

z/OS



# DFSMShsm Storage Administration Reference



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**Note**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 653.

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This edition applies to Version 1 Release 7 of z/OS® (5694-A01), Version 1 Release 7 of z/OS.e (5655-G52), and to all subsequent releases and modifications until otherwise indicated in new editions.

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## About This Document

This document describes the DFSMShsm™ commands used by the system programmer, storage administrator, and operator. It also contains four appendixes to help you use DFSMShsm commands and interpret DFSMShsm reports. It contains information about command syntax and parameters, command coding examples, and how to use certain commands.

For information about the accessibility features of z/OS®, for users who have a physical disability, see Appendix E, “Accessibility,” on page 651.

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## Major Divisions of This Document

DFSMShsm commands are arranged in alphabetical order. The following four appendixes provide additional information:

- Appendix A, “Using the AUDIT Command,” on page 501, describes what happens when you issue the AUDIT command with any one of its parameters. This appendix describes the type of checking that is done and which error conditions can be detected by each AUDIT parameter. For most of these reported error conditions, the AUDIT function is able to determine the repair actions.
- Appendix B, “Using the LIST Command,” on page 585, describes what happens when you issue the LIST command with any one of its parameters. This appendix explains what the output headings mean for each parameter you specify with the LIST command. It also gives examples of the output for each parameter you specify.
- Appendix C, “Using the QUERY Command,” on page 629, shows the messages you receive when you issue the QUERY command with any one of its parameters.
- Appendix D, “Using the REPORT Command,” on page 637, describes what happens when you issue the REPORT command with any one of its parameters. It also gives examples of a daily statistics report and a volume statistics report.

This document also contains a glossary and an index.

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## Required product knowledge

Readers of this publication should have a systems background, especially concerning TSO/E commands. The system programmer and storage administrator must understand the basic concepts of DFSMS before they read this document.

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## Referenced documents

The following publications have additional information about DFSMShsm:

Publication Title	Order Number
<i>z/OS DFSMS Access Method Services for Catalogs</i>	SC26-7394
<i>z/OS DFSMS Installation Exits</i>	SC26-7396
<i>z/OS DFSMSdfp Storage Administration Reference</i>	SC26-7402
<i>z/OS DFSMSdss Storage Administration Reference</i>	SC35-0424
<i>z/OS DFSMShsm Implementation and Customization Guide</i>	SC35-0418

Publication Title	Order Number
<i>z/OS DFSMShsm Managing Your Own Data</i>	SC35-0420
<i>z/OS DFSMShsm Storage Administration Guide</i>	SC35-0421
<i>z/OS DFSMSrmm Implementation and Customization Guide</i>	SC26-7405
<i>z/OS MVS Initialization and Tuning Guide</i>	SA22-7591
<i>z/OS Security Server RACF Security Administrator's Guide</i>	SA22-7683
<i>z/OS TSO/E Customization</i>	SA22-7783
<i>z/OS TSO/E REXX Reference</i>	SA22-7790

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## Accessing z/OS DFSMS documents on the Internet

In addition to making softcopy documents available on CD-ROM, IBM provides access to unlicensed z/OS softcopy documents on the Internet. To view, search, and print z/OS documents, go to the z/OS Internet Library:

[www.ibm.com/servers/eserver/zseries/zos/bkserv/](http://www.ibm.com/servers/eserver/zseries/zos/bkserv/)

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## Using LookAt to look up message explanations

LookAt is an online facility that lets you look up explanations for most of the IBM® messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can use LookAt from the following locations to find IBM message explanations for z/OS elements and features, z/VM®, and VSE:

- The Internet. You can access IBM message explanations directly from the LookAt Web site at <http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/>.
- Your z/OS TSO/E host system. You can install code on your z/OS or z/OS.e systems to access IBM message explanations, using LookAt from a TSO/E command line (for example, TSO/E prompt, ISPF, or z/OS UNIX® System Services running OMVS).
- Your Windows® workstation. You can install code to access IBM message explanations on the *z/OS Collection* (SK3T-4269), using LookAt from a Windows DOS command line.
- Your wireless handheld device. You can use the LookAt Mobile Edition with a handheld device that has wireless access and an Internet browser (for example, Internet Explorer for Pocket PCs, Blazer, or Eudora for Palm OS, or Opera for Linux handheld devices). Link to the LookAt Mobile Edition from the LookAt Web site.

You can obtain code to install LookAt on your host system or Windows workstation from a disk on your *z/OS Collection* (SK3T-4269), or from the LookAt Web site (click **Download**, and select the platform, release, collection, and location that suit your needs). More information is available in the LOOKAT.ME files available during the download process.

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## Summary of Changes

This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

You may notice changes in the style and structure of some content in this document—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

This document has been enabled for the following z/OS Library Center advanced searches: commands and examples.

---

## Summary of Changes for SC35-0422-04 z/OS Version 1 Release 7

This document contains information previously presented in *z/OS Version 1 Release 6 DFSMSHsm Storage Administration Reference* (SC35-0422-03).

The following sections summarize the changes to that information.

### New Information

This edition includes the following new information:

- **Using large format data sets**

DFSMSHsm supports the processing of large format sequential data sets. For more information about large format data sets, see *z/OS DFSMS Using Data Sets*, SC26-7410.

- **Using a DFSMSHsm journal larger than 65,535 tracks**

DFSMSHsm supports the use of a large format data set for the journal. A larger journal data set can allow more DFSMSHsm activity to take place between journal backups and helps to reduce journal full conditions.

DFSMSHsm continues to require that the journal be allocated as a single volume, single extent data set with contiguous space.

- **Using extended tape table of contents (TTOCs)**

To make better use of new high capacity tape volumes, you can specify the use of extended TTOCs at your installation. With this change, DFSMSHsm can write more than *one million* data sets to a migration tape or backup tape. In previous releases, this number was limited to 330,000 data sets per volume.

