST-COST
IEF170I 1 SVTSAS   CAJR251I SVT1PT      1 SVTSAS   0000     $35.54
IEF404I SVTSAS - ENDED - TIME=15.10.01
IEF170I 1 SVTSAS   CAJR252I JOB ENDED. TOTAL EST-COST       $35.54
$HASP395 SVTSAS   ENDED
$HASP100 SVTSAS   ON STCINRDR
$HASP373 SVTSAS   STARTED
ACF9CCCD USERID SVTSAS   IS ASSIGNED TO THIS JOB - SVTSAS
IEF403I SVTSAS - STARTED - TIME=15.10.01
SVT1A0000I SVT1PT   Ready
```

Important! If the Cancel option is used when Externalization tasks are active, the Backstore Tapes that were mounted should be released from further processing by issuing the SVT*n* SET BACKSTORE=EXCLVOL,VOLser=*volser* console command when the Backstore Engine address space is active again. This is necessary because the tasks were prevented from saving the last file sequence number used by the cancel. If these physical tapes are remounted by the Backstore Engine, they must be read sequentially to determine the appropriate file sequence number to use. This could result in a significant delay for Externalization as each task started reads its PRIMARY tape sequentially and then, if duplexing is active, repeats the action for its DUPLEX tape.

RESTART CMDMGR

This command can be used to restart the Command Manager when errors are detected in module SVTSDIV or if console commands are not being executed. The Command Manager controls and processes most console commands and runs as an independent subtask managed by the SVTSDIV module.

Syntax

```
SVTn Restart CMDmgr
```

RESTART CU=

This command emulates the Power OFF/Power ON of a real tape control unit. The command stops all Virtual Device activity for the specified Virtual Control Unit. The command also shuts down the corresponding SVTSAS subaddress space and automatically starts it again. The Virtual Devices are not varied OFFLINE or ONLINE during this process. You can issue this command to reset error conditions affecting some Virtual Devices, or when executing the SVT*n* R U command does not clear the Virtual Device. Most error conditions are cleared by restarting the affected Virtual Control Units, minimizing the need to restart CA Vtape.

Syntax

SVT*n* Restart CU=*n*

Where *n* is the Virtual Control Unit subaddress space number (SVTSAS.*svtn*V*n* where *svtn* is the subsystem id and *n* is the control unit number).

RESTART TIMERMGR

This command can be used to restart the Timer Manager and reset and restart all timer events. The Timer Manager controls timer events and housekeeping tasks running under the SVTSIRB module.

Syntax

```
SVTn Restart Timermgr
```

RESTART UNIT=

This command emulates the Power OFF/Power ON of a real tape device. It stops the activity executing in the specified Virtual Device, terminates the subtask, and restarts it. Other Virtual Devices running under the same Virtual Control Unit are not affected. The Virtual Device is not varied OFFLINE or ONLINE during this process.

You can issue this command to reset hang conditions affecting only one Virtual Device or to recover it from processing errors. This command will not eliminate a partially satisfied or unsatisfied Mount Pending condition. In this case, use the SVT*n* MOUNT command to redrive the virtual mount or cancel the affected job.

Syntax

SVT*n* `Restart Unit=`*nnnn*

Where *nnnn* is the address of the Virtual Device.

SET BACKSTORE=

This command controls Backstore processing.

The following syntax conventions are used for all the commands in this section:

- "SET BACKstore=" or "SET BACKstore," (equal sign or command) can be used interchangeably.
- For the SubGroup parameter, S equals Short, M equals Medium, and L equals Long.
- For the Type parameter, P equals Primary, D equals Duplex, and B equals both Primary and Duplex
- An asterisk (*) indicates all, as in Group=* equals all groups, Type=* equals all tape types.

Syntax

```
SVTn SET BACKstore=


Auto,Group={nn|*} [,SubGroup={S|M|L|*}]
```

Where *nn* is a valid group number.

```
DEQueue,VOLser =volser
```

Where *volser* is a Virtual Volume VOLSER.

```
EXCLVOL,Group={nn|*}[,SubGroup={S|M|L|*}] [,Type={P|D|B|*}]
```

Where *nn* is a valid group number.

```
EXCLVOL,VOLser=volser
```

Where *volser* is a physical tape VOLSER.

```
Hold|Release,Group={nn|*} [,SubGroup={S|M|L|*}]
```

Where *nn* is a valid group number.

```
-Hold|-Release,Group={nn|*} [,SubGroup={S|M|L|*}]
```

Where *nn* is a valid group number.

```
reseT,Group={nn|*} [,SubGroup={S|M|L|*}]
```

Where *nn* is a valid group number.

The following describes each line of the syntax:

Auto,Group=*nn* [,SubGroup={S|M|L|*}]

This option temporarily turns on automation for a group or group and subgroup combination. Automated subgroups are dynamically held or released based on cache utilization thresholds established through parmlib attributes.

The automation status set by this command is temporary and is reset based on parmlib values if the Backstore Engine is restarted, the Groups are refreshed, or the Backstore settings are RESET.

DEQueue,VOLser=*volser*

This option causes the GRR (GRoup Request control block), which documents the need to Externalize a particular Virtual Volume, to be removed from the Externalization queue.

EXCLVOL,Group={*nn*|*} [,SubGroup={S|M|L|*}] [,Type=P|D|B|*]

This option releases the Backstore Tape (of the type specified) last used for Externalization by the specified group or group and subgroup combination. The next Externalization for the specified group or group and subgroup combination will use a scratch tape.

Note: The standard version of the command used to release all Duplex tapes last used by the Backstore Engine from further processing so they can be moved off-site is:

```
SVTn SET BACK=EXCLVOL,G=*,T=D
```

EXCLVOL,VOLser=*volser*

This option releases a specific Backstore Tape from Externalization. Instead of remounting that Backstore Tape Externalization performs a scratch mount.

Hold|Release,Group={*nn*|*} [,SubGroup={S|M|L|*}]

This option is used to hold or release for Externalization the Externalization subgroup queues associated with non-automated groups or a group and subgroup combination.

Queues associated with Automated Subgroups are not processed by this command. Automated subgroup queues are dynamically held or released based on cache utilization thresholds as defined by parmlib attributes.

Note: When the CacheWarningThreshold is set to 0, the Group parameter is not allowed. The Externalization Server queues can only be held or released in mass, not individually. When the CacheWarningThreshold is set to a value greater than 0, the Group parameter must be coded. To hold or release all groups in mass, use Group=*.

When a subgroup queue is held, Externalization subtasks processing that queue are stopped at completion of the current Virtual Volume.

To immediately start or stop a group subtask, use the SVT*n* START GROUP or SVT*n* STOP GROUP console commands. You can use the SVT*n* CHECK BACKSTORE console command to immediately trigger an internal check for work so that the Externalization tasks can be started sooner.

-Hold|-Release,Group={*nn*|*} [,SubGroup={S|M|L|*}]

This option is used to temporarily turn off automation for the selected groups or a group and subgroup combination and then hold or release the now manual Externalization subgroup queues for the selected groups or a group and subgroup combination.

Note: When a subgroup queue is held, Externalization subtasks processing that queue are stopped at completion of the current Virtual Volume.

Use the SVT*n* SET BACK=RESET, G= command to restore the automation status based on the attributes specified in parmlib.

When a subgroup queue is released, Externalization subtasks are started based on available tape drives and subgroup priority.

To immediately start or stop a group subtask, use the SVT*n* START GROUP or SVT*n* STOP GROUP console commands. You can use the SVT*n* CHECK BACKSTORE console command to immediately trigger an internal check for work so that the Externalization tasks can be started sooner.

reseT,Group={*nn*|*} [,SubGroup={S|M|L|*}]

This option reactivates Subgroup Automation for a group or group and subgroup combination after accessing the group definitions in parmlib to determine whether automation should be activated. This option is typically used after Subgroup Automation has been temporarily deactivated with the -HOLD or -RELEASE options.

SET CONSOLE=

This command allows you to echo unsolicited console output produced by a CA Vtape Subsystem on the console of a system associated with a remote P2P CA Vtape Subsystem. The remote CA Vtape Subsystem must be defined in the parmlib in a Peer To Peer Remotes Section. The console suffix value used by this command will be defined in the appropriate Peer To Peer Remotes Section.

Note: The CA Vtape P2P Option must be licensed to define and activate a remote connection.

Syntax

SVT*n* SET Console=(LOCAL | *ConsoleSuffix*)

Examples of the SET CONSOLE= command

```
SVT4 SET CONSOLE=S561
SVT4TP000I Console routed to S561, XE61.SVT5
SVT4TP100I Command complete

SVT4 SET CONSOLE=LOCAL
SVT4TP000I Console reset to LOCAL
SVT4TP100I Command complete
```

Note: The current console status is displayed by the SVT*n* Display Status console command.

SET CPU=

This command allows the CPU mode to be changed. You must issue the command on each LPAR where the mode needs to be changed.

Syntax

```
SVTn SET CPU={ISOLATION | STANDARD}
```

You can determine the current setting for this option by issuing the SVT*n* DISPLAY STATUS console command.

For a description of the CPU mode, see the section CPU Performance Compared to Memory Utilization in the *Configuration Guide*.

Note: This command is only used for Subsystems running with CacheManagement=Static.

SET HSOPEN=

This command activates or deactivates the high-speed open option used by CA Vtape for Externalizing or Recalling Virtual Volumes to or from Backstore Tapes. You must issue the command on each LPAR where the option needs to be changed.

Syntax

```
SVTn SET HSOPEN={ON | OFF}
```

You can determine the current setting for this option by issuing the SVT*n* DISPLAY STATUS console command. The default setting is ON.

SET IDRC=

This command activates and deactivates IDRC support for Backstore Tapes. DEFAULT is the system default as specified in SYS*x*.IPLPARM or SYS1.PARMLIB member DEVSUP*xx*. ON is like coding TRTCH=COMP in JCL and OFF is like coding TRTCH=NOCOMP in JCL. You must issue the command on each LPAR where the option needs to be changed.

Note: This option only affects Externalization to or Recycle of Backstore Tapes and has no effect on the application Virtual Volume being written to in the DASD buffer.

Syntax

```
SVTn SET IDRC={ON | OFF | DEFAULT}
```

You can determine the current setting for this option by issuing the SVT*n* DISPLAY STATUS console command.

SET MAXDRIVES=

This command changes the maximum number of tape devices the Backstore Engine can use to allocate PRIMARY, DUPLEX, and EXPORT Backstore Tapes. You must issue the command on each LPAR where the limit needs to be changed.

To immediately lower the number of tape drives in use, you may need to stop one or more Externalization tasks. See the commands START GROUP (see page 108) and STOP PTASKID (see page 110).

Syntax

SVT*n* SET MAXDRIVES=*nn*

Where *nn* is the number of tape drives.

You can determine the current setting for this option by issuing the SVT*n* DISPLAY GROUPS console command.

SET MAXUSS=

This command changes the maximum number of concurrent UNIX files that the Backstore Engine can use to read or write Triplex USS files. You must issue the command on each LPAR where the limit is to be changed. To immediately lower the number of USS files in use, you may need to stop one or more Externalization tasks.

Note: For more information, see the commands STOP GROUP (see page 109) and STOP PTASKID (see page 110).

Syntax

SVT*n* SET MAXUSS=*nn*

Where *nn* is a value between 0 and 99 indicating the maximum number of concurrent UNIX files it can activate.

You can determine the current setting for this option by issuing the SVT*n* DISPLAY GROUPS console command.

SET RECALL=

By default Recall looks to read the Primary source file first when restoring a Virtual Volume. If the Primary source file is not located then Recall looks for a Duplex and then ultimately a Triplex copy. This command changes the order of precedence used by Recall to locate the source file used to restore a Virtual Volume.

You must issue the command for each CA Vtape subsystem where the order needs to be changed.

Syntax

```
SVTn SET RECALL={Primary|Duplex|Triplex}
```

You can determine the current setting for this option by issuing the SVT*n* DISPLAY STATUS console command.

To change the recall source of individual Virtual Volumes, see the SET RECALL VVE= console command.

SET RECALL VVE=

This command sets the Recall order of precedence for locating the source file when restoring a specific Virtual Volume. This causes the identified Recall source to be considered first whenever the Virtual Volume is recalled. This command is used when the default Recall source has become damaged or otherwise unusable.

Syntax

SVT*n* SET RECALL VVE=*volser*,{PRImary|DUPlex|TRIplex|P2P|Reset}

Where:

volser

Is the Virtual Volume VOLSER.

PRImary|DUPlex|TRIplex|P2P

Is the desired Recall source override.

Reset

Causes the Recall source override to be reset to the site defined source specified by the SET RECALL= console command.

You can determine the current setting of this option for the specified Virtual Volume using the Virtual Volumes Display of the CA Vtape ISPF Interface.

Note: A recall source override of P2P cannot be processed by a manual recall (SVT*n* START RECALL=*volser*).

To change the Recall Source for all Virtual Volumes, see the SET RECALL= console command.

SET THRESHOLD

This command temporarily overrides one of the following parmlib attributes:

- CacheFreespaceThreshold
- CacheAutoHoldLowThreshold
- CacheAutoReleaseHighThreshold
- CacheWarningThreshold

The override affects only the CA Vtape Subsystem that the command was issued for and remains in effect until it is overridden again, a REFRESH=OPTIONS console command is issued, or the Subsystem is stopped and restarted.

Syntax

SVT*n* SET THRESHOLD FREEspace=*nnn* | HOLD=*nnn* | RELease=*nnn* | WARNing=*xxx*

Where:

nnn

Is a numeric value from 0 to 100

xxx

Is a value of -1 (minus 1) or a numeric value from 0 to 100.

You can determine the current setting of the attribute using the Display Parmlib command.

SET USS=UNMOUNT

This command controls the USS Backstore feature. It causes the CA Vtape to dismount all the UNIX mount points defined to USS Backstore.

This command is useful if you intend to stop an CA Vtape subsystem in order to change the RootDirectory= attribute in the Startup Options Section of parmlib.

To properly use this command, we recommend stopping all USS Backstore and Recall Activity while changing mount points.

Note: For a detailed description how to accomplish this task, see the section File System Reconfiguration in the *Configuration Guide*.

Syntax

```
SVTn  SET USS=UNMOUNT
```

Example of information displayed by the SET USS=UMOUNT command

```
SVT4 SET USS=UNMOUNT
SVT4US304I 114,01AB,USS@FSUD,Unmount,Normal(10),VTAPEQA.TRIPLEX
SVT4US304I 0,00,USS@FSUD,Unmount,Immediate(08),VTAPEQA.TRIPLEX
SVT4X0100I Command Complete
```

In the example output, VTAPEQA.TRIPLEX is the name of the USS mount point defined to CA Vtape.

SET WRITPROT

This command places sets of 100 numerically sequential Virtual Volumes or individual Virtual Volumes in read-only mode so they cannot be overwritten or reused as scratch tapes.

Separate CA Vtape Complexes can be allowed to read each other's Virtual Volumes by adding one complex's Virtual Volume range to the other complex's Global VCAT and by sharing the ICF catalogs that contain the Externalized Virtual Volume catalog entries. By write-protecting the Virtual Volume range used by complex A in complex B's Global VCAT and vice versa, each complex can read the other complex's Virtual Volumes, but cannot overwrite them.

If complex B was allowed to overwrite the Virtual Volumes written by complex A, complex A would have no way of knowing that the Virtual Volumes had been changed. This type of action could cause data loss.

If two separate CA Vtape complexes need to share Virtual Volumes on an ongoing basis, the two complexes should be merged into one complex with a common DASD buffer and Tape Management System.

This command is also used to prevent the accidental overwriting of a critical Virtual Volume during problem determination. It is not used to extend the expiration date of a Virtual Volume. Virtual Volume expiration is controlled by the Tape Management System; consequently, the Tape Management System should always be updated to extend the expiration date of any Virtual Volume.

After Virtual Volumes are write-protected on their owning system, they must have write protection turned off before they can be reused as scratch tapes.

Syntax

SVT*n* SET WRITPROT {ON | OFF},{VVE=*volser* | VVP=*cccc*00}

Where *volser* is the Virtual Volume VOLSER or *cccc* is the first four digits of the set of 100 numerically sequential Virtual Volumes to be processed (*cccc*00-*cccc*99).

SHUTDOWN

This command works just like the STOP SVTS command. It stops the CA Vtape address spaces and brings down the subsystem.

If the Backstore Engine has an active subtask with a tape drive allocated, the subtask stops gracefully and the tape drive is released prior to the SVTSAS.SVT1PT address space being shutdown. If an application job or a started task has a Virtual Device allocated, the shutdown is delayed until the application job or started task completes its use of the Virtual Device and releases it. When the Virtual Device is released, the corresponding SVTSAS.SVT1V*n* address space will complete its shutdown.

During the shutdown, the Virtual Devices are automatically varied offline.

Syntax

SVT*n* SHUTDOWN

Note: For more information about stopping CA Vtape, see the section Starting and Stopping CA Vtape (see page 62).

START GROUP=

This command starts a subtask to Externalize Virtual Volumes for a specific group and subgroup. If the subgroup is currently held, the task terminates without performing any work. In this case, issue the SVT*n* SET BACKSTORE=RELEASE console command first for the desired subgroup.

This command would normally be used instead of the CHECK BACKSTORE. The difference between the two commands is that CHECK BACKSTORE browses the Local VCAT in ascending group ID order searching for the first group with Virtual Volumes queued for Externalization, and the SVT*n* START GROUP command starts the specified group or subgroup immediately.

Syntax

SVT*n* START Group=*nn*,SubGroup={Short|Medium|Long}

Where *nn* is a valid group number.

START RECALL=

This command initiates a Recall request of a Virtual Volume. If the Virtual Volume resides on DASD it can still be Recalled from a Backstore Tape as long as the cache copy is not required for Externalization.

The optional keyword, REQUEUE, can be used to queue the Virtual Volume for Externalization after a Recall has successfully completed. Because the Virtual Volume is requeued, existing Group definitions determine whether Primary, Duplex, or USS Backstore copies are created. If TEMPONLY is in effect at the time of the Recall the Virtual Volume will not be queued, but will remain cache resident until scratched. If the TEMPONLY Virtual Volumes is mounted, its Backstore Copy will be deleted. REQUEUE is not supported for P2P Remote Virtual Volumes.

Syntax

SVT*n* START RECALL=*volser* [,REQUEUE]

Where *volser* is the Virtual Volume VOLSER.

Example of information displayed by the START RECALL= command

```
SVT1 START RECALL=100001
SVT1X0101I Command Scheduled in SVTS
SVT1X0100I Command Complete
SVT1A0700I SVT1PT  Command Scheduled
SVT1P0400I 100001 is now being recalled
```

STOP GROUP=

This command terminates all Externalization tasks working on the specified subgroup queue. The subgroup queue continues in released status and a new subtask is automatically started by the subsystem during the next Backstore check. If you are issuing this command to release tape drives or give priority to pending allocations, Externalization should be held first by issuing the SVT*n* SET BACKSTORE=HOLD console command for the specific subgroup queue.

Note: When the Virtual Volume's group specifies a non-zero RecallAttemptsThreshold the counters are initialized.

Syntax

SVT*n* STOP Group=*nn*,SubGroup={Short|Medium|Long}

Where *nn* is a valid group number.

Example of information displayed by the STOP GROUP= command

```
SVT1 STOP G=11,SG=S
SVT1X0101I Command Scheduled in SVTS
SVT1X0100I Command Complete
SVT1A1500I SVT1PT   Group(11) Subgroup(S) 01 Externalization request(s)
were stopped
SVT1P0001I SubTask 02 Completion
CTS014  IEF234E K 0752,501661,PVT,SVTSAS,SVT1PT
IEF234E K 0752,501661,PVT,SVTSAS,SVT1PT
```

STOP PTASKID=

This command terminates any Backstore Engine task that matches the task ID number. You can obtain the task ID number from the SVT*n* DISPLAY BACKSTORE console command.

The difference between SVT*n* STOP RECALL and SVT*n* STOP PTASKID is that SVT*n* STOP RECALL stops only the specific Recall for the specified Virtual Volume, while SVT*n* STOP PTASKID stops the task, including any pending work queued to the task. The difference between SVT*n* STOP GROUP and SVT*n* STOP PTASKID is that SVT*n* STOP GROUP stops all Externalization tasks active for the specified group or subgroup, while SVT*n* STOP PTASKID stops only one task.

Syntax

SVT*n* STOP PTaskid=*nn*

Where *nn* is an active task number (01-99).

Example of information displayed by the STOP PTASKID= command

```
SVT1 STOP PTASKID=01
SVT1X0101I Command Scheduled in SVTS
SVT1X0100I Command Complete
SVT1A2200I SVT1PT   01 Taskid terminated
IEF196I IOS071I 074D,2F,SVTSAS, HALT SUBCHANNEL INTERRUPT MISSING
IOS071I 074D,2F,SVTSAS, HALT SUBCHANNEL INTERRUPT MISSING 860
```

The IBM and IOS messages are normal informational messages expected when the task is stopped while a tape drive is being allocated.

STOP RECALL=

This command terminates any Recall requests for the specified Virtual Volume.

Syntax

SVT*n* STOP RECALL=*volser*

Where *volser* is the Virtual Volume VOLSER.

Example of information displayed by the STOP RECALL= command

```
SVT1 STOP RECALL=100001
SVT1X0101I Command Scheduled in SVTS
SVT1X0100I Command Complete
SVT1P0001I SubTask 02 Completion
SVT1A1300I SVT1PT   100001 01 recall request(s) were stopped
CTS014  IEF234E K 0750,508667,PVT,SVTSAS,SVT1PT
IEF234E K 0750,508667,PVT,SVTSAS,SVT1PT
```

XRECALL RESET

This command reinitializes the common Recall Server area in the Global VCAT. All pending recall requests will be deleted. The requests associated with a pending mount will be automatically recreated by the pending mount within a few minutes. The requests associated with the SVT*n* START RECALL= console command will not be automatically recreated. The START RECALL command must be reissued to recreate the request.

This command should only be issued once for a CA Vtape Complex and only if there are critical common Recall Server area problems.

Syntax

```
SVTn Xrecall Reset
```

PeerToPeer Remote Commands

If the CA Vtape P2P Option is active, console commands can be executed on a remote system. If the command is a display command, that display will appear on the console of the target remote system and also in the system log of the issuing system.

Syntax

The syntax to issue a command on a remote system is as follows:

SVT*n*.S*xnn command* or SVT*n*/S*xnn command*

Where:

SVT*n*

Is the system which issues the command

S*xnn*

Is the suffix ID of the target SVTS remote console. The remote consoles definitions can be found in the VTP2PRMT parmlib member.

command

Is the CA Vtape console command.

For example, if the local CA Vtape subsystem is SVT3 and the console suffix ID of the remote system is S261, then the syntax would be:

SVT3.S261 *command*

Chapter 6: SVTSUTIL Batch Commands

This chapter describes the batch commands available for use with the SVTSUTIL program, except for the LIST (report) commands. The LIST commands are described in the chapter "Reports."

This section contains the following topics:

SVTS Parameter

PARM='SVTS=SVT1'

Defines the subsystem the batch command is directed to. The value must be SVT*n*, where *n*=1-8.

DD Statements

The following is a list of the DD statements for the CA Vtape SVTSUTIL program:

BSDS1

Defines the CA Vtape Boot Strap Data Set being processed. Note that DISP=OLD is required when running the INITIALIZE=BSDS1 and EXPAND CDS commands.

COMMANDS

Input data set containing START RECALL commands to be issued by the SVTSUTIL MASSRECALL command. This input is normally supplied to the ISSUECMDS step in CCUUJCL member RCALMANY, having been generated by the preceding steps.

GLOBAL

Defines the CA Vtape Global VCAT being processed.

LDS*nnnnn*

Defines the CA Vtape Linear Data Set being processed.

SVTPARMS

Defines the resident library for member SVTPARMS (that is, PREFIX.SVTJCL or parmlib). The DD statement can include a member name.

When a partitioned data set is defined without a member name, the default member name SVTPARMS is used.

The SVTPARMS DD statement is required by the following CA Vtape utility functions:

- INITIALIZE=VCAT - Initialize a new Local VCAT.
- LDS_DELETE - Delete a Static Cache LDS.
- LDS_INITIALIZE=LDS*nnnnn* - Initialize a Static Cache LDS.

SYSIN

Defines a sequential data set, PDS member, or instream data set with 80-character records containing CA Vtape Utility control statements.

CA Vtape utility batch commands are defined between column one (1) and fifty (50) on the control statement. Comment statements are defined by placing an asterisk (*) in column one (1). Blank control statement lines or records are permitted and are written to the SYSPRINT DD.

SYSPRINT

Defines a sequential data set used for the utility output reports and messages. The following DCB attributes are used:

```
DCB=(LRECL=132,BLKSIZE=1320,RECFM=FB,DSORG=PS)
```

SYSUT1

Defines a sequential data set required for the following utility control statements:

- EXTRACT - Defines a Backstore Tape data set name used as input.
- SCRATCH - Defines an input file created by the EXTRACT,SCRATCH_INFORMATION function.
- RECOVER=BACKSTORE - Defines an SMF input sequential file in which SMF Type 65 records are read and processed by the RECOVER=BACKSTORE command.

DCB attributes for this DD change, based on the batch command coded.

SYSUT2

Defines a sequential data set required for the following utility control statements:

- EXTRACT - Defines the output device to write the application data set to.
- SCRATCH - Defines a data set containing a list of Virtual VOLSERs to be scratched.
- GENERATE - Defines the output data set to write the generated information to.
- RECOVER=BACKSTORE

DCB attributes for this DD change, based on the batch command coded.

UTLDSDEF

Defines an output sequential file, PDS member, or JES SYSOUT required for the LDS_DELETE command. You can use a JES SYSOUT in SIMULATE mode only. The following DCB attributes are required:

```
DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160)
```

UTLDSINI

Defines an output sequential file, PDS member, or JES SYSOUT required for the LDS_DELETE command. You can use a JES SYSOUT in SIMULATE mode only. The following DCB attributes are required:

```
DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160)
```

UTLPRINT

Defines a sequential data set required for the LDS_DELETE command. The following DCB attributes are used:

```
DCB=(LRECL=125,RECFM=VBA,DSORG=PS,BLKSIZE=27998)
```

UTLWK*nn*

Defines sequential data sets required for the LDS_DELETE, LIST=BACKSTORE, and RECOVER=BACKSTORE commands.

VCAT

Defines the CA Vtape Local VCAT being processed. Note that DISP=OLD is required when running the INITIALIZE=VCAT and RECOVER=GLOBAL commands.

Utility Return Codes

The following table defines the CA Vtape Utility return codes for the SVTSUTIL program:

00

Successful completion.

04

Successful completion with anomalies, processing continues.

08

Command failed, proceeding to next command.

12

Unrecoverable error exists, proceeding to next command.

16

Invalid batch command, proceeding to next command.

SVTSUTIL reports a return code for each command executed. The highest command return code is passed to the SVTSUTIL job step or job.

SVTSUTIL Batch Commands

This section describes all of the non-report generating SVTSUTIL batch commands and their options. The SVTSUTIL batch commands that generate reports are documented in the chapter "Reports."

CMDSEPOFF

This batch command turns off the command separator line that was set on by the CMDSEPON batch command. By default the command separator line is turned off.

CMDSEPON

This batch command turns on the command separator line. A line separator (line of dash characters) is written between each CA Vtape utility batch command in order to group the respective batch command, associated log and output reporting data as a report section within the output (SYSPRINT) file.

DEFERXMT

This command is used to trigger transmission requests to a local, owning subsystem for Virtual Volumes it created with the ExhangeMetaDataOnly=D attribute setting. These Virtual Volumes are normally deferred for transmission until the remote subsystem attempts to Externalize them.

The DEFEREXMT command provides a manual method for concurrently transmitting these Remote Virtual Volumes prior to Externalization to prevent the transmission from delaying Externalization.

Syntax

```
DEFERXMT [GROUP=nn, SUBGROUP=S|M|L, CONCURRENCY=nn, DELAY=nnn, EXPIRE=nnnn]
```

Where GROUP, SUBGROUP, or both are used to filter and serialize the scan of the Externalization Queue while looking for Remote Virtual Volumes that require deferred transmission. The program defaults to all Groups and Subgroups.

CONCURRENCY allows you to control the number of concurrent transmission requests to control the increase in network traffic. The value can be from 1 to 32. The default is 5.

DELAY is used to specify the amount of time in seconds that the program will wait between progress checks on the transmissions requested. When a progress check determines that a transmission request has completed, the next request in the job's list is submitted. The value can be from 1 to 120. The default is 15.

EXPIRE is used to specify the maximum amount of time in minutes that the job should perform progress checks on submitted transmission requests. When a transmission request reaches the coded time limit, it is assumed complete and the next request in the job's list is submitted. The value can be from 1 to 1440. The default is 10.

EXPAND CDS,VOLUMES=

This command is used to initialize additional space for the Virtual Volumes Entries (VVEs) in the BSDS and Global VCAT when these data sets are being increased in size.

Syntax

```
EXPAND CDS,VOLUMES=nnnnnn [,CONVERT]
```

Where *nnnnnn* is the required increase in the number of Virtual Volumes.

The optional parameter CONVERT is required only when the control files are initially expanded to contain more than 510,800 virtual volumes. To find out more about expanding control data sets, see Expanding and Converting the Control Data Sets (see page 226).

Sample JCL can be found in HLQ.CCUUJCL(EXPAND).

Note: You must shut down all CA Vtape subsystems using the Global VCAT and BSDS to be expanded before executing the EXPAND JCL.

EXTRACT

CA Vtape uses this command when running the SVTSUTIL program to read a Virtual Volume on a Backstore Tape and copy the application data set to another non-CA Vtape tape in native or application format. The extraction can be done and the application can read the extracted data set while CA Vtape is shutdown.

Extract can be run in one of two modes, relabel or not relabel the output tape. The mode is controlled by the VOLSER parameter. When VOLSER= is coded Extract will relabel the output tape to the Virtual VOLSER being read or to the coded VOLSER value.

This utility function was designed for use during Disaster Recovery when CA Vtape is not available to access critical data that has been written to a Virtual Volume and Externalized to tape.

Syntax

```
EXTRACT
EXTRACT,VOLSER=INPUT
EXTRACT,VOLSER=volser
```

Where *volser* is the VOLSER of the output tape.

Note: For a complete description of this command and sample JCL, see the chapter “Recovering CA Vtape”.

EXTRACT,SCRATCH_ INFORMATION

Important! This command is documented for your information only. Do not execute the command.

An internal command that the Scratch Synchronization Job uses to synchronize the Tape Management System scratch pool with the CA Vtape scratch pool.

For more information, see "Scratch Tape Synchronization" in the *Configuration Guide*.

GENERATE=VOLUMEPOOLS

This command is used when executing the SVTSUTIL program to create an SVTS VTPOOLS parameter library member from the active GLOBAL VCAT assigned to the Subsystem defined by the specified utility JCL SVTS parameter.

This command is used to create a customized VTPOOLS member for the first time, to recreate a lost or corrupted VTPOOLS member, or to audit your current VTPOOLS member by generating a new member from the VOLSER ranges and pool definitions currently in use in the Global VCAT.

Syntax:

```
GENERATE=VOLUMEPOOLS
```

Sample JCL can be found in HLQ.CCUUJCL(GENVOLPL).

INITIALIZE=BSDS1

This command is used when running the SVTSUTIL program to initialize a BSDS during the product verification process, or when recreating a BSDS in a recovery situation.

Syntax

```
INITIALIZE=BSDS1,NUMBER_OF_VOLUMES=nnnnnnnn
```

Where *nnnnnnnn* is the number of Virtual Volumes the BSDS should be sized for.

Sample JCL was generated by the Customization Panels and can be found in PREFIX.SVTJCL(GLOBAL).

Note: Volume Pooling will be required if the NUMBER_OF_VOLUMES is greater than 510,800 Virtual Volumes.

INITIALIZE=GLOBAL

This command is used when running the SVTSUTIL program to initialize a Global VCAT during the product verification process, or when re-creating a Global VCAT in a recovery situation.

Syntax

```
INITIALIZE=GLOBAL
```

Sample JCL was generated by the Customization Panels and can be found in PREFIX.SVTJCL(GLOBAL).

INITIALIZE=VCAT

Use the command when running the SVTSUTIL program to initialize a Local VCAT on each LPAR sharing a Global VCAT during the product verification process. Also use the command when re-creating a Local VCAT in a recovery situation.

Syntax

```
INITIALIZE=VCAT
```

Sample JCL can be found in HLQ.CCUUJCL(DEFVCAT).

LDS_ADD

This command is used when running the SVTSUTIL program to add static cache LDSs that have already been defined and initialized to the Global VCAT. This command is used during installation, after the Global VCAT has been recovered from the BSDS, or whenever the DASD buffer is being increased in size.

Syntax

```
LDS_ADD
```

Sample JCL can be found in PREFIX.SVTJCL(LDSADD*xx*).

LDS_DELETE

This command is used when running the SVTSUTIL program to delete static cache LDSs. The command performs the following function:

- Remove static cache LDS entries from the Global VCAT and delete them from the DASD buffer, if they are defined
- Create LDS Define and LDS Initialization control statements to recover the cache LDSs that were deleted by the utility
- Provide reports and analysis of the DASD buffer

Syntax