- **Using simplified recycle criteria for connected sets**

To allow connected sets to be recycled sooner, and free up more volumes to scratch or tape pools, you can specify that the first volume of a connected set need not meet the PERCENTVALID requirement, as long as the average for the connected set meets the requirement. In previous releases, DFSMSHsm required the first volume in the connected set to meet the percent valid criterion before determining the connected set's average percentage of valid data.

- **Improvements in fast subsequent migration processing**

To increase the number of migrated data sets eligible for fast subsequent migration, this function is changed to use new indicators for reconnection

eligibility. This more robust indication of reconnection eligibility can increase your use of fast subsequent migration in two ways. First, the new indication allows you to use fast subsequent migration even if you use a product other than DFMSHsm to back up your data sets. Second, it allows DFMSHsm to reconnect to data sets originally migrated to ML2 tape without a valid backup copy, such as Tape Mount Management data.

- **Determining LRECL and DS Empty status**

For easier analysis of migrated data sets, you can determine the logical record length (LRECL) of a data set that has been migrated and the data set is empty. The LRECL and an 'empty data set' flag are now recorded in the MCD record for a migrated data set. In previous releases, you needed to recall a migrated data set to learn this information.

You can also use the IDCAMS DCOLLECT function to display this information when specifying the MIGRATEDDATA option.

## New Commands and Parameters

- **The SETSYS command**
  - EXTENDEDTTOC is a new optional parameter.
- **The RECYCLE command**
  - CHECKFIRST is a new optional parameter.
- **The LIST command**
  - EMPTY is a new optional parameter.

---

## Summary of Changes for SC35-0422-03 z/OS Version 1 Release 6

This document contains information previously presented in *z/OS Version 1 Release 5 DFMSHsm Storage Administration Reference* (SC35-0422-02).

The following sections summarize the changes to that information.

## New Information

This edition includes information for the following new functions:

- **Multiple tasks for DFMSHsm secondary space management:** This enhancement allows secondary space management functions to process in multiple tasks.
- **Support for IBM TotalStorage Enterprise Tape System 3592:** DFMSHsm writes to 97% of the capacity of new media types MEDIA6, MEDIA7 and MEDIA8 unless otherwise specified by the installation. To specify another percentage, use the SETSYS TAPEUTILIZATION command, which is described in this book.

*z/OS DFMSHsm Storage Administration Reference Summary* is no longer available as a separate document. The summary information has been added to this book.

## New Commands and Parameters

- **The SETSYS command**
  - MAXSSMTASKS is a new optional parameter. TAPEMOVEMENT and CLEANUP are optional subparameters of MAXSSMTASKS.
  - To aid in the processing of deletes initiated by secondary space management, DFMSHsm has increased the default value for MAXRECALLTASKS from 5 to 15 tasks.

---

## Summary of Changes for SC35-0422-02 z/OS Version 1 Release 5

This document contains information previously presented in *z/OS Version 1 Release 3 DFSMShsm Storage Administration Reference* (SC35-0422-01).

The following sections summarize the changes to that information.

### New Information

This edition includes information for the following new functions:

- **Fast Replication:** DFSMS has enhanced its use of volume-level fast replication to create backup versions for sets of storage groups. A set of storage groups is defined through a new SMS construct termed 'copy pool'. The new DFSMShsm FRBACKUP command creates a fast replication backup version for each volume in every storage group defined within a copy pool. Volumes that have a fast replication backup version can be recovered either individually or at the copy pool level with the new DFSMShsm FRRECOV command. This function enables the backup and recovery of a large set of volumes to occur within a small time frame. The term fast replication refers to the FlashCopy® function supported by IBM TotalStorage® Enterprise Storage Server® (ESS) disk and the SnapShot function supported by IBM RAMAC® Virtual Array (RVA) disk.
- **DFSMShsm RACP® FACILITY class:** DFSMShsm now uses the RACF FACILITY class to control access to storage administrator commands and user commands. This allows a security administrator to identify which storage administrators can perform which tasks. It also allows control of which actions users can perform.
- **DFSMShsm Migration Installation Exits:** ARCMDEXT and ARCMMEXT installation exits are now invoked during data set migration processing, in addition to volume migration processing.
- **3590 Model H1x:** The 3590 Model H1x software support provides customers with the following benefits:
  - A significant improvement in storage capacity through 384-track recording on the Model H, up from 256-track recording on the Model E1x. This reduces the amount of floor space needed for tape storage devices. Installations are thus able to cut the costs associated with tape storage and management.
  - Customers can now record 60 to 90 GB of compressed data on standard-length media and 30 GB of uncompressed data. They can record 120 to 180 GB of compressed data on extended-length media and 60 GB of uncompressed data.
  - Supports both standard- and extended-length 3590 media that are currently in use by Model B1x and Model E1x drives. This reduces storage costs by allowing installations to reuse media that they already own.
  - Emulates 3490E storage devices. This allows customers to add 3590 Model H1x devices to third-party libraries.
  - Permits the rewriting of a tape cartridge from the beginning, regardless of the format—128-track or 256-track—that had previously been written on the cartridge. The 3590 Model H1x is downwardly read compatible with tapes written by 3590 Model B1x and 3590 Model E1x. This reduces storage costs by allowing installations to reuse media that they already own.
  - Reports any previously recorded volume serial number in any interchange-and-overwrite scenario among any of the 3590 Models: B, E, or H. This allows installations to keep volume traceability records.
- **3592 Model J1A:** The IBM TotalStorage Tape System 3592 consists of the IBM TotalStorage Enterprise Tape Drive 3592 Model J1A drive and the IBM

TotalStorage Enterprise Tape Controller 3592 Model J70 controller. The 3592 Model J tape drive uses the newly introduced EFMT1 recording technology to write to the newly introduced MEDIA5 tape cartridges.

The 3592 Model J tape drives offer these features.

- The 3592 Model J optionally provides tape scaling for performance using only the first 60 GB of physical tape. The default is to use the full 300 GB of physical tape.
- The 3592 Model J reads and writes EFMT1 (enterprise format 1) recording technology.
- The 3592 Model J uses the Enterprise Tape Cartridge (MEDIA5) physical media providing 300 GB of uncompressed capacity and 900 GB (assuming a 3:1 compression ratio) of compressed capacity depending on the type of data written.
- The 3592 Model J emulates 3590 Model B1A tape drives or 3490E tape drives.
- The 3592 Model J coexists with 3490E and 3590 devices in the 3494 automated tape library.

The 3592 Model J coexists with 3490, 3490E, and 3590 devices in a manual tape library. The 3592 Model J tape drive is always in emulation mode, either as a 3590-1 device or as a 3490E device. The 3592 Model J cannot use the MEDIA3 and MEDIA4 cartridges used in 3590 tape drives , nor the MEDIA1 and MEDIA2 cartridges used in 3490 tape drives.

## New Commands and Parameters

- **The new FRBACKUP command**
  - COPYPOOL is a required parameter.
  - EXECUTE | PREPARE | WITHDRAW are mutually exclusive, optional parameters.
- **The new FRDELETE command**
  - COPYPOOL is a required parameter.
  - ALL | TOKEN | VERSIONS are mutually exclusive, required parameters.
- **The new FRRECOV command**
  - TOVOLUME | COPYPOOL are mutually exclusive, required parameters.
  - GENERATION | VERSION | DATE | TOKEN are mutually exclusive, optional parameters.
- **The existing HOLD command**
  - FRBACKUP is a new optional parameter.
  - FRRECOV is a new optional parameter.
- **The existing LIST command**
  - COPYPOOL | COPYPOOLBACKUPSTORAGEGROUP are new mutually exclusive, required parameters.
- **The existing QUERY command**
  - SECURITY is a new optional parameter.
  - COPYPOOL is a new optional parameter.
- **The existing RELEASE command**
  - FRBACKUP is a new optional parameter.
  - FRRECOV is a new optional parameter.
- **The existing SETSYS command**

- MAXCOPYPOOLTASKS (FRBACKUP | FRRECOV | DSS) is a new optional parameter.

---

## Summary of Changes for SC35-0422-01 z/OS Version 1 Release 3

This document contains information previously presented in *z/OS Version 1 Release 1 DFMSHsm Storage Administration Reference* (SC35-0422-00).

The following sections summarize the changes to that information.

### New Information

This edition includes information for the following new functions:

- **Common Recall Queue:** DFMSHsm supports an HSMplex-wide common recall queue (CRQ). This CRQ balances recall workload across the HSMplex. This queue is implemented through the use of a coupling facility (CF) list structure.
- **Capacity Utilization and Performance Enhancements:** DFMSHsm is able to more fully utilize available physical tape media. Tapes on a CAPACITYMODE switchable IBM 3590 emulating an IBM 3490 tape unit can either be filled to their full capacity, or stop at a point compatible with an IBM 3590 emulating an IBM 3490 tape unit that is not CAPACITYMODE switchable.
- **Large Volume Support:** S/390® has greater hardware and software exploitation, resulting in less system constraint. To accommodate large volumes, output field lengths have changed for the following:

#### LIST BACKUPVOLUME

increases field length of TOTAL TRACKS and FREE TRACKS

#### LIST DATASETNAME SUMMARY

increases field length of MIGRATED DATA SETS, TRACKS MIGRATED, and K-BYTES MIGRATED

#### LIST DATASETNAME BOTH INCLUDEPRIMARY

increases field length of MIGRATED DS, TRACKS MIGRATED, and K-BYTES MIGRATED

#### LIST PRIMARYVOLUME MIGRATIONCONTROLDATASET

increases field length of MIGRATED DS---TRKS

#### LIST MIGRATIONLEVEL1 MIGRATIONCONTROLDATASET

increases field length of MIGRATED DS---TRKS

#### LIST MIGRATIONLEVEL2(TAPE) MIGRATIONCONTROLDATASET

increases field length of MIGRATED DS---TRKS

### New Parameters

- **The AUDIT command**  
COMMONQUEUE is an optional parameter.
- **The HOLD command**  
COMMONQUEUE is an optional parameter.
- **The LIST command**  
CAPACITYMODE(COMPATIBILITY | EXTENDED) is an optional subparameter of the TTOC SELECT parameter.
- **The QUERY command**  
COMMONQUEUE is an optional parameter.
- **The RELEASE command**  
COMMONQUEUE is an optional parameter.

- **The SETSYS command**
  - COMMONQUEUE is an optional parameter.
  - CAPACITYMODE(COMpatibility | EXTENDED) is an optional subparameter of the TAPEUTILIZATION parameter.

---

# Chapter 1. DFSMShsm Commands

There are four groups of DFSMShsm commands:

- User
- Operator
- Storage administrator
- System programmer

The user commands are listed here for your information, but *z/OS DFSMShsm Managing Your Own Data* describes them in detail. This book contains detailed explanations of the operator, storage administrator, and system programmer commands, which are listed in alphabetical order.

Several commands listed below can be specified in the ARCCMDxx PARMLIB member at startup time. The descriptions for the appropriate commands are found in "DFSMShsm Libraries and Procedures" in the *z/OS DFSMShsm Implementation and Customization Guide*.