```
LDS_DELETE   [SIMulate|LIVE],
             [CACHE_VOLUME={*|/|volser
                            |(volser1,volser2,…,volsern)}
                            |vol*|vol/}],
             [CLEAN_NOT_ALLOC],
             [RELEASE_TARGET_PERCENT=nnn%],
             [CLEAN_INELIGIBLE_ONLY]
```

The optional SIMULATE parameter can be used to invoke all functions of the LDS_Delete utility without updating the GLOBAL VCAT or deleting the LDSs from the DASD buffer. SIMULATE can be abbreviated to SIM and is the default value.

Note: If the UTLWK03 DD is changed to a SYSOUT or a data set, you can view the IDCAMS DELETE commands generated by the utility for the LDSs processed.

The optional LIVE parameter removes the LDS entries from the GLOBAL VCAT and deletes the LDSs from the DASD buffer.

Note: The UTLWK03 file must be allocated to a DASD data set during LIVE operation mode in order for the generated IDCAMS statements to be processed.

You can use the CACHE_VOLUME parameter to identify the DASD buffer volume or volumes to be processed. A single VOLSER, a list of VOLSERs enclosed in parentheses, a VOLSER prefix (for example, vol* or vol/), or an asterisk (*) or a forward slash (/) for all VOLSERs can be coded. The parameter can be abbreviated to CV and can be defined more than once to define several DASD Buffer volumes (for example, CV=volser1,CV=volser2).

Note: If the CLEAN_INELIGIBLE_ONLY parameter is coded, the CACHE_VOLUME parameter is ignored.

The optional CLEAN_NOT_ALLOC parameter is used to delete LDSs that are defined on DASD, but have not been added to the Global VCAT being processed. The LDS_DELETE command will process these orphan LDSs in addition to the LDSs that were added to the Global VCAT being processed. This parameter should not be used in an environment where multiple CA Vtape Complexes are defined with the same DSN PREFIX. The parameter can be abbreviated to CNA.

Note: The CLEAN_NOT_ALLOC parameter is mutually exclusive with the CLEAN_INELIGIBLE_ONLY parameter.

The RELEASE_TARGET_PERCENT parameter defines the maximum percentage of the total DASD buffer to delete. A specification of 100% permits LDS_DELETE to delete 100% of the DASD buffer. The parameter can be abbreviated to RTP.

Note: The percentage coded is converted to a number of LDSs and establishes the maximum number of LDSs that can be deleted.

The optional CLEAN_INELIGIBLE_ONLY parameter is used to delete LDSs that have been marked ineligible for allocation in the Global VCAT and which are either uncataloged or contain invalid control information. The parameter can be abbreviated to CIO.

Note: The CLEAN_INELIGIBLE_ONLY parameter specification is mutually exclusive with the CLEAN_NOT_ALLOC parameter.

Sample JCL can be found in PREFIX.CCUUJCL(LDSDELT).

LDS_INELIGIBLE

This command flags one static cache LDS as ineligible for allocation. Ineligible LDSs are counted as part of the DASD buffer, but bypassed during LDS allocation. You can use this command to temporarily remove one or more LDSs from processing. It is also internally used by CA Vtape when errors are detected while LDSs are being allocated or accessed.

This command should only be used when no virtual mount activity is occurring and after running the SVTSUTIL program with the LIST=CACHE command to verify that the LDS does not currently contain a Virtual Volume that needs to be Externalized.

Syntax

```
LDS_INELIGIBLE=lds.cluster.name
```

LDS_INITIALIZE=

This command is used when running the SVTSUTIL program to initialize a static cache LDS allocated for the DASD buffer.

If the LDS was not previously initialized, the function will be executed. If the LDS was initialized, CA Vtape checks to see if there is a Virtual Volume associated with the LDS to determine if it has been Externalized. If the Virtual Volume has not been Externalized, the function is not executed and the command ends with a return code 44.

Syntax

LDS_INITIALIZE=*ddname*

Where *ddname* is the JCL DD name of the LDS to be initialized.

Sample JCL can be found in PREFIX.SVTJCL(LDSDEF*xx*).

The optional parameter NOVERIFY causes the LDS to be initialized regardless of whether or not there is a Virtual Volume associated with the LDS that has not been Externalized. We recommend that NOVERIFY be used only in recovery situations where the intent is to clear the LDS, even if this action may generate a data loss.

Syntax

LDS_INITIALIZE=*ddname*,NOVERIFY

Where *ddname* is the JCL DD name of the LDS to be initialized.

LIST=GRR

This command can be used to generate a report of Virtual Volumes queued for Externalization.

Syntax

```
LIST=GRR [,VVE_WRITE | ,REMOTE]
```

Sample JCL can be found in HLQ.CCUUJCL(LISTGRR).

VVE_WRITE and REMOTE are optional parameters. They are primarily intended for internal use only.

VVE_WRITE causes the program to generate VVE_WRITE= control cards for Virtual Volumes missing from the Externalization Queue that require Backstore processing. These generated control cards are used by the GRRJCL1 batch job to requeue Virtual Volumes that are missing from the Externalization Queue that were transmitted to this subsystem with the ExchangeMetaDataOnly=D attribute setting.

REMOTE causes the program to generate a control card list of Virtual Volumes queued for Externalization that were transmitted to this subsystem with the ExchangeMetaDataOnly=D attribute setting. This list is used by the DEFERXMT batch job to issue transmission requests for the Virtual Volume data to the local, owning subsystems.

MASSRECALL

This command issues the Recall commands supplied in DD statement COMMANDS with a slight delay between the Recall commands. The delay allows the Backstore Engine to start a single subtask to mount the required physical tape. This minimizes the number of subtasks that are started for this tape and the number of times the tape is mounted and dismounted. Since the Recall commands are typically sorted by physical VOLSER and file sequence number, this also allows the Backstore Engine to use the tape in the most efficient way.

The optional VOLCNT=*n* keyword, where n is from 1 through 10, specifies how many physical volumes to process concurrently (the number of Recall subtasks to be started). The default is five.

Syntax

```
MASSRECALL [VOLCNT=n]
```

Note: VOLCNT will only be honored when the Backstore Engine to which the recall commands are issued to is the Backstore Engine which will be performing the recalls.

RECLAIM

This command is used when running the SVTSUTIL program to correct improperly chained or lost static cache LDSs in the Global VCAT, to recover Ineligible LDSs, and to rebuild the static cache totals.

RECLAIM rebuilds the LDS tables and puts all LDSs without proper Virtual Volume ownership in the free cell pool. RECLAIM tries to open and check LDSs marked ineligible. If the check is successful, the LDSs are also added to the free cell pool.

During some recovery operations or when a proper Virtual Volume dismount cannot be accomplished, LDSs can be left in the allocated queue without true Virtual Volume ownership. These LDSs are unused DASD buffer space that cannot be used because they were not returned to the free cell pool.

You should schedule RECLAIM to run periodically, once a day or once a week, to return orphaned LDSs to the free cell pool to maximize available DASD buffer space. CA Vtape does not need to be shutdown to execute RECLAIM.

The optional NOCHECK_INELIGIBLE parameter is used to stop RECLAIM from resetting the ineligible flag of cache LDSs'. An ineligible LDS is one that CA Vtape attempted to reuse, but could not find its catalog entry or found its catalog entry and the subsequent open failed. This typically occurs because a DASD cache volume is off-line or cache LDSs were deleted from DASD, but not from the Global VCAT. Coding NOCHECK_INELIGIBLE will stop RECLAIM from performing the catalog locate and open of each ineligible LDS, which will allow the job to run faster, and eliminate the error messages issued by CA Vtape when the now eligible LDS is reused and marked ineligible again.

Syntax

```
RECLAIM [,NOCHECK_INELIGIBLE]
```

Sample JCL can be found in HLQ.CCUUJCL(RECLAIM).

RECOVER=BACKSTORE

This command is used when running the SVTSUTIL program to recover z/OS catalog information for CA Vtape Backstore Volumes that were deleted. The catalog information is obtained by reading and processing SMF input volumes and analyzing Type 65 records based on the defined command attributes.

The output of this command creates IDCAMS control statements that are used as input to re-catalog Backstore data sets that were previously deleted. The IDCAMS control statements include the Block-ID that is required for high speed open. A report of the candidate volumes based on the selection criteria coded is also produced.

Syntax

```
RECOVER=BACKSTORE,
      [CPU|LPAR]=[nnnn|n*|*],
      JOB=[nnnnnnnn|nnn*|*],
      FROM=[*|([YYYY/DDD|MM/DD/YY|
               MM/DD/YYYY|YYYY/MM/DD],hh:mm])]
      TO=[*|([YYYY/DDD|MM/DD/YY|
               MM/DD/YYYY|YYYY/MM/DD],hh:mm])]
      PVOLSER=[volser|vol*|*]
      PVOLSER=(volser1,volser2,…..,vol*|*)
      VVOLSER=[volser|vol*|*]
      VVOLSER=(volser1,volser2,…..,vol*|*)
      ORDER_BY_VOLTYPE=[PHYSICAL|VIRTUAL]
```

Where:

CPU|LPAR

Filters SMF Type 65 records based on the processor identification. Only SMF records with matching processor identification will be selected. Default: LPAR=*.

JOB

Filters SMF Type 65 records based on job name. SMF records assigned to the job name identification of this attribute will be processed. Only SMF records with a matching job name will be selected. Default: JOB=*.

FROM

Filters SMF Type 65 records based on FROM Date and Time. All SMF Type 65 records with a time stamp lower than the FROM date and time will be ignored. Default: FROM=*.

TO

Filters SMF Type 65 records based on a TO Date and Time. All SMF Type 65 records with a time stamp higher than the TO date and time will be ignored. Default: TO=*.

PVOLSER

Filters SMF Type 65 records based on Backstore Tape Volume Serial Number. Only SMF records with a matching VOLSER will be selected. The PVOLSER command attribute is mutually exclusive with the VVOLSER command attribute. Default: PVOLSER=*.

VVOLSER

Filters SMF Type 65 records based on Virtual Volume Serial Number. Only SMF records with a Backstore Tape data set name containing a matching Virtual VOLSER will be selected. The VVOLSER command attribute is mutually exclusive with the PVOLSER command attribute. Default: VVOLSER=*.

ORDER_BY_VOLTYPE

Defines the order in which IDCAMS control statements and report output are written. Default: VIRTUAL.

Sample JCL can be found in PREFIX.CCUUJCL(RCVBKSTR).

Sample output – SYSUT2 DD Statement File

IDCAMS Control Statements

```
/*-------------------------------------------------------------*/
/* SVTSUTIL RECOVER=BACKSTORE IDCAMS CONTROL STATEMENTS     */
/*  CA VTAPE 12.6  XE61.SVT3                                   */
/*  WED JUN 12, 2013  10:32:12                                 */
/*-------------------------------------------------------------*/
/* ENTRY CREATION DATE:                                       */
/*  WED JUN 12, 2013  10:32:12                                 */
DEFINE NONVSAM(NAME                          -
  (CAVTAPE1.VVE.V101602.DUPLEX                ) -
  VOLUMES(542983)                             -
  FSEQN(00003)                                -
  OWNER(X'0000006FFFFFFF91')                  -
  DEVT(3590-1  ))
 /* ENTRY CREATION DATE:                                      */
/*  WED JUN 12, 2013  10:32:12                                 */
DEFINE NONVSAM(NAME                          -
  (CAVTAPE1.VVE.V101602.PRIMARY               ) -
  VOLUMES(600147)                             -
  FSEQN(00003)                                -
  OWNER(X'0000006FFFFFFF91')                  -
  DEVT(3590-1  ))
```

Note: The ENTRY CREATION DATE in the comment is the date and time the catalog entry was created by the Backstore Engine, Recycle, or someone executing IDCAMS DEFINE commands.

Sample output report

```
SMF DATE    SMF TIME   JOBNAME   CPU           DATA SET NAME                        VOLSER  FSEQ   DEVTYPE   OWNER (HEX DATA)
2013/162  14.28.03.38  SVTSXE61  XE61  CAVTAPE1.VVE.V101602.DUPLEX                  542983  00003  3590-1    0000006FFFFFFF91
2013/162  14.28.03.44  SVTSXE61  XE61  CAVTAPE1.VVE.V101602.PRIMARY                 600147  00003  3590-1    0000006FFFFFFF91
  *** End of Report
```

The following is an explanation for the columns in the report:

SMF DATE

The date the entry was uncataloged.

SMF TIME

The time the entry was uncataloged.

JOBNAME

Who uncataloged the entry.

CPU

The system on which the uncatalog action occurred.

DATA SET NAME

What was uncataloged.

VOLSER

The Backstore Tape it was uncataloged from.

FSEQ

The file sequence number on that Backstore Tape.

DEVTYPE

The type of device used to mount the Backstore Tape.

OWNER

The starting block-ID of the file (X’0000006F’) on the Backstore Tape and the checksum (X’FFFFFF91’). The two values added together will equal X’10000000’.

RECOVER=GLOBAL

This command is used when running the SVTSUTIL program to recover a damaged Global VCAT from the BSDS. The BSDS only contains information pertaining to Virtual Volumes. If the Global VCAT being recovered was using Dynamic Cache Management, nothing else needs to be done to the Global VCAT after the recovery is complete. If the Global VCAT being recovered was using Static Cache Management, only the static cache LDSs allocated to a Virtual Volume will be automatically added back into the Global VCAT. After the recovery is complete, start a CA Vtape Subsystem and execute the LDS_ADD SVTSUTIL command to add the remaining static cache LDSs back into the Global VCAT.

This command is intended for recovery situations, such as an off-site disaster recovery, a Global VCAT volume failure, or a DASD buffer volume failure.

Syntax

```
RECOVER=GLOBAL,PREFIX=prefix [,NOINIT] [,SCRATCH] [,DROP_INELIGIBLE]
```

You can use the optional NOINIT parameter when recovery is being done into an existing Global VCAT. This parameter improves the performance of the recovery and can reduce the elapsed time needed to recover a Global VCAT. Do not use the NOINIT parameter when recovering into a newly allocated, noninitialized Global VCAT, as the recovery will fail. Use of this parameter is limited to those times when the Global VCAT was previously initialized.

The optional SCRATCH parameter causes Virtual Volumes being recovered in the Global VCAT to be automatically scratched if they do not reside in their assigned LDSs. This parameter would normally be used when recovery is being done at a disaster recovery site or after a DASD buffer volume failure. Without the parameter, the Virtual Volume entry is returned to the Global VCAT as is for manual resolution. An error message is issued for Virtual Volumes that cannot be recovered.

The optional DROP_INELIGIBLE parameter provides a method for deleting static cache LDSs that were defined, but are no longer required. The LDSs must be unavailable, uncataloged, or fail open during the recover process. If this occurs, the LDS will be deleted from any virtual assignment and will not show in List=Cache reports. If an associated nonscratch virtual is referenced, a new LDS will be assigned, and Recall will proceed normally at first reference.

If a Virtual Volume Entry is found during the recovery that does not have a group number and subgroup number assigned to it, the Virtual Volume is assigned to group 01 subgroup Long.

Sample JCL can be found in HLQ.CCUUJCL (RECGLVC).

Recovery Error Messages

Virtual Volume entries containing error conditions are always printed during the recovery. The error messages printed to the SYSPRNT DD contain the following information:

vvvvvv,lds*nnnnn*,*yy*,RSN=*rr*: *ddddddddddddddddd* *vvvvv ssssssss*

Where:

vvvvvv

The Virtual Volume serial number.

lds*nnnnnn*

The LDS cache data set incorrectly assigned or in error.

yy

The LDS cache data set entry number assigned within the VVE.

RSN=*rr*

A reason code used to identify the error condition.

ddd…dd

A description of the error condition.

vvvvvv

The Virtual Volume serial number.

sssssss

The recovery action either KEPT or DELETED.

Error conditions include the following:

RSN=04:Invalid VVETDDN

The Virtual Volume entry for a Virtual Volume that has not been Externalized points to a corrupted LDS cache ddname. These ddnames should always be prefixed with LDS.

RSN=08:Invalid VVETDDN

The Virtual Volume entry for a Virtual Volume that has not been Externalized points to a corrupted LDS ddname. These ddnames should always be suffixed with a 6-character number.

RSN=12:LDS marked ineligible

The Virtual Volume entry for a Virtual Volume that has not been Externalized points to an LDS that cannot be opened or read. Make sure that the DASD volumes containing these LDSs are available and varied online.

RSN=16:LDS unassigned

The Virtual Volume entry for a Virtual Volume that has not been Externalized points to an LDS that is not currently assigned to a Virtual Volume.

RSN=16:LDS assigned to VOLSER

The Virtual Volume entry for a Virtual Volume that has not been Externalized points to an LDS that is assigned to a different Virtual Volume.

RSN=08:Invalid VVETDDN

The Virtual Volume entry for a Virtual Volume that has not been Externalized points to a corrupted LDS ddname. These ddnames should always be suffixed with a 6-character number.

RSN=12:LDS marked ineligible

The Virtual Volume entry for a Virtual Volume that has not been Externalized points to an LDS that cannot be opened or read. Make sure that the DASD volumes containing these LDSs are available and varied online.

RESET_CACHETYPE

This command is used when running the SVTSUTIL program to convert the Virtual Volume Entries (VVEs) in the Global VCAT from Static to Dynamic Cache Management or vice versa. Only Virtual Volumes that have been Externalized can be converted. Virtual Volumes that have not been Externalized will receive an error message and will not be converted.

This command should only be used as part of the cache management conversion procedures.

Note: For more information, see the appendix “Conversion Procedures.”

Syntax

```
RESET_CACHETYPE={DYNAMIC | STATIC}
```

SCRATCH

This command is used by the Scratch Synchronization Job to return the Virtual Volumes to scratch status.

The optional REDOP2P parameter is used to synchronize all VOLSERs in scratch status in the local CA Vtape complex with all remote CA Vtape complexes that these Virtual Volumes were transmitted to. The parameter is only used when network or TCP/IP problems have prevented the regular execution of the Scratch Synchronization Job from transmitting scratch updates to the remote CA Vtape complexes.

Note: For more information about the scratch process, see Scratch Tape Synchronization in the *Configuration Guide*.

Syntax

```
SCRATCH [,REDOP2P]
```

During the scratch process some volumes may be bypassed due to the following conditions:

Virtual Volume not found

The Virtual Volume entry could not be located.

Cellpool query failed

An internal error occurred while verifying the Virtual Volume status.

Status has changed

The Virtual Volume entry for a Virtual Volume has changed. The volume may have been updated during the time the scratch process has been running.

Just used

The Virtual Volume entry for a Virtual Volume has changed. The volume may have been updated during the time the scratch process has been running.

Bypassed, already scratch

The Virtual Volume entry for a Virtual Volume is already in scratch status.

Parms incorrect

An internal error occurred calling a subroutine. Contact CA Support.

Workarea too small

An internal error occurred calling a subroutine. Contact CA Support.

Backstore active

The Virtual Volume is being used by the Backstore Engine. The volume is bypassed.

Reserved elsewhere

The Virtual Volume is being used by another CA Vtape subsystem.

Mounted/Inuse

The Virtual Volume is being used by a Virtual Drive.

Signature mismatch

The Virtual Volume has been used in a P2P configuration and the ownership of the volume belongs to another subsystem. Run the scratch process for this volume from a subsystem in the same CA Vtape complex that mounted it as scratch.

SETCC0

This command sets the actual return code to zero (0). You can reset nonzero return codes to zero by defining this command as part of the utility input data.

VVE_FREE=

This command is used when running the SVTSUTIL program to reset the system ownership flag in the Virtual Volume Entry in the Global VCAT. This command is used only after determining that the Virtual Volume in question is not currently in use on any system sharing the Global VCAT.

Syntax

VVE_FREE=*volser*

Where *volser* is the Virtual Volume VOLSER.

VVE_FREECELLS

This command is used when running the SVTSUTIL program to return scratched Virtual Volumes to the scratch cell pool for reuse in a CA Vtape Complex that does not have its Virtual VOLSER ranges defined in the Volume Pool Definition Section of parmlib (VTPOOLS member). In this environment the Scratch Synchronization Job does an internal VVE_FREECELLS first and then uses a tape management system scratch report to scratch Virtual Volumes. The newly scratched Virtual Volumes are not returned to the scratch cell pool for reuse until the next run of the Scratch Synchronization Job. If a scratch shortage occurs before to the next run of the Scratch Synchronization Job, you can use this command to immediately make the last set of scratched Virtual Volumes available for reuse.

In a CA Vtape Complex that does use the Volume Pool Definition Section, this command does nothing.

Syntax

VVE_FREECELLS

VVE_SCRATCH=

This command is used when running the SVTSUTIL program to scratch a Virtual Volume in the Global VCAT. This command is used when correcting the status of a Virtual Volume after a problem has occurred. This command does not scratch the Virtual Volume in the tape management system.

Note: We recommend running the Scratch Synchronization Job instead of VVE_SCRATCH. For more information, see Scratch Tape Synchronization in the *Configuration Guide*.

Syntax

VVE_SCRATCH=*volser*[,FORCE]

Where *volser* is the Virtual Volume VOLSER.

Running VVE_SCRATCH on the local system of a P2P system will queue the volume for scratch processing on the remote system and always scratch the volume locally. If running with the optional keyword FORCE then internal P2P edits are bypassed. Care must be exercised when using the FORCE keyword. Also, running VVE_SCRATCH=*nnnnnn*,FORCE on a remote system will scratch the volume on the remote system, but will not scratch it on the local or originating system.

VVE_WRITE=

This command is used when running the SVTSUTIL program to requeue a Virtual Volume for Externalization by building a GRR (Group Request Record). This command is used when a Virtual Volume has been dequeued from Externalization due to a problem that caused the error retry limit to be exceeded.

The optional keyword, FORCE, can be used to requeue a previously Externalized Virtual Volume that currently resides in cache. FORCE can only be used with DYNAMIC cache volumes. Force is ignored for STATIC cache volumes. The current Group definitions determine whether a Primary, Duplex, or USS Backstore copies are created.

Syntax

VVE_WRITE=*volser* [,FORCE]

Where *volser* is the Virtual Volume VOLSER.

Chapter 7: Reports

This chapter describes sample jobs and reports that are provided with CA Vtape. The first half of the chapter describes the standard reports that are generated by running the SVTSUTIL utility. The second half of the chapter describes the customizable reports that are generated by running CA Earl.

This section contains the following topics:

Using SVTSUTIL Batch Commands to Generate Reports

You can produce the following four reports using SVTSUTIL Batch Commands:

- ANALYZE=COMPRESSION
- LIST=BACKSTORE
- LIST=CACHE
- LIST=MODULE
- REPORT=BACKSTORE

Only one report command can be used per execution of the utility.

ANALYZE=COMPRESSION

This command is used when running the SVTSUTIL program to generate a report showing the effective CPU cost for using hardware compression in the DASD buffer for a generated data sample. The CA Vtape compression routines rely on the use of certain hardware instructions. This report can estimate how much additional CPU overhead is required to compress data using these hardware instructions.

Syntax

```
ANALYZE=COMPRESSION
```

The additional CPU cost is expressed in terms of megabytes (MBs) for each CPU second. This reflects the amount of data the hardware compression instructions themselves are capable of moving. Using information from this report, you can estimate the additional CPU cost for hardware compression based on the number of MBs of data to process.

You can also use this report to determine how to adjust the MaximumCPURate parmlib attribute. This attribute can reduce or increase the additional CPU cost by reducing or increasing the amount of data compressed. By reducing the amount of data compressed, CPU cost can be reduced.

The analysis report tends to vary on different physical machines due to the hardware implementation of the compression instructions.

Sample report output

```
      CA Vtape V2R00  S V T S U T I L      -    X E 6 1  -  ddddddd  mmm dd, yyyy  hh.mm.ss

------------------------------------------- Utility Control Statement(s) & Report Log -----
SVTSU0171I ANALYZE=COMPRESSION

Compression Call Performance Analysis

     Type       Method   MB/Inp CpuSec MB/Sec
     ------- -------- ------ ------ ------
     CMPSC    SVTHC#01      13    .250       55
     CMPSC    SVTHC#02      14    .250       57
     CMPSC    SVTHC#03      15    .250       65
     CMPSC    SVTHC#04      15    .250       64
     CMPSC    SVTHC#05      14    .250       60

        Average Velocity mb/Sec             60

SVTSU0172I ANALYZE=COMPRESSION                                    SVTSUT60, RC=     0

SVTSU0173I Number of commands processed:        1
SVTSU0174I Highest condition code:              0
```

LIST=BACKSTORE

This command is used when running the SVTSUTIL program to generate a list of all Virtual Volumes in VOLSER order that have been stacked on physical tape.

Syntax

```
LIST=BACKSTORE
```

Sample JCL can be found in HLQ.CCUUJCL (BACKSTOR).

The report shows each application data set name on each Virtual Volume and its associated physical tape primary and duplex VOLSERs, group and subgroup information, Virtual Volume size in megabytes, actual Virtual Volume size in megabytes, and DASD buffer compression percentage. The compression percentage is set to zero for any Virtual Volumes that do not contain compressed data. Totals of volumes, compressed volumes, and uncompressed volumes are displayed at the end, along with total uncompressed Virtual Volume size, total compressed size, and overall compression percentage. This report does not show Virtual Volumes stored in the DASD buffer, but that are not yet Externalized to physical tape.

Note: You can run this report when CA Vtape is active or inactive. When CA Vtape is inactive, include the VCAT and Global DD statements.

Example of the LIST=BACKSTOR Report

```
                  CA Vtape r12.0       S V T S U T I L    -   CA11.SVT3     - Mon SEP 22, 2008  14:59:45
------------------------------------------- Utility Control Statement(s) & Report Log -------------------------------------------
SVTSU0171I LIST=BACKSTORE
SVTSU1661I Accessing SVTS to identify GLOBAL VCAT and Local VCAT datasets
           Reason: GLOBAL DDName statement not defined
                   VCAT   DDName statement not defined

List Backstore Log                                        2008.266  14:59:45

Virtual                                                Prim Primary  Primary2  Duplex  Duplex2          Sub
Volser    Data Set Name                                 FS# Volser   Volser    Volser  Volser   Group  Group      MB    Size Cmp%
101108    SVTS120.QASVT4.G1113.DMSN.C2008264.T132453   0001 540949                                  11     S        816    816   0%
          SVTS120.QASVT4.G1113.ALC
101109    SVTS120.QASVT4.G1111.DMSN.C2008264.T132454   0001 541345                                  11     S        976    976   0%
101110    SVTS120.QASVT4.G1111.COMP                    0001 541518                                  11     S      1,928  1,928   0%
          SVTS120.QASVT4.G1111.COMPSRT
101111    SVTS120.QASVT4.G1113.COMP                    0001 541391                                  11     S        968    968   0%
101112    SVTS120.QASVT4.G1111.SYNSRT                  0001 541344                                  11     S        732    732   0%
101113    SVTS120.QASVT4.G412.DMSN.C2008264.T134835    0004 542548                                  41     S      1,480  1,480   0%
          SVTS120.QASVT4.G412.ALC
          SVTS120.QASVT4.G412
          SVTS120.QASVT4.G412.DFDSS
          SVTS120.QASVT4.G412.VB
          SVTS120.QASVT4.G412.FDR
          SVTS120.QASVT4.G412.VTS
101114    SVTS120.QASVT4.G111.DMSN.C2008264.T134836    0002 541344                                  11     S         12     12   0%
101115    SVTS120.QASVT4.G113.DMSN.C2008264.T134836    0005 541345                                  11     S        556    556   0%
101116    SVTS120.QASVT4.G410.DMSN.C2008264.T134847    0004 542407                                  41     S      1,048  1,048   0%
101117    SVTS120.QASVT4.G113.COMP                     0002 541345                                  11     S      2,000  2,000   0%
          SVTS120.QASVT4.G113.COMPSRT
101119    SVTS120.QASVT4.G111.COMP                     0003 540949                                  11     S      2,000  2,000   0%
101120    SVTS120.QASVT4.G410.COMP                     0001 542406                                  41     S      2,000  2,000   0%

Report was abbreviated to save space.

                            Volume Count                    MB                   Size    Cmp%
TOTAL UNCOMPRESSED                   162               109,216
TOTAL COMPRESSED                       4                   648                    564     13%
TOTAL                                166               109,864
End of List Backstore Log
```

The following is an example of truncated abbreviated output for LIST=BACKSTORE command output:

```
                          Volume Count                    MB                   Size    Cmp%
TOTAL UNCOMPRESSED              2,353               750,412
TOTAL COMPRESSED                   24                 9,068                  3,136     66%
TOTAL                           2,377               759,480

End of List Backstore Log

SVTSU0172I LIST=BACKSTORE                                        SVTSUT60, RC=     0


SVTSU0173I Number of commands processed:        1
SVTSU0174I Highest condition code:              0
```

LIST=CACHE

This command is used when running the SVTSUTIL program to determine whether or not any DASD buffer LDSs have become unchained or lost. LDSs should be chained to one of the following locations:

- The free cell pool for use at any time
- The free queue for use when the free cell pool is empty (oldest unused Virtual Volume LDSs are freed first)
- An active Virtual Volume

The report generated by this command details where the LDSs are chained and whether or not they are unchained, along with whether or not a Virtual Volume associated with an LDS needs to be Externalized.

Syntax

```
LIST=CACHE [,NOCATALOG|NOCATALOG,WTOD]
```

The optional NOCATALOG,WTOD parameter is used by the GRRJCL utility to suppress the catalog locates for the DASD buffer LDSs and to access the Write Time Of Day (WTOD) field in the Virtual Volume Entry in the Global VCAT. Eliminating the catalog locate reduces the GRRJCL utility runtime. The WTOD output consists of the date in Julian format and the time of day printed side-by-side in 16-byte fields.

Sample JCL can be found in HLQ.CCUUJCL(LISTCACH).

Note: If this diagnostic tool is run during periods of high virtual tape activity, it can impact virtual tape response times.

The LDS chains are dynamic. During mount or Backstore activity, these chains are being continuously updated. To determine if an LDS is correctly chained, this diagnostic tool must serialize the Global VCAT to prevent updates. The serialization is maintained for a short period and then released to allow other processes to update the Global VCAT. After a short wait, the Global VCAT is again serialized. This pattern is repeated until all LDSs have been evaluated.

If the report indicates that an LDS has become unchained or lost, you can recover it by using the SVTSUTIL RECLAIM command. Sample JCL can be found in HLQ.CCUUJCL(RECLAIM).

Sample output created from using the LIST=CACHE parameter

```
               CA Vtape r11.5        S V T S U T I L     -    CA11.SVT2        - Thu JUN 28, 2007  19:02:07

---------------------------------- Utility Control Statement(s) & Report Log -------------------------------
SVTSU0171I LIST=CACHE
SVTSU1661I Accessing SVTS to identify GLOBAL VCAT and Local VCAT datasets
           Reason: GLOBAL DDName statement not defined
                   VCAT   DDName statement not defined
List Cache Log                                          2007.179  19:02:07
*Inelig* - Allocation of the LDS failed
Queued - Queued for externalization
*MustReq - Must be manually requeued
n/a - in Virtual field indicates LDS Cellpool status is UNUSED
Lost1 - The LDS Cellpool status is allocated, but the LDS VVE vol does not exist
Lost2 - The LDS Cellpool status is allocated, but the VVE vol has been scratched

Lost3 - The LDS Cellpool status is allocated, but the LDS is not in the associated VVE vol LDSTABLE
Lost types above - Generally the Reclaim utility will make these LDS usable again

                                      Dynamically Allocated Cache Data Sets
-------------------------------------------------------------------------------------------------------------------
Cache     Linear                                        Virtual   Externalized
Volser    Dataset                                       Volser    Status       #mb.InUse #mb.Alloc CacheExpDt CacheExpTm
-------------------------------------------------------------------------------------------------------------------

VTP11H    SVTS120.VT3.VVE.V108006.MM.CACHE              108006                      12        13   07/19/07      20:22
LOANV1    SVTS120.VT3.VVE.V108008.MM.CACHE              108008                      16        17   07/18/07      19:51
LOANV3    SVTS120.VT3.VVE.V108009.MM.CACHE              108009                      16        17   07/18/07      19:51
LOANV6    SVTS120.VT3.VVE.V108010.MM.CACHE              108010                      16        17   07/18/07      19:51
LOANV3    SVTS120.VT3.VVE.V108090.MM.CACHE              108090                       8         9   07/18/07      19:51
VTP11A    SVTS120.VT3.VVE.V108091.MM.CACHE              108091                       8         9   07/18/07      19:51
VTP11D    SVTS120.VT3.VVE.V108092.MM.CACHE              108092                       8         9   07/18/07      19:51
LOANV5    SVTS120.VT3.VVE.V109100.MM.CACHE              109100                     432       433   07/18/07      18:56


                                              Pre-allocated Cache Data Sets
-------------------------------------------------------------------------------------------------------------
Cache     Linear                                          Virtual   Externalized
Volser    Dataset                                         Volser    Status
-------------------------------------------------------------------------------------------------------------
SMD062    QAPROD.VVE.LDS00000                             100708
SMD062    QAPROD.VVE.LDS00002                             100751
SMD043    QAPROD.VVE.LDS00003                             100722
SMD066    QAPROD.VVE.LDS00004                              n/a
SMD056    QAPROD.VVE.LDS00005                             100724
SMD065    QAPROD.VVE.LDS00006                             100724
SMD065    QAPROD.VVE.LDS00007                             100721    CA11,3
SMD031    QAPROD.VVE.LDS00008                             100721    CA11,3
SMD004    QAPROD.VVE.LDS00009                             100726
SMD045    QAPROD.VVE.LDS00010                             100725
```

```
SMD046    QAPROD.VVE.LDS00011                          100692
SMD061    QAPROD.VVE.LDS00012                          100692
SMD054    QAPROD.VVE.LDS00013                          100692
SMD052    QAPROD.VVE.LDS00014                          100724
SMD065    QAPROD.VVE.LDS00015                          100721
SMD043    QAPROD.VVE.LDS00016                          100767     Queued
SMD058    QAPROD.VVE.LDS00017                          100725
SMD051    QAPROD.VVE.LDS00018                          100732
SMD060    QAPROD.VVE.LDS00019                          100767     Queued
SMD052    QAPROD.VVE.LDS00020                          100767     Queued