---

## User Commands

The following user commands are used by application programmers, TSO terminal users, and other data processing personnel involved in storage administration:

<b>HALTERDS</b>	Changes the data set parameters that affect backup
<b>HBACKDS</b>	Backs up a specific data set
<b>HBDELETE</b>	Deletes a backup version of a data set
<b>HCANCEL</b>	Cancels an existing queued request
<b>HDELETE</b>	Deletes a migrated data set on a level 1 or level 2 volume
<b>HLIST</b>	Lists information from the migration and backup control data sets
<b>HMIGRATE</b>	Migrates a specific data set
<b>HQUERY</b>	Lists DFSMShsm requests
<b>HRECALL</b>	Recalls a specific data set
<b>HRECOVER</b>	Recover a backup version of a data set

---

## Operator Commands

The following operator commands are submitted primarily by a system operator from the system console. They can also be submitted by an authorized user from a TSO terminal.

<b>CANCEL</b>	Cancels an existing request
<b>HOLD</b>	Suspends all or part of DFSMShsm functions
<b>LOG</b>	Enters data into the DFSMShsm log
<b>QUERY</b>	Lists the status of DFSMShsm parameters and pending requests
<b>RELEASE</b>	Releases for processing all or part of the DFSMShsm functions
<b>STOP</b>	Shuts down DFSMShsm
<b>SWAPLOG</b>	Switches between the DFSMShsm log data sets

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## Storage Administrator Commands

The following storage administrator commands are submitted primarily by an authorized storage administrator who uses the HSENCMD command to issue these commands from a TSO terminal. All storage administrator commands, except the HSENCMD and the ONLYIF commands, can also be submitted by a system operator from the system console.

<b>ABACKUP</b>	Backs up a specified aggregate group
<b>ADDVOL</b>	Adds or changes the volumes DFSMShsm manages or owns
<b>ALTERDS</b>	Changes the data set parameters that affect backup
<b>ARECOVER</b>	Recovers a specified aggregate group
<b>AUDIT</b>	Audits DFSMShsm
<b>AUTH</b>	Identifies authorized DFSMShsm users
<b>BACKDS</b>	Backs up a specific data set
<b>BACKVOL</b>	Backs up or dumps data sets from a volume
<b>BDELETE</b>	Deletes backup versions of a data set
<b>DEFINE</b>	Defines control structures for use by DFSMShsm
<b>DELETE</b>	Deletes a migrated data set from a migration volume
<b>DELVOL</b>	Removes a volume from the list of volumes DFSMShsm manages or owns
<b>EXPIREBV</b>	Deletes unwanted backup versions from DFSMShsm-owned storage
<b>FRBACKUP</b>	Creates a fast replication backup version for each volume in a specified copy pool
<b>FRDELETE</b>	Deletes one or more fast replication backup versions in a specified copy pool
<b>FREEVOL</b>	Moves migration or backup copies
<b>FRRECOV</b>	Uses fast replication to recover a single volume or a pool of volumes from the managed backup versions
<b>HSENCMD</b>	Issues authorized user commands from a TSO terminal
<b>LIST</b>	Lists information from the MCDS, BCDS, and OCDS
<b>MIGRATE</b>	Requests a space management function
<b>ONLYIF</b>	Allows the single command immediately following it in ARCCMDxx to be executed conditionally.
<b>RECALL</b>	Recalls a specific data set
<b>RECOVER</b>	Recovery a backup version or dump copy of a data set or volume
<b>RECYCLE</b>	Consolidates valid data on one tape from other tapes
<b>REPORT</b>	Requests reports based on daily or volume statistics records
<b>SETMIG</b>	Changes the space management status of data sets or volumes
<b>SETSYS</b>	Establishes or changes the values of various DFSMShsm control parameters

<b>TAPECOPY</b>	Copies cartridge-type single-file tape volumes
<b>TAPEREPL</b>	Replaces cartridge-type single-file tape volumes

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## System Programmer Commands

The following system programmer commands are submitted primarily by an authorized system programmer who uses the HSENDCMD command to issue these commands from a TSO terminal. They can also be submitted by an authorized user from a TSO terminal or by a system operator from the system console.

<b>DISPLAY</b>	Displays DFSMShsm storage locations
<b>FIXCDS</b>	Displays or modifies MCDS, BCDS, and OCDS records
<b>PATCH</b>	Modifies storage within DFSMShsm
<b>TRAP</b>	Requests a dump when a specified error occurs
<b>UPDATEC</b>	Recovers the control data sets

**Note:** DISPLAY, FIXCDS, PATCH, and TRAP are commands used only for maintenance and are explained in the *z/OS DFSMShsm Diagnosis*.

---

## Using RACF FACILITY Class to Control Authorization of Commands

The use of the RACF FACILITY class allows security administrators to control who can issue DFSMShsm commands. Security administrators can define RACF profiles that DFSMShsm honors. See the *z/OS DFSMShsm Implementation and Customization Guide* "Authorizing and Protecting DFSMShsm Resources" section for a list of FACILITY class resource names.

In order to use RACF FACILITY class checking, the RACF FACILITY class must be active when DFSMShsm is started. If the RACF FACILITY class is active, DFSMShsm uses RACF FACILITY class checking for all authorized and user commands. Adding or modifying the RACF FACILITY class resources does not require a restart of DFSMShsm. If the RACF FACILITY class is used to control access to DFSMShsm commands, the resources defined at the time a command is processed will be used to determine authorization for that command.

If the RACF FACILITY class is not active when DFSMShsm starts, DFSMShsm uses the AUTH command to process all storage administrator commands.

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## Using DFSMShsm Commands

Before using the DFSMShsm commands and their parameters, you should read and understand the following use and notational conventions for DFSMShsm commands.

A command consists of a command name usually followed by one or more operands. The maximum size of a DFSMShsm command and its operands is 1024 bytes. All operands described in this book are called parameters, which qualify certain commands to perform the requested functions.