SVTSU0172I LIST=CACHE                                          SVTSUT60, RC=     0

SVTSU0173I Number of commands processed:        1
SVTSU0174I Highest condition code:              0
```

The Cache Volser on the far left is the DASD volume the LDS resides on. LDS00000 resides on DASD volume SMD054 and currently contains part or all of Virtual Volume 102619.

The following is a list of Externalized Statuses, which indicate the current Externalization status of the Virtual Volume:

Blank

Indicates that the Virtual Volume has been Externalized.

CrashProt

VVE does not have a *write time of day*. The ending tape mark may be missing. Check the tape management system to determine if the Virtual Volume is active with data blocks written to it or in scratch status. If the Virtual Volume is in scratch status, the next run of the Scratch Synchronization Job should scratch the Virtual Volume with the Global VCAT.

Inelig

Indicates the LDS has been marked ineligible. Verify that the LDS has been properly defined and then execute the SVTSUTIL batch command LDS_ADD.

***MustReq**

Indicates that the Virtual Volume is still in the DASD buffer. The volume is not queued and should be manually requeued by using the SVTSUTIL batch command VVE_WRITE or the batch job GRRJCL.

Queued

Indicates that the Virtual Volume is still in the DASD buffer. The volume is queued and waiting to be Externalized.

SYSID,*n*

Indicates the Virtual Volume has been reserved on the displayed system by subsystem *n*. If the Virtual Volume is not in use execute the SVTSUTIL batch command VVE_FREE.

If *n/a* appears in the Virtual Volser column, then the associated LDS does not contain a Virtual Volume. This is an LDS that was never allocated to any Virtual Volume or never freed for reuse by running RECLAIM.

LIST=MODULE

The LIST=MODULE SVTSUTIL command provides a Module Revision List (MRL) report pertaining to CA Vtape loadlib members. The loadlib must be defined by a SVTSLOAD, JOBLIB or STEPLIB DD statement, or must be included in the operating system Link List (LINKLST) definition.

The MRL report is also automatically created for the libraries accessed by the SVTS address space during CA Vtape initialization. The MRL report is written to the SVTS JOBLOG.

You can use the SVTSLOAD DD statement to generate MRL reports from previous versions of CA Vtape load libraries or, while executing SVTSUTIL from one CA Vtape loadlib, verify the maintenance level of CA Vtape modules after PTFs or Service Pack installations to a different library.

When the SVTSLOAD DD statement is not specified, SVTSUTIL tries to generate the MRL report from the libraries specified as JOBLIB or STEPLIB DD statements.

When a SVTSLOAD, JOBLIB or STEPLIB DD statement are not included, SVTSUTIL tries to process the operating system LINKLST and generate the report based on the CA Vtape load modules found on the LINKLST definition.

The MRL report is written to the SYSUT1 DD statement. The SYSPRINT DD statement provides operational return codes and messages.

Syntax

```
LIST=MODULE
```

Example of the List Module report

```
                  CA Vtape V2R00     S V T S U T I L    -    X E 6 1  -   ddddddddd  mmm dd, yyyy  hh.mm.ss

---------------------------------------- Utility Control Statement(s) & Report Log ----------------------------------------
SVTSU0171I LIST=MODULE
  CCUULOAD DDName: STEPLIB
           DSName: QAPROD.VTAPE.SMP120.CCUULOAD
      ModuleName Description                                  Address   AM  SP  ---- ATTRIBUTES ----
   +0  SLSUX02   SLSUX02  15.53 08/24/00 SVT1120-SS05429
   +0  SVTCJMLW  SVTCJMLW 18.29 12/05/02 SVT1120-QO28760  8C900AA8  31  FC  RE RU
   +0  SVTCMDPA  SVTCMDPA 16.08 07/25/03 SVT1120-QO40486
   +0  SVTCMMRL  SVTCMMRL 17.56 09/02/03 SVT1120-QO43468  8C909CE0  31  FC  RE RU
   +0  SVTDSCNV  SVTDSCNV 19.35 09/24/01 SVT1120-QO01722
   +0  SVTDVRVL  SVTDVRVL 10.48 04/17/02 SVT1120-QO10564
   +0  SVTEFN10  SVTEFN10 15.13 06/27/03 SVT1120-QO39947
   +0  SVTERD10  SVTERD10 15.13 06/27/03 SVT1120-QO39947
   +0  SVTGFLOC  SVTGFLOC 21.45 06/21/01 SVT1120-LO95566
   +0  SVTGRRVL  SVTGRRVL 10.48 04/17/02 SVT1120-QO10564
   +0  SVTHC#01  SVTHC#01 00.00 00/00/00 SVT0000-0000000
   +0  SVTHC#02  SVTHC#02 00.00 00/00/00 SVT0000-0000000
   +0  SVTHC#03  SVTHC#03 00.00 00/00/00 SVT0000-0000000
   +0  SVTHC#04  SVTHC#04 00.00 00/00/00 SVT0000-0000000
   +0  SVTHC#05  SVTHC#05 00.00 00/00/00 SVT0000-0000000
   +0  SVTPMDRV  SVTPMDRV 19.35 09/24/01 SVT1120-QO01722
   +0  SVTPRMLB  SVTPRMLB 18.54 12/27/01 SVT1120-QO08313
   +0  SVTPRT01  SVTPRT01 10.48 04/17/02 SVT1120-QO10564  800103D0  31  FC  RE RU
   +0  SVTPTRVL  SVTPTRVL 10.48 04/17/02 SVT1120-QO10564
   +0  SVTRCYCL  SVTRCYCL 18.14 07/18/03 SVT1120-QO41303
   +0  SVTREXX   SVTREXX  14.19 08/11/00 SVT1120-SS05423
   +0  SVTS#TAP  SVTS#TAP 15.28 04/14/03 SVT1120-QO33680
   +0  SVTSAPI   SVTSAPI  14.35 01/24/00 SVT1120-SS05106
   +0  SVTSAPX   SVTSAPX  15.40 02/18/00 SVT1120-SS05139
   +0  SVTSAS    SVTSAS   16.53 06/26/03 SVT1120-QO40356
   +0  SVTSC99   SVTSC99  15.28 04/14/03 SVT1120-QO33680
   +0  SVTSDIV   SVTSDIV  16.53 06/26/03 SVT1120-QO40356
   +0  SVTSEDT   SVTSEDT  20.12 05/06/03 SVT1120-QO33794
   +0  SVTSENF   SVTSENF  15.28 04/14/03 SVT1120-QO33680
   +0  SVTSGDG   SVTSGDG  20.25 07/31/03 SVT1120-QO40038
   +0  SVTSGDGU  SVTSGDGU 08.47 09/19/00 SVT1120-SS05468
   +0  SVTSINI   SVTSINI  17.09 08/26/03 SVT1120-QO42146
   +0  SVTSIO    SVTSIO   15.21 06/18/03 SVT1120-QO35343
   +0  SVTSIPCS  SVTSIPCS 15.14 08/05/03 SVT1120-QO41412
   +0  SVTSIRB   SVTSIRB  17.27 07/15/03 SVT1120-QO41232
   +0  SVTSISPF  SVTSISPF 18.14 07/18/03 SVT1120-QO41303
   +0  SVTSMIH   SVTSMIH  15.29 04/14/03 SVT1120-QO33680
   +0  SVTSMODS  SVTSMODS 17.56 09/02/03 SVT1120-QO43468  8C901140  31  FC  RE RU
   +0  SVTSMSTR  SVTSMSTR 15.29 04/14/03 SVT1120-QO33680
   +0  SVTSNAP1  SVTSNAP1 10.49 04/17/02 SVT1120-QO10564
   +0  SVTSOPT   SVTSOPT  00.00 00/00/00 SVT0000-0000000
   +0  SVTSORTX  SVTSORTX 14.23 08/11/00 SVT1120-SS05423
   +0  SVTSPAL   SVTSPAL  15.29 04/14/03 SVT1120-QO33680
   +0  SVTSPAR   SVTSPAR  17.13 07/03/03 SVT1120-QO40489
   +0  SVTSPAX   SVTSPAX  17.13 07/03/03 SVT1120-QO40489
   +0  SVTSPGM   SVTSPGM  15.29 04/14/03 SVT1120-QO33680
   +0  SVTSPRMS  SVTSPRMS 16.35 08/28/03 SVT1120-QO43302
   +0  SVTSPTU   SVTSPTU  18.15 07/18/03 SVT1120-QO41303
   +0  SVTSREQ   SVTSREQ  18.20 08/15/03 SVT1120-QO41664
   +0  SVTSSRV   SVTSSRV  10.19 08/07/03 SVT1120-QO42149
   +0  SVTSSS    SVTSSS   14.40 05/24/01 SVT1120-LO92320
   +0  SVTSSSI   SVTSSSI  09.45 08/07/99 SVT1120-SVT1120
   +0  SVTSS99   SVTSS99  10.19 07/21/00 SVT1120-SS05373
   +0  SVTSUTIL  SVTSUTIL 17.56 09/02/03 SVT1120-QO43468  80007878  31  FC  RE RU
   +0  SVTSUT20  SVTSUT20 17.56 09/02/03 SVT1120-QO43468  80011418  31  FC  RE RU
   +0  SVTSUT40  SVTSUT40 17.56 09/02/03 SVT1120-QO43468  8001A600  31  FC  RE RU
   +0  SVTSUT60  SVTSUT60 17.56 09/02/03 SVT1120-QO43468  80039448  31  FC  RE RU
   +0  SVTSUT80  SVTSUT80 17.57 09/02/03 SVT1120-QO43468  80042728  31  FC  RE RU
```

```
   +0  SVTSU100  SVTSU100 20.12 05/06/03 SVT1120-QO33794
   +0  SVTSU110  SVTSU110 17.13 07/03/03 SVT1120-QO40489
   +0  SVTSVAPI  SVTSVAPI 18.15 07/18/03 SVT1120-QO41303
   +0  SVTSVIO   SVTSVIO  15.27 06/19/03 SVT1120-QO38493
   +0  SVTSVTU   SVTSVTU  15.21 06/18/03 SVT1120-QO35343
   +0  SVTSWAIT  SVTSWAIT 09.46 08/07/99 SVT1120-SVT1120
   +0  SVTSXCTL  SVTSXCTL 12.08 03/28/03 SVT1120-QO33679
   +0  SVTSXSS   SVTSXSS  15.23 06/19/03 SVT1120-QO38302
   +0  SVTTAPIO  SVTTAPIO 20.12 05/06/03 SVT1120-QO33794
   +0  SVTUTHDR  SVTUTHDR 17.57 09/02/03 SVT1120-QO43468  80007158  31  FC  RE RU
   +0  SVTVCTRD  SVTVCTRD 10.49 04/17/02 SVT1120-QO10564
   +0  SVTVTRVL  SVTVTRVL 10.49 04/17/02 SVT1120-QO10564
   +0  VSLSUX02  VSLSUX02 15.24 06/19/03 SVT1120-QO38302
   Module count: 71
 END Message SVTCM0110I
SVTSU0004I MRL request successfully processed
SVTSU0172I LIST=MODULE                                          SVTSUT60, RC=     0

SVTSU0173I Number of commands processed:        1
SVTSU0174I Highest condition code:              0
```

REPORT=BACKSTORE

This command is used when running the SVTSUTIL program to generate a list of all Virtual Volumes in VOLSER order that have been externalized to physical media. This is the only report that includes the Triplex or UNIX System Services (USS) information.

Syntax

```
REPORT=BACKSTORE
```

Sample JCL can be found in HLQ.CCUUJCL (RPRTBACK).

The report includes group number, Virtual Volume size in megabytes, actual Virtual Volume size in megabytes, DASD buffer compression percentage, as well as the physical VOLSER, file sequence number, and owner ID for primary, duplex, and triplex external media. The final field on each line will be the first 17 bytes of the first dataset on the Virtual Volume. Virtual Volumes externalized to USS will indicate a VOLSER of USS along with a blank file sequence number and owner ID. The compression percentage is set to zero for any Virtual Volumes that do not contain compressed data. Totals of volumes, compressed volumes, and uncompressed volumes are displayed at the end, along with total uncompressed Virtual Volume size, total compressed size, and overall compression percentage. This report does not include Virtual Volumes that have not been externalized.

Note: You can run this report when CA Vtape is active or inactive. When CA Vtape is inactive, include the VCAT and Global DD statements.

Example of the REPORT=BACKSTOR Report

```
SVTSU0171I REPORT=BACKSTORE
SVTSU1661I Accessing SVTS to identify GLOBAL VCAT and Local VCAT data sets
           Reason: GLOBAL DDName statement not defined
                   VCAT   DDName statement not defined
SVTSU3093I Dynamic allocation successful for GLOBAL data set QAPROD.VT2.GLOBAL.VCAT
SVTSU3093I Dynamic allocation successful for VCAT   data set QAPROD.VT2.XE61.SVT4VCAT
SVTSU3083I Obtaining backstore data objects from system catalog
Backstore Report                                        2010.334  19:01:55

Virtual                         P R I M A R Y               D U P L E X                 T R I P L E X
Volser Grp Used Size Cmp Volser  Fseq      Owner       Volser  Fseq      Owner       Volser  Fseq     Owner        DSNAME(17)
------ --- ---- ---- --- ------ ----- ---------------- ------ ----- ---------------- ------ ----- ---------------- -----------------
107005  11 1032 1032   0 541051   137 000A3939FFF5C6C7                                                            SVTS120.QASVT3.G1
107016  41 1032 1032   0 541413    79 0005D773FFFA288D                                                            SVTS120.QASVT3.G4
107017  41 1032 1032   0 541454    25 0001A8F9FFFE5707                                                            SVTS120.QASVT3.G4
107018  11 1032 1032   0 541051   138 000A4960FFF5B6A0                                                            SVTS120.QASVT3.G1
107019  11 1032 1032   0 541490    18 00016488FFFE9B78                                                            SVTS120.QASVT3.G1
107020  11  648  648   0 542965    32 00021C9AFFFDE366                                                            SVTS120.QASVT3.G1
107021  41  648  648   0 541454    21 0001855DFFFE7AA3                                                            SVTS120.QASVT3.G4
107022  41  648  648   0 541413    73 00057099FFFA8F67                                                            SVTS120.QASVT3.G4

Report was abbreviated to save space.

                            Volume Count                    MB                   Size    Cmp%
TOTAL UNCOMPRESSED                   305                336,948
TOTAL COMPRESSED                       0                      0                      0      0%
TOTAL                                305                336,948
End of Backstore Report Log

SVTSU3095I Dynamic unallocation successful for GLOBAL data set QAPROD.VT2.GLOBAL.VCAT
SVTSU3095I Dynamic unallocation successful for VCAT   data set QAPROD.VT2.XE61.SVT4VCAT
SVTSU0172I REPORT=BACKSTORE                                      SVTSUT60, RC=     0

SVTSU0173I Number of commands processed:        1
SVTSU0174I Highest condition code:              0
```

Using CA Earl with CA Vtape

CA Earl provides you with the capability to design and produce customized reports. Easy access to system information provides flexibility and lets you tailor reports to your desired format.

You can modify or use the samples provided to report or extract information unique to the system. These jobs are distributed in the HLQ.CCUUECPB data set. A cross reference of supplied CA Earl members can be found in the E$INDEX member of the HLQ.CCUUJCL data set.

Note: For additional information about CA Earl, see the *CA Earl Reference Guide*.

Sample CA Earl Components

The following list shows the supplied members that are used to produce the various CA Earl reports.

Note: If you intend to modify an existing sample, copy the sample into a new member and modify that new member, because subsequent product maintenance could overlay your changes.

The following is a list of the provided sample CA Earl components and their supplied members:

CA Earl component: Procedures

Member: EREPORT

JCL procedure used to run CA Earl reports. This procedure requires customization.

CA Earl component: CA Earl File Definitions and Record Layouts

Member: EFMTGRP

CA Earl copybook member that provides data and file definitions for accessing the CA Vtape Group (GRP) and Sub-Group (SGRP) records.

Member: EFMTLOG

CA Earl copybook member that provides data and file definitions for accessing the CA Vtape Group log records.

Member: EFMTVVE

CA Earl copybook member that provides data and file definitions for accessing the CA Vtape Virtual Volume Entry (VVE) records.

CA Earl component: Copy Books

Member: ERPTOPT

CA Earl copybook member that defines CA Earl execution options.

Member: ERPTHDR

Standard heading line format for CA Vtape.

CA Earl component: JCL Members Required to Produce CA Earl Reports

Member: EJOB0110

Execution JCL to invoke IDCAMS. Issues delete and define statements for generation data set used by EJOB0120 and EJOB0130.

Member: EJOB0120

Execution JCL to invoke CA Earl to produce Report ERPT0120.

Member: EJOB0130

Execution JCL to invoke CA Earl to produce Report ERPT0130.

Member: EJOB0200

Execution JCL to invoke CA Earl to produce Report ERPT0200.

Member: EJOB0300

Execution JCL to invoke CA Earl to produce reports ERPT0300 and ERPT0301.

CA Earl component: CA Earl Report Programs

Member: ERPT0120

CA Earl program that creates a daily Virtual Mount Performance Analysis Report.

Member: ERPT0130

CA Earl program that creates a monthly Virtual Mount Performance Analysis Report.

Member: ERPT0200

CA Earl program reads the Local VCAT and extracts group information. The extract file is input to ERPT0210, the Backstore Volume Retention Candidate List Report.

Member: ERPT0210

CA Earl program that creates the Backstore Volume Retention Candidate List Report. The report details the physical volumes in use by the Backstore Engine.

Member: ERPT0300

CA Earl program that creates the Active Virtual Volume Report. The report details the Virtual Volumes currently in use.

Member: ERPT0301

CA Earl program that creates the Scratch Summary Report. The report summarizes a count of Virtual Volumes in scratch status.

CA Vtape Supplied CA Earl Reports

The following examples are CA Earl reports that CA Vtape provides.

ERPT0120 and ERPT0130 Virtual Mount Performance Analysis

ERPT0120 produces a daily report by reading the log stream produced by CA Vtape. ERPT0130 produces a monthly report by reading a set of generational data sets produced by ERPT0120.

Example reports

```
dd/mm/yy                                      CA Vtape                                              PAGE    13
hh.mm.ss       ERPT0120                 Copyright(c) yyyy CA. All Rights Reserved

               EOD DETAIL                  VIRTUAL MOUNT PERFORMANCE ANALYSIS

-------------------------------------------------------------------------------------------------------------------------------------
SYSTEM     DATE        TIME        TIME      DEVICE  VIRTUAL          #MOUNT        MOUNT       #SCRATCH      #CACHE-HIT     #CACHE-MISS
         REQUESTED   REQUESTED   COMPLETED           VOLSER                       #SECONDS
-------------------------------------------------------------------------------------------------------------------------------------
XE61     2003/03/26 23:29:41.38 23:34:22.74 350F    100534              1          281                                                1
XE61     2003/03/26 23:30:27.93 23:30:37.13 3501    100538              1            9                              1
XE61     2003/03/26 23:31:51.00 23:31:56.69 3507    100546              1            5                              1
XE61     2003/03/26 23:35:58.77 23:36:07.02 350F    100543              1            8                              1
XE61     2003/03/26 23:37:24.80 23:37:30.50 350D    100543              1            5                              1
XE61     2003/03/26 23:37:42.06 23:37:47.29 350E    100543              1            5                              1
XE61     2003/03/26 23:38:13.65 23:40:35.61 3500    100547              1          142                                                1
XE61     2003/03/26 23:38:13.66 23:38:44.64 3501    100568              1           31                                                1
XE61     2003/03/26 23:38:13.92 23:40:23.57 350E    100548              1          128                                                1
XE61     2003/03/26 23:38:14.14 23:39:32.37 3507    100550              1           78                                                1
XE61     2003/03/26 23:41:58.81 23:42:32.44 3509    100564              1           33                                                1
XE61     2003/03/26 23:42:35.88 23:45:15.87 350A    100552              1          159                                                1
XE61     2003/03/26 23:42:41.53 23:43:47.18 3500    100555              1           66                                                1
XE61     2003/03/26 23:42:48.10 23:42:54.93 3506    100559              1            7                              1
XE61     2003/03/26 23:50:08.36 23:50:13.01 3509    100560              1            4                              1
XE61     2003/03/26 23:55:28.61 23:55:35.93 350D    100566              1            7                              1
                                                              ------------             ------------  ------------  ------------
XE61                                                                  664                       182           373           109
                                                              ------------             ------------  ------------  ------------
                                                              ------------             ------------  ------------  ------------
GRAND TOTAL                                                           664                       182           373           109
                                                              ------------             ------------  ------------  ------------

dd/mm/yy                                       CA Vtape                                                PAGE     1
hh.mm.ss       ERPT0120                 Copyright(c) yyyy CA. All Rights Reserved
               EOD SUMMARY                 VIRTUAL MOUNT PERFORMANCE ANALYSIS

-------------------------------------------------------------------------------------------------------------------------------------
SYSTEM     DATE     HOUR         #MOUNT       MOUNT     #SCRATCH      SCRATCH    #CACHE-HIT     CACHE-HIT   #CACHE-MISS    CACHE-MISS
         REQUESTED                          #SECONDS                 #SECONDS                    #SECONDS                   #SECONDS
-------------------------------------------------------------------------------------------------------------------------------------
XE61     2003/03/26   11              1          11                                      1            11
XE61     2003/03/26   12              3           8                                      3             8
XE61     2003/03/26   18              7           3            1            5            6             3
XE61     2003/03/26   19            105          13           35            4           64             5             6          152
XE61     2003/03/26   20            155          26           56            5           78             5            21          158
XE61     2003/03/26   21            163          24           34            6           97             6            32          100
XE61     2003/03/26   22            110          32           31            7           58             7            21          139
XE61     2003/03/26   23            120          32           25            7           66             5            29          117
                          ------------             ------------             ------------              ------------
XE61     2003/03/26                 664          25          182            6          373             6           109          126
                          ------------             ------------             ------------              ------------
                          ------------             ------------             ------------              ------------
XE61                                664          25          182            6          373             6           109          126
                          ------------             ------------             ------------              ------------
                          ------------             ------------             ------------              ------------
GRAND TOTAL                         664          25          182            6          373             6           109          126
```

ERPT0210 Backstore Volume Retention List

The volume serial numbers shown on this report represent physical volumes that are remounted by the Backstore Engine for the externalization of Virtual Volumes. Volume serial numbers displayed with an asterisk (*) are queued for exclusion by the CA Vtape SET BACKSTORE=EXCLVOL command. Volumes marked with an asterisk are no longer remounted by the Backstore Engine.

Note: The optional sequential file (FILEOUT DD statement) generated in Job EJOB0200, step J0200S02 can be used to exclude the Backstore Engine physical volumes from the ATL/SILO eject process and also used to define the PEXCLUDE file for the CA Vtape Recycle Utility. The file and report generated by EJOB0200 contains information about all the physical volumes the Backstore Engine used up to the time the job was executed. If Recycle has processed some of those volumes, they may be in SCRATCH status.

Example of the ERPT0210 report

```
05/09/07                                              CA Vtape r12.0                                                    PAGE     1
16.40.36       ERPT0210                             All Rights Reserved
                                  B A C K S T O R E  V O L U M E  R E T E N T I O N  L I S T
                              Detail Listing - Order by System, GRP#, SubGrp, Volume Type (P/D) & VOLSER

  (*) Volume queued for exclusion
-------------------------------------------------------------------------------------------------------------------------------
  Physical                            SubGrp   Vol     OffSite   Primary    Duplex
   Volume   SEQ#  P/D  System  GRP#  S/M/L   Pool#   BackStCpy  Esoteric  Esoteric  Group Description
-------------------------------------------------------------------------------------------------------------------------------
  541961       6   P   XE61     41     S     Pool1    None      SL859840            SVT7 GROUP41
  540783       4   P   XE61     41     M     Pool1    None      SL859840            SVT7 GROUP41

END OF REPORT

05/09/07                                              CA Vtape r12.0                                                    PAGE     1
16.40.36       ERPT0210                             All Rights Reserved
                                  B A C K S T O R E  V O L U M E  R E T E N T I O N  L I S T
                                                       Summary Listing

 VCAT TOTAL - VCAT System ID: XE61
              Total P/D Volumes =        2
                Primary Volumes =        2
                  Duplex Volumes =       0
              Number of VCAT(s) =        1
                                ----------
GRAND TOTAL
              Total P/D Volumes =        2
                Primary Volumes =        2
                  Duplex Volumes =       0
              Number of VCAT(s) =        1
                                ----------
```

ERPT0300 Active Virtual Volume Report

The volume serial numbers shown on this report represent Virtual Volumes that currently contain active data. An optional output file can be created. The file creation is triggered by the presence of DD statement FILEOUT. The optional file is provided to allow follow-up processing or additional reporting.

Active Virtual Volumes identified as being in group 0 with a data set name of Volume Unusable - Manual Action Required were selected to be reused by CA Vtape but were rejected as scratch tapes by your tape management system. Identify any action required to recover data if necessary.

The VCAT DD statement is required to resolve subgroup information for the active Virtual Volumes. If you have a single system image, or if your group definitions are identical across all images, a single run of the report will generate accurate subgroup information. If you maintain different group definitions on different system images, you may have to run the report against more than one VCAT to obtain accurate results.

Example reports

```
/mm/yy                                                    CA Vtape                                                    PAGE     1
 hh.mm.ss       ERPT0300                  Copyright(c) yyyy CA. All Rights Reserved
                                      A C T I V E  V I R T U A L  V O L U M E  R E P O R T

 ------------------------------------------------------------------------------------------------------------------------------------
        Sub Last Reference System   Volume Cache  Extrn 1st Dataset Name                                  Tape     Cmp Last Modified
    Grp Grp      Date        ID     Serial  Y/N    Y/N                                                  Sz/MB     %      Date
 ------------------------------------------------------------------------------------------------------------------------------------
0    0          2003/05/21 CA71     100058 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21
     0          2003/05/21 CA71     100066 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21
     0          2003/05/21 CA71     100067 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21
     0          2003/05/21 CA71     100361 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21
     0          2003/05/21 CA71     100362 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21
     0          2003/05/21 CA71     100363 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21
     0          2003/05/21 CA71     100364 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21
     0          2003/05/21 CA71     100365 N      Y     Volume Unusable - Manual Action Required            8    0.00    2003/05/21

     0
                                        8                                                                   64    0.00

     0
                                        8                                                                   64    0.00
     1  S       2003/05/08 XE61     100041 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2003/05/08 XE61     100044 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2003/05/08 XE61     100048 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100012 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100013 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100014 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100015 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100016 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100022 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100029 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100033 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100036 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100037 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100051 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/23 XE61     100052 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         400    0.00    2002/12/23
     1  S       2002/12/19 XE61     100525 N      Y     ZOBKU01.SVTS01.DSSBKUP.B2                         268    0.00    2002/12/19
```

```
    .
    .
    .
    .
 GRAND TOTAL
                                    6,189                                                         1,790,028   35.70
 dd/mm/yy                                                      CA Vtape                                            PAGE     1
 hh.mm.ss       ERPT0300                         Copyright(c) yyyy CA. All Rights Reserved

 dd/mm/yy                                A C T I V E  V I R T U A L  V O L U M E  R E P O R T                      Page     1
                                                          Report Summary

0GRAND TOTAL   Active Volumes =    6,189     In Cache =      106 Externalized =    6,188
               Total Tape Storage(MB) =   1,790,028    Avg Cmp % =  3.97
```

ERPT0300 Active Virtual Volume Optional Output File Record Layout

The record layout for the 90-byte LRECL output file is:

Position	Length	Format	Description
01	6	A/N	Volume Serial
07	1	Y/N	Cache Indicator
08	1	Y/N	Externalization Indicator
09	1	Binary	Group
10	1	A/N	Sub Group
11	44	A/N	Data Set Name
55	3	Binary	Tape size
58	3	Binary	Compression percent
61	8	A/N	System ID - Left Justified
69	10	A/N	Reference Date (YYYY/MM/DD)
79	10	A/N	Last Modified (YYYY/MM/DD)
89	2	Blank	Filler

ERPT0301 Scratch Virtual Volume Summary Report

This report lists the following:

- The total number of available Virtual Volumes in the scratch pool.
- The number of scratch pool Virtual Volumes flagged with the Write Protect status.
- The total number of Virtual Volumes in scratch status in the Global VCAT.

The *Available in Scratch Pool* report line is the total number of scratch volumes residing in the scratch pool. The value indicates the number of scratch volumes available with one exception. If Virtual Volumes were write protected at the pool level (SVT*n* SET WRITPROT,ON,VVP=*vvvvnn*) then these volumes are included in this total. If Virtual Volumes were write protected at the volume level (SVT*n* SET WRITPROT,ON,VVE=*vvvvvv*) then the volumes are not included in this total.

The *Available in Scratch Pool* value is printed as asterisks (*********) if the GLOBAL or VCAT DD statements are not defined, or they reference the wrong Global VCAT or Local VCAT.

The *Virtual Volumes in Write Protect* report line indicates the number of Scratch Virtual Volumes with write protection turned on. Scratch Virtual Volumes that are write protected cannot be written to so they cannot be used as scratch tapes. To make these VOLSERs available for use as scratch tapes, you must use the SVT*n* SET WRITPROT console command to turn off write protection.

Note: For details on printing a list of write protected VOLSERs, see Obtain the Optional ERPT0301 Detail Scratch Virtual Volume Report (see page 152).

The *Virtual Volumes in Scratch Status* report line is the total number of Virtual Volumes that are marked as scratch volumes. This value includes volumes that are marked with the write protect flag and volumes that are not marked with the write protect flag.

Example of the Summary Scratch Virtual Volume report

```
Summary Scratch Virtual Volume Report

DD/MM/YY                                              CA Vtape r12.6                                                PAGE     1
HH.MM.SS       ERPT0301                             All Rights Reserved
                                  S C R A T C H  V I R T U A L  V O L U M E  R E P O R T
                                                     Report Summary

GRAND TOTAL  Available in Scratch Pool         =          5235
             Virtual Volumes in Write Protect  =            21
             Virtual Volumes in Scratch Status =          5256

             Note: - Write Protect Scratch Virtual Volumes are not available for mount processing unless
                     Write Protect flag is turned off (refer to SVTn SET WRITPROT command).
```

Obtain the Optional ERPT0301 Detail Scratch Virtual Volume Report

To view the Detail Scratch Virtual Volume Report, remove the DUMMY from the optional FILEOUT DD. You can also edit the CA Vtape CA Earl member ERPT0301 in the CA Vtape CCUUEARL library and uncommenting the Detail Scratch Virtual Volume Report lines. The report contains a list of VOLSERs in scratch status in the Global VCAT. If a VOLSER has write protection on, *Write Protected* appears next to the VOLSER.

Example of editing the CA Vtape CCUUEARL library member ERPT0301:

```
*****************************************************************
*       =====>> Detail Scratch Virtual Volume Report <<=====   *
*       To generate a Detail Scratch Virtual Volume Report,    *
*       remove the '!' comment characters from the following   *
*       7 lines (do not remove any '!*' lines).                *
*****************************************************************
REPORT
COPY ERPTHDR USING 'ERPT0301'
TITLE @  39 'S C R A T C H  V I R T U A L  V O L U M E  R E P O R T'
TITLE 'Report Detail'
TITLE '              '
PRINT
     @2 RECORD_OUT
```

Example of the Detail Scratch Virtual Volume report

```
DD/MM/YY                                          CA Vtape r12.6                                                PAGE     1
HH.MM.SS       ERPT0301                        All Rights Reserved

                                  S C R A T C H  V I R T U A L  V O L U M E  R E P O R T
                                                 Report Detail

-------------------------------------------------------------------------------------------------------------------------------
  Volume
  Serial
-------------------------------------------------------------------------------------------------------------------------------
  100000
  100001
  100002  Write Protected
  100003
  100004
  100005
  100006
```

ERPT0301 Detail Scratch Virtual Volume Optional Output File Record Layout

The record layout of the 80-byte LRECL output file is:

Position	Length	Format	Description
1	1	Blank	Filler
2	6	A/N	Volume Serial
8	1	Blank	Filler
9	15	A	Status (Write Protected | Blank)
24	58	Blank	Filler

Chapter 8: RECYCLE Utility

This section contains the following topics:

Overview

Application data sets created on CA Vtape Virtual Volumes are stored in files that are stacked onto Backstore physical tapes. When initially created, these Backstore tapes are filled to capacity. Over time, as the application tapes are released through tape management processing, these Backstore tapes become fragmented or partially used.

The RECYCLE utility reclaims unused space by merging the remaining active Virtual Volumes onto new Backstore tapes, allowing the input Backstore tapes to be scratched for reuse.

RECYCLE is a batch process that you can schedule manually or through automated job submission facilities. The frequency at which RECYCLE should be run depends on the rate that the Backstore tapes reach an unacceptable level of fragmentation.

RECYCLE Features

The RECYCLE utility has the following features:

- It merges CA Vtape Externalized Virtual Volumes onto new Backstore tapes without using the CA Vtape DASD buffer. Data is moved, tape-to-tape, keeping the physical tape reorganization fast and efficient.
- All application data remains accessible during processing.
- Threshold-based processing reduces volume reorganization requirements to a minimum and keeps system overhead low.
- Command options enable processing by selected groups to further control processing overhead.
- Command options enable processing by selected VOLSERs.
- Command options that provide cost reduction of system resources by utilizing Tape Consolidation features.

- The output Backstore tapes can optionally be duplexed.
- Any number of concurrent processes can be run, allowing you to take maximum advantage of available system resources.
- SIMULATE processing provides tools for testing and evaluating different processing threshold parameters to allow for performance tuning and optimization of the Backstore tapes.
- Reports provide extensive knowledge of all actions taken. They provide valuable feedback on how efficiently the Backstore and RECYCLE processes are functioning.
- Scheduling and duration is client-specified and can be modified at any time. You can interface with CA 1 and CA TLMS to determine the Virtual Volume's expiration date and to report upon which physical volume the Virtual Volume has been recycled to (container).
- It can be gracefully shutdown using a console command.
- Optional DD Statements can be coded to select a list of physical tape VOLSERs for input processing and to exclude a list of physical tape VOLSERs from input processing, or to do both.

Note: Because RECYCLE serializes its processing at the group level, concurrent processing of the same group is prevented by design.

Running RECYCLE

The following sections provide an overview of how to run the RECYCLE utility.

Guidelines for RECYCLE Implementation

The following guidelines describe some considerations for setting up RECYCLE processing:

- RECYCLE is a physical tape-to-tape process. A minimum of two tape drives are needed for processing: one for the input tape and another for the output tape. If duplex tapes are being created, a third drive is necessary for the duplex tape. You should plan ahead to ensure that sufficient physical drives are available for RECYCLE processing.
- Although RECYCLE can be run at any time, it requires approximately the same CPU and tape channel time as any other tape-to-tape job. Consider running RECYCLE during nonpeak processing times when physical tape drive activity is low.

- Avoid recycling the same data sets repeatedly. You should avoid merging tapes that will expire within a few days. Also, try not to move groups or subgroups that have relatively short expiration dates.
- Evaluate tape library scratch needs in order to establish an appropriate RECYCLE percentage threshold. Higher percentage values select more physical tapes, requiring longer processing runs. Lower percentage values select fewer tapes and result in shorter, but more frequent, processing runs.

Gracefully Stop RECYCLE

The RECYCLE function is used to consolidate fragmented Backstore physical tapes. It is a batch utility submitted on any LPAR where CA Vtape is running.

You can gracefully stop the utility by issuing a modify command for the job such as the following:

```
F jobname,END
```

Or, issue a stop command such as the following:

```
P jobname
```

In this instance, *jobname* is the name of the RECYCLE job that is running.

The utility will finish processing the Virtual Volume in progress at the time the command is issued and then stop.

RECYCLE JCL

Sample JCL can be found in HLQ.CCUUJCL(RECYCLE). Modify the SVT1 default value in the EXEC JCL statement to define the subsystem RECYCLE will be communicating with. Valid values are SVT*n* where *n*=1-8.

Required RECYCLE JCL Data Definition (DD) Statements

The following are required RECYCLE JCL Data Definition (DD) statements:

JOB

The JOB statement.

STEPLIB

The STEPLIB DD statement specifies the CA Vtape authorized program library.

EXEC

The EXEC DD statement or execution statement specifies the program to be executed and program parameters that invoke the CA Vtape RECYCLE Utility. Specify PGM=SVTRCYCL, PARM='START=SVTRC100, SVTS=SVT*n*', where SVT*n* is the name of the SVTS system identification name that is accessed by the RECYCLE Utility. The program parameter, START=SVTRC100, informs the RECYCLE Utility to execute REXX member SVTRC100, which resides as a member of the data set defined by the SYSEXEC DD statement.

SYSEXEC

The SYSEXEC DD statement defines the CA Vtape REXX content library used by the RECYCLE Utility.

SYSTSIN

The SYSTSIN DD statement defines the REXX procedure language command input file. CA Vtape REXX routines do not access or require the functions provided by the SYSTSIN DD statement; therefore, specify the SYSTSIN DD statement as DD DUMMY,DCB=(BLKSIZE=80).

SYSTSPRT

The SYSTSPRT DD statement defines the REXX procedure language message processing output file. CA Vtape and SORT informational messages are written to this DD statement when the RECYCLE control statement, SET DEBUG, is defined as a RECYCLE Utility input command parameter. REXX file I/O services requires the SYSTSPRT DD statement to be allocated to a JES SYSOUT data set.

Data set attributes are DCB=(LRECL=121,DSORG=PS, RECFM=VBA). The DCB BLKSIZE parameter is defined as multiple of LRECL plus 4-bytes for the Block Descriptor Word (BDW). For example DCB=(BLKSIZE=1214). DCB attributes are provide by REXX and are not required to be specified when defining the SYSTSPRT DD statement.

SYSPRINT

The SYSPRINT DD statement defines the CA Vtape RECYCLE Utility log data set. RECYCLE control statements and informational status messages are written to the SYSPRINT DD statement. The SYSPRINT DD statement defines a physical sequential data set, a member of a partitioned data set, or a GDG data set. The SYSPRINT DD statement DCB attributes are defined by the RECYCLE Utility program. The RECYCLE Utility program defines the SYSPRINT DCB attributes are DCB=(LRECL=137,DSORG=PS,RECFM=VBA, BLKSIZE=4114).

REPORTS

The REPORTS DD statement defines the CA Vtape RECYCLE Utility output report file. RECYCLE output reports and informational status messages are written to the REPORTS DD statement. The REPORTS DD statement defines a physical sequential data set (DASD, TAPE), a member of a partitioned data set, or a GDG data set.

The REPORTS DD statement DCB attributes are defined by the RECYCLE Utility program. The RECYCLE Utility program defines the REPORTS DCB attributes as follows:

DCB=(LRECL=125,DSORG=PS,RECFM=VBA). You may define a BLKSIZE DCB attribute using the following formula: BLKSIZE=((n*LRECL)+4).

SYSUT*n*

The SYSUT*n* DD statements define CA Vtape RECYCLE Utility work files. All DCB attributes for the SYSUT*n* DD statements are defined by the RECYCLE Utility program. The RECYCLE Utility program defines the DCB attributes as follows:

DCB=(LRECL=256,DSORG=PS,RECFM=VB). Do not define DCB attributes when defining the SYSUT*n* DD statements. The RECYCLE Utility program dynamically changes the *SYSUTn* DCB attributes during execution of the REXX procedure modules during RECYCLE.

SYSUT*n* DD statements are not permitted to be allocated to TAPE or GDG data sets and are only permitted to be defined with a disposition (DISP) of DISP=(NEW,SHR, or OLD). DISP=MOD is invalid and will result in an error message.

SORTWK*nn*

The SORTWK*nn* DD statements define CA Vtape RECYCLE Utility internal sort work files.

Data set attributes are defined by the respective CA Sort program products.

Optional RECYCLE JCL Data Definition (DD) Statements

The following are optional RECYCLE JCL Data Definition (DD) statements:

DEBUGDD

The DEBUGDD DD statement defines the CA Vtape RECYCLE Utility request log data set. RECYCLE volume requests and informational messages are written to the DEBUGDD DD statement. The DEBUGDD DD statement defines a physical sequential data set, a member of a partitioned data set, or a GDG data set.

The DEBUGDD DD statement DCB attributes are defined by the RECYCLE Utility program. The RECYCLE Utility program defines the DEBUGDD DCB attributes as follows:

```
DCB=(LRECL=137,DSORG=PS,RECFM=VBA, BLKSIZE=4114)
```

PEXCLUDE

The DD that defines an 80-character sequential data set or partitioned data set (PDS) member containing the Exclude Physical Volume List (EPVL). The EPVL is a list of physical tape VOLSERs that should not be processed by RECYCLE during simulate or live processing.

The EPVL consists of one physical tape VOLSER per record. The VOLSER can start anywhere between columns 1 and 65 of the record. Nonblank characters coded prior to the VOLSER will turn the record into a comment and the record will be ignored. Comments can be coded in a record after the VOLSER if they are separated from the VOLSER by one blank character.

The PEXCLUDE DD statement, when defined, requires the following DCB attributes:

```
//PEXCLUDE DD    DSN=@PRFIX.@SYSID.@SVTN.PEXCLUDE,
                 UNIT=SYSDA,DISP=(NEW,CATLG,DELETE),
                 SPACE=(CYL,(1,3)),
                 DCB=(LRECL=80,BLKSIZE=n*LRECL,RECFM=FB)
```

PINCLUDE

The DD that defines an 80-character sequential data set or partitioned data set (PDS) member containing the Include Physical Volume List (IPVL). The IPVL is a list of physical tape VOLSERs to be processed by RECYCLE during simulate or live processing. Only the VOLSERs assigned to the group number being processed by the RECYCLE command will be included. If RECYCLE GROUP(02),… is coded and the IVPL contains ten VOLSERs, but only one of those VOLSERs is for group 02, only that VOLSER will be selected for processing. The other VOLSERs will be ignored.

The PERCENT and MAXVOLS selection criteria are ignored when a PINCLUDE DD is coded in the RECYCLE JCL.

The IPVL consists of one physical tape VOLSER per record. The VOLSER can start anywhere between columns 1 and 65 of the record. Nonblank characters coded prior to the VOLSER will turn the record into a comment and the record will be ignored. Comments can be coded in a record after the VOLSER if they are separated from the VOLSER by one blank character.

The SVTR190A file (pull list) can be copied to the PINCLUDE file. RECYCLE will recognize the pull list format and read it without the need for any modifications.

The PINCLUDE DD statement, when defined, requires the following DCB attributes:

```
//PINCLUDE DD    DSN=@PRFIX.@SYSID.@SVTN.PINCLUDE,
                 UNIT=SYSDA,DISP=(NEW,CATLG,DELETE),
                 SPACE=(CYL,(1,3)),
                 DCB=(LRECL=80,BLKSIZE=n*LRECL,RECFM=FB)
```

SNAPDUMP

The SNAPDUMP DD statement defines the CA Vtape RECYCLE Utility memory image diagnostic file. RECYCLE volume requests and informational messages are written to the SNAPDUMP DD statement. The SNAPDUMP DD statement defines a physical sequential data set, a member of a partitioned data set, or a GDG data set.

Data set attributes are as follows:
DCB=(LRECL=125,DSORG=PS,RECFM=VBA). Do not define DCB attributes when specifying the SNAPDUMP DD statement. DCB attributes are defined by the RECYCLE Utility program.

SVTR190A

Output File For Physical Input Volume Pull List Records. This DD statement specifies an output sequential data set that defines a list of physical input volume serial numbers selected for RECYCLE.

The SVTR190A output records are produced when running RECYCLE in LIVE or SIMULATE mode. Each record defines one physical volume. The records are written in RECYCLE input mount processing order. Only the first occurrence of a duplicate input volume is written to the Volume Pull List file.

Customers may use the Volume Pull List file contents to automate media management and ensure that volumes representing the Volume Pull List are available for processing before executing RECYCLE in LIVE mode.

This DD statement, when defined, requires the following JCL parameters (the BLKSIZE DCB attribute may be changed to reflect a multiple of LRECL=80).

```
//SVTR190A DD    DSN=@PREFIX.@SYSID.@SVTN.SVTR190A,
                 UNIT=SYSDA,DISP=(NEW,CATLG,DELETE),
                 SPACE=(CYL,(1,3)),
                 DCB=(LRECL=80,BLKSIZE=6160,RECFM=FB)
```

SVTR190A Record Description:

```
R190ARID    DS   CL4     Record ID (190A)
            DS   CL1     Pad
R190AVID    DS   CL6     Recycle Physical Input Volser
            DS   CL1     Pad
R190ASVV    DS   CL5     #Physical Files(s) Selected (Decimal)
            DS   CL1     Pad
R190AAVV    DS   CL5     #Active Physical Files(s) (Decimal)
            DS   CL1     Pad
R190ATYP    DS   CL1     Type [P]rimary, [D]uplex
            DS   CL1     Pad
R190AGRP    DS   CL2     Group#
            DS   CL1     Pad
R190ASID    DS   CL4     System ID
            DS   CL1     Pad
R190ASVT    DS   CL4     SVTS Subsystem Number (SVT1-8)
            DS   CL1     Pad
R190ADAT    DS   CL8     Process Date: YYYYMMDD
            DS   CL1     Pad
R190ATIM    DS   CL8     Process Time: HH:MM:SS
            DS   CL9     Reserved (Unused)
```

SVTR190B

Output File For Physical Input Volume Status Records.

This DD statement specifies an output sequential data set or member of a partitioned data set. Each record defines one physical volume. The contents of the SVTR190B file represent a Volume Status List that documents which physical tapes were processed.

Volume Status records are written to the SVTR190B file during RECYCLE LIVE mode. The data set contents are written in ascending volume serial number order.

This DD statement, when defined, requires the following JCL parameters.

```
//SVTR190B DD    DSN=@PRFIX.@SYSID.@SVTN.SVTR190B,
                 UNIT=SYSDA,DISP=(NEW,CATLG,DELETE),
                 SPACE=(CYL,(1,3)),
                 DCB=(LRECL=80,BLKSIZE=6160,RECFM=FB)
```

SVTR190B Record Description:

```
R190BRID    DS   CL4     Record ID (190B)
            DS   CL1     Pad
R190BVID    DS   CL6     Recycle Physical Input Volser
            DS   CL1     Pad
R190BPPF    DS   CL5     #Physical Files(s) Selected (Decimal)
            DS   CL1     Pad
R190BPPF    DS   CL5     #Physical Files(s) Processed (Decimal)
            DS   CL1     Pad
R190BRPF    DS   CL5     #Remaining Physical Files(s) (Decimal)
            DS   CL1     Pad
R190BTYP    DS   CL1     Type [P]rimary, [D]uplex
            DS   CL1     Pad
R190BGRP    DS   CL2     Group
            DS   CL1     Pad
R190BSID    DS   CL4     System ID
            DS   CL1     Pad
R190BSVT    DS   CL4     SVTS Subsystem Number (SVT1-8)
            DS   CL1     Pad
R190BDAT    DS   CL8     Process Date: YYYYMMDD
            DS   CL1     Pad
R190BTIM    DS   CL      Process Time: HH:MM:SS
            DS   CL9     Reserved (Unused)
```

Command Input

The RECYCLE utility accepts various types of commands to control input selection and the output method during the execution.

Example of Group-based RECYCLE

```
SET MODE(SIM)
 SET LINECOUNT(60)
 SET MOUNTTIMEOUT(5)
 SET CART3480(00400),CART3490(00800),CART3590(10000)
 RECYCLE GROUP(21),SUBGROUP(*),PERCENT(50),SOURCE(PRI),TARGET(BOTH)
```

Example of VOLSER-based RECYCLE

```
SET MODE(SIM)
 SET LINECOUNT(60)
 SET CART3480(00400),CART3490(00800),CART3590(10000)
 RECYCLE PHYSICAL(123456),TARGET(BOTH)
```

The following syntax conventions are used throughout this chapter:

Single bar

A | B

A single bar is used to separate multiple values for the same parameter.

Underlining

A|B|C

Underlines are used to indicate the default value of a parameter.

Italics

nn

Italics text represents a variable, for example Group=*nn* where *nn* is a number.

Uppercase

AAaaa

Uppercase characters indicate abbreviations or the minimum number of characters that must be entered to identify the parameter or value.

SET Command

The SET command establishes basic environmental parameters for the current run of RECYCLE. Multiple SET parameters can be coded in a comma separated list spanning multiple lines or with multiple SET statements.

Syntax

```
SET  MODE(SIMulate|LIVE|SYNTAX),
     LINECOUNT(nn),
     CART3480(nnnnnnnn),
     CART3490(nnnnnnnn),
     CART3590(nnnnnnnnnn),
     DEBUG,
     UNITRETENTION,
     MOUNTTIMEOUT(nnn)
     [TAPECONSOLIDATIONRATIO(n)]
```

The following gives details about each line of the syntax:

MODE(SIMulate |LIVE |SYNTAX)

(Optional)

Default value: LIVE

SIMULATE runs RECYCLE in a test mode to do the following actions:

- Test the effects of the commands provided without making any changes to the CA Vtape complex, system catalogs, tape management catalogs, or tape data
- Show the average percentage of utilization in the physical tapes
- Produce reports that show which physical tapes would be processed
- Tune selection criteria in order to minimize processing cycles while producing a significant number of scratch tapes

Specifying LIVE causes RECYCLE to actually move the Virtual Volumes on the selected Backstore tapes and update the corresponding control and catalog information.

Note: LIVE is the default.

Specifying SYNTAX instructs RECYCLE to perform a syntax check of the remaining control card commands.

LINECOUNT(*nn*)

(Optional)

Default value: 60

The LINECOUNT(*nn*) parameter determines the number of lines per page printed on output reports. The default value is 60 if LINECOUNT is not specified.

CART3480(*nnnnnnnn*)

(Optional)

Default value: 400

The CART3480 parameter specifies the estimated megabytes capacity for 3480 tape cartridge devices. Leading zeroes are not required. This parameter is used for the following tasks:

- Calculating the percentage of cartridge utilization
- Estimating or projecting the number of output cartridge volumes for simulation purposes

CART3490(*nnnnnnnn*)

(Optional)

Default value: 800

The CART3490 parameter specifies the estimated megabytes capacity for 3490 tape cartridge devices. Leading zeroes are not required. This parameter is used for the following tasks:

- Calculating the percentage of cartridge utilization
- Estimating or projecting the number of output cartridge volumes for simulation purposes

CART3590(*nnnnnnnnnn*)

(Optional)

Default value: 10000

The CART3590 parameter specifies the estimated megabytes capacity for 3590 tape cartridge devices. Leading zeroes are not required. This parameter is used for the following tasks:

- Calculating the percentage of cartridge utilization
- Estimating or projecting the number of output cartridge volumes for simulation purposes

Note: The output physical tape format during a simulate run is determined by the input Backstore tape type. If the input tapes are 3490s, the output estimates will be for 3490s.

DEBUG

(Optional)

The DEBUG parameter activates logging and sort informational message printing for this execution of RECYCLE. If the CA Vtape logger is not active, no logging will be done. The sort informational messages will be printed to the SYSTSPRT DD.

UNITRETENTION

(Optional)

The UNITRETENTION parameter informs RECYCLE that the same input tape unit should be used for all input physical tapes mounted for all the RECYCLE commands in the job step.

Unit retention remains active for the duration of the RECYCLE job step unless the following occurs:

- A RECALL operation requires the same physical tape that is currently being recycled.
- Physical tapes with unlike device type attributes are being recycled.

This parameter allows auto-cartridge loaders of manual tape drives to be preloaded with the input physical tapes documented in the Recycle Volume Pull List Report (SVTRC190.A). This permits unattended operation when executing RECYCLE with the TapeManagementSystem attribute set to NONE to prevent subgroup reassignment or when recycling subgroups individually.

To keep unit retention active for the duration of the job step, use the DEVTYPE parameter to limit physical tape selection to a specific device type or split the Recycle Volume Pull List Report by device type. Executing RECYCLE during periods when recall activity is low will reduce the chance of unit retention being terminated.

Important! Do not define the UNITRETENTION parameter for automated tape libraries because RECYCLE must wait for the input tape to rewind to continue processing the next input tape. Using this option for automated tape libraries will have a negative performance impact on RECYCLE processing.

MOUNTTIMEOUT(*nnn*)

(Optional)

Default value: 0

The MOUNTTIMEOUT(*nnn*) parameter, which can be abbreviated as MTO, defines the elapsed time from 0 to 999 minutes that RECYCLE will wait for a Backstore input volume to be mounted. If the volume is not mounted within the time defined by MOUNTTIMEOUT, then RECYCLE cancels the mount request and continues processing subsequent Backstore input mount requests.

Specifying 0 for the MOUNTTIMEOUT value turns off elapsed time monitoring of Backstore input volume mount requests.

Note: To prevent the unnecessary skipping of input volumes, the value set should be high enough to allow for the average time to mount a tape, robotic or manual, plus a reasonable amount of delay time to find an errant tape.

TAPECONSOLIDATIONRATIO(0-9)

(Optional)

Default value: 0

The Recycle TapeConsolidationRatio or TCR parameter defines a ratio of input Backstore tapes that must be freed for each Primary or Duplex output tape written. The parameter implies an *n*:1 ratio.

If the ratio defined by the TCR parameter cannot be achieved for a RECYCLE GROUP command, an informational message is issued to the *Command Processor Report SVTRC100* and to the JOBLOG. Recycle will skip this RECYCLE command and proceed to the next command.

The TCR parameter can be specified as a SET parameter and as a RECYCLE GROUP parameter. When specified on a SET command, the TCR value is active for all RECYCLE GROUP commands coded in the same job step. When specified on a RECYCLE GROUP command, the TCR value only applies to that command. If specified on a SET command and on a RECYCLE GROUP command in the same job step, the TCR value coded on the RECYCLE GROUP command overrides that of the SET command.

The default value of 0 indicates that TCR is not active.

The projected TCR ratio is based on the values specified for the CART3480, CART3490, and CART3590 parameters. You need to ensure that the values specified are correct for your media otherwise the projected TCR ratios will be skewed. A skewed projected TCR ratio may cause Recycle to skip a group that should have been recycled or recycle a group that should have been skipped.

The values specified should include the average compression that the Backstore tapes normally achieve. If the Backstore tapes are 3590 20 GB cartridges which average 4:1 or 75% compression, then the value specified should be 80 GBs -- CART3590(80000).

Note: Using TapeConsolidationRatio(2) will free a minimum of two input tapes for each output Primary or Duplex tape written.

TCR Relationship between SOURCE and TARGET

The purpose of TCR is to provide a way to reliably recycle fragmented tapes that will guarantee a certain number of input tapes will be returned to scratch for each scratch tape used for output. If the requested ratio of returned tapes cannot be achieved, the RECYCLE command is not performed.

When a RECYCLE GROUP command is coded with a TARGET parameter that does not include the tape type defined by the SOURCE parameter the TCR value is automatically set to zero. TCR is set to zero because the ratio is calculated based on the SOURCE tape type defined, but the SOURCE tapes will not be the tapes released by the RECYCLE command. For example, RECYCLE GROUP(*nn*),SOURCE(PRIMARY),TARGET(DUPLEX). This command will cause PRIMARY tapes to be read to create new DUPLEX tapes. If TCR was added to this command, the ratio calculated would be based on the PRIMARY tapes, but it is the DUPLEX tapes that will be released. No PRIMARY tapes will be released or recataloged. In this situation there is no way to guarantee that the calculated ratio will actually be achieved so the TCR value coded will be automatically changed to zero, a warning message will be issued and the RECYCLE GROUP command will be processed with a TCR of 0.

REPORT Command

The REPORT command determines the level of detail produced in various printed RECYCLE reports.

Syntax

```
REPORT CANDIDATE(ALL|DETAIL|SUMMARY|NONE),
 SELECTED(ALL|DETAIL|SUMMARY|NONE),
 PROCESSED(ALL|DETAIL|SUMMARY|NONE)
```

The following gives details about each line of the syntax:

CANDIDATE(ALL|DETAIL|SUMMARY|NONE)

(Optional)

Default value: ALL

The CANDIDATE report displays all Virtual Volumes considered for selection. This command option lets you control the level of detail that is printed in this section of the reports.

SELECTED(ALL |DETAIL |SUMMARY |NONE)

(Optional)

Default value: ALL

The SELECTED report displays all Virtual Volumes selected by RECYCLE. The Virtual Volumes selected for processing are determined by parameters specified in other control cards. This command option allows you to control the level of detail that is printed in this section of the reports.

PROCESSED(ALL |DETAIL |SUMMARY |NONE)

(Optional)

Default value: ALL

The PROCESSED report displays all Virtual Volumes merged by RECYCLE. This command option lets you control the level of detail that is printed in this section of the reports.

RECYCLE Command

The RECYCLE command specifies the selection criteria for each group or subgroup process, or a single physical tape VOLSER. You can specify multiple commands for each execution of the utility.

When multiple requests are specified, they are processed in the order specified. To run multiple requests concurrently, create a separate job for each RECYCLE request.

Syntax

```
RECYCLE GROUP(nn),
         SUBGROUP(*|S|M|L),
         SOURCE(PRIMARY|DUPLEX),
         TARGET(*|P|PRIMARY|D|DUPLEX|B|BOTH),
         PERCENT(nnnnn),
         MAXVOLS(nnnnnn),
         DEVTYPE(*|3480|3490|3590),
         PRIORITY(SML|SLM|MSL|MLS|LMS),
         TAPECONSOLIDATIONRATIO(n)
RECYCLE PHYSICAL(volser),
         SOURCE(PRIMARY|DUPLEX),
         TARGET(*|P|PRIMARY|D|DUPLEX|B|BOTH)
```

The following gives details about each line of the syntax:

GROUP(*nn*) - (Required for group-based RECYCLE)

Use the GROUP(*nn*) parameter to specify the group number to be processed. Each command processes a single Backstore group. Only Virtual Volumes from a single group are stored on any one physical tape (Virtual Volumes from different groups or subgroups are not placed on the same Backstore tape). RECYCLE processing is serialized at a group level. If RECYCLE determines that another job is trying to process the same group, it will print an error message and continue processing at the next command.

SUBGROUP(* |S |M |L)

(Optional)

Default value: L

Use the SUBGROUP(* |S |M |L) parameter to specify a subgroup to be selected for processing. Use an asterisk (*) to select all subgroups. Specify S, M, or L to include Backstore tapes from the SHORT, MEDIUM, or LONG retention period subgroups. RECYCLE keeps all Virtual Volumes for each subgroup on separate Backstore tapes.

```
SUBGROUP(*)
SUBGROUP(L)
```

PHYSICAL(volser) - (Required for VOLSER-based RECYCLE)

Use the PHYSICAL(volser) parameter to specify one physical tape VOLSER to be processed. Each command processes a single VOLSER.

Note: When the PHYSICAL parameter is coded, the group, SUBGROUP, DEVTYPE, PRIORITY, PERCENT, and MAXVOLS parameters are ignored and a message is issued for each ignored parameter. For example:

```
SVTSZ190I GROUP IGNORED ON SINGLE VOLUME RECYCLE
```

SOURCE(PRIMARY|DUPLEX|REPAIR)

(Optional)

Default value: PRIMARY

The SOURCE(PRIMARY|DUPLEX|REPAIR) parameter indicates the source of the input Backstore tapes to be used for processing as follows:

- PRIMARY instructs RECYCLE to read primary Backstore tapes.
- DUPLEX instructs RECYCLE to read duplex Backstore tapes.
- REPAIR is used with the PHYSICAL parameter to recreate a damaged or lost PRIMARY or DUPLEX physical tape as follows:
  - If physical tape *vvvvvv* belongs to a group supporting DUPLEX and SOURCE(REPAIR) is specified, the corresponding mirror or backup physical tape is mounted and processed instead of physical tape *vvvvvv*.
  - If the group does not support DUPLEX, physical tape *vvvvvv* is mounted, moving all the readable data to the output tape.
  - If Virtual Volumes are bypassed because the move process cannot be completed, they remain catalogued to physical tape *vvvvvv*.
  - If further attempts to recover the Virtual Volumes fail, they should be scratched in the Tape Management System and in CA Vtape.

Note: Duplex Backstore tapes are only created for CA Vtape groups with a Duplex attribute coded in their group definitions. If DUPLEX is specified in a RECYCLE job for a group that does not have the Duplex attribute coded, an error message is produced.

TARGET(* |PRIMARY |DUPLEX |BOTH)

(Optional)

Default value: * (asterisk)

RECYCLE can create primary output, duplex output, or both types of Backstore tapes. An asterisk (*) indicates that the Backstore tapes created by RECYCLE are to be the same type as the input Backstore tapes. PRIMARY or DUPLEX indicates that the output data sets are to be primary or duplex, regardless of the input data set. BOTH specifies that the primary and duplex copy are to be created regardless of input type.

Note: A duplex tape can only be created if the group being processed has the DUPLEX attribute coded.

PERCENT(*nnnnnn*)

(Optional)

Default value: 999999

The PERCENT(*nnnnnn*) parameter determines the used space threshold selection criteria to be used in determining which Backstore tapes are to be processed. Selection is determined based on the percentage of used space on a Backstore tape. If not specified, 999999 is used, which indicates that all Backstore tapes, regardless of utilization percentage, are to be selected. PERCENT(40) selects Backstore tapes from the specified group having less than 40 percent unexpired data (60 percent or more of the data on the tape is expired).

When SUBGROUP(*) is used with PERCENT, the PERCENT value coded is for the entire tape. When a specific subgroup is recycled with PERCENT, the PERCENT value coded is for that subgroup's data on a tape. For example, a backstore tape that is 60% full, where 40% of the data is for subgroup medium and 20% of the data is for subgroup long, will not be selected by RECYCLE when PERCENT(40),SUBGROUP(*), but will be selected when PERCENT(40),SUBGROUP(M) or SUBGROUP(L) is used.

Note: The PERCENT parameter is ignored when a PINCLUDE DD is coded in the RECYCLE JCL.

MAXVOLS(*nnnnnn*)

(Optional)

Default value: 999999

The MAXVOLS(*nnnnnn*) parameter specifies a maximum number of input Backstore tapes to process. This parameter is a way of limiting the elapsed run time. For example, specify MAXVOLS(50) to limit RECYCLE processing to 50 tapes.

The following are additional considerations:

- MAXVOLS can be overridden by RECYCLE processing. If a Virtual Volume spans multiple Backstore tapes, all of the tapes are processed even if this causes RECYCLE to exceed the MAXVOLS parameter.
- The MAXVOLS parameter is ignored when a PINCLUDE DD is coded in the RECYCLE JCL.

DEVTYPE(* |3480 |3490 |3590)

(Optional)

Default value: 3480

The DEVTYPE(* |3480 |3490 |3590) parameter specifies a Backstore tape device type to select for processing. DEVTYPE(3490) selects only input Backstore tapes with that device type.

Use this parameter to recycle physical volumes from one device type to another.

Note: DEVTYPE can be overridden by RECYCLE processing. If a Virtual Volume spans multiple Backstore tapes of different device types, all of the tapes are processed, even if this causes RECYCLE to override the DEVTYPE parameter.

PRIORITY(SML |SLM |MSL |MLS |LSM |LMS)

(Optional)

Default value: LMS

The PRIORITY(SML |SLM |MSL |MLS |LSM |LMS) parameter specifies the preference or processing order for selecting subgroups. If not specified, RECYCLE selects and processes subgroups in LONG, MEDIUM, SHORT order. To modify this processing order, specify an alternate processing sequence. When used in combination with the MAXVOLS parameter, this parameter helps to ensure that the most important subgroup volumes are selected for processing first. For example, specifying PRIORITY(MLS) indicates that the subgroups should be processed in MEDIUM, LARGE and then SHORT order.

TAPECONSOLIDATIONRATIO(0-9)

(Optional)

Default value: 0

The value of the TapeConsolidationRatio or TCR parameter implies an *n*:1 ratio that is used to define the minimum number of input Backstore Volumes that must be freed in relationship to the number of projected PRIMARY or DUPLEX output volumes written.

The default value assigned to the Recycle Group TCR parameter is defined by the Recycle SET Command parameter or if not specified is assumed to be 0 (zero).

The TCR parameter is applied after the PERCENT and MAXVOLS parameters.

Reports

This section describes RECYCLE Utility reports.

Command and Input Parameter Syntax Check

Report SVTRC100 documents the command and input parameters coded for the current execution of the RECYCLE Utility and any problems found with those commands and input parameters. The following are examples of the SVTRC100 report.

Example 1 of the SVTRC100 report

```
RECYCLE.SVTRC100    CA11.SVT2                          CA VTAPE                              HH:MM:SS mm/dd/yy  PAGE#     1
CA VTAPE R11.5                              RECYCLE PHYSICAL BACKSTORE VOLUMES
                                          COMMAND AND INPUT PARAMETER SYNTAX CHECK
SYNTAX CHECK:
....+....1....+....2....+....3....+....4....+....4....+....5....+....6....+....7..
* (COMMENTS CONTAIN AN ASTERISK IN COLUMN#1)
* SETUP ENVIRONMENT
* SET DEBUG             (OPT)  DEBUG MODE (DIAGNOSTIC INFORMATION)
 * SET UNITRETENTION     (OPT)  UNIT RETENTION FOR MANUAL CARTRIDGE
*                              LOADER (UNATTENDED) OPERATION OR
*                              ALLOCATE SAME INPUT UNIT ADDRESS
*                              FOR ALL INPUT BACKSTORE VOLUMES
*SET MOUNTTIMEOUT(0-999) (OPT) RECYCLE MOUNT MONITOR TIMEOUT
*SET MTO(0-999)          (OPT) RECYCLE MOUNT MONITOR TIMEOUT ALIAS
*                              VALUE FOR INPUT BACKSTORE VOLUMES
*                              VALUE: 0     = DEFAULT     (OFF)
*                                     1-999 = TIMER VALUE
*                                             IN MINUTES  (ON)
*SET TAPECONSOLIDATIONRATIO(0-9) (OPT) RECYCLE TAPE CONSOLIDATION
*                                      RATIO
*SET TCR(0-9)                  (OPT) RECYCLE TAPE CONSOLIDATION
*                                     RATIO ALIAS
*                              VALUE: 0     = TURN OFF TCR (OFF)
*                                     1     = DEFAULT      (ON)
*                                     1-9   = TCR VALUES   (ON)
 SET MODE(LIVE),       (OPT)  SIMULATE|LIVE|SYNTAX CHECK
      LINECOUNT(60),    (OPT)  MAX LINES PER PAGE
      CART3480(00800),  (OPT)  DEFINE DEFAULT CARTRIDGE SIZES
      CART3490(02400),  (OPT)  IN MEGABYTES FOR 3480, 3490 & MAGSTAR
      CART3590(40000),  (OPT)  *
      MOUNTTIMEOUT(0),  (OPT)  RECYCLE MOUNT TIMEOUT
      TAPECONSOLIDATIONRATIO(3) (OPT) TAPE CONSOLIDATION RATIO

* SET MODE(SYNTAX)      (OPT)  ONLY PERFORM A CC SYNTAX CHECK

* YOU CAN OPTIONALLY CONTROL WHICH REPORTS ARE PRODUCED BY THE
* RECYCLE PROCESS USING THE REPORT CONTROL CARD:
 *
  REPORT CANDIDATE(ALL),   (OPT)  LIST DETAIL|SUMMARY|ALL DATA SETS
         SELECTED(ALL),    (OPT)  LIST DETAIL|SUMMARY|ALL DATA SETS
         PROCESSED(DETAIL) (OPT)  LIST DETAIL|SUMMARY|ALL DATA SETS
* RUN A RECYCLE FOR GROUP# 61 PRIMARY (EXAMPLE)


  RECYCLE GROUP(61),      (REQ)  GROUP
          SUBGROUP(*),    (OPT)  SUBGROUP *=ALL, S|M|L
          SOURCE(PRI),    (OPT)  INP VOLUMES PRIMARY|DUPLEX
          TARGET(PRI),    (OPT)  OUT VOLUMES PRIMARY|DUPLEX|BOTH
          PERCENT(50),    (OPT)  MAX VOLUME % USED TO SELECT
          MAXVOLS(1000),  (OPT)  MAX # VOLUMES TO SELECT
          DEVTYPE(*),     (OPT)  SELECT 3480,3490,3590, *=ALL
          PRIORITY(LMS),  (OPT)  SELECTION PRIORITY
          TAPECONSOLIDATIONRATIO(5) (OPT) TAPE CONSOLIDATION RATIO
```

```
 SYNTAX CHECK:
....+....1....+....2....+....3....+....4....+....4....+....5....+....6....+....7..