**Example:** The parameters associated with the BACKDS command specify the name of the data set that you want DFSMShsm to back up and, optionally, the volume and unit that contains the data set to be backed up. An example of the BACKDS command is:

```
BACKDS TEST.CASES VOLUME(VOL123) UNIT(3390) /*comment*/
```

where:

**BACKDS** is the command name.

**TEST.CASES** is the name of the data set you want to back up.

**VOLUME(VOL123)**

is the parameter, specifying the volume that contains the uncataloged data set to be backed up.

**UNIT(3390)** is the parameter, specifying the unit where the volume can be allocated.

**/\*comment\*/** is a comment about the command, the parameter, or both.

All TSO conventions apply to the syntax of DFSMShsm commands. DFSMShsm commands use positional and keyword parameters.

## Positional Parameters

Positional parameters follow the command name in a prescribed sequence. In the command explanations used in this book, the positional parameters are shown in *lowercase italic* characters. There are two types of positional parameters: required and optional. You must specify required positional parameters immediately after the command name. If you use optional positional parameters, you must specify them immediately after any required positional parameters. If the command does not have any required positional parameters, you must specify any optional positional parameters immediately after the command name. If you specify a list of items to replace a positional parameter, you must put parentheses around the list; otherwise, you do not have to use the parentheses. For example, you can specify a list of data set names with the ALTERDS command by putting parentheses around the list of data set names. If you specify only one data set name, you do not have to use parentheses.

## Keyword Parameters

Keyword parameters are specific words or symbols that have a meaning to DFSMShsm. They follow positional parameters and can occur in any order. In the command explanations used in this book, the keyword parameters are shown in **UPPERCASE BOLDFACE** characters.

*Italic* type specifies values or variables that you supply to DFSMShsm. You can specify values or variables with some keyword parameters by putting them in parentheses after the keyword parameter. An example of a keyword with a value follows:

```
VOLUME(volser)
```

Some keyword parameters are separated by a vertical bar, for example, TERMINAL | SYSOUT | OUTDATASET. This bar shows keywords that conflict with one another. You can consider the bar to be a logic **OR**. The above statement would read, TERMINAL **OR** SYSOUT **OR** OUTDATASET. Do not use the vertical bar when you submit the command.

**Notes:**

1. If you enter conflicting parameters in a single command, the last parameter entered in the command overrides all previously entered conflicting parameters and is the only parameter of those in conflict that is processed. All the previous conflicting parameters within the command are ignored.
2. If you enter the same parameter more than once in a single command, only the last of the repeated parameters entered in the command is processed.
3. As long as valid parameters are specified on a command, extraneous parameters are ignored.
4. Unless you are specifically restricted in a parameter explanation, you can code numeric parameters in three different ways:
  - Decimal (EBCDIC)
  - Hexadecimal (X'n')
  - Binary (B'n')

If you issue commands from the system console, you must enter the DFSMShsm commands in the following manner:

F DFSMSHSM,command

You should replace the **DFSMSHSM** abbreviation with the procedure name in the startup procedure in SYS1.PROCLIB.

## Abbreviating Commands and Parameters

The TSO abbreviation convention applies for all DFSMShsm storage administrator, system programmer, and operator command names and parameters. The TSO abbreviation convention requires you to specify as much of the command name or parameter as is necessary to distinguish it from the other command names or parameters. For example, the VERSIONS parameter of the ALTERDS command can be abbreviated as V (also VE, VER, VERS, VERSI, VERSIO, and VERSION).

Some DFSMShsm keyword parameters allow unique abbreviations. All unique abbreviations are shown in the command syntax diagrams.

## Delimiters

When issuing a DFSMShsm command, use one or more blanks to separate the command name from the first parameter. To separate succeeding parameters use one or more blanks or a comma. Do not use a semicolon as a delimiter because any characters that follow a semicolon are ignored.

## Line Continuations

When you continue a command to the next line during batch processing (for instance from the batch reader or a PARMLIB member), insert a plus or minus sign as the last character of each line except the last line of the command. If a comment is included on the same line, the plus or minus sign follows the comment. Refer to “Comments” on page 6 for information about comments. When you use a plus sign, leading delimiters are removed from the continued line.

For commands entered from a TSO terminal, do not use a line-continuation character. All command examples in this book are commands entered for batch processing.

**Example:** The following is an example of a line continuation with a comment and a line continuation that does not have a comment.

```
SETSYS AUTOBACKUPSTART(1800 2100 2300) /* set start times */ +
AUTOMIGRATIONSTART(2300 0600 0800) +
BACKUP BACKUPPREFIX(HSM)
```

## Data Set Naming Conventions

When you specify a data set name with a DFSMShsm command, the data set name must conform to TSO data set naming conventions. With DFSMShsm, you can use the characters \$, @, and # as the first character in the data set name. A hyphen (-) can be used as a character in a data set name; however, when a hyphen is used as the last character in a data set name, it may be mistaken for a continuation symbol.

You cannot specify an alias data set name for authorized commands. Refer to “Storage Administrator Commands” on page 2 for a list of authorized commands.

## Comments

You can add comments to DFSMShsm commands anywhere that a blank might appear. To set off your comments, enter them between the symbols /\* and \*/. You can continue a comment to the next line by using a line continuation character (+ or -) at the end of the line following the \*/ of the comment.