* RUN A RECYCLE FOR GROUP# 62 DUPLEX  (EXAMPLE)
*
  RECYCLE GROUP(62),      (REQ)  GROUP
          SUBGROUP(*),    (OPT)  SUBGROUP *=ALL, S|M|L
          SOURCE(PRI),    (OPT)  INP VOLUMES PRIMARY|DUPLEX
          TARGET(BOTH),   (OPT)  OUP VOLSMES PRIMARY|DUPLEX|BOTH|*
          PERCENT(300),   (OPT)  MAX VOLUME % USED TO SELECT
          MAXVOLS(100),   (OPT)  MAX # VOLUMES TO SELECT
          DEVTYPE(*),     (OPT)  SELECT 3480,3490,3590, *=ALL
          PRIORITY(LMS)   (OPT)  SELECTION PRIORITY

* RECYCLE MORE GROUPS OR INDIVIDUAL PHYSICAL TAPES AS NEEDED

>END OF INPUT<

4 COMMAND(S) ANALYZED, NO ERRORS DETECTED, PROCESSING BEGINS.
```

Example 2 of the SVTRC100 report

```
RECYCLE.SVTRC100    CA11.SVT2                          CA VTAPE                        HH:MM:SS mm/dd/yy  PAGE#     3
CA VTAPE R11.5                                RECYCLE PHYSICAL BACKSTORE VOLUMES
                                                   COMMAND PROCESSOR REPORT

 REASON
  CODE    COMMAND     OPTIONS                                          MESSAGES                                  PAGE#
--------  ----------  -----------------------------------------------  ----------------------------------------- -----
          SET         MODE(LIVE),DEBUG(N),UNITRETENTION(N),
                      MOUNTTIMEOUT(0),LINECOUNT(60),
                      TAPECONSOLIDATIONRATIO(3:1),
                      CART3480(800),CART3490(2400),CART3590(40000)

          REPORT      CANDIDATE(ALL),SELECTED(ALL),PROCESSED(DETAIL)

SVTSZ197I PERCENT IGNORED WHEN INCLUDE VOLUME LIST DEFINED
SVTSZ198I MAXVOLS IGNORED WHEN INCLUDE VOLUME LIST DEFINED
          RECYCLE     GROUP(61),SUBGROUP(*),PRIORITY(LMS),                                                        1
                      SOURCE(PRIMARY),PERCENT(999999),DEVTYPE(*),
                      TARGET(PRIMARY),MAXVOLS(999999),
                      TAPECONSOLIDATIONRATIO(5:1)

SVTSZ197I PERCENT IGNORED WHEN INCLUDE VOLUME LIST DEFINED
SVTSZ198I MAXVOLS IGNORED WHEN INCLUDE VOLUME LIST DEFINED
00000004  RECYCLE     GROUP(62),SUBGROUP(*),PRIORITY(LMS),            PROJECTED TCR LOWER THAN REQUESTED TCR       13
                      SOURCE(PRIMARY),PERCENT(999999),DEVTYPE(*),
                      TARGET(BOTH),MAXVOLS(999999),
                      TAPECONSOLIDATIONRATIO(3:1)
```

RECYCLE Command Processor Report Message Descriptions

The following provides a description of the Recycle Command Processor Report messages:

"PHYSICAL" KEYWORD PARAMETER NOT DEFINED

A Recycle SOURCE(REPAIR) control statement requires the definition of the PHYSICAL keyword parameter.

Define the PHYSICAL keyword parameter and resubmit Recycle.

ALL PHYSICAL VOLUMES EXCLUDED

All candidate physical tapes were excluded from processing by the PEXCLUDE file.

CANCELED BY THE OPERATOR

The operator issued a stop Recycle command (P RECYCLE) during Recycle execution. Recycle subsequently interrupted processing and stopped execution. When the stop command is issued during LIVE execution mode Backstore Tapes are Recycled up to the point the stop command is issued and output reports will reflect the Backstore Tapes that were processed.

COMMAND STATEMENT *nnn* EXCEEDS MAXIMUM

Recycle input command statement *nnn* exceeds the maximum allowed of 99.

EXCESSIVE NUMBER OF COMMAND STATEMENTS

The number of Recycle input command statements has exceeded 199. The maximum allowed is 99.

HALTED INTERNALLY

Recycle detected an operational anomaly which halted the current Recycle Command Statement from exciting. The Recycle Exception Report defines the specific cause.

Refer to the Recycle Exception Report to determine and resolve the cause.

I/O ERROR. PROCESS TERMINATED

An I/O error terminated Recycle execution. This error is the result of REXX I/O operations performing a read, write or update of SYSUTn work files or writing SYSPRINT or REPORT output files. If the I/O error occurred during the analysis phase of Recycle (pre-Recycle process or SIMULATE execution) then the Recycle request of Backstore Tapes was not performed. If the I/O error occurred during the post-Recycle phase (LIVE execution) then the Recycle request of Backstore Tapes was performed and output report information may be incomplete. When an I/O error occurs during the post-Recycle phase use the Recycle JOBLOG to verify the results of Recycle. In all cases the integrity of customer data residing on Backstore Tapes remains intact and valid.

Determine the cause of the I/O error by viewing the Recycle JOBLOG. Perform problem determination and lookup z/OS IEC error message definitions. Based on the recommendations of IEC messages attempt to resolve the problem and resubmit the Recycle job for execution in SIMULATE mode. Compare the results of the terminated Recycle execution with the new SIMULATE execution of Recycle to determine what physical Backstore Tapes were Recycled. If the I/O error cannot be resolved report the problem to CA Support.

When attempting to perform problem determination it is recommended that all SYSUT*n* files be allocated to permanent data sets for viewing and analysis when reporting problems to CA Support.

INVALID GROUP NUMBER SPECIFIED

The Group number specified is not valid. Specify a valid Group number and resubmit Recycle for execution.

INVALID REXX COMMAND REQUEST

An invalid REXX command has been detected. Report the problem to CA Support.

INVALID TARGET. GRP DUPLEX ATTR NOT DEFINED

The parmlib member VTGROUP does not specify a Duplex attribute for the group parameter specified by the Recycle command statement.

Correct the TARGET parameter and re-submit the Recycle job.

NO PRIMARY/DUPLEX ENTRIES FOUND

No candidate tapes meet the requirements defined by the Recycle command statements. All Backstore Tapes were eliminated from Recycle consideration or there are no cataloged Backstore Tapes (physical files) to process.

This description message may also be the result of a z/OS catalog processing error or Recycle parsing errors processing catalog records.

Verify the specification of the Recycle command statements and run a LIST=BACKSTORE report to verify that Backstore tapes are cataloged. Check the Recycle JOBLOG to verify that no catalog processing errors are issued and view the SYSOUT file defined by the SYSTSPRT DD statement (you must define the SET DEBUG command statement to obtain diagnostic messages). If it is known that Backstore Tapes should be selected for Recycle then report the problem to CA Support.

PRIMARY/DUPLEX OUTPUT UNIT NAME INVALID

Issue the Display Parmlib,LONG CA Vtape console command and verify that the Primary and Duplex attributes for the respective group specify a valid unit generic or esoteric. Correct the attributes in the VTGROUP parmlib member, issue the SVT*n* REFRESH=GROUP console command, and re-submit the Recycle job.

PROJECTED TCR LOWER THAN REQUESTED TCR

The RECYCLE GROUP command was skipped because the projected tape consolidation ratio calculated was lower than the requested tape consolidation ratio. Refer to the SVTRC190.A report to view the results of the tape consolidation ratio rejection report.

RECYCLE DENIED. GROUP ALREADY IN USE

The referenced Group is already in use by another CA Vtape task (for example, SVT*n* REFRESH=GROUP operator command, RECALL, Externalization or another Recycle JOB). Wait until the group is no longer locked or used by other CA Vtape tasks and re-submit the Recycle job for execution.

REPORT OUTPUT LINE TRUNCATION ERROR

The Recycle report may have truncated the contents of a report output line. Report the problem to CA Support.

REVIEW EXCEPTION REPORTS

The results of the Recycle request completed with exceptions that are written to the SVTRC130.E Exception Report.

SB37, SD37 ABEND OR I/O FAILURE ERROR

The Recycle Utility detected a SD37 ABEND (a dataset out of space condition) or an I/O failure error. Refer to JOBLOG messages IEC03nI and IRX0250E messages for a reason/resolution description of the failure. Recycle ends with a completion code of 0008.

Included and Excluded Physical Volumes

Report SVTRC125.A0 lists the physical volume serial numbers defined by the Include Physical Volume List (Recycle JCL PINCLUDE DD statement file) and the Exclude Physical Volume List (Recycle JCL PEXCLUDE DD statement file). The physical volume serial numbers are listed in ascending order and the respective volume is tagged as originating from the Include or Exclude Physical Volume List. The report also indicates the total number of volumes defined by the PINCLUDE and PEXCLUDE files and the designation of the physical volume (Unknown, Primary, or Duplex).

Example of the SVTRC125.A0 report

```
RECYCLE.SVTRC125.A0 CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#     1
CA VTAPE R11.5                       INCLUDE/EXCLUDE PHYSICAL VOLUME LIST REPORT
GROUP# N/A                                    SORTED BY PHYSICAL VOLSER

 PHYSICAL                                PHYSICAL                                PHYSICAL                                PHYSICAL
 VOLSER   TYPE   ACTION    VOLSER   TYPE   ACTION    VOLSER   TYPE   ACTION    VOLSER   TYPE   ACTION
 ------ ------- --------   ------ ------- --------   ------ ------- --------   ------ ------- --------
 540336 PRIMARY INCLUDED
 540476 PRIMARY INCLUDED
 540520 PRIMARY INCLUDED
 540562 PRIMARY INCLUDED
 540692 PRIMARY INCLUDED
 540701 PRIMARY INCLUDED
 540701 PRIMARY EXCLUDED
 541053 PRIMARY INCLUDED
 541085 PRIMARY INCLUDED
 541202 PRIMARY INCLUDED
 541284 PRIMARY INCLUDED

SVTSRC042I 10 Include volume(s) specified:
           00 Unknown, 10 Primary, and 00 Duplex
SVTSRC042I 01 Exclude volume(s) specified:
           00 Unknown, 01 Primary, and 00 DuplexIf a VOLSER is in both Physical Volume Lists, the exclude takes precedence and the VOLSER
is excluded from processing. If all VOLSERs are in both lists, RECYCLE will terminate with a return code of four and the following message:

SVTSRC043I No candidate virtual volumes to recycle.
```

If a Physical Volume List has no VOLSERs, an SVTSRC041I error message will be printed for the empty list.

Excluded Virtual Volume Files

Report SVTRC125.A1 lists the Virtual Volume Files that are excluded from input selection due to a Physical Volume Exclude List (PEXCLUDE DD defined in RECYCLE JCL) for the specified group and subgroup.

Example of the SVTRC125.A1 report

```
RECYCLE.SVTRC125.A1 CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#     2
CA VTAPE R11.5                    PHYSICAL VOLSERS EXCLUDED FROM RECYCLE (DETAIL)
 GROUP# 61                                    SORTED BY PHYSICAL FILENAME

                        VIRTUAL DSN EXCLUDED                FILE ESTIMATED
GROUP SUB VOLSER SEQ PHYSICAL VOLSER   SEQ#  #MB.USED  EXCLUDED PHYSICAL FILENAME                                  REF#
----- --- ------ --- --------------- ------  --------  ------------------------------------------           --------
   61  S  101762 P   540701 EXCLUDED      1         8  QAPROD.VVE.V101762.PRIMARY                                    1
   61  S  101763 P   540701 EXCLUDED      2         8  QAPROD.VVE.V101763.PRIMARY                                    1
```

Candidate Virtual Volume Files

The RECYCLE Utility provides two reports listing the candidate Virtual Volumes as described in the following sections.

Sorted by Physical Filename

Report SVTRC125.A lists the candidate Virtual Volumes sorted in ascending physical filename sequence. These are the Virtual Volumes available for input selection processing after excluding any physical volumes defined by a Physical Volume Exclusion List (PEXCLUDE DD defined in the RECYCLE JCL). Only volumes for the group and subgroup or subgroups specified by the RECYCLE command are listed. If multiple RECYCLE commands are coded, a report will be produced for each command.

Example of the SVTRC125.A report

```
RECYCLE.SVTRC125.A  CA11.SVT2                          CA VTAPE                      HH:MM:SS mm/dd/yy  PAGE#     4
A VTAPE R11.5                                  CANDIDATE VIRTUAL VOLUME FILES
GROUP# 61                                        SORTED BY PHYSICAL FILENAME

         VIRTUAL DSN PHYSICAL  FILE ESTIMATE
GROUP SUB VOLSER SEQ VOLSER    SEQ#  #MB.USED  PHYSICAL FILENAME                                                  REF#
----- --- ------ --- ------  ------  --------  ---------------------------------------------                    --------
   61  S  101565 P   541284       1         8  QAPROD.VVE.V101565.PRIMARY                                           21
   61  S  101566 P   541284       2         8  QAPROD.VVE.V101566.PRIMARY                                           22
   61  S  101568 P   541284       3         8  QAPROD.VVE.V101568.PRIMARY                                           23
   61  S  101572 P   541284       4         8  QAPROD.VVE.V101572.PRIMARY                                           24
   61  S  101574 P   541284       5         8  QAPROD.VVE.V101574.PRIMARY                                           25
   61  S  101577 P   541284       6         8  QAPROD.VVE.V101577.PRIMARY                                           26
   61  S  101579 P   541284       7         8  QAPROD.VVE.V101579.PRIMARY                                           27
   61  S  101581 P   541284       8         8  QAPROD.VVE.V101581.PRIMARY                                           28
   61  S  101583 P   541284       9         8  QAPROD.VVE.V101583.PRIMARY                                           29
   61  S  101585 P   541284      10         8  QAPROD.VVE.V101585.PRIMARY                                           30
   61  S  101587 P   541284      11         8  QAPROD.VVE.V101587.PRIMARY                                           31
   61  S  101589 P   541284      12         8  QAPROD.VVE.V101589.PRIMARY                                           32
   61  S  101591 P   541284      13         8  QAPROD.VVE.V101591.PRIMARY                                           33
   61  S  101593 P   541284      14         8  QAPROD.VVE.V101593.PRIMARY                                           34
   61  S  101595 P   541284      15         8  QAPROD.VVE.V101595.PRIMARY                                           35
   61  S  101597 P   541284      16         8  QAPROD.VVE.V101597.PRIMARY                                           36
   61  S  101599 P   541284      17         8  QAPROD.VVE.V101599.PRIMARY                                           37
   61  S  101601 P   541284      18         8  QAPROD.VVE.V101601.PRIMARY                                           38
   61  S  101602 P   541202       1         8  QAPROD.VVE.V101602.PRIMARY                                           16
   61  S  101603 P   541202       2         8  QAPROD.VVE.V101603.PRIMARY                                           17
   61  S  101739 P   541202       3         8  QAPROD.VVE.V101739.PRIMARY                                           18
   61  S  101740 P   541202       4         8  QAPROD.VVE.V101740.PRIMARY                                           19
   61  S  101741 P   541202       5         8  QAPROD.VVE.V101741.PRIMARY                                           20
   61  S  101744 P   540336       1         8  QAPROD.VVE.V101744.PRIMARY                                            1
   61  S  101745 P   540336       2         8  QAPROD.VVE.V101745.PRIMARY                                            2
   61  S  101746 P   540336       3         8  QAPROD.VVE.V101746.PRIMARY                                            3
   61  S  101747 P   540476       1         8  QAPROD.VVE.V101747.PRIMARY                                            4
   61  S  101748 P   540476       2         8  QAPROD.VVE.V101748.PRIMARY                                            5
   61  S  101750 P   540476       3         8  QAPROD.VVE.V101750.PRIMARY                                            6
   61  S  101751 P   540520       1         8  QAPROD.VVE.V101751.PRIMARY                                            7
   61  S  101752 P   540520       2         8  QAPROD.VVE.V101752.PRIMARY                                            8
   61  S  101753 P   540520       3         8  QAPROD.VVE.V101753.PRIMARY                                            9
   61  S  101754 P   540562       1         8  QAPROD.VVE.V101754.PRIMARY                                           10
   61  S  101756 P   540562       2         8  QAPROD.VVE.V101756.PRIMARY                                           11
   61  S  101758 P   540562       3         8  QAPROD.VVE.V101758.PRIMARY                                           12
   61  S  101759 P   540692       1         8  QAPROD.VVE.V101759.PRIMARY                                           13
   61  S  101760 P   540692       2         8  QAPROD.VVE.V101760.PRIMARY                                           14
   61  S  101761 P   540692       3         8  QAPROD.VVE.V101761.PRIMARY                                           15
```

Sorted by Subgroup, Physical VOLSER and File Sequence

Report SVTRC125.B lists the candidate Virtual Volumes sorted by subgroup, physical VOLSER, and physical VOLSER file sequence number. These are the Virtual Volumes available for input selection processing after excluding any physical volumes defined by a Physical Volume Exclusion List (PEXCLUDE DD defined in the RECYCLE JCL). Only volumes for the group and subgroup or subgroups specified by the RECYCLE command are listed. If multiple RECYCLE commands are coded, a report will be produced for each command.

Example of the SVTRC125.B report

```
RECYCLE.SVTRC125.B  CA11.SVT2                        CA VTAPE                        HH:MM:SS mm/dd/yy  PAGE#     3
CA VTAPE R11.5                              CANDIDATE VIRTUAL VOLUME FILES
GROUP# 61                          SORTED BY SUBGROUP, PHYSICAL VOLSER AND FILE SEQUENCE

         VIRTUAL DSN PHYSICAL  FILE ESTIMATED
GROUP SUB VOLSER SEQ VOLSER    SEQ#  #MB.USED  PHYSICAL FILENAME                                                  REF#
----- --- ------ --- ------  ------  --------  ---------------------------------------------  --------
   61  S  101565 P   541069       1         8  QAPROD.VVE.V101565.PRIMARY                                          1
   61  S  101566 P   541069       2         8  QAPROD.VVE.V101566.PRIMARY                                          2
   61  S  101568 P   541069       3         8  QAPROD.VVE.V101568.PRIMARY                                          3
   61  S  101572 P   541125       1         8  QAPROD.VVE.V101572.PRIMARY                                          4
   61  S  101574 P   541125       2         8  QAPROD.VVE.V101574.PRIMARY                                          5
   61  S  101577 P   541125       3         8  QAPROD.VVE.V101577.PRIMARY                                          6
   61  S  101579 P   541126       1         8  QAPROD.VVE.V101579.PRIMARY                                          7
   61  S  101581 P   541126       2         8  QAPROD.VVE.V101581.PRIMARY                                          8
   61  S  101583 P   541126       3         8  QAPROD.VVE.V101583.PRIMARY                                          9
   61  S  101585 P   541132       1         8  QAPROD.VVE.V101585.PRIMARY                                         10
   61  S  101587 P   541132       2         8  QAPROD.VVE.V101587.PRIMARY                                         11
   61  S  101589 P   541132       3         8  QAPROD.VVE.V101589.PRIMARY                                         12
   61  S  101591 P   541147       1         8  QAPROD.VVE.V101591.PRIMARY                                         13
   61  S  101593 P   541147       2         8  QAPROD.VVE.V101593.PRIMARY                                         14
   61  S  101595 P   541147       3         8  QAPROD.VVE.V101595.PRIMARY                                         15
   61  S  101597 P   541148       1         8  QAPROD.VVE.V101597.PRIMARY                                         16
   61  S  101599 P   541148       2         8  QAPROD.VVE.V101599.PRIMARY                                         17
   61  S  101601 P   541148       3         8  QAPROD.VVE.V101601.PRIMARY                                         18
```

Excluded Physical Volumes

Report SVTRC125.A2 lists the physical volumes that are excluded from input selection due to a Physical Volume Exclusion List (PEXCLUDE DD defined in RECYCLE JCL) for the specified group and subgroup.

Example of the SVTRC125.A2 report

```
RECYCLE.SVTRC125.A2 CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#     3
CA VTAPE R11.5                    PHYSICAL VOLSERS EXCLUDED FROM RECYCLE (SUMMARY)
 GROUP# 61                                  SORTED BY PHYSICAL VOLSER

PHYSICAL  --#PHYSICAL FILES--
VOLSER    EXCLUDED                                                                                        REF#
------    -------------------                                                                          --------
540701          2                                                                                             1
          -------------------
 TOTAL          2

SVTSRC044I 1 Selected volume(s) excluded.
```

Candidate Physical Backstore Volume Utilization

The RECYCLE Utility provides two reports listing the candidate Physical Backstore Volume usage as described in the following sections.

Candidate Physical Backstore Volumes (Sorted by Physical VOLSER)

Report SVTRC125.1 lists the physical volume candidates selected by the input selection process. Physical volume serial numbers are written in ascending order. The report shows utilization statistics of each physical volume selected for Recycle.

Example of the SVTRC125.1 report

```
RECYCLE.SVTRC125.1  CA11.SVT2                          CA VTAPE                        HH:MM:SS mm/dd/yy  PAGE#     6
CA VTAPE R11.5                      CANDIDATE PHYSICAL BACKSTORE VOLUMES
GROUP# 61                         UTILIZATION STATISTICS SORTED BY PHYSICAL VOLSER

          PHYSICAL    ----     ESTIMATED     ----            AVERAGE
GROUP SUB VOLSER DEVT VOL.%USED SG.%USED #MB.USED    #FILES #MB/FILE                                  VDSXREF#      REF#
----- --- ------ ---- --------- -------- -------- --------- --------                                  --------  --------
   61  S  540336 3590         0      100       24         3      8.0                                         1         1
   61  S  540476 3590         0      100       24         3      8.0                                         4         2
   61  S  540520 3590         0      100       24         3      8.0                                         7         3
   61  S  540562 3590         0      100       24         3      8.0                                        10         4
   61  S  540692 3590         0      100       24         3      8.0                                        13         5
   61  S  541202 3590         0      100       40         5      8.0                                        16         6
   61  S  541284 3590         0      100      144        18      8.0                                        21         7
```

Candidate Physical Backstore Volumes (Sorted by subgroup)

Report SVTRC125.2 lists the physical volume candidates selected by the input selection process. Physical volume serial numbers are written in ascending order by volume serial number within subgroup. The report shows utilization statistics of each physical volume subgroup selected for Recycle.

Example of the SVTRC125.2 report

```
RECYCLE.SVTRC125.2  CA11.SVT2                          CA VTAPE                        19:25:48 12/07/06  PAGE#     7
CA VTAPE R11.5                          CANDIDATE PHYSICAL BACKSTORE VOLUMES
GROUP# 61                          UTILIZATION STATISTICS SORTED BY SUBGROUP AND %USED

          PHYSICAL    ----     ESTIMATED     ----           AVERAGE
GROUP SUB VOLSER DEVT VOL.%USED SG.%USED #MB.USED    #FILES #MB/FILE                                  VDSXREF#      REF#
----- --- ------ ---- --------- -------- -------- --------- --------                                  --------  --------
   61  S  540336 3590         0      100       24         3      8.0                                         1         1
   61  S  540476 3590         0      100       24         3      8.0                                         4         2
   61  S  540520 3590         0      100       24         3      8.0                                         7         3
   61  S  540562 3590         0      100       24         3      8.0                                        10         4
   61  S  540692 3590         0      100       24         3      8.0                                        13         5
   61  S  541202 3590         0      100       40         5      8.0                                        16         6
   61  S  541284 3590         0      100      144        18      8.0                                        21         7
```

Summarized By Device Type and Subgroups

Report SVTRC125.3 summarizes the candidate physical volumes utilization statistics by device type and subgroup for the group specified by the RECYCLE command. If multiple RECYCLE commands are coded, a report will be produced for each command.

Example of the SVTRC125.3 report

```
RECYCLE.SVTRC125.3  CA11.SVT2                          CA VTAPE                    19:25:48 12/07/06  PAGE#     8
CA VTAPE R11.5                          CANDIDATE PHYSICAL BACKSTORE VOLUMES
GROUP# 61                        UTILIZATION STATISTICS SUMMARIZED BY DEVICE TYPE & SUBGROUP

       - - - - - - - - I N P U T - - - - - - - - -
DEVICE      SHORT     MEDIUM       LONG      TOTAL       DESCRIPTION
------ ---------- ---------- ---------- ---------- -------------------------
3590          0.3        0.0        0.0        0.3        #GB USED
                7          0          0          7    #PHYSICAL VOLUMES*
              0.1        0.0        0.0        0.1    AVG#(%USED/VOLUME*)
             43.4        0.0        0.0       43.4  AVG#(#MB.USED/VOLUME*)
               38          0          0         38      #PHYSICAL FILES
              5.4        0.0        0.0        5.4    AVG#(FILES/VOLUME*)
              8.0        0.0        0.0        8.0    AVG#(#MB.USED/FILE)

TOTALS        0.3        0.0        0.0        0.3        #GB USED
                7          0          0          7    #PHYSICAL VOLUMES*
             43.4        0.0        0.0       43.4  AVG#(#MB.USED/VOLUME*)
               38          0          0         38      #PHYSICAL FILES
              5.4        0.0        0.0        5.4    AVG#(FILES/VOLUME*)
              8.0        0.0        0.0        8.0    AVG#(#MB.USED/FILE)

                                     NOTE: * PHYSICAL VOLUMES PER SUBGROUP
```

Selected Virtual Volume Files

Report SVTRC125.C lists the Virtual Volume Files selected for input. Only volumes for the group and subgroup or subgroups specified by the RECYCLE command are listed. If multiple RECYCLE commands are coded, a report will be produced for each command.

Example of the SVTRC125.C report

```
RECYCLE.SVTRC125.C  CA11.SVT2                          CA VTAPE                      HH:MM:SS mm/dd/yy  PAGE#     9
CA VTAPE R11.5                                SELECTED VIRTUAL VOLUME FILES
GROUP# 61

         VIRTUAL DSN PHYSICAL  FILE ESTIMATED
GROUP SUB VOLSER SEQ VOLSER    SEQ#  #MB.USED  PHYSICAL FILENAME                                                REF#
----- --- ------ --- ------  ------  --------  ------------------------------------------  --------------------  --------
   61  S  101744 P   540336       1         8  QAPROD.VVE.V101744.PRIMARY                                           1
   61  S  101745 P   540336       2         8  QAPROD.VVE.V101745.PRIMARY                                           2
   61  S  101746 P   540336       3         8  QAPROD.VVE.V101746.PRIMARY                                           3
   61  S  101747 P   540476       1         8  QAPROD.VVE.V101747.PRIMARY                                           4
   61  S  101748 P   540476       2         8  QAPROD.VVE.V101748.PRIMARY                                           5
   61  S  101750 P   540476       3         8  QAPROD.VVE.V101750.PRIMARY                                           6
   61  S  101751 P   540520       1         8  QAPROD.VVE.V101751.PRIMARY                                           7
   61  S  101752 P   540520       2         8  QAPROD.VVE.V101752.PRIMARY                                           8
   61  S  101753 P   540520       3         8  QAPROD.VVE.V101753.PRIMARY                                           9
   61  S  101754 P   540562       1         8  QAPROD.VVE.V101754.PRIMARY                                          10
   61  S  101756 P   540562       2         8  QAPROD.VVE.V101756.PRIMARY                                          11
   61  S  101758 P   540562       3         8  QAPROD.VVE.V101758.PRIMARY                                          12
   61  S  101759 P   540692       1         8  QAPROD.VVE.V101759.PRIMARY                                          13
   61  S  101760 P   540692       2         8  QAPROD.VVE.V101760.PRIMARY                                          14
   61  S  101761 P   540692       3         8  QAPROD.VVE.V101761.PRIMARY                                          15
   61  S  101602 P   541202       1         8  QAPROD.VVE.V101602.PRIMARY                                          16
   61  S  101603 P   541202       2         8  QAPROD.VVE.V101603.PRIMARY                                          17
   61  S  101739 P   541202       3         8  QAPROD.VVE.V101739.PRIMARY                                          18
   61  S  101740 P   541202       4         8  QAPROD.VVE.V101740.PRIMARY                                          19
   61  S  101741 P   541202       5         8  QAPROD.VVE.V101741.PRIMARY                                          20
   61  S  101565 P   541284       1         8  QAPROD.VVE.V101565.PRIMARY                                          21
   61  S  101566 P   541284       2         8  QAPROD.VVE.V101566.PRIMARY                                          22
   61  S  101568 P   541284       3         8  QAPROD.VVE.V101568.PRIMARY                                          23
   61  S  101572 P   541284       4         8  QAPROD.VVE.V101572.PRIMARY                                          24
   61  S  101574 P   541284       5         8  QAPROD.VVE.V101574.PRIMARY                                          25
   61  S  101577 P   541284       6         8  QAPROD.VVE.V101577.PRIMARY                                          26
   61  S  101579 P   541284       7         8  QAPROD.VVE.V101579.PRIMARY                                          27
   61  S  101581 P   541284       8         8  QAPROD.VVE.V101581.PRIMARY                                          28
   61  S  101583 P   541284       9         8  QAPROD.VVE.V101583.PRIMARY                                          29
   61  S  101585 P   541284      10         8  QAPROD.VVE.V101585.PRIMARY                                          30
   61  S  101587 P   541284      11         8  QAPROD.VVE.V101587.PRIMARY                                          31
   61  S  101589 P   541284      12         8  QAPROD.VVE.V101589.PRIMARY                                          32
   61  S  101591 P   541284      13         8  QAPROD.VVE.V101591.PRIMARY                                          33
   61  S  101593 P   541284      14         8  QAPROD.VVE.V101593.PRIMARY                                          34
   61  S  101595 P   541284      15         8  QAPROD.VVE.V101595.PRIMARY                                          35
   61  S  101597 P   541284      16         8  QAPROD.VVE.V101597.PRIMARY                                          36
   61  S  101599 P   541284      17         8  QAPROD.VVE.V101599.PRIMARY                                          37
   61  S  101601 P   541284      18         8  QAPROD.VVE.V101601.PRIMARY                                          38
```

Projected Output for Selected Virtual Volume Files

Report SVTRC125.4 summarizes the projected results of the RECYCLE process. The left side of the report shows the input statistics and the right side shows the estimated results of performing a LIVE recycle run. Only statistics for the group specified by the RECYCLE command are listed. If multiple RECYCLE commands are coded, a report will be produced for each command.

The #Physical Volumes* report column defines the number of mounts required to complete the Recycle request. A physical volume may be mounted up to three times; one mount for each subgroup. Therefore, the #Physical Volumes* column does not actually reflect the number of physical volumes that are processed. Refer to the Volume Pull List Report (SVTRC190.A) to get the actual number of physical volumes that are to be mounted to process the Recycle request.

As Virtual Volumes age and the number of remaining retention days decrease, Recycle will change the Virtual Volumes subgroup assignment. The associated physical volumes will now contain Virtual Volumes for more than one subgroup. If Recycle is processing multiple subgroups for a group, these physical volumes will be mounted multiple times, once for each subgroup processed. The pull list VOLSER order reflects the first time a physical volume is mounted.

Example of the SVTRC125.4 report

```
RECYCLE.SVTRC125.4  CA11.SVT2                        CA VTAPE                              HH:MM:SS mm/dd/yy  PAGE#    10
CA VTAPE R11.5                    PROJECTED OUTPUT FOR SELECTED VIRTUAL VOLUME FILES
GROUP# 61                      UTILIZATION STATISTICS SUMMARIZED BY DEVICE TYPE & SUBGROUP

      - - - - - - - - - I N P U T - - - - - - - - -                          - - - P R O J E C T E D   O U T P U T - - -
DEVICE      SHORT     MEDIUM       LONG      TOTAL        DESCRIPTION           SHORT     MEDIUM       LONG      TOTAL
------ ---------- ---------- ---------- ---------- ------------------------ ---------- ---------- ---------- ----------
3590          0.3        0.0        0.0        0.3         #GB USED               0.3        0.0        0.0        0.3
                7          0          0          7    #PHYSICAL VOLUMES*            1          0          0          1
              0.1        0.0        0.0        0.1    AVG#(%USED/VOLUME*)         0.7        0.0        0.0        0.7
             43.4        0.0        0.0       43.4  AVG#(#MB.USED/VOLUME*)      304.0        0.0        0.0      304.0
               38          0          0         38      #PHYSICAL FILES           38          0          0         38
              5.4        0.0        0.0        5.4    AVG#(FILES/VOLUME*)         38.0        0.0        0.0       38.0
              8.0        0.0        0.0        8.0    AVG#(#MB.USED/FILE)          8.0        0.0        0.0        8.0
TOTALS        0.3        0.0        0.0        0.3         #GB USED               0.3        0.0        0.0         .3
                7          0          0          7    #PHYSICAL VOLUMES*            1          0          0          1
             43.4        0.0        0.0       43.4  AVG#(#MB.USED/VOLUME*)      304.0        0.0        0.0       04.0
               38          0          0         38      #PHYSICAL FILES           38          0          0         38
              5.4        0.0        0.0        5.4    AVG#(FILES/VOLUME*)         38.0        0.0        0.0       38.0
              8.0        0.0        0.0        8.0    AVG#(#MB.USED/FILE)          8.0        0.0        0.0        8.0

                                        NOTE: * PHYSICAL VOLUMES PER SUBGROUP
```

Processed Exception Report

Report SVTRC130.E provides a list of the Virtual Volumes that were selected, but were not actually processed by RECYCLE.

Example of the SVTRC130.E report

```
RECYCLE.SVTRC130.E  CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#    11
CA Vtape r11.5                                RECYCLE PROCESSING EXCEPTIONS
GROUP# 61                                      REPORTED IN PROCESSING ORDER

         VIRTUAL DSN            RETCODE
GROUP SUB VOLSER SEQ MESSAGE#   RSNCODE   DESCRIPTION
----- --- ------ --- ---------- --------- ------------------------------------------------------------------------------------

No Processing Exceptions.
```

Processed Virtual Volume Files

Report SVTRC130.D lists the Virtual Volume Files that were processed by RECYCLE. Only volumes for the group and subgroup or subgroups specified by the RECYCLE command are listed. If multiple RECYCLE commands are coded, a report will be produced for each command.

Example of the SVTRC130.D report

```
RECYCLE.SVTRC130.D  CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#    12
CA Vtape r11.5                          VIRTUAL VOLUME FILES RECYCLED TO PRIMARY
GROUP# 61                                     REPORTED IN PROCESSING ORDER

         VIRTUAL DSN PHYSICAL  FILE ESTIMATED
GROUP SUB VOLSER SEQ VOLSER    SEQ#  #MB.USED  PHYSICAL FILENAME
----- --- ------ --- ------  ------  --------  ----------------------------------------
   61  S  101744 P   542613       1         8  QAPROD.VVE.V101744.PRIMARY
   61  S  101745 P   542613       2         8  QAPROD.VVE.V101745.PRIMARY
   61  S  101746 P   542613       3         8  QAPROD.VVE.V101746.PRIMARY
   61  S  101747 P   542613       4         8  QAPROD.VVE.V101747.PRIMARY
   61  S  101748 P   542613       5         8  QAPROD.VVE.V101748.PRIMARY
   61  S  101750 P   542613       6         8  QAPROD.VVE.V101750.PRIMARY
   61  S  101751 P   542613       7         8  QAPROD.VVE.V101751.PRIMARY
   61  S  101752 P   542613       8         8  QAPROD.VVE.V101752.PRIMARY
   61  S  101753 P   542613       9         8  QAPROD.VVE.V101753.PRIMARY
   61  S  101754 P   542613      10         8  QAPROD.VVE.V101754.PRIMARY
   61  S  101756 P   542613      11         8  QAPROD.VVE.V101756.PRIMARY
   61  S  101758 P   542613      12         8  QAPROD.VVE.V101758.PRIMARY
   61  S  101759 P   542613      13         8  QAPROD.VVE.V101759.PRIMARY
   61  S  101760 P   542613      14         8  QAPROD.VVE.V101760.PRIMARY
   61  S  101761 P   542613      15         8  QAPROD.VVE.V101761.PRIMARY
   61  S  101602 P   542613      16         8  QAPROD.VVE.V101602.PRIMARY
   61  S  101603 P   542613      17         8  QAPROD.VVE.V101603.PRIMARY
   61  S  101739 P   542613      18         8  QAPROD.VVE.V101739.PRIMARY
   61  S  101740 P   542613      19         8  QAPROD.VVE.V101740.PRIMARY
   61  S  101741 P   542613      20         8  QAPROD.VVE.V101741.PRIMARY
```