**Example:** The following is an example of using comments:

```
COMMAND1 PARAMETER1 /* comment */ +
PARAMETER2 /* comment */ +
/* more comments */ +
PARAMETER3 /* comment */
COMMAND2 PARAMETER1 +
PARAMETER2 /* comment */
```

## TSO Attention Key

If your terminal is locked because DFSMShsm is executing a command with the WAIT parameter specified, message ARC1020I explains that you can cancel the wait state by pressing the attention key. If you press the attention key, you will receive the following message:

```
ARC1023A CONVERTING TO A NON-WAIT WILL FAIL THE USER REQUEST,
BUT WILL ALLOW THE {RECALL | RECOVER | MIGRATE | BACKUP |
DELETE | HSENDCMD} TO COMPLETE IN THE BACKGROUND.
CONVERT Y OR N?
```

If you respond Y, you are released from the wait state while the command completes processing. If you respond N, the wait state continues until the command has completed processing.

If your terminal is locked because DFSMShsm is executing an HLIST command with the WAIT parameter specified and if you press the attention key, you will receive the following message:

```
ARC1025A DO YOU WISH TO CANCEL DFSMShsm LIST REQUEST? ENTER Y OR N
```

If you respond Y, DFSMShsm terminates processing of the HLIST command. If you respond N, DFSMShsm completes processing of the HLIST command.

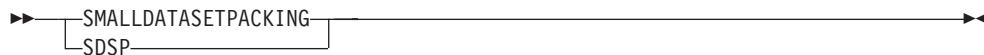
**Note:** If you are in full screen mode when the TSO attention key is pressed (for example, ISPF browse), the screen that is displayed after the attention interrupt does not show correct information. Press the refresh key, which is usually the PA2 key, to display the correct information on your screen.

## How to Read Syntax Diagrams

To read syntax diagrams, follow one line at a time from the beginning to the end, and code everything you encounter on that line.

The following conventions apply to all syntax diagrams for DFMSHsm commands:

- Read the syntax diagrams from left to right and top to bottom.
- Each syntax diagram begins with a double arrowhead (►►) and ends with opposing arrows (►◄).
- An arrow (→) at the end of a line indicates that the syntax continues on the next line. A continuation line begins with an arrow (►).
- Some commands and keywords have alternative abbreviations; these appear as part of the stack for that command or keyword. For example, the alternative abbreviation for SMALLDATASETPACKING is SDSP.



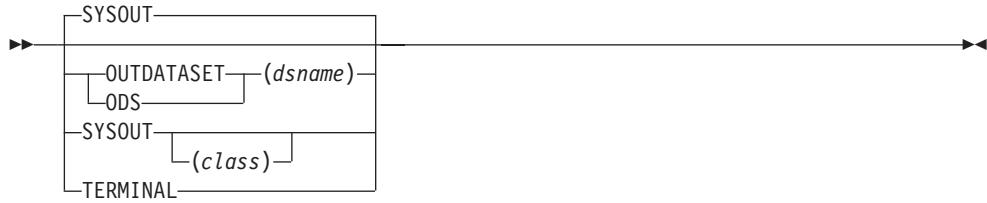
- Words in all lowercase *italics* letters represent information you supply. For example, *volser* or *dsname*.
- You must provide all items enclosed in parentheses, ( ), and you must include the parentheses.
- Where you can choose from two or more keywords, the choices are stacked one above the other. If one choice within the stack lies on the main path, you must choose a keyword. In the following example you must choose either BACKUP, DUMP, or MIGRATION.



- If one or more keywords are below the main path, they are optional. In the following example, DAILY and SPILL are optional keywords. You can choose one, or the other, or none.



- If a stack of keywords is below the main path, the use of the keywords is optional. If a keyword appears above the main path, the keyword above the main path is the default. In the following example, if no keywords are specified, the default is taken.



- The repeat symbol is shown below:



The repeat symbol appearing above keywords and variables indicates that you can specify those keywords and variables more than once. If a comma appears in the repeat symbol, you must separate repeated keywords or variables with a comma or any valid separator. For example, after the keyword VOLUMES, you can enter multiple volume serial numbers separated by commas.

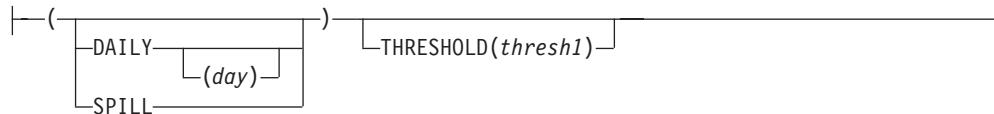


- Substitution blocks are used to simplify the diagrams. They indicate that blocks of the syntax diagram are located outside of the main diagram. You insert the keywords for that block where the symbol appears, and return to the main diagram to continue with the command.

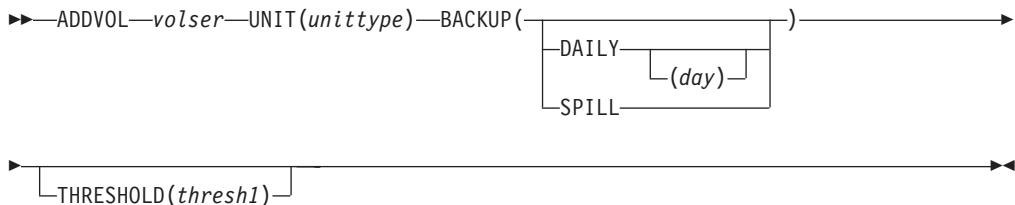
In the following example, the substitution block, Fragment A, points to a block of the syntax diagram that immediately follows the BACKUP keyword.