```
61  S  101565 P   542613      21         8  QAPROD.VVE.V101565.PRIMARY
61  S  101566 P   542613      22         8  QAPROD.VVE.V101566.PRIMARY
61  S  101568 P   542613      23         8  QAPROD.VVE.V101568.PRIMARY
61  S  101572 P   542613      24         8  QAPROD.VVE.V101572.PRIMARY
61  S  101574 P   542613      25         8  QAPROD.VVE.V101574.PRIMARY
61  S  101577 P   542613      26         8  QAPROD.VVE.V101577.PRIMARY
61  S  101579 P   542613      27         8  QAPROD.VVE.V101579.PRIMARY
61  S  101581 P   542613      28         8  QAPROD.VVE.V101581.PRIMARY
61  S  101583 P   542613      29         8  QAPROD.VVE.V101583.PRIMARY
61  S  101585 P   542613      30         8  QAPROD.VVE.V101585.PRIMARY
61  S  101587 P   542613      31         8  QAPROD.VVE.V101587.PRIMARY
61  S  101589 P   542613      32         8  QAPROD.VVE.V101589.PRIMARY
61  S  101591 P   542613      33         8  QAPROD.VVE.V101591.PRIMARY
61  S  101593 P   542613      34         8  QAPROD.VVE.V101593.PRIMARY
61  S  101595 P   542613      35         8  QAPROD.VVE.V101595.PRIMARY
61  S  101597 P   542613      36         8  QAPROD.VVE.V101597.PRIMARY
61  S  101599 P   542613      37         8  QAPROD.VVE.V101599.PRIMARY
61  S  101601 P   542613      38         8  QAPROD.VVE.V101601.PRIMARY
```

Results for Recycled Virtual Volume Files

Report SVTRC130.5 summarizes the results of the RECYCLE process. The left side of the report shows the primary output statistics and the right side shows duplex output statistics.

Example of the SVTRC130.5 report

```
RECYCLE.SVTRC130.5  CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#    13
CA Vtape r11.5                        RESULTS FOR RECYCLED VIRTUAL VOLUME FILES

GROUP# 61                    UTILIZATION STATISTICS SUMMARIZED BY DEVICE TYPE & SUBGROUP
      - - - - - - - P R I M A R Y - - - - - - - -                          - - - - - - - D U P L E X - - - - - - - - -
DEVICE      SHORT     MEDIUM       LONG      TOTAL        DESCRIPTION            SHORT     MEDIUM       LONG      TOTAL
------ ---------- ---------- ---------- ---------- ------------------------- ---------- ---------- ---------- ---------
3590          0.4        0.0        0.0        0.4         #GB Used                0.0        0.0        0.0        0.0
                1          0          0          1     #Physical Volumes            0          0          0          0
              1.2        0.0        0.0        1.2    Avg#(%used/Volume)           0.0        0.0        0.0        0.0
            480.0        0.0        0.0      480.0   Avg#(#MB.Used/Volume)         0.0        0.0        0.0        0.0
               60          0          0         60      #Physical Files            0          0          0          0
             60.0        0.0        0.0       60.0    Avg#(Files/Volume)          0.0        0.0        0.0        0.0
                         0.0        0.0        8.0    Avg#(#MB.Used/File)         0.0        0.0        0.0        0.0
TOTALS        0.4        0.0        0.0        0.4         #GB Used               0.0        0.0        0.0        0.0
                1          0          0          1     #Physical Volumes            0          0          0          0
            480.0        0.0        0.0      480.0   Avg#(#MB.Used/Volume)         0.0        0.0        0.0        0.0
               60          0          0         60      #Physical Files            0          0          0          0
             60.0        0.0        0.0       60.0    Avg#(Files/Volume)          0.0        0.0        0.0        0.0
                         0.0        0.0        8.0    Avg#(#MB.Used/File)         0.0        0.0        0.0        0.0
```

Selected Physical Input Volume Pull List Report

Report SVTRC190.A lists the physical volumes selected for input processing in VOLSER sequence by group specified. You can use this report as a pull list.

As Virtual Volumes age and the number of remaining retention days decrease, RECYCLE will change the Virtual Volumes subgroup assignment. The associated physical volumes will now contain Virtual Volumes for more than one subgroup. If RECYCLE is processing multiple subgroups for a group, these physical volumes will be mounted multiple times, once for each subgroup processed. The pull list VOLSER order reflects the first time a physical volume is mounted.

Report SVTRC190.A is broken into three sections as follows:

- The Selected Physical Input Volume Pull List Report.

  This section lists the physical Backstore Volumes selected for input processing and shows the mount order in which Recycle will mount and process the respective volumes. Subsequent mount requests for the same physical volume are not listed. When more than one subgroup is being Recycled and an input volume contains more than one subgroup then that volume will be mounted once for each subgroup.

  When a group is rejected due to the TCR value, the group will not be processed. The volumes should not be loaded in manual tape cartridge loaders.

- The Tape Consolidation Ratio Exception Statistics Report.

  This section documents those groups which were skipped because the projected TCR was less than the requested TCR and the number of tapes that would have been released and written.

- The Tape Consolidation Ratio Selection Summary Report.

  This section of the report documents the projected number of volumes that will be selected, released, and written.

Example of the SVTRC190.A report

```
RECYCLE.SVTRC190.A  CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#    23
CA Vtape r11.5                      SELECTED PHYSICAL INPUT VOLUME PULL LIST REPORT
                                       REPORTED BY FIRST VOLUME PROCESSING ORDER

      PHYSICAL  --#PHYSICAL FILES--
GROUP VOLSER     ACTIVE   SELECTED
----- ------    ------------------
   61 540336          3          3
   61 540476          3          3
   61 540520          3          3
   61 540562          3          3
   61 540692          3          3
   61 541202          5          5
   61 541284         18         18
                  ------------------
                     38         38

   62 541085          2          2
   62 541053         58         58
                  ------------------
                     60         60

       TOTAL     --#PHYSICAL FILES--
                  ACTIVE   SELECTED
                  ------------------
                     98         98

                                    TAPE CONSOLIDATION RATIO EXCEPTION STATISITCS
                                         *** PROJECTED REJECTION REPORT ***
                                         REPORTED BY GROUP PROCESSING ORDER

        PROJECTED   REQUESTED   ------#PHYSICAL VOLUMES------
GROUP       TCR         TCR      SELECTED  RELEASED  WRITTEN
-----    -------     -------    ----------------------------
   62     (2:1)       (3:1)            2         2        1
                              ----------------------------
                     TOTAL            2         2        1

                                   TAPE CONSOLIDATION RATIO SELECTION SUMMARY
                                        RUNTIME PROJECTION STATISTICS
                                       REPORTED BY GROUP PROCESSING ORDER

        PROJECTED   REQUESTED   ------#PHYSICAL VOLUMES------
GROUP       TCR         TCR      SELECTED  RELEASED  WRITTEN
-----    -------     -------    ----------------------------
   61     (7:1)       (5:1)            7         7        1
                              ----------------------------
                     TOTAL            7         7        1
```

Physical Input Volume Status Report

Report SVTRC190.B is the post Recycle or Recycle results report. The report is broken into two sections as follows:

- The Selected Physical Input Volume Status Report.

  This report documents the physical Backstore Volumes selected for input processing, the number of physical files (Virtual Volumes) that were processed and the number of physical files that were not processed on each volume. The volumes are listed in volume serial number order.

  Physical volumes that have no remaining physical files will be expired by the tape management system or can be expired manually.

- The Tape Consolidation Ratio Physical Output Volume Summary Report.

  This report documents the Group Number that was Recycled, the Actual TCR achieved, the requested TCR, the number of physical volumes selected, processed, release and written. The entries are listed in group order.

Note: Physical volumes with no remaining physical files are written to the SVTR190B DD statement file. This file can be used as input for return-to-scratch processing at those sites without a tape management system.

Example of the SVTRC190.B report

```
RECYCLE.SVTRC190.B  CA11.SVT2                          CA VTAPE                          HH:MM:SS mm/dd/yy  PAGE#    24
CA Vtape r11.5                       SELECTED PHYSICAL INPUT VOLUME STATUS REPORT
                                            REPORTED BY PHYSICAL VOLSER

      PHYSICAL  --#PHYSICAL FILES--------------
GROUP VOLSER     SELECTED  PROCESSED  REMAINING
----- ------    ---------------------------------
   61 540336           3          3          0
   61 540476           3          3          0
   61 540520           3          3          0
   61 540562           3          3          0
   61 540692           3          3          0
   61 541202           5          5          0
   61 541284          18         18          0
              ---------------------------------
       TOTAL          38         38          0
                               TAPE CONSOLIDATION RATIO PHYSICAL OUTPUT VOLUME SUMMARY
                                         ACTUAL RUNTIME STATISTICS
                                             REPORTED BY GROUP

        ACTUAL   REQUESTED   ------------#PHYSICAL VOLUMES-----------
GROUP    TCR        TCR      SELECTED  PROCESSED  RELEASED  WRITTEN
-----  -------    -------    ----------------------------------------
   61   (7:1)      (5:1)           7          7         7        1
                             ----------------------------------------
                 TOTAL             7          7         7        1
```

Note: The REMAINING column of report SVTRC190.B always depicts the number of physical files that are cataloged to the source volume; therefore, if a RECYCLE control statement does not define a target tape type (Primary or Duplex) that includes the source tape type, the number of physical files shown in the REMAINING column will be equal to or greater than the number of processed files. This is because the files residing on the source volume were not recycled (read and recataloged to a different tape), but read to create a tape of a different type. This occurs when the following RECYCLE control statements are used:

```
RECYCLE SOURCE(PRIMARY)          TARGET(DUPLEX)

RECYCLE SOURCE(DUPLEX)TARGET(PRIMARY)

RECYCLE PHYSICAL(VOLSER)         SOURCE(REPAIR)
```

When a RECYCLE control statement defines SOURCE(PRIMARY) with TARGET(PRIMARY|BOTH) or SOURCE(DUPLEX) with TARGET (DUPLEX|BOTH), the REMAINING column of the report will reflect a true RECYCLE of the input tape. If a tape with ten files is selected and six files are processed, four files will be reported as REMAINING. If all ten files were selected and processed, then the REMAINING column will show a file count of zero, indicating that the input volume can be returned to scratch status.

Automating the Exclusion of Retained Backstore Volumes

A CA Earl report is provided to list the Backstore Physical Volumes; VOLSERs being retained for additional output. You can accumulate the exclusion of these physical volumes by executing the provided report job with a FILEOUT DD coded to create a sequential file containing a list of the VOLSERs in the report. The FILEOUT DD data set is then coded on the PEXCLUDE DD in the RECYCLE JCL to exclude these volumes from RECYCLE input processing.

Note: For additional information about this report, see the chapter “Reports”.

An example of the JCL to execute the report with a FILEOUT DD and pass the created data set to a RECYCLE job can be found in HLQ.CCUUJCL(RECYCLE1).

Multisystem Considerations

In LIVE mode, a number of RECYCLE jobs can be run concurrently as long as each is processing a different group. RECYCLE tries to serialize processing at the group level, using either a systems-level enqueue or through a flag in a shared data set that is serialized using a hardware reserve. The method used by RECYCLE depends on the presence or absence of the GROUPENQ ddname.

Systems-Level Enqueue

When the GROUPENQ DD is not coded in the RECYCLE JCL, a systems-level enqueue is issued. This type of enqueue requires IBM's Global Resource Serialization (GRS) or CA MIM to be active to propagate the enqueue to the other LPARs.

Shared Data Set Hardware Reserve

When the GROUPENQ DD is coded in the RECYCLE JCL, flags in the GROUPENQ data set are serially accessed under a hardware reserve to determine which groups are being processed. This type of serialization can safely operate in a multisystem environment without IBM's GRS or CA MIM.

Note: The GROUPENQ data set must be placed on a shared DASD volume that is accessible to all of the participating systems.

A RECYCLE job issues a hardware reserve on the shared DASD volume and enqueues the GROUPENQ data set, a flag representing a given group is placed in the data set, and the reserve and enqueue are released. This allows all RECYCLE jobs to determine if a given group is currently being processed, but only one job at a time can access the data set. When a RECYCLE job completes processing a group, the hardware reserve is issued on the shared DASD volume and the GROUPENQ data set is enqueued, the flag is removed from the file, and the reserve and enqueue are released.

This type of serialization can provide performance advantages over an IBM GRS or CA MIM environment as long as the shared DASD volume does not have any significant contention.

If RECYCLE is canceled after it begins processing, the flag representing the current group may not be cleared. Subsequent RECYCLE jobs will not attempt to process a group whose flag has not been cleared. You can manually clear a flag left on in error by deleting and then redefining the GROUPENQ data set.

Sample JCL to allocate and initialize the GROUPENQ data set and to reset a group flag can be found in HLQ.CCUUJCL(RECYRSET).

Chapter 9: How to Prepare and Recover CA Vtape

This section describes the in-house recovery techniques for the control data sets that CA Vtape uses.

Restore or Recover CA Vtape Control Data Sets

This section describes how to restore the control data sets from a backup and how to recover the Global VCAT and BSDS1 from each other.

Recover the Global VCAT

The BSDS and the Global VCAT maintain similar information. Either data set can be recovered from the other. They should be placed on separate DASD volumes, preferably in separate DASD subsystems so that they do not end up on the same physical HDA. This ensures that a single hardware failure does not damage both data sets.

The ability to recover the BSDS and the Global VCAT is an important feature of CA Vtape. We recommend that you do regular backups of the BSDS. In the unlikely event that both the BSDS and the Global VCAT are accidentally deleted or destroyed, you can restore the BSDS from a backup tape and then use it to recover the Global VCAT.

To recover the Global VCAT from the BSDS

1. Bring down all the CA Vtape subsystems that are part of the CA Vtape complex sharing the Global VCAT to be recovered.
2. Customize the sample JCL found in HLQ.CCUUJCL(RECGLVC).
   - If the Global VCAT is not accessible, the first step of the job is required to define a new Global VCAT. If the Global VCAT is accessible, the first step of the job can be commented out and NOINIT can be added to the recovery commands in the second step to reduce runtime.

     RECOVER=GLOBAL,PREFIX=*prefix*,NOINIT [,DROP_INELIGIBLE] [,SCRATCH]
   - If you are using Static Cache Management and the size of the DASD buffer pool has been reduced, the DROP_INELIGIBLE parameter should be added to the recovery commands. This parameter will cause cache LDSs that cannot be located or opened during the recovery job run to not be added back into the Global VCAT.

     RECOVER=GLOBAL,PREFIX=*prefix*,DROP_INELIGIBLE [,NOINIT] [,SCRATCH]

     If these LDSs are not dropped, they will be added back to the Global VCAT and to the cache totals. If these LDSs will not be created or corrected, dropping them will ensure that the DASD buffer totals are not artificially inflated, which affects the parmlib cache percentage parameters and the displayed cache subtotals. Dropping them will also ensure that the LIST=CACHE and Reclaim jobs will not try to process and report on them.

     If you use Dynamic Cache Management, the DROP_INELIGIBLE command has no affect on the recovery.

     Note: For additional information about the RECOVER=GLOBAL command, see the chapter "SVTSUTIL Batch Commands."

3. Submit the customized RECGLVC job to perform the recovery of the Global VCAT from the BSDS. Carefully review the job return codes and messages for any errors and take the appropriate corrective action.
4. If you are using Static Cache Management, submit the LDSADD*xx* jobs residing in PREFIX.SVTJCL. This will add back into the Global VCAT any static cache LDSs that were not added back by the recover job. These jobs will get non-zero return codes as many of the static cache LDSs will not need to be added back. There is no need to modify these jobs as a duplicate add will not cause any problems.

   If you are using Dynamic Cache Management, this step is not needed.
5. Start one CA Vtape subsystem in the CA Vtape complex and execute the console command SVT*n* D A. The correct cache totals should be displayed on the DASD cache utilization line of the display.
6. Customize and submit the sample JCL in HLQ.CCUUJCL(GRRJCL) to build the Backstore subgroup queues. If you are at a disaster recovery site where the cache is empty, this step can be skipped.
7. Start the remaining CA Vtape subsystems in the CA Vtape complex.

Recover a Local VCAT

The Local VCAT contains data that is loaded from the parmlib or is transient in nature. If a Local VCAT is damaged or lost, create a new one by customizing and executing the DEFVCAT job found in HLQ.CCUUJCL.

After the new Local VCAT has been created and the CA Vtape Subsystem has been started, issue the SVT*n* SET MAXDRIVES=*nn* console command to establish a limit on the number of physical tape drives used by the Backstore Engine. If you need to deactivate the High-Speed Open option, issue the SVT*n* SET HSOPEN=OFF console command.

Updating the parmlib VTSCMDS member with these console commands will ensure that the appropriate limits and features are established and activated whenever CA Vtape is started.

Note: For information concerning the VTSCMDS parmlib member, see the chapter "The Parameter Library (PARMLIB)" in the *Configuration Guide*.

Restore the BSDS from Backup

You can recover the BSDS from information that is contained in the Global VCAT.

Follow these steps:

1. Bring down all the CA Vtape subsystems that are part of the CA Vtape complex sharing the BSDS to be recovered.
2. Customize and submit the RECBSDS member from the HLQ.CCUUJCL library. The job deletes the old BSDS, defines a new BSDS using the Global VCAT as a model, and REPROs the Global VCAT into the new BSDS.

Virtual Volume Recovery

This section addresses the following recovery scenarios:

- Recalling a Virtual Volume from a duplex Backstore tape.
- Physical loss or damage of a Backstore tape.
- Physical loss or damage of an LDS in the DASD buffer pool.
- Accidental scratching.
- Extracting a Virtual Volume from a Backstore tape if CA Vtape is down or inoperative.

Recall from a Virtual Duplex Backstore Tape

The Group Definitions control whether Virtual Volumes are written to primary and duplex Backstore tapes. If a duplex Backstore tape was created, problems with a primary tape are automatically addressed by CA Vtape by recognizing the error condition and mounting the duplex tape instead. The Group attributes that control automatic recovery are:

- RecallAttemptsThreshold
- OffsiteBackstoreCopy

During CA Vtape Recall processing, the primary Virtual Volume data set name is located first. If the primary is not found, the duplex Virtual Volume data set is then located. The locate order can be reversed by using the SVT*n* SET RECALL=Duplex console command to tell CA Vtape to locate the duplex version first. This command is typically used at a disaster recovery site when only the duplex Backstore tapes are available.

You can force the use of a duplex copy by uncataloging the primary after verifying that the duplex exists. If you are going to uncatalog Backstore tape entries, document them first so that they can be recataloged with IDCAMS DEFINE NONVSAM commands later. Recataloging is required before running the Recycle utility to rebuild a lost or broken Backstore tape from its copy.

You can determine whether a duplex exists by using ISPF 3.4 to look-up the standard Backstore data set name of PREFIX.VVE.Vv*olser*, where *volser* is the virtual VOLSER in question, will provide the required information.

For example, using the default CA Vtape prefix, Virtual Volume 899186 might display the following information:

```
CAVTAPE1.VVE.V899186.DUPLEX
CAVTAPE1.VVE.V899186.PRIMARY
```

Having verified the existence of the duplex copy of 899186, the primary copy can be uncataloged with the ISPF panels and subsequent Recalls of 899186 will call for the duplex tape.

Caution: RECYCLE PHYSICAL REPAIR reads the ICF catalog to determine which Virtual Volumes are currently on the bad primary Backstore tape so their corresponding duplex copies can be read to create a new primary tape. Using the example above, if the uncataloged primary entry for 899186 is not recataloged before Recycle is executed, the new primary Backstore tape will be missing 899186.

Recover from Lost or Damaged Backstore Tape

Virtual Volumes are stacked onto physical cartridges. Losing a single cartridge can cause the loss of multiple Virtual Volumes.

To document the Virtual Volumes on the problem Backstore Tape, customize and submit the HLQ.CCUUJCL(BACKSTOR) member to create a Backstore Report. The report will contain the VOLSERs of the primary and duplex Backstore Tapes. Copy the report to a data set and sort the report on the primary or duplex VOLSER column depending on which type the problem tape is.

If a primary and a duplex copy of the Virtual Volumes on the problem tape exist, you can run the Recycle utility with the following command to recreate the problem tape:

```
RECYCLE PHYSICAL(problem.volser),SOURCE(REPAIR) .
```

If only a primary copy of the Virtual Volumes exist and the problem tape is not lost, the same Recycle utility job can be run to recreate the primary tape with all the readable Virtual Volume files. Any Virtual Volumes that cannot be read from the problem tape should be scratched in the tape management system.

If only a primary copy of the Virtual Volumes exists and the problem tape was lost or destroyed, then the Virtual Volumes are not recoverable. They should be scratched in the tape management system.

When the Scratch Synchronization Job is executed, the Virtual Volumes that were scratched in the tape management system will be scratched in CA Vtape and their Backstore tape catalog entries will be uncataloged.

Note: For more information about RECYCLE REPAIR, see the chapter “RECYCLE Utility.”

Recover from Static Cache LDS Failure

If a DASD volume containing a portion of the CA Vtape DASD buffer pool is lost, the LIST=CACHE Report shows the specific Virtual Volumes that have been impacted.

Note: For more information about this report, see the chapter “Reports”.

Options are as follows:

- If the Virtual Volumes were Externalized, a valid copy can be Recalled from a Backstore tape.
- If the Virtual Volumes were not Externalized and the DASD volume cannot be recovered intact, the affected Virtual Volumes cannot be recovered and should be returned to scratch status in the Tape Management System.

Damaged or unavailable Static Cache LDSs will get allocation errors during CA Vtape mount or Externalization processing and will be flagged as ineligible. These LDSs will no longer be allocated or referenced.

If the LDSs cannot be recovered, copy, customize and execute an LDSDEFxx member from the PREFIX.SVTJCL library to recreate them. After the ineligible LDSs are reallocated or recovered, customize and execute the JCL in HLQ.CCUUJCL(RECLAIM) to reactivate them.

For a severely damaged Static Cache DASD buffer, rebuild the Global VCAT from the BSDS following the steps in the topic Recovering the Global VCAT (see page 194). To facilitate the handling of non-Externalized Virtual Volumes residing in damaged LDSs, add the optional parameter SCRATCH to the RECOVER=GLOBAL command, for example, RECOVER=GLOBAL,NOINIT,SCRATCH.

Note: For additional information about the RECOVER=GLOBAL command, see the chapter “SVTSUTIL Batch Commands”.

During the recover process, all the Static Cache LDSs referenced by a Virtual Volume Entry are checked. Any LDSs that cannot be located and opened are automatically flagged as ineligible. Also, all Virtual Volumes in the damaged LDSs that have not been Externalized will be returned to Scratch status in the Global VCAT. A report is produced which lists the ineligible LDSs and their corresponding, if any, scratched Virtual Volumes. These Virtual Volumes will need to be scratched in the Tape Management System.

Recover from a Dynamic Cache LDS Failure

If a DASD volume containing a portion of the CA Vtape DASD buffer pool is lost, the LIST=CACHE Report shows the specific Virtual Volumes that have been impacted.

Note: For more information about the LIST=CACHE Report, see the chapter “Reports.”

Options are as follows:

- If the Virtual Volumes were Externalized, a valid copy can be Recalled from a Backstore tape.
- If the Virtual Volumes were not Externalized and the DASD volume cannot be recovered intact, the affected Virtual Volumes cannot be recovered and should be returned to scratch status in the Tape Management System.

Damaged or unavailable Dynamic Cache LDSs will get allocation errors during CA Vtape mount or Externalization processing. These LDSs will generate allocation errors until they are deleted or recovered.

Reactivate an Accidentally Scratched Virtual Volume

You can reactivate a Virtual Volume that has been scratched if its Backstore Primary or Duplex Tape is still available.

To reactivate a Virtual Volume

1. Look up the Virtual Volume in the tape management system. If the VOLSER has been reused, copy the new data set to another Virtual Volume to free up the VOLSER.
2. After Externalizing the new Virtual Volume, scratch the needed VOLSER in the tape management system and in the Global VCAT. To scratch the VOLSER in the Global VCAT, execute the SVTSUTIL batch command VVE_SCRATCH=*volser* where *volser* is the Virtual Volume VOLSER.
3. Look up the physical tape in the tape management system. If the tape has been scratched, return it to active status.
4. Look up the data set records for this physical tape and return the expired Virtual Volume data set to active status.

5. Using the information from the tape management system, customize and execute the sample JCL found in HLQ.CCUUJCL(CATBKSTR) to recatalog the Virtual Volume Backstore Entry:

   Update the tape management system to return the Virtual Volume to active status with the correct application data set name and other information. Ensure that the expiration date is extended to prevent the Virtual Volume from being scratched too soon.

6. Issue the SVT*n* START RECALL=volser console command to manually Recall the Virtual Volume.

   The Recall reactivates the Virtual Volume in the Global VCAT and allows the application to read it.

Extract a Virtual Volume

CA Vtape lets you extract a Virtual Volume from a Backstore physical tape to another physical tape in native or application format. The extracted tape can be read by the application without using CA Vtape.

Extract to CA Vtape is not supported. If CA Vtape is active when an Extract is submitted, the output tape mount may be intercepted by CA Vtape unless a unit esoteric or generic that does not include the Virtual Devices is coded on the SYSUT2 DD statement or the filter lists are updated to not include or to exclude the data set.

Extract recreates the Virtual Volume tape label, including the application data set name, on the output tape. The output tape VOLSER is preserved, but you can change it if you want.

To specify the data set name to be used by your tape management system when recording the output tape volume, code the DSN= you want on the SYSUT2 DD statement. Coding a DSN on the SYSUT2 DD statement will not change the DSN in the tape label.

If you code a temporary data set name or default to a system-generated name, EXTRACT will pass the first data set name on the Virtual Tape to your tape management system. You may need to code DSN= if your security product does not allow the EXTRACT job to OPEN for output using the first data set name on the Virtual Tape.

Syntax

The EXTRACT command can be executed in one of three ways using the following syntax:

```
EXTRACT
EXTRACT,VOLSER=INPUT
EXTRACT,VOLSER=volser
```

The following is an explanation of each line of the syntax:

EXTRACT

Provides default processing that copies from the virtual VOLSER to the VOLSER mounted for the output tape, keeping the output volume serial.

EXTRACT,VOLSER=INPUT

Provides a way to copy from the virtual VOLSER to an output tape and relabel the output tape to the same VOLSER as the Virtual Volume. This method supports extracting Virtual Volumes created by products that remember what VOLSERs they originally wrote to and cannot tolerate change (for example, CA Disk or DFSMShsm).

EXTRACT VOLSER=*volser*

Lets you relabel the output tape to the coded VOLSER.

Important! The EXTRACT utility does a standard open on the output tape and then changes to Bypass Label Processing (BLP). Some security products prevent users from processing tapes using BLP. In this case a user with permission to perform BLP processing must submit the EXTRACT job. BLP should only be coded on the output tape DD to bypass the standard open tape management validation when a foreign tape is being used.

Sample JCL can be found in HLQ.CCUUJCL(EXTRACT).

Extract a Virtual Volume Under CA TLMS

For those sites using CA TLMS, a different version of the utility is provided. When BLP is invoked for an output tape data set, a temporary data set name is generated. The CA TLMS version of the EXTRACT utility replaces the temporary data set name in the extracted volume tape management record with the original or application data set name. The user submitting this version of the EXTRACT utility requires update authority to the CA TLMS database.

Sample JCL can be found in HLQ.CCUUJCL(TLMSEXTJ) and HLQ.CCUUJCL(TLMSEXTP). TLMSEXTP is a procedure (proc) that is executed by TLMSEXTJ and needs to be customized.

Off-Site Disaster Recovery

CA Vtape provides special features for off-site Disaster Recovery. To fully use those features, you must take specific steps in preparation for the emergency and during the recovery itself. Completely review all the steps before starting the process.

This procedure assumes the following:

- Parmlib is fully implemented, including Enhanced Filters
- Duplex tapes are being generated for the Virtual Volumes to be recovered

Prepare for Disaster Recovery

The following steps should be followed at the designated Disaster Recovery Center (DRC).

To prepare for disaster recovery

1. Install and customize a new CA Vtape system based on the Production Data Center (PDC) system. Assuming the product libraries, including the parmlib, are copied from the PDC, complete the relevant steps described in Precustomization Planning.
2. To complete the DRC installation, use the jobs already generated in the PREFIX.SVTJCL and delivered in the HLQ.CCUUJCL data sets copied from the PDC.

   Note: The CA Vtape DSN prefix must be the same as the one in use at the PDC.
3. The DRC BSDS will be recovered from the PDC. You should plan for the required DASD space in a separate DASD volume from the other control data sets, but you do not have to create the BSDS now.
4. The DASD buffer size may be different from the one being used at the PDC. From PREFIX.SVTJCL, submit the number of LDSDEF*xx* jobs required to create the DRC DASD buffer.
5. Define and initialize the Global VCAT by extracting the DELDEFG and UTILITYG steps located in the GLOBAL member in PREFIX.SVTJCL.
6. Define and initialize the Local VCAT by submitting job DEFVCAT located in HLQ.CCUUJCL.
7. Verify that the SVTS and SVTSAS JCL procedures are located in your DRC proclib. If not, copy them from the HLQ.CCUUJCL library.
8. The esoterics defined in PARMLIB/VTGROUP must conform to the ones defined at the DRC. If the resources are available, you should continue generating duplex tapes at the DRC, but it is not required.
9. Review member VTDRIVE and verify that the virtual UCB addresses conform to the ones defined at the DRC.

Perform the following steps at the PDC:

1. Ensure the VTGROUP member in the parmlib specifies a valid esoteric in the duplex parameter related with the groups to be recovered at the DRC.
2. Perform a backup of the product libraries, including the parmlib, the tape management system catalog, the BSDS, and the ICF catalog containing the Externalization entries. Be aware of the following considerations:
   - This backup will be your restart point at the DRC, meaning all the scratch volumes created and Virtual Volumes modified after the backup is taken will need to be reprocessed in case of a disaster.
   - It is very important to back up the BSDS, tape management, and ICF catalogs at the same time, to keep them in synchronization. You do not have to stop CA Vtape to perform the BSDS backup.
   - Schedule this backup to run as often as your business requires. At minimum the backup should be run after all the duplex tapes needed for the disaster recovery are created and as often as your business requires. Keep track of the date and time when the backup started.

Recover at the Disaster Recovery Data Center

The recover process will set the DRC CA Vtape and the tape management system back to the date and time when the backup was created. Any update process against Virtual Volumes executed after the backup may need to be re-executed. It is assumed all the following elements are available at the DRC:

- Backstore duplex tapes
- Latest copy of the backup performed at the PDC, the preceding Step 2
- The CA Vtape system predefined at the DRC

To initiate the recovery

1. Restore the Tape Management System Catalog.
2. Restore the PDC ICF Catalog containing the Externalization entries and merge it with the DRC ICF Catalog.

   Note: After the ICF catalog has been merged with the DRC ICF catalog, the catalog entries for CA Vtape DASD cache and Virtual Device data sets should be uncataloged. The entries to delete are PREFIX.VVE.V*.MM.CACHE, PREFIX.VVE.D*.*, and PREFIX.VVE.LDS*.
3. Restore the product libraries and copy the VTFILTR member and VTPARMS (if appropriate) to the DRC parmlib.

4. Restore the BSDS and perform all the steps in the section Recover the Global VCAT (see page 194). Add the options SCRATCH and DROP_INELIGIBLE to the RECOVER=GLOBAL utility statement, for example, RECOVER=GLOBAL,SCRATCH,NOINIT,DROP_INELIGIBLE.

   This process will not recover the LDSs previously defined at the PDC that are not currently defined at the DRC. Any non-Externalized Virtual Volume found in the BSDS will be returned to SCRATCH status in the Global VCAT.

5. Start CA Vtape.
6. Issue the following console commands:
   - SVT*n* SET RECALL=DUPLEX
   - SVT*n* SET HSOPEN=ON
   - SVT*n* SET MAXDRIVES=nn
7. Submit your jobs requiring Virtual Volumes.

Return to the Production Data Center

After you are ready to switch the processing back to the PDC, perform the following procedure at the DRC.

To return processing back to the PDC

1. Vary all the Virtual Devices offline and fully Externalize all the Virtual Volumes.
2. Run GRRJCL to requeue any potential Virtual Volumes that have not yet been Externalized and, if there are any, Externalize them.
3. Stop CA Vtape.
4. Back up the product libraries, including the parmlib, the Tape Management System catalog, the BSDS, and the ICF catalog containing the Externalization entries. Only the Externalization entries with the format of PREFIX.VVE.V*volser*.PRIMARY/DUPLEX are required.
5. Gather the Backstore primary tapes and, if they were created, also the duplex tapes.

Perform the following steps at the PDC:

1. Restore the product libraries and the BSDS.
2. Follow the DRC-related steps in the section Disaster Recovery Preparation (see page 202).
3. Restore the Tape Management System Catalog.

4. Restore the DRC ICF Catalog and merge it with the PDC ICF Catalog.

   Note: After the ICF catalog has been merged with the DRC ICF catalog, the catalog entries for CA Vtape DASD cache and Virtual Device data sets should be uncataloged. The entries to delete are PREFIX.VVE.V*.MM.CACHE, PREFIX.VVE.D*.*, and PREFIX.VVE.LDS*.

5. Restore the product libraries and copy the VTFILTR member and VTPARMS (if appropriate) to the PDC parmlib.

6. Restore the BSDS and perform all the steps in the section Recovering the Global VCAT (see page 194). Add the options SCRATCH and DROP_INELIGIBLE to the RECOVER=GLOBAL utility statement, for example, RECOVER=GLOBAL,SCRATCH,NOINIT,DROP_INELIGIBLE.

   This process will not recover all the LDSs previously defined at the DRC, that are not currently defined at the PDC. Any non-Externalized Virtual Volume found in the BSDS will be returned to SCRATCH status in the Global VCAT.

7. Start CA Vtape.

8. Issue the following console commands on each CA Vtape subsystem:

   - SVT*n* SET RECALL=DUPLEX
   - SVT*n* SET HSOPEN=ON
   - SVT*n* SET MAXDRIVES=*nn* (only required for the Externalization and Recall Servers)

9. Submit your jobs requiring Virtual Volumes but keep Externalization in HOLD status.

10. Uncatalog all the primary Backstore physical tapes lost during the disaster. After this process finishes, issue the following console commands on each CA Vtape subsystem:

    SVT*n* SET RECALL=PRIMARY

11. Issue the following console command once:

    SVT*n* SET BACKTORE=RELEASE,G=*,SG=*

    You must not generate new duplex copies until all the lost tapes are uncataloged and the Backstore is set back to Recall from the primary tapes. CA Vtape will automatically Recall from the duplex tape when the primary copy is not cataloged.

12. Schedule RECYCLE jobs to read the duplex-only copies and create new primary and duplex tapes. You can send the new duplex copies off site to restart the Disaster Recovery process.

13. Run LIST=BACKSTORE reports to monitor the Virtual Volumes now Externalized to primary and duplex tapes, and to schedule the duplex tapes to ship to the DRC.

Chapter 10: Troubleshooting

This chapter describes problems and conditions that you can solve using the CA Vtape console or batch commands. If you cannot completely resolve the condition, follow the additional steps in this chapter to gather debugging documentation and to protect the system.

This section contains the following topics:

Virtual Devices Will Not Vary Online

Several problems can occur when you try to vary the Virtual Devices online. Two of the most common are as follows:

- If the Virtual Devices were not properly defined with HCD, the following message is issued:

  ```
  IEE313I nnn              UNIT REF. INVALID
  ```

  Review the HCD definitions and correct the errors.

  Also verify within IPCS. From option 6, issue the following command:

  ```
  SETD ACTIVE
  LISTUCB ucb
  ```

  where *ucb* is the device address you are investigating.

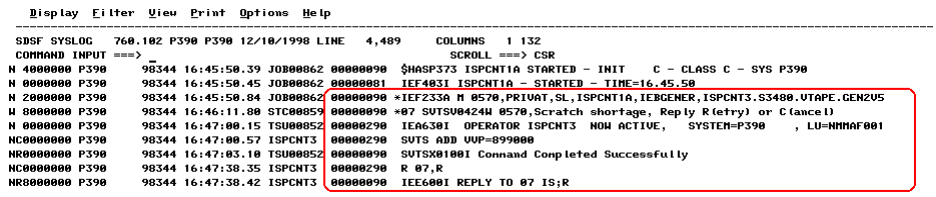
  In the UCBXPX at offset +0C, you find the SIDA and SCHNO fields. If the values in these fields are 0000s, then CA Vtape successfully allocates this address. If these fields contain anything other than 0000s, then you need to define another range.

CA Vtape uses this safety mechanism to ensure that no physical devices are associated with the UCB. After CA Vtape uses these devices, other resources can use the UCB only after the next IPL.

- If you try to vary the Virtual Devices online without the SVTS STC active, you get the following message:

  IEE025I UNIT *nnn* HAS NO LOGICAL PATHS

If you do not define enough Virtual Volumes, CA Vtape displays the SDSF SYSLOG Scratch Shortage message, as shown in the following example:



Virtual Volume Shortage

If you do not define enough Virtual Volumes for scratch processing, the system issues a SVT*n*V0424W *devn*, Pool *n*, Scratch shortage, Reply R(etry) or C(ancel) message.

Before replying, Retry the new scratch Virtual Volumes, and, assuming a scratch volume range is available in the Tape Management System, add that range to CA Vtape with the following console command:

SVT*n* ADD VVP=

For more information, see Console Commands (see page 61).

Run the corresponding Scratch Synchronization job immediately to release as many Virtual Volumes as possible. For more information, see Scratch Tape Synchronization in the *Configuration Guide*.

Virtual Device Appears Hung

Perform the following steps:

1. Verify there is no outstanding Cache Shortage message. If you find any, see the topic DASD Buffer Shortage (see page 210) later in this chapter.
2. Issue the D R,L command and look for any outstanding messages requesting a reply that can be affecting the job, CA Vtape, or a Virtual Device. Follow the instructions for any specific message and its reply.
3. Issue the SVT*n* D A command to display Virtual Device activity. This also places information into the system log for later reference, if necessary.

4. Issue the D U,,,*xxxx*,1 command where *xxxx* is the address of the Virtual Device to record additional information.
5. Wait 2-3 minutes while the CA Vtape Missing Interrupt Handler detects and corrects missing interrupts.
6. If the device still appears hung, issue the SVT*n* MIH=*nnnn*,DUMP command where *nnnn* is the Virtual Device UCB. Save the dump of CA Vtape and the job or application to help diagnose the problem. Issue the SVT*n* MIH=*nnnn* command as many times as needed, until the response indicates that the busy bit is not set.
7. If the SVT*n* MIH console command was able to clear the busy bit, the application will cancel and the Virtual Device should now be released. If not, run the IPCS report [see the section IPCS (see page 212)], and send the DUMP, the IPCS report, and the SYSLOG to CA Support.
8. If the device still appears to be hung, issue the SVT*n* RESTART UNIT=*nnnn* command. This command restarts the task assigned to control the Virtual Device. Restarting the device clears GRS latch sets and frees other resources that might cause the hang.
9. If the device still appears to be hung, you can restart the Virtual Control Unit. This is analogous to an Initial Microcode Load (IML) of a physical control unit. The scope of the number of devices affected widens to include all devices defined to the Virtual Control Unit. First, issue the SVT*n* DISPLAY UNIT command and take note of the column labeled CU (Virtual Control Unit identifier). Locate the problem device in the command response and make sure other devices sharing the same CU number are not in use as the jobs using any drives on the same CU will receive unit checks when the CU is restarted. Second, issue the command SVT*n* RESTART CU=*n* where *n* is the CU value from the SVT*n* DISPLAY UNIT command.

SO8B Abends

S08B abends are related to the IBM Data-In-Virtual (DIV) access method. These abends typically occur when accessing a control data set, such as the Global VCAT or Local VCAT, when the data set has not been initialized. An error message that indicates a problem may precede abends. Looking up the S08B reason code in the IBM System Codes manual allows you to relate the S08B abend to the preceding error messages.

DASD Buffer Shortage

As shown in the following figure, the SVT*n*D0908I message is sent every minute after the DASD buffer threshold is reached, and continues to be sent until the DASD buffer pool is relieved (SVT*n*D0912I). If the DASD buffer reaches 100 percent utilization, all the Virtual Devices will stop and message SVT*n*P0420W or SVT*n*V0432E or both are issued. Virtual Device activity automatically resumes as soon as DASD buffer space is available.

The following illustration is the first example of SDSF SYSLOG:

```
SVT1 D G,D
 SVT1X0300I Cache Size (MB) 00013000/00012840/00002400, In Use=080%
 Max Drives=0006, Thresholds Warning=075%, Hold=020%, Release=065%
 Schedule=(00:00-15:00,15:05-19:59,20:15-23:59), State=On

   Group Status  Queue  #Vols  MB.Used MB.Alloc Dasd% MB.Thold Prty
   ----- ------- ------ ----- -------- -------- ----- -------- ----
    11.S *Act(2) Local      2      800      800    6%     1000  3.0
                 Global     5     1852     1880   14%
    11.M *Act(1) Local      2      652      680    5%     1000  3.0
                 Global     1      400      400    3%
    33.L *Rlse   Local      0        0        0    0%     3000  1.1
                 Global     4      832      880    7%
    51.S *Act(1) Local      1      400      400    3%    12000  1.0
                 Global     4      912      960    7%
    51.L *Act(1) Local      1      400      400    3%    12000  1.0
                 Global     1      400      400    3%
   Totals:                 21     6648     6800   52%

 SVT1X0100I Command Complete
*SVT1D0908I SVTS Cache Shortage - 080% Utilization Reached
*SVT10432W 3504,100556, Cache shortage, Reply R(etry) or C(ancel)
 *SVT10432W 3501,100557, Cache shortage, Reply R(etry) or C(ancel)
CTS014      IEF23E K 3507,100544,PVT,RIDOSDI4
 IEF234E    K 3507,100544,PVT,RIDOSD14
 IEF404I    RIDOSD14 - ENDED - TIME=17.56.48
*SVT1D0908I SVTS Cache Shortage - 077% Utilization Reached
 SVT1 REFRESH=OPTONS           <<--- Changed CacheWarningThreshold in parmlib
 SVT1X0100I Command Completed Successfully
 SVT1D0912I SVTS Cache Shortage Relieved
```

The DASD buffer may reach 100% utilization in the following conditions:

- Insufficient DASD buffer space allocated to handle CA Vtape activity.

  Note: For information on how to properly size the DASD buffer, see the chapter "Cache Management" in the *Configuration Guide*.

- Insufficient physical drives to Externalize the Virtual Volumes to physical tape.

- The Primary and Failover Externalization Servers are not active or Subgroup Automation was not set for the group or subgroups queues using most of the DASD buffer. Corrective actions include the following:
  - Execute SVT*n* D G on the CA Vtape subsystem defined to run the primary Externalization Server. Is Release > 0? (Second line of the SVT*n* D G display). If so, this is the Externalization Server.
  - Is Warning <= Release? If so, you are receiving the Warning Cache Shortage message before Subgroup Automation was scheduled to start the Externalization Server. Either modify parmlib attributes CacheWarningThreshold or CacheAutoReleaseHighThreshold, or check other CA Vtape subsystems because this subsystem might not be set up as the primary Externalization Server but the secondary instead.
  - Is Release >= In Use? If so, that means Subgroup Automation was not scheduled to start yet. Temporarily release the queues by issuing SVT*n* SET BACK=-R,G=*, and after the DASD buffer utilization is back to normal issue SVT*n* SET BACK=T,G=* to reset Subgroup Automation to the parmlib specified values. Modify parmlib attribute CacheAutoReleaseHighThreshold to a more suitable value.
  - Is the State On? If not, the Externalization Server is Off based on schedule. To override the schedule and release the queues execute a SVT*n* SET BACK=-R,G=* command.
  - If the State is On, but the group or subgroup queue holding most of the data is on Hold without a leading * in front of the Status, it is because the queue is not automated. Either temporarily automate it by executing the SVT*n* SET BACK=A,G=xx or just release it by executing SVT*n* SET BACK=R,G=*xx*.

Other corrective action includes the following steps:

1. Run SVTSUTIL RECLAIM.

   Note: For information on how to run the SVTSUTIL RECLAIM command, see the chapter “SVTSUTIL Batch Commands.”

2. Execute the SVT*n* D B console command to verify that the Backstore can allocate and write over the physical tapes.
3. If possible, let the Backstore Engine use more physical tapes by issuing the SET MAXDRIVES=*nn* console command.
4. Reply **R** to any outstanding SVT*n*0432W message.

GTF Trace

The Virtual Devices are provided with GTF Trace capability with output formatted exactly like a physical volume GTF trace.

IPCS

CA Vtape comes with an IPCS VERBX exit to use during problem determination. Customize and run the IPCS job that is distributed in HLQ.CCUUJCL to obtain detail information about control block structures residing in the Global and Local VCAT and the content of the Internal and External Logger.

IPCS Parameters to Print the Logger

Following is the syntax and option descriptions for running the Logger print engine that is implemented as part of the IPCS command.

```
VERBX SVTSIPCS '[SVTS(SVTn)] +
               [VOLUMES(ALL| NONE | ONLY(nnn))] +
               NOLOG | [LOG(see note)] | [LOGONLY(see note)]'
               PRINT
```

Valid Subcommands are as follows:

```
ACTIVE | NOACTIVE |,LEVEL(n) |,DDNAME(nnnnnnnn)
```

SVTSIPCS Operands

Operands are as follows:

SVTS(SVT*n*)

Specifies the subsystem ID number of the CA Vtape subsystem for which to display information. This value correlates to the last character of the CA Vtape subsystem (SVT*n*, where *n* must be between 1 through 8). The operand defaults to 1 which is the subsystem ID number of SVT1.

NOLOG

Specifies that no historical logging data be displayed.

VOLUMES

Specifies which Virtual Volumes to include in the report. ALL prints all Virtual Volumes, NONE does not print any, and ONLY(*nnn*) prints the Virtual Volumes that match the first three qualifying alphanumeric characters.

PRINT

Indicates the PRINT keyword that is part of IBM's IPCS VERBX command and if supplied writes to the IPCSPRNT DDNAME. The PRINT keyword must not be included within quotes. Output is written to the SYSTRPRT DDNAME, so specifying DUMMY helps to limit the output.

The following is an example of the IPCSPRNT DDNAME:

```
//IPCSPRNT DD DISP=(,CATLG),DSN=SVTS.TEMP.IPCS.PRINT,
// SPACE=(CYL,(5,5),RLSE),UNIT=SYSALLDA,
 // DCB=(LRECL=137,RECFM=VBA,BLKSIZE=23476)
```

LOG

Appends the Logger report to the regular IPCS report.

LOGONLY

Formats the Logger report exclusively.

ACTIVE

Indicates the default. Specifies that the IPCS SETDEF keyword (either a Dump or the Active system) controls the input to the Logger print engine.

NOACTIVE

When specified, instructs the Logger print engine to ignore the SETDEF keyword. If this option is not specified ACTIVE is generated.

LEVEL(*n*)

Overrides the detail level the Logger print engine formats. The value *n* must be between 1 through 3.

If LEVEL is not specified, all records, regardless of their Logger Detail Level, are included. Specify a lower detail level than the one that the data was recorded at filters all events that are generated for a Logger Level Detail greater than the supplied value. Specifying a greater detail level than the one that the data was recorded at has no effect. Level(3) may generate thousands of lines for only a few minutes of logging. Adjust the IPCSPRNT DD SPACE parameter accordingly.

DDNAME(*xxxxxxxx*)

When specified, indicates that the input to the Logger print engine is supplied by the specified DDNAME *xxxxxxxx* value. This parameter is independent of parameters ACTIVE/NOACTIVE and NOACTIVE and specified to process only input from the supplied DDNAME. The supplied *xxxxxxxx* value must match a DDNAME allocated to the Job Step that is pointing to a valid Log Stream name or a sequential data set containing extracted external Logger data.

The following is a typical example of how to code a Log Stream DDNAME using IBM's LOGR subsystem parameter to filter records based on date and time.

```
//LOGR     DD DISP=SHR,DSN=VTAPE.LOG,SUBSYS=(LOGR,,
 // FROM=(2002/302,12:00),TO=(2002/302,15:23),LOCAL'),
 // DCB=(RECFM=U,BLKSIZE=24576)
```

Examples of the IPCS command

```
VERBX SVTSIPCS PRINT
```

In this example, the IPCS print engine takes all the CA Vtape defaults and writes a copy of the output to the IPCSPRNT DDNAME. The options in effect are VOLUMES(ALL) and NOLOG.

```
VERBX SVTSIPCS 'LOGONLY(NOACTIVE,DDNAME(LOGR))'
```

In this example, the IPCS print engine generates the output that is based on the external Logger events pointed to by DDNAME LOGR and does not include the typical internal control blocks and Virtual Volumes data.

```
SETD DA('SYS1.P390.DMP00017') NOCONFIRM
VERBX SVTSIPCS 'LOGONLY(ACTIVE,LEVEL(1))' PRINT
```

In this example, the IPCS print engine looks in the dump 'SYS1.P390.DMP00017' for the internal Logger dataspace and formats all events at level 1. A copy of the output is written to the IPCSPRNT DDNAME.

```
SETD ACTIVE NOCONFIRM
VERBX SVTSIPCS 'LOGONLY'
```

In this example, the IPCS print engine writes the output to the SYSTRPRT DDNAME and only formats the data from the active running system's internal Logger dataspace.