#### A: BACKUP Optional Parameters:



The above example is equivalent to the following:



## Considering the Command Sequence

In the DFSMShsm environment, certain commands must follow a particular sequence to ensure that the command does not malfunction or fail. The following table lists these sequences:

Issue This Command	Before This Command
ADDVOL	DEFINE POOL or DEFINE VOLUMEPOOL
DEFINE DUMPCLASS	ADDVOL with either AUTODUMP or DUMPCLASS parameters
SETSYS JES2 or JES3	ADDVOL commands
SETSYS SMALLDATASETBACKUP	ADDVOL with SDSP
SETSYS SYSOUT	SETSYS ACTLOGTYPE
SETSYS UNITNAME	SETSYS CDSVERSIONBACKUP
SETSYS USERUNITTABLE	ADDVOL ARECOVERUNITNAME(unittype) DEFINE with a DUMPCLASS(unittype) ABACKUP ARECOVER SETSYS BACKUP(tape) SETSYS CDSVERSIONBACKUP SETSYS MIGUNITNAME SETSYS RECYCLEOUTPUT SETSYS SPILL SETSYS TAPEMIGRATION SETSYS UNITNAME

## Submitting DFSMShsm Commands

A DFSMShsm user with access to the system can submit the operator, storage administrator, and system programmer commands from the system console. If you want to submit these same commands from a TSO terminal, you must be an authorized user. To issue these commands from a TSO terminal, the authorized user must preface each command with the HSENCMD command. For example, if you want to submit the HOLD MIGRATION command from a TSO terminal, you specify the following:

```
HSENCMD HOLD MIGRATION
```

If you are authorized by the database authority control attribute, you can use the AUTH command to add another user to the list of users with DFSMShsm authorization. If you are an authorized user, you can submit the AUTH command from a TSO terminal. If you submit a command from a TSO terminal, DFSMShsm checks your TSO identification for DFSMShsm authorization.

In systems with RACF, a component of the Security Server for z/OS, you can submit the operator, storage administrator, and system programmer commands for processing in batch mode if you are an authorized user. To do this, your TSO identification must be specified on the JOB statement of the MVS JCL

(USER=*userid*). RACF scans the *userid* field and builds the control blocks DFSMShsm uses to confirm the authorization of the person who submitted the command.

If the batch submittal fails because the user ID is missing or invalid, DFSMShsm cannot issue a message to your terminal but notes the exception in the DFSMShsm log. The following example shows the MVS JCL for submitting the system programmer REPORT command to request DFSMShsm daily and volume statistics reports:

```
//REPRTRJOB JOB ...,USER=userid,...
```

```
//STEP1 EXEC PGM=IKJEFT01,REGION=512K
```

```
//SYSPRINT DD SYSOUT=A
```

```
//SYSTSPRT DD SYSOUT=A
```

```
//SYSTSIN DD *
```

```
    HSENCMD REPORT DAILY FUNCTION
```

```
    HSENCMD REPORT VOLUME FUNCTION
```

```
/*
```

---

## Commands in a System without RACF—Method 1

In a system without RACF, you can submit operator, storage administrator, and system programmer commands for batch processing by defining the HSENCMD command to the terminal monitor program (TMP) as an authorized command and by providing a STEPLIB or JOBLIB card to an authorized program facility (APF) authorized version of module ARCMCMD.

To use method 1, do the following:

- Instead of specifying USER=*userid* on the JOB card, add the HSENCMD command to the authorized commands table in TMP so that this command can be invoked and submitted to DFSMShsm as an acceptable, authorized command.
- Modify the CSECT IKJEFTE2 within the IKJEFT02 load module to indicate that HSENCMD is an authorized command and should be attached with APF authorization.
  - Make this modification to the first entry in IKJEFTE2 that contains eight blanks, and ensure that one blank entry remains in the authorized command table to indicate the end of the table.
  - In the *z/OS TSO/E Customization*, the authorized command table has been moved to a CSECT in a separate load module named IKJTABLS. The IKJTABLS load module is located in the SYS1.LPALIB.
- Link-edit the DFSMShsm module ARCMCMD (the HSENCMD command processor) into an APF-authorized library as an authorized program.
- Ensure that the job submitting the HSENCMD command uses a STEPLIB or JOBLIB card to this library.
- Restrict access to this APF library to prevent unauthorized use of the HSENCMD command.

The system programmer is responsible for ensuring that any DFSMShsm maintenance to module ARCMCMD is also applied to the authorized copy of ARCMCMD. All concatenated STEPLIBs must be authorized. The APF library name must appear either in the system LINKLIST or in the appropriate IEAAPFx of the SYS1.PARMLIB. (The IEAAPFx member is used to identify program libraries that require APF authorization). Refer to the *z/OS MVS Initialization and Tuning Guide* for additional information about the IEAAPFx member.

The following job step link-edits the ARCMCMD module to create an authorized copy of ARCMCMD:

```
//LINKED EXEC PGM=IEWL,PARM='LIST,LET,NCAL,XREF,RENT,REUS'  
//SYSPRINT DD SYSOUT=A  
//SYSUT1 DD UNIT=SYSDA,SPACE=(CYL,(1,1))  
//SYSMOD DD DISP=SHR,DSN=DFHSM.AUTHLIB  
//IN DD DISP=SHR,DSN=SYS1.CMDLIB  
//SYSLIN DD *  
INCLUDE IN HSENDCMD  
SETCODE AC(1)  
ENTRY ARCMCMD  
NAME HSENDCMD(R)  
/*
```

The successful execution of this link-edit results in message IEW0461 for ARCWTU2 and ARCCVT.

## Commands in a System without RACF—Method 2

You can use another method to process authorized commands from a batch TMP on a system without RACF installed. To use this option, you must ensure that the TSO user ID is stored in the protected step control block (PSCB).

First, define the user ID as an authorized user by entering the following command:

```
AUTH userid DATABASEAUTHORITY(USER)
```

The AUTH command is submitted as part of the PARMLIB member being processed during DFSMShsm startup.

Then enter the following command:

```
SETSYS ACCEPTPSCBUSERID
```

DFSMShsm retrieves the user ID for the TSO batch requests from the PSCB and associates it with the previously defined user ID.