```
SETD ACTIVE NOCONFIRM
VERBX SVTSIPCS 'LOG(ACTIVE)'
```

In this example, the IPCS print engine prints the traditional internal control blocks and all Virtual Volume information with data from the internal Logger dataspace. The input is the live system and output is written to the SYSTRPRT DDNAME.

Self-Documenting Error Recovery Routines

When an error is detected in any CA Vtape module, error recovery routines take place by issuing messages like SVT*nx*100E and SVT*nx*200E. This condition generates an SVC dump. The SVC dump is eligible to be suppressed by DAE (Dump Analysis and Elimination) and is generated during the first failure only. These self-documenting error recovery procedures are designed to simplify the error data collection process and ensure that the documentation is appropriately collected. As soon you detect that a dump is generated under these conditions, contact CA Support to report the error and receive the corresponding corrective maintenance.

Note: For online technical assistance and a complete list of locations, primary service hours, and telephone numbers, contact CA Support at http://ca.com/support.

Appendix A: Conversion Procedures

This section contains the following topics:

Migrating to Dynamic Cache Management

CA Vtape provides several tools to convert from Static Cache Management to Dynamic. More than one conversion method is supported because no one strategy is right or wrong for all shops. There are several factors to consider when converting, as in the following examples:

- How much additional DASD space is available? If sufficient DASD space is available, you may consider converting all of the Virtual Volumes in one step. If there is little or no additional DASD space you may need to convert your existing cache volumes in phases.
- How many subsystems are you converting? If there are only a couple of subsystems and a small amount of down time is acceptable, the conversion may be easier to do all at once. Conversely, if there are many subsystems, it may make more sense to slowly roll out the conversion to each subsystem separately.

While these are not the only possible methods, the two basic strategies described for converting are:

- Quick Migration
- Phased Migration

Minimum Requirements - Quick or Phased Migration

Regardless of the conversion method chosen, Quick or Phased, some steps are common to both. These common steps form the minimum requirements that must be considered so that dynamic mode Virtual Volumes are properly allocated and can be mounted by any SVTS subsystem. The common items include the following:

- To run in dynamic mode, all SVTS subsystems sharing the same set of control files must be running at least r11.5 of CA Vtape. Multiple subsystems in a mixed mode environment (where some are dynamic and others are static) must run downward-compatible software. CA Vtape r11.5 prevents you from running incompatible modes. If all SVTS subsystems are running in static mode, a mix of CA Vtape r11 SP01 and CA Vtape r11.5 subsystems is allowed. *Software levels lower than r11 SP01 are not compatible with CA Vtape r11.5 running with Dynamic Cache Management active.*
- Use ISMF to create or review the DFSMS constructs intended for use by CA Vtape (data class, storage class, and storage group are all required). You should create and assign a unique set of constructs for use by CA Vtape in order to avoid confusion.

  A complete description and example of the data class and storage class definitions required for CA Vtape can be found in the section Setting up Dynamic Cache Management.

Important! The data class and storage class attribute definitions must allow the SVTS subsystem to allocate DFSMS managed linear data sets (LDS) that are single striped extended format, (multi-striped data sets will prevent CA Vtape from releasing unused DASD space) that can be allocated as multivolume and that support Space Constraint Relief.

- Check that the DFSMS automated class selection (ACS) rules will properly assign the appropriate DFSMS constructs to the dynamic cache LDSs.

  Note: Assigning available DASD volumes to the dynamic cache storage group to support the conversion of the first SVTS subsystem, rather than converting static cache DASD volumes, will eliminate any conversion impact on the subsystems that continue to run in static mode. These subsystems will continue to have the full static cache available to support their workload until DASD volumes are converted to support the conversion of the second SVTS subsystem to dynamic mode.
- Review the CA Vtape documentation and update the following attributes of the VTPARMS parmlib member of each subsystem sharing the same set of control files (BSDS and Global VCAT):
  - CacheDefaultDataClass='*your cache LDS DataClas*'
  - CacheDefaultStorageClass='*your cache LDS StorClas*'
  - CacheFreeSpaceThreshold=90

- CachePrimary =200
- CacheSecondary=200

Note: If you have more than one CA Vtape subsystem and each has its own set of parmlib members, you must make changes in more than one parmlib member.

- Restart one of your SVTS subsystems. While you have not yet modified the cache management mode (CacheManagement=STATIC), you can still check that the DFSMS constructs you have chosen are properly assigned.

  Use the SVTS DISPLAY CACHE command to check the data and storage class values assigned by DFSMS. This command also displays DASD storage usage and gives you some sense of useable space within the storage class. Remember that class constructs specified in CA Vtape may be inadvertently overridden by the automated class selection (ACS) logic. Check to ensure that the construct values assigned by SVTS are assigned and not somehow overridden.

Quick Migration

The following is assumed for the Quick Migration conversion strategy:

- There is plenty of additional DASD space and that the existing static cache volumes can be kept as is. You will use other DASD volumes for the dynamic cache.
- There are relatively few SVTS subsystems running. If necessary, you accept short periods of down time during which no Virtual Devices are available.
- All the subsystems will be converted at once.
- Because the existing static cache linear data sets will remain available, you can fall back to static mode quickly if necessary. Once you are sure that the Dynamic Cache Management is stable, you can delete the static cache linear data sets and reclaim that space.

Perform a Quick Migration

Quick Migration assumes that relatively few CA Vtape Subsystems are involved and that sufficient additional DASD space is available to create a dynamic cache DASD pool the same size as the static cache DASD pool. This allows all of the subsystems to be converted at the same time.

To perform a Quick Migration

1. If you have more than one CA Vtape Complex, pick one complex to start with.
2. Change the cache management mode to dynamic by setting CacheManagement=DYNAMIC in the Startup Options Section of the CA Vtape Parmlib. If multiple subsystems are active in the chosen complex, check each one to ensure that they are all using the updated Startup Options Section. If they are not, update all of the Startup Options Sections in use.

3. Stop and start all of the updated subsystems. All new scratch mounts will now be written to dynamic LDSs.

   Note: Until Step 6 is completed, mounts of existing Virtual Volumes will be performed in the mode that the volume was originally created in. Virtual Volumes created before changing to dynamic will be read and recalled in the static cache.

4. You can use the SVT*n* Display Parmlib,Short console command to check if each restarted subsystem is running in dynamic mode.

5. Execute the GRRJCL batch utility to ensure that all Virtual Volumes that need to be Externalized are queued for Externalization. Then use SVT*n* Display Group and SVT*n* SET BACKstore console commands to ensure that any queued Virtual Volumes are Externalized.

   Note: If any Virtual Volumes created in static mode cannot be Externalized, take the necessary actions to copy any needed application data sets to DASD or physical tape and scratch the Virtual Volumes.

6. After all static mode Virtual Volumes are Externalized, you can convert them to dynamic mode by executing the SVTSUTIL batch utility with the following command:

   ```
   RESET_CACHETYPE=DYNAMIC
   ```

   Each static Virtual Volume Entry in the Global VCAT will be converted to dynamic. It takes approximately 18 minutes to convert 20,000 active Virtual Volumes when the subsystems are under a light workload. Executing the utility when the subsystems are under a heavy workload will cause delays due to competition for the Global VCAT and BSDS.

   The program will produce an error report for any unconverted Virtual Volumes. These are typically Virtual Volumes that were not Externalized or were active or mounted when the utility was executed.

   Note: You can repeat Steps 5 and 6 as often as necessary in order to convert all of the existing static Virtual Volumes.

7. Execute jobs to test the allocation of new and old Virtual Volumes by the subsystems running in dynamic mode. All Virtual Volumes should be written into dynamic LDSs with a data set name pattern of *prefix*.VVE.V*volser*.MM.CACHE.

8. After you are satisfied that dynamic mode is working properly and you no longer intend to return to static mode, you can reclaim the space assigned to static mode LDSs by executing the SVTSUTIL batch utility with the following command:

   ```
   LDS_DELETE
   ```

   This will delete all static cache LDSs from both DASD and the CA Vtape Global VCAT.

   Note: For more information about the command and its parameters, see the chapter “SVTSUTIL Batch Commands.”

9. Repeat all of the preceding steps for the next complex to be converted.

   All your complexes are converted.

Phased Migration

The following is assumed for the Phased Migration conversion strategy:

- There is very little additional DASD space available and that the same storage volumes used today for static cache need to be reassigned for use as the dynamic cache.
- There are too many SVTS subsystems running concurrently to convert all of them at once. You do not want short periods of down time during which no Virtual Devices are available.
- The intent is to convert individual subsystems one at a time as DASD space and time permit. Some subsystems will be running static while others are running dynamic. If there are problems, you can tolerate a slow migration back to static.

Perform a Phased Migration

Phased Migration assumes that too many CA Vtape Subsystems are involved or that there is insufficient DASD space available to create a dynamic cache DASD pool the same size as the static cache DASD pool.

To perform Phased Migration

1. If you have more than one CA Vtape Complex, pick one complex to start with.
2. Evaluate the subsystems running in this complex to determine how much of the static cache DASD pool will need to be converted to dynamic cache to support the normal daily operations of each subsystem.

   For example, assume 600 GBs of data are written to Virtual Volumes per day in a complex with three subsystems. The first subsystem services 100 GBs, the second subsystem services 200 GBs, and the third subsystem services 300 GBs. 100 GBs/600 GBs (or one sixth of the static cache LDSs) will need to be converted to dynamic cache to support the first subsystem.
3. Execute the GRRJCL batch utility to ensure that all Unexternalized Virtual Volumes are queued for Externalization. Then, use SVT*n* Display Group and SVT*n* SET BACKstore console commands to ensure that any queued Virtual Volumes are Externalized.

   Note: If any Virtual Volumes created in static mode cannot be Externalized, take the necessary actions to copy any needed application data sets to DASD or physical tape and scratch the Virtual Volumes.

   Execute the SVTSUTIL batch utility with the following command:

   LDS_DELETE,RTP=*nnn*%

This will delete the specified percentage of the total static cache LDSs from DASD and from the CA Vtape Global VCAT.

Note: Make sure *nnn*% is set to a percentage appropriate for the subsystem you are converting. From the preceding example, if you are converting cache for the first subsystem, *nnn*% would be set to 16% or one sixth of the total static cache LDSs. The utility will stop automatically when the number of static cache LDSs corresponding to 16% of the total static cache LDSs have been deleted. For the second subsystem in the preceding example, 200 GBs or the remaining 500 GBs of the static cache should be converted, or 40%.

If the static cache DASD volumes are in a DFSMS storage group and the same storage group will be used for the dynamic cache, then the space released is immediately available.

If the DFSMS storage groups are different or the static cache DASD volumes are not managed by DFSMS, then the volumes must be emptied so they can be converted with ISMF to the appropriate DFSMS storage group. In this case it may be more advantageous to execute the SVTSUTIL batch utility with the following command:

`LDS_DELETE,RTP=100%,VOL=(volser1,volser2,…volsern)`

This allows you to concentrate on emptying specific DASD volumes for conversion to DFSMS while releasing the appropriate percentage of the total static cache. Using the preceding example, if the static cache is composed of 2000 LDSs and 16% of these LDSs need to be cleared, DASD volumes with a total of 320 cache LDSs defined on them will need to be emptied.

Note: For more information about the command and its parameters, see the chapter “SVTSUTIL Batch Commands.”

You can execute the utility as often as necessary to clear the appropriate space.

4. If multiple subsystems are active in the complex and they share the same Startup Options Section, use symbolic substitution to create unique Startup Options Sections for each subsystem.

   Note: For examples on how to do this, see the section Parmlib Syntax in the *Configuration Guide*.

5. In the Startup Options Section for the subsystem being converted, change the cache management mode to dynamic by setting CacheManagement=DYNAMIC.

6. Stop and start the subsystem.

7. You can use the SVT*n* Display Parmlib,Short console command to check if the subsystem is running in dynamic mode.

8. Execute jobs to test the allocation of new Virtual Volumes by this subsystem. All Virtual Volumes should be written into dynamic LDSs with a data set name pattern of *prefix.VVE.Vvolser*.MM.CACHE.

   Note: Recalls of old Virtual Volumes that were written in static cache mode will be recalled to the static cache. Recalls of new Virtual volumes written in dynamic cache mode will be recalled to the dynamic cache.

9. Repeat Steps 3 through 9 for the next subsystem to be converted in this complex.

   When you repeat the steps is up to you. You can convert one subsystem and run it in Dynamic Cache Mode for an hour, a day, or a week before moving on to the next subsystem in the complex. Your only consideration is that what was a single large DASD pool, available to support the peak workload of all subsystems in a complex, is now two smaller DASD pools that may not be able to support the peak workload of all subsystems and keep the same number of Virtual Volumes in cache. As a result, you may see an increase in recall activity.

   Note: When less than ten static cache LDSs remain, any subsystems still running in static mode will automatically Recall Externalized static Virtual Volumes into the dynamic cache.

10. After all the subsystems in the complex are running in dynamic mode, you can convert all Virtual Volumes to dynamic mode by executing the SVTSUTIL batch utility with the following command:

    ```
    RESET_CACHETYPE=DYNAMIC
    ```

    Each static Virtual Volume Entry in the Global VCAT will be converted to dynamic. It takes approximately 18 minutes to convert 20,000 active Virtual Volumes when the subsystems are under a light workload. Executing the utility when the subsystems are under a heavy workload will cause delays due to competition for the Global VCAT and BSDS.

    An error report will be produced for any Virtual Volumes that cannot be converted. These are typically Virtual Volumes that were not Externalized or were active or mounted when the utility was executed.

    You can execute the utility as many times as is necessary to complete the conversion.

Return to Static Cache Management Mode

Use the following procedure to revert back to static mode.

To revert back to static mode

1. If you have deleted the static cache LDSs, the recovery jobs, created when SVTSUTIL was executed with the LDS_DELETE command, can be executed to re-create them. These jobs create, initialize, and add back the static cache LDSs.

   Note: If after converting to dynamic cache you also converted to 2000 MB Virtual Volumes, you cannot convert back to 400 or 800 MB Virtual Volumes. This will cause any 2000 MB Virtual Volumes to be lost. Execute the Define option of the CA Vtape ISPF Customization Process to generate a new SUTPARMS member with a Virtual Volume Size of 2000 MB and to generate the DEFLDS*xx* and LDSADD*xx* jobs to define, initialize, and add 200 MB cache LDSs to the Global VCAT.

2. Update the VTPARMS parmlib member to set CacheManagement=STATIC in the Startup Options Section and CacheFreeSpaceThreshold=0 in the Dynamic Options Section.
3. Refresh your parmlib options using the SVTS REFRESH=OPTION command. This enables the parmlib option CacheFreeSpaceThreshold=0 and allows the SVTS subsystem to begin releasing all the dynamic cache space associated with Virtual Volumes that have been Externalized.
4. To convert existing Virtual Volumes from one mode to the other, you must externalize them to physical tape.

   First, run GRRJCL to ensure that all Unexternalized Virtual Volumes are queued for Externalization. Then use the SVT*n* Display Group and SVT*n* SET BACKstore commands to ensure that dynamic Virtual Volumes are queued and being Externalized.
5. Restart the SVTS subsystems.
6. Run SVTSUTIL with the following command:

   ```
   RESET_CACHETYPE=STATIC
   ```

   This will convert the existing dynamic Virtual Volumes to static mode. You may need to do this step more than once if the report shows errors.

Convert the Virtual Volume Size to 2000 MB

CA Vtape supports Virtual Volumes that are 400 MB, 800 MB, or 2000 MB in size. When using CacheManagement=DYNAMIC, 2000 MB Virtual Volumes should be defined to minimize the number of multivolume tape data sets created. Defining 2000 MB Virtual Volumes does not increase DASD space usage because unused DASD space is immediately released when a Virtual Volume is dismounted.

If you have converted all of your SVTS subsystems to dynamic mode, you may want to change your Virtual Volume Size from 400 MB or 800 MB to 2000 MB.

To change your Virtual Volume Size from 400 MB or 800 MB to 2000 MB

1. Run GRRJCL to ensure that all unexternalized Virtual Volumes are queued for externalization. Then use the SVT*n* Display Group and SVT*n* SET BACKstore commands to ensure that the Virtual Volumes are queued and being externalized.
2. Bring down all SVTS subsystems.

3. Execute the Define option of the CA Vtape ISPF Customization Process to generate a new SUTPARMS member with a Virtual Volume Size of 2000 MB.

   Note: Do not run any of the generated jobs.

   Run the DEFVCAT job from HLQ.CCUUJCL(DEFVCAT). This will create and initialize a new Local VCAT. You will need to run this job for each SVTS subsystem, making sure that the SVTPARMS DD statement in the job points to the SVTJCL library used for Step 3.

4. Recover the Global VCAT from the BSDS1 by running SVTSUTIL with the following command:

   `RECOVER=GLOBAL,PREFIX=`*`prefix`*`,DROP_INELIGIBLE`

   Note: Make sure that the SVTPARMS DD statement in this job points to the SVTJCL library used for Step 3.

5. Restart your SVTS subsystems. They should now be able to create 2000 MB Virtual Volumes.

6. Copy the SUTPARMS member from the SVTJCL library to the parmlib.

   Note: If you are running in dynamic mode and you convert your Virtual Volume size to 2000 MB, you can only revert back to a static mode subsystem that supports 2000 MB Virtual Volumes. 2000 MB Virtual volumes cannot be mounted by 400 MB or 800 MB SVTS subsystems.

After the Global VCAT recovery, the number of scratch tapes may increase. This occurs because the recovery will evaluate the status of each Virtual Volume recovered and rebuild the scratch pool with all Virtual Volumes that are in scratch status. The Virtual Volumes which were scratched by the last Scratch Synchronization Job run, but would not be returned to the scratch pool until the next Scratch Synchronization Job run, are being returned early to the pool by the recovery.

Since the Global VCAT recovery was run without the SCRATCH command, the Global VCAT did not scratch additional Virtual Volumes. If the SCRATCH command was accidentally included in the recovery commands, any Virtual Volume scratched by the recovery would be documented with a message in the recovery job output.

Migrate from Basic to Enhanced Filters

To migrate from Basic to Enhanced filters, you must run a conversion utility. Sample JCL can be found in HLQ.CCUUJCL(SVTDSCNV). You must modify this JCL to point to the appropriate parmlib data set and members.

After the conversion utility has been run, you must modify the ParmlibDirectory section of the parmlib. The default member for this section is VTPARMS. After you are in edit mode, you should replace $BASIC in the DatasetFilters attribute in the Parmlib Directory Section with the member name used for the conversion. The default member is VTFILTR. After saving the change, issue the SVT*n* REFRESH=FILTERS console command for each CA Vtape subsystem sharing the updated parmlib to activate Enhanced mode filters.

CA Vtape supports switching from Enhanced mode back to Basic mode, however; changes made to the filters in Enhanced mode are not included in Basic mode. Conversely, any changes made in Basic mode are not automatically included when switching back to Enhanced mode. You must run the filter conversion utility again to convert the Basic mode changes to Enhanced mode.

Expanding and Converting the Control Data Sets

To accommodate more than 510,800 Virtual Volume Entries in the Global VCAT and BSDS, the internal index needs to be modified. The modification involves changing the index from pointing to individual records, to pointing to VSAM Control Intervals which contain sets of records.

The change in indexing occurs when the Global VCAT and BSDS are increased in size and the CONVERT parameter is coded on the EXPAND CDS,VOLUMES= command. This command is executed by the JCL found in HLQ.CCUUJCL(EXPAND).

To index more than 510,800 VOLSERs, Volume Pooling must be active. Volume Pooling is activated by updating the Parmlib Directory Section to uncomment or add the VolumePoolDefinitions=VTPOOLS attribute. The VTPOOLS parmlib member is then updated with the VOLSER ranges currently in use by CA Vtape. If you do not know the VOLSER ranges in use you can customize and execute HLQ.CCUUJCL(GENVOLPL) to create a VTPOOLS parmlib member with the current VOLSER ranges.

The control data sets are currently sized for the specific number of VOLSERs they currently index. To determine how large to allocate the new data sets, use the following formula:

7296 + current VOLSERs + additional VOLSERs = total records

If you currently have 500,000 VOLSERs in the Global VCAT and BSDS and are adding 50,000 more, the total number of records would be 7296 + 500,000 + 50,000 or 557296. The RECORDS parameters in the VSAM LDS DEFINEs in the EXPAND member would need to have their primary allocation amount updated to 557296.

The total records divided by 12 equals the number of 3390 tracks that will be required to hold one of the control data sets. Following the example above, 557296 records would require 557296 / 12 or 46,441 tracks or 3096 cylinders of DASD for each control data set.

To perform the conversion the EXPAND job will dynamically invoke a recovery of the Global VCAT from the BSDS.

To expand and convert the control data sets, follow these steps:

1. Calculate the number of records required for the new control data sets.
2. Find two DASD volumes with enough free space to allocate the new data sets.
3. Customize HLQ.CCUUJCL(EXPAND) by following the comments in the member:
   a. The CONVERT parameter should be added to the EXPAND command.
   b. The Global VCAT DEFINE and the BSDS DEFINE RECORDS parameters should be updated to the calculated total number of records.
   c. Change the Global VCAT DEFINE VOLUME parameter to point to one of the DASD volumes from step2 and the BSDS DEFINE VOLUME parameter to point to the other.
4. Release the Externalization Subgroup Queues to Backstore all Virtual Volumes. This step is only required if you normally Backstore your Virtual Volumes.
5. Stop all the CA Vtape Subsystems that are sharing the Global VCAT and BSDS to be expanded and converted.
6. Execute the EXPAND JCL.
7. Start one if the CA Vtape Subsystem.
8. If you are running with CacheManagement=Static, execute the LDSADDnn jobs you execute for disaster recovery to add the static cache LDSs to CA Vtape.
9. Execute HLQ.CCUUJCL(GRRJCL) to rebuild the Externalization Subgroup Queues. This step is only required if you normally Backstore your Virtual Volumes and did not Externalize all Virtual Volumes prior to stopping the CA Vtape Subsystems.

10. Perform any desired testing:
    a. Browse your Virtual VOLSER ranges with the CA Vtape ISPF Interface (SVTSMON CLIST).
    b. Read an existing Virtual Volume.
    c. Write to a scratch Virtual Volume.
11. Start the remaining CA Vtape Subsystems.

Appendix B: Health Checks

This Appendix describes health checks for CA Vtape. The check owner for all CA Vtape health checks is CA_VTAPE.

VTAPE_TMS_COMPATIBILITY

Description

This check monitors that the tape management system specified by the TapeManagementSystem= attribute and ensures that it can be located and if located that the TMS is at the appropriate maintenance levels. The interval for this check is once each time CA Vtape is started.

Best Practice

The tape management system you employ must be at a level that is supported and recognized by CA Vtape.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

See the section Tape Management System Interface and the description of attribute TapeManagementSystem= in the section DYNAMIC OPTIONS in the *Configuration Guide*.

Messages

SVTH1101E

CA Vtape verification of the defined Tape Management System (TMS) failed. The TMS release level or maintenance level is not compatible with the CA Vtape TMS interface.

VTAPE_CDS_SEPARATION

Description

On different DASD volumes, allocate the Global VCAT, BSDS, and ICF Catalog data sets that CA Vtape uses. Allocate any combination of the data sets on the same volume to create a single point of failure, inhibit disaster recovery, but degrade performance due to contention.

Best Practice

The CA Vtape control data sets are critical system files. Keep these files on high-performance reliable media, such as a RAID-compliant DASD, to improve performance and minimize potential system outages. CA Vtape uses Hardware Reserve processing to serialize access to the Global VCAT. The need to perform volume Hardware Reserve may require you to isolate the Global VCAT on a single DASD volume. To ensure recoverability if the hardware unexpectedly fails, maintain current backups of the BSDS and keep the Global VCAT and BSDS on separate DASD volumes.

Allocating the ICF Catalog that CA Vtape uses or any other ICF catalog on the same DASD volume with the Global VCAT or the BSDS causes contention on the concurrent data set volume. This contention degrades performance and could lead to lock outs when other software products that scan catalogs or VTOCs are active in your environment.

We recommend that you relocate all CA Vtape control data sets to separate, high performance, RAID-compliant DASD volumes. Also allocate the CA Vtape control data sets in separate DASD subsystems. The allocation spreads the workload across separate channels and control units. The allocation maximizes performance, recovery, and availability.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information pertaining to the DASD placement and recovery of CA Vtape control data sets, see the chapters "Operational Considerations" in the *Configuration Guide* and "Recovering CA Vtape" in this guide.

Messages

SVTH1251E

A combination of the CA Vtape control data sets has been allocated on the same DASD volume. This is a single point of failure and could also degrade performance due to contention.

VTAPE_MODULE_CONSISTENCY

Description

The main address space and the sub address spaces are running with the same load modules, but at different maintenance levels. This can occur when:

- Executing the two PROCs with different loadlibs coded in the STEPLIB DD statements.
- One PROC has a STEPLIB DD coded and the other is using a loadlib in the LNKLST.

Maintenance has been applied to the loadlib and a single address space has been restarted instead of the entire CA Vtape subsystem.

Best Practice

Ensure that all CA Vtape address spaces are started with the same maintenance level library. Changing the CA Vtape Split Maintenance-Level Protection to run in AUTOMATIC mode is recommended. Split Maintenance-Level Protection is controlled by the TaskLib attribute in the Startup Options Section of parmlib.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information, see Split Maintenance-Level Protection (see page 39) in this guide and STARTUP OPTIONS in the *Configuration Guide*.

Messages

SVTH1301E

The CA Vtape address spaces are not all running with the same maintenance level.

VTAPE_DATAQ_ALLOCATION

Description

The Data Queue (VDATAQ) environment failed to initialize the VDATAQ data set. VDATAQ data set is a temporary repository for storing messages that cannot be immediately transmitted to a remote CA Vtape subsystem. If the remote is available the message data is transmitted to the remote's VDATAQ and any necessary action is taken. One example of the message traffic is the transmittal of scratch requests for Virtual Volumes that were sent by Peer-To-Peer to the remote subsystem.

Because the VDATAQ data set was not created, any messages still queued for remote transmission will be lost when CA Vtape is terminated.

Best Practice

Review the z/OS System Log for error messages pertaining to the allocation request. The typical problem is a security or SMS change. Correct the error and restart CA Vtape.

If the error cannot be found, search the CA problem reporting databases for a resolution. If you are unable to find a resolution to the error, contact CA Technical Support for assistance.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information about P2P, see the chapter "CA Vtape P2P Option".

Messages

SVTH1401E

CA Vtape Peer-To-Peer VDATAQ items will not be saved across subsystem restarts.

VTAPE_INACTIVE_RECALLSERVER

Description

A Recall has remained unassigned by a Recall Server beyond the RecallServerTimeout attribute value in the CA Vtape Dynamic Options Section in parmlib. The Recall remains queued and not processed and the job initiating the Recall is delayed.

Best Practice

The RecallServerTimeout attribute value determines the number of seconds a subsystem will wait before issuing a critical alert message that a Recall request is not being processed. The value should be set high enough to not issue unnecessary alert messages when a Recall request is delayed due to contention for physical tape drives.

Issue the SVT*n* Display Parmlib,Short console command and review the settings for the RecallServer attribute. The CA Vtape subsystem that should be performing the recalls for all subsystems in the CA Vtape complex should be active and should be running with RecallServer=Server. If the subsystem is not active, start it. If the subsystem is not running with RecallServer=Server, update the attribute in the Dynamic Options or parmlib and issue the SVT*n* REFRESH=OPTIONS console command to pick up the change.

After verifying that a subsystem is running as the Recall Server, check the Display Parmlib output for the setting of the FullMaxdrivesEnforcement attribute. If it is set to Y, issue the SVTS Display Groups console command and check the setting of MAXDRIVES. If MAXDRIVES is set to zero than this subsystem is not allowed to mount tapes to perform recalls. Use the SVT*n* SET MAXDRIVES=*nn* console command to set MAXDRIVES to a nonzero number.

Ensure that tape drives, compatible with the Backstore Physical Tapes used for recalls, are on-line and available on the system where the Recall Server is running.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information about RecallServer=, RecallServerTimeout=, and FullMaxdrivesEnforcement= attributes, see their descriptions in the section DYNAMIC OPTIONS in the *Configuration Guide*.

Messages

SVTH1451E

A Recall queued for a Virtual Volume has not started. Ensure that a Recall Server is active.

VTAPE_PARM_CACHE_MGMT

Description

SVTH4001E CA Vtape is running with Static Cache Management. Static Cache Management is scheduled to be sunset in future releases of CA Vtape.

Dynamic Cache Management provides advanced performance, reduced CPU consumption and the exploitation of new product features in CA Vtape.

Best Practice

Convert to Dynamic Cache Management. If you cannot convert to Dynamic Cache Management due to some site or hardware restriction, contact CA Technical Support.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information about cache management, see the chapter "Cache Management" in the *Configuration Guide*.

Messages

SVTH4001E

CA Vtape is running with Static Cache Management. Static Cache Management is scheduled to be sunset in future releases of CA Vtape.

VTAPE_PARM_RECALL_SERVER

Description

The recommended configuration for the Backstore Engine in a CA Vtape complex is to define one Primary and multiple Failover Servers. The Primary Server processes Externalization and Recall requests on behalf of all CA Vtape subsystems within the same CA Vtape complex. Each Failover Server is configured exactly like the Primary Server, but with its MAXDRIVES set to zero. To trigger failover the SVT*n* SET MAXDRIVES=*nn* console command is used to set MAXDRIVES to a nonzero number.

The definition of a Failover Backstore configuration requires that all CA Vtape subsystems within the CA Vtape Complex share the same Group Definitions (VTGROUP), Externalization and Recall related attributes that are defined in the VTPARMS Dynamic Options section. These attributes are:

CacheAutoHoldLowThreshold	CacheAutomationSchedule
CacheAutoReleaseHighThreshold	CachewarningThreshold
FullMaxdrivesEnforcement*	RecallNotificationEvent
RecallServer**	RecallServerTimeout

* The attribute FullMaxdrivesEnforcement=Y is required.

** The attribute RecallServer=SERVER is required.

To define a Primary Backstore Server you define the following parameter library attributes:

- FullMaxdrivesEnforcement=Y
- RecallServer=SERVER
- MaxDrives=[Greater Than Zero]

To define a Failover Backstore Server you define the following parameter library attributes:

- FullMaxdrivesEnforcement=Y
- RecallServer=SERVER
- MaxDrives=0

In summary, CA Vtape is not configured for Failover Backstore Server operation because the RecallServer attribute does not specify RecallServer=SERVER.

Best Practice

Verify that the current Backstore Engine configuration is defined in accordance with the policies of the intended CA Vtape Complex.

Consider changing the Backstore Engine configuration to the recommended configuration which allows for easy and quick failover with minimal differences in parmlib attribute settings. This makes understanding the configuration and responding to problems simple and straight forward.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information, see the chapter "Operational Considerations" in the *Configuration Guide*.

Messages

SVTH4151E

CA Vtape is not running with the recommended configuration of a Primary Backstore Server and a Failover Backstore Server. The RecallServer attribute in the Dynamic Options section of parmlib is not set to a value of SERVER.

VTAPE_PARM_FULL_MAXDRVS

Description

A CA Vtape complex Backstore Engine configuration can be defined with one Primary and multiple Failover Servers. The Primary Server is defined to process Externalization and Recall requests on behalf of all SVT*n* systems within the same CA Vtape complex. Each Failover Server is configured dormant and poised to take over the functions of the Primary Server in the event the Primary Server becomes non-responsive.

The definition of a Failover Backstore configuration requires that all SVTS subsystems within the CA Vtape Complex share the same Group Definitions (VTGROUP) and Externalization and Recall related attributes defined by the VTPARMS Dynamic Options. The related VTPARMS Dynamic Options are:

CacheAutoHoldLowThreshold	CacheAutomationSchedule
CacheAutoReleaseHighThreshold	CachewarningThreshold
FullMaxdrivesEnforcement*	RecallNotificationEvent
RecallServer**	RecallServerTimeout

* The attribute FullMaxdrivesEnforcement=Y is required.

** The attribute RecallServer=SERVER is required.

To define a Primary Backstore Server you define the following parameter library attributes:

- FullMaxdrivesEnforcement=Y
- RecallServer=SERVER
- MaxDrives=[Greater Than Zero]

To define a Failover Backstore Server you define the following parameter library attributes:

- FullMaxdrivesEnforcement=Y
- RecallServer=SERVER
- MaxDrives=0

In summary, SVT*n* is not configured for Failover Backstore Server operation because the FullMaxdrivesEnforcement attribute specifies FullMaxdrivesEnforcement=N.

Best Practice

The Backstore Engine is not configured for Failover Backstore Server operation. If the current SVT*n* Backstore Engine configuration is intended then ignore this Health Check notification. Verify that the current Backstore Engine configuration is defined in accordance with the policies of the intended CA Vtape Complex.

Consider changing the Backstore Engine configuration for Failover Backstore policies which minimize tape usage and reduce the number of physical tape drive resources required by Backstore Externalization and Recall services.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information pertaining to Backstore Engine configurations, see the chapter "The Backstore Engine" in the *Configuration Guide*.

Messages

SVTH4201E

The VTPARMS Dynamic Options verification check has determined that SVT*n* is not configured to provide Failover Backstore Server services based on the specification of the FullMaxDrivesEnforcement parameter attribute.

VTAPE_PARM_zIIP_STATUS

Description

IBM zIIP specialty processors are installed and available for use yet CA Vtape is not currently configured to take advantage of these specialty processors.

Best Practice

Investigate and evaluate the use of zIIP specialty processors for CA Vtape. The use of zIIP specialty processors by CA Vtape increase performance and lower general processor usage.

The CA Vtape use of zIIP specialty processors is controlled by the zIIPExploitation and PercentRunOnZIIP attributes defined in the respective Startup Options and Dynamic Options Sections of the CA Vtape parmlib.

To enable CA Vtape exploitation of zIIP specialty processors, specify the zIIPExploitation attribute as zIIPExploitation=Y, and set the PercentRunOnzIIP attribute to a value greater than 0.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information, see the chapters "Operational Considerations" and "The Parameter Library (PARMLIB)" in the *Configuration Guide*.

Messages

SVTH4501I

CA Vtape is not configured to take advantage of the IBM zIIP specialty processors available on this system.

VTAPE_PARM_zIIP_CONFLICT

Description

The zIIPExploitation attribute indicates that SVTS uses the zIIP specialty processors to process virtual I/O activity. However, the PercentRunOnzIIP attribute indicates that no work is scheduled on those processors.

Best Practice

The use of zIIP specialty processors in a CA Vtape environment offers superior performance advantages over non-zIIP processor configurations. Evaluate the zIIPExploitation and PercentRunOnzIIP attributes defined in the respective Startup Options and Dynamic Options sections of the respective CA Vtape parmlib. Change the attributes to enable CA Vtape exploitation of zIIP if a zIIP specialty processor is installed.

To enable CA Vtape exploitation of zIIP, specify the zIIPExploitation attribute as zIIPExploitation=Y, set the PercentRunOnzIIP attribute to a value greater than 0, and restart CA Vtape.

To disable CA Vtape exploitation of zIIP, specify the attribute as zIIPExploitation=N and restart CA Vtape.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information, see the chapters "Operational Considerations" and "The Parameter Library (PARMLIB)" in the *Configuration Guide*.

Messages

SVTH4601I

CA Vtape has detected an inconsistency between the settings of the zIIPExploitation and the PercentRunOnzIIP attributes.

VTAPE_PARM_TAPE_MGMT_SYSTEM

Description

When TapeManagementSystem=AUTOMATIC is specified, CA Vtape can dynamically determine the Tape Management Subsystem Interface.

Best Practice

By specifying TapeManagementSystem=AUTOMATIC, CA Vtape will be able to dynamically detect the CA 1 or CA TLMS Tape Management Subsystem Interface.

Parameters Accepted

None

Debug Support

Yes

Verbose Support

Yes

Reference

For more information, see the description of the TapeManagmentSystem= attribute in the section DYNAMIC OPTIONS in the *Configuration Guide*.

Messages

SVTH4651E

The VTPARMS Dynamic Options verification check has detected the presence of a CA 1 or CA TLMS Tape Management Subsystem, however the parmlib TapeManagementSystem attribute is defined as NONE. The recommended value for this attribute is AUTOMATIC.

Glossary

A/N

A/N is the abbreviation for alphanumeric.

Automated Class Selection (ACS)

Automated Class Selection (ACS) routine is a procedural set of ACS language statements. Based on a set of input variables, the ACS language statements generate the predefined SMS class name or a list of predefined storage groups names for a data set.

Backstore

Backstore is the process of copying Virtual Volumes in the DASD buffer and stacking them on physical media. Also known as Externalization. Used as a synonym for the physical media where Virtual Volumes are stacked.

Backstore Engine

Backstore Engine is another name for the SVTSAS.SVTnPT address space that controls the physical media processes like stacking Virtual Volumes on physical media or Recalling a Virtual Volume from physical media.

Backstore Entries

Backstore Entries are the ICF catalog entries that document the Virtual Volumes stacked on physical tape. These catalog entries are used by CA Vtape to find the physical tape location of a Virtual Volume to perform a Recall. The Virtual Volumes stacked on the physical tapes are cataloged using the high-level qualifier or DSN prefix defined for use by CA Vtape during customization. These cataloged DSNs take the form of PREFIX.VVE.V*volser*.PRIMARY and PREFIX.VVE.V*volser*.DUBLEX where *volser* is the virtual VOLSER.

Backstore group

See glossary item group.

Bootstrap Data Set (BSDS)

Bootstrap Data Set (BSDS) is the backup or mirror data set for the Global VCAT, but does not contain DASD buffer information. You can recover the Global VCAT from the BSDS and also conversely.

CA Graphical Management Interface (CA GMI)

CA Graphical Management Interface (CA GMI) is the graphical management interface product that allows you to view and manage mainframe activity from a Windows PC. It consists of the CA Vantage Windows Client user-interface (referred to as the Windows Client), and the CA Vantage Web Client user-interface (referred to as the Web Client). Both of which interface with a z/OS server component to allow access to basic z/OS server functions. *CA GMI* is included free of charge with many CA products, including CA Vtape.

CA License Management Program (LMP)

The *CA License Management Program (CA LMP)* provides a standardized and automated approach to the tracking of licensed software. CA LMP uses common real-time enforcement software to validate the user configuration.

cache

Cache is another name for the DASD buffer pool of disk packs on which the VSAM linear data sets (LDSs) are defined that contain the data written to Virtual Volumes.

cell pool

Cell pool is an area of virtual storage that is subdivided into fixed-size storage areas named cells. CA Vtape uses cell pools to document lists of available resources (such as free LDSs and scratch Virtual Volumes), commands for execution, and Recalls in progress.

Channel Command Word

Channel Command Word (CCW) is the detailed instructions that are used to read and write data on a device that is attached to the mainframe.

Channel Path ID (CHPID)

A valid online *Channel Path ID (CHPID)* is required for the Virtual Devices. At startup, CA Vtape automatically selects the CHPIDs for the volume on which the data set referred to with the BSDS1 DD card is allocated. You can override by coding //CHPID DD in the SVTS PROC to point to a different device or by utilizing the ChpidDeviceList attribute of parmlib.

Complex, CA Vtape

A CA Vtape *Complex* is one or more CA Vtape subsystems running on one or more LPARs that share the CA Vtape Global VCAT and BSDS.

Control Data Sets (CDS)

CA Vtape uses a set of files or *control data sets (CDS)* to record system and configuration information. The CA Vtape control data sets consist of the Local VCAT, Global VCAT, and BSDS. CA Vtape control data sets should be considered critical system files. For more information see the chapter "Control and Cache Data Sets" in the *Configuration Guide*.

DASD buffer

DASD buffer is the pool of disk packs on which the VSAM linear data sets (LDSs) are defined that are used as work areas for data written to Virtual Volumes. Also known as cache.

Data Set Name (DSN)

Data Set Name (DSN) is the name of a data set.

Data-In-Virtual (DIV)

Data-In-Virtual (DIV) is a technique for holding data from linear data sets in memory to improve access performance.

Data-In-Virtual Entry (DVE)

Data-In-Virtual Entry (DVE) is a 4 MB virtual storage segment that CA Vtape uses when partitioning an LDS. This is the standard unit of data transfer between the Virtual Device dataspace and an LDS. Multiple DVEs are chained when writing to physical tape. The number of DVEs used determines the size of the Virtual Volume reported in the ISPF Interface and for reports.

dataspace

Dataspace is the area of storage that is defined for high-speed data storage and retrieval. The use of dataspaces allows the application to process as though it has much more central storage than it actually does. Data is considered mapped into a data space. Data-In-Virtual (DIV) is used to store and retrieve data. Dataspaces are used for each virtual drive and for the Global and Local VCAT data.

Deadly Embrace

Deadly Embrace is:

- A condition where a transaction cannot proceed. The transaction depends on exclusive resources that another transactions locked, which also depend on exclusive resources locked by the original transaction.
- Unresolved contention for resource use.

duplex tape

Duplexing provides a second copy of the data sets processed for a group. This provides 100 percent redundancy for media and Disaster Recovery.

Eligible Device List (EDL)

Eligible Device List (EDL) is the list of eligible devices.

exclude filter

Exclude filter refers to a Data Set Filter List entry that indicates CA Vtape should not intercept a tape mount done for a Data Set Name matching this entry. An exclude works only if the DSN matched also matches an include entry for the same group. Data classes do not have exclude entries because patterning is not allowed for Data Class includes.

export tape

Export tape refers to a physical tape containing an uncataloged, native format copy of the data sets written to a Virtual Volume. This tape is created during Externalization and can be read without CA Vtape being active.

Externalization

Externalization is the process of copying Virtual Volumes in the DASD buffer to physical tape. Also known as backstoring.

Externalization group

For an explanation of *Externalization group*, see glossary item group.

Failover Server

A *Failover Server* is a CA Vtape Subsystem configured as a Recall and Backstore Server that is not currently active because FullMaxdrivesEnforcement is set to 'Y' and Maxdrives is set to '0'. Failover to this server is activated by issuing the SVT*n* SET MAXDRIVES=*nn* console command where *nn* is a value other than zero which would allow this server to allocate physical tape drives.

filter list

A *filter list* is a list of Data Set Names or patterns or Data Classes for which CA Vtape should or should not intercept a tape mount. Each filter list entry is assigned to a group number whose attributes can control how CA Vtape Externalizes the matching data set and how it is written to the DASD buffer.

free cell pool

A *free cell pool* is the cell pool containing the DASD buffer LDSs that are not currently assigned to a Virtual Volume. It is these LDSs that will be picked first to support a virtual scratch mount or a Recall request. This only applies when CacheManagement=Static is set or during the conversion from Static to Dynamic.

Free Queue

Free Queue is the list of Virtual Volumes, in last-used order, that have been Externalized and can be removed from cache to free DASD space.

Global VCAT

Global VCAT refers to the Global Volume Catalog. VSAM Linear Data Set containing information about resources shared by multiple CA Vtape Subsystems active on one or more LPARs. Shared resources are the Virtual Volumes, the DASD buffer or cache, and the Externalization Subgroup Queues.

group

A *group* is a set of attributes that controls how Virtual Volumes are copied to physical media and how they are written to the DASD buffer. Each filter list entry is assigned to a *group*. *Groups* allow Virtual Volumes to be collected or separated based on site management requirements.

Group Request Record (GRR)

Group Request Record (GRR) is an element or control block in a subgroup queue that documents the need to Externalize or stack a Virtual Volume onto physical tape.

Hardware Configuration and Definition (HCD)

The Virtual Devices are defined to the operating system as a part of the CA Vtape installation. IBM's *Hardware Configuration and Definition (HCD)* software is used to create the definitions. These are software, not hardware, definitions that require only an HCD activation to use. An IPL is not necessary.
For more information, see the section "Define Virtual Devices Using IBM's Hardware Configuration and Definition (HCD) Dialogs" in the *Configuration Guide*.

High-Level Qualifier (HLQ)

High-Level Qualifier (HLQ) refers to the SMP/E installation data sets.

HIPER

HIPER is a SMP/E term that stands for Highly Pervasive problem.

Improved Data Recording Capability (IDRC)

Improved Data Recording Capability (IDRC) refers to the IBM hardware-based data compression option.
Virtual Volume compression lets you simulate *Improved Data Recording Capability (IDRC)* in CA Vtape Virtual Volumes by compressing the data as soon as the Virtual Device Engine receives it from the application.

include filter

Include filter refers to a Data Set Name or pattern, or Data Class Filter List entry that indicates CA Vtape should intercept a tape mount done with a matching Data Set Name or Data Class.

ISPF Customization

After SMP/E installation, *ISPF customization* refers to the panel-driven process of creating the JCL to define the Global VCAT and BSDS, and, if static cache management is selected, format the DASD buffer (define and initialize the LDSs).

Linear Data Sets (LDS)

Linear Data Sets (LDS) is a VSAM data set defined with standard IDCAMS control statements. LDSs are used for the Global VCAT, BSDS, Local VCAT, and the DASD buffer or cache. When CacheManagement=Static is in effect, the DASD buffer LDSs are sized to contain 10 percent of the capacity of a Virtual Volume. If the Virtual Volumes are defined as 400 MBs, the internal capacity of an LDS is 40 MBs. If the Virtual Volumes are defined as 800 MBs, the internal capacity of an LDS is 80 MBs. If the Virtual Volumes are defined as 2000 MBs, the internal capacity of an LDS is 200 MBs. LDSs are defined with a generated name of PREFIX.VVE.LDSnnnnn where nnnnn is a number from 00000 to 65534, depending on the number of LDSs required for the DASD buffer size chosen during the customization process. When CacheManagement=Dynamic is in effect, one LDS contains a single Virtual Volume. That LDS is defined with a generated name of PREFIX.VVE.V*volser*.MM.CACHE where *volser* is the Virtual VOLSER.

Local VCAT

Local VCAT refers to the Local Volume Catalog. VSAM Linear Data Set initialized with the SUTPARMS member. Each CA Vtape Subsystem has its own, unique Local VCAT into which parmlib attributes are loaded at startup and that is used as a work file by the running subsystem.

Physical Tape Unit (PTU)

Physical Tape Unit (PTU) refers to a PTU control block. PTUs are attached to the Backstore Engine during Externalization to, or Recall from, physical media.

PREFIX

PREFIX refers to the CA Vtape DSN Prefix. This is the data set prefix used for generating the data set names for various CA Vtape data sets such as the DASD Buffer LDSs and the Backstore Physical Tapes.

Program Temporary Fix (PTF)

Program Temporary Fix (PTF) is an IBM-sanctioned patch, often implemented using ZAP or SUPERZAP.

Program Temporary Fix in Error (PE)

Program Temporary Fix in Error (PE) is a SMP/E term.

PRP

PRP is a SMP/E term that stands for PTF Resolving PTF in error.

Reclaim

Reclaim is a batch utility that reviews the assignment of all the static LDSs that make up the DASD buffer and returns any orphans to the free cell pool for reuse.

RECYCLE

RECYCLE is a batch utility that reads fragmented Backstore physical tapes and consolidates them to scratch physical tapes. This utility can also repair damaged Backstore physical tapes or create a primary or duplex copy of an existing Backstore physical tape.

Scratch synchronization

Scratch synchronization is the process by which CA Vtape is informed which Virtual Volumes that the tape management system scratched.

Service Request Block (SRB)

The Virtualization Engine for CA Vtape is designed to run in *Service Request Block (SRB)* mode, a prerequisite of zIIP processing.
For more information, see the section "Exploitation of the zIIP Specialty Processor" in the *Configuration Guide*.

Small Product Enhancement (SPE)

Small Product Enhancement (SPE) is a SMP/E term.

Subgroup

Subgroup is one of the three subsets of a Group determined by retention periods defined in the Group. They are called Short, Medium, and Long. The purpose of the subgroups is to group Virtual Volumes by expiration date on the Backstore tapes to reduce fragmentation.

Subgroup Queues

When a Virtual Volume is created or modified, a Group Request Record (GRR) is built to document the need to Externalize or stack the Virtual Volume onto physical tape. The GRR is placed in a queue with other GRRs for the same group and subgroup. These queues are collectively referred to as the *subgroup queues*.

Subsystem, CA Vtape

A CA Vtape *subsystem* is a single set of CA Vtape started tasks running on an LPAR. A CA Vtape *subsystem* can be part of a CA Vtape complex that shares a Global VCAT or BSDS with other CA Vtape *subsystems.* The subsystem can also make up its own, stand-alone complex. The started tasks that make up a CA Vtape *subsystem* are, by default, named SVTS, SVTSAS.SVT*n*PT, SVTSAS.SVT*n*UT, and *SVTSAS.SVTn*V*m* where *n* is the subsystem number and *m* is a number from 1 to 8.

SVTJCL library

SVTJCL library is a work data set into which the customization panels generate the necessary JCL members to define the global or shared resources. Resources include the Global VCAT, BSDS, and DASD Buffer LDSs.

System Management Facility (SMF)

System Management Facility (SMF) is a component of IBM z/OS. SMF provides a standardized method for writing out records of activity to a file (or data set). SMF provides full instrumentation of baseline activities that are running on z/OS, including: I/O, network activity, software usage, error conditions, processor utilization, and so on.

Task Control Block (TCB)

A Task Control Block (TCB) is a data structure in the operating system kernel containing the information to manage a particular process.

Unit Control Block (UCB)

Unit Control Block (UCB) is a control block in storage that describes the characteristics of a particular I/O device on the operating system.

VDATAQ

VDATAQ, or data queue, is a temporary repository for putting messages that cannot be immediately transmitted to a remote. Once the requestor has put the message data into the *VDATAQ* data space, the requestor is free to continue without concern of data delivery. If the remote is available the message data is transmitted to the remote's *VDATAQ* data space. Once there, we have exits that get control to operate on the message data.

Version Release and Modification (VRM)

CA Vtape implemented the *Version Release and Modification (VRM)* level concept prior to Release 11.5. The VRM is used to prevent incompatible software levels between subsystems sharing the same control data sets from running at the same time. As each CA Vtape subsystem is started, it compares its VRM to that of the Global VCAT to determine if it is safe to continue the start-up. If the VRM levels are incompatible, the subsystem shuts down.

- VRM=0 is 400 or 800 MB Virtual Volumes running with Static Cache Management.
- VRM=1 is 2000 MB Virtual Volumes running with Static Cache Management.
- VRM=2 is any size Virtual Volume running with Dynamic Cache Management.
- VRM=3 is Dynamic Cache Management with Virtual Volume Pools.
- VRM=4 is the LZ78 compression algorithm.

Virtual Device Engine

Virtual Device Engine is another name for the SVTSAS.SVT*n*V*n* subaddress spaces that control the Virtual Devices.

Virtual Devices

Virtual Devices are the virtual tape drives.

Virtual Storage Access Method (VSAM)

Virtual Storage Access Method (VSAM) is an access method for disk files that offers various techniques to access data. Data access includes: sequential, keyed, indexed, and relative record. Some of these techniques support special media access including data compression, caching, and data striping.

Virtual Tape System (VTS)

CA Vtape is installed into an address space and is often known as a *Virtual Tape System (VTS)*.

Virtual Tape Unit (VTU)

A *Virtual Tape Unit (VTU)* is a control block. VTUs are attached when a z/OS command varies Virtual Devices online. They are detached when varied offline. They are attached to the SVTSAS.SVT*n*V*n* subaddress spaces.

Virtual Volume Entry (VVE)

A *Virtual Volume Entry (VVE)* is a control block. Documents a single Virtual Volume. Each VVE uses 4 KBs of space in the Global VCAT.

Virtual Volume Pool (VVP)

A *Virtual Volume Pool (VVP)* is a control block that documents a consecutive series of 100 Virtual Volumes. Example volumes include: 000000-000099, 000100-000199, and so on.

Volume Catalog (VCAT)

Volume Catalog (VCAT) is:

- An LDS used by one or more CA Vtape subsystems to contain control information or temporary data. See glossary items Global VCAT and Local VCAT.
- A DD in the SVTS PROC or utility JCL for the Local VCAT.

Volume Mount Analyzer (VMA)

Refers to the IBM *Volume Mount Analyzer (VMA)*.

write-protected

Write-protected refers to a Virtual Volume or Virtual Volume pool that has been placed in read-only status in CA Vtape.

Index

A

B

C

D

E

F

G

H

I

J

L

M

O

P

Q

R

S

T

U

V

W

X