Refer to *z/OS TSO/E Customization* for additional information about adding authorized commands to the TSO/E environment.



---

## Chapter 2. ABACKUP: Backing Up Aggregated Data Sets

The ABACKUP command creates a copy of a specified, user-defined aggregate group of data sets. Aggregated data sets can be any combination of data sets treated as an entity, for example, an application. The aggregated data sets must be cataloged. A BCDS must be defined at the backup site prior to issuing an ABACKUP command; otherwise, the command fails.

**Note:** In some sections of this book as well as in the books within the DFSMShsm library, you will find the term *Application Backup and Recovery* used rather than *Aggregate Backup and Recovery*. The two terms are interchangeable.

To create a copy of aggregate data sets with the ABACKUP command, you must:

- Specify the name of the predefined aggregate group that identifies the user-defined aggregated data sets.
- Specify the EXECUTE parameter of the ABACKUP command.

**Note:** To determine if any changes are required to either the existing SMS constructs or SMS environment prior to actual data movement, run the ABACKUP command with the VERIFY parameter prior to running the ABACKUP command with the EXECUTE parameter. The VERIFY parameter detects whether any errors exist in the aggregate backup configuration and lists all input tape volumes that are required at the aggregate backup site when a subsequent EXECUTE is submitted.

The ABARS backup error installation exit (ARCBEEEXT) allows you to skip a data set when DFSMSdss errors occur while DFSMSdss is dumping level 0 DASD data sets in the INCLUDE list. Specifying the SETSYS EXITON(BE) command is only required if you wish to skip data sets in error and it must be specified prior to issuing the ABACKUP command.

If you have volumes protected by peer-to-peer remote copy (PPRC) or extended remote copy (XRC), you can direct ABACKUP processing to skip backing up data sets from those volumes.

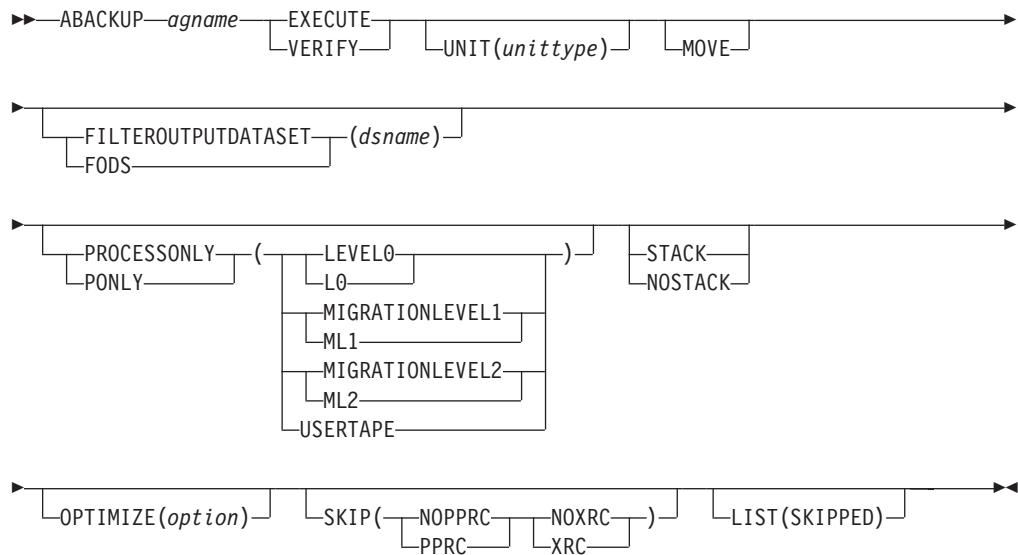
Upon successful completion of ABACKUP processing, an aggregate backup and recovery support (ABARS) activity record (ABR record) is created and written to the DFSMShsm backup control data set (BCDS) at the backup site. When multiple ABACKUP copies are created, there is one ABR record created for each copy of the output files. Refer to *z/OS DFSMShsm Storage Administration Guide* for a description of the information contained in the ABR record.

You can use the ARECOVER command to recover the data sets previously backed up with the ABACKUP command.

For information on defining aggregate groups using ISMF panels, refer to *z/OS DFSMSdfp Storage Administration Reference*.

---

## Syntax of the ABACKUP Command

**Notes:**

1. SMS must be active on your system before you can issue the ABACKUP command.
2. The SETSYS MAXABARSADDRESSSPACE command determines the number of ABACKUP commands that can run at one time. The maximum number is 64.
3. Only one ABACKUP command for each aggregate group name can process at one time.
4. In a multiple address space for DFSMShsm environment, ABARS commands, like ABACKUP, can only be issued by the host identified as the main host. DFSMShsm ignores the ABARS commands if directed to a host identified as HOSTMODE=AUX.

---

## Required Parameters of the ABACKUP Command

This section describes the required parameters of the ABACKUP command.

### **agname: Specifying the Aggregate Group Name**

**Explanation:** *agname* is a required parameter specifying the SMS aggregate group name that defines the data sets you want backed up. It contains the necessary control information to perform the aggregate backup. For *agname*, substitute the name of the SMS aggregate group.

**Defaults:** None.

**Note:** You must define the aggregate group before issuing the ABACKUP command. If you have specified a management class name in the aggregate group definition, make sure that you also define or update that management class prior to issuing the ABACKUP command. Refer to *z/OS DFSMSdfp Storage Administration Reference* for information on how to define the aggregate group using ISMF panels.

### **EXECUTE | VERIFY: Specifying Whether Data Movement Processing or Data Verification Occurs**

**Explanation:** EXECUTE | VERIFY are mutually exclusive required parameters specifying whether actual data movement should occur or whether a validation of the aggregate data sets should be performed.

EXECUTE specifies that DFSMShsm is to create the backup copies of the aggregate data sets.

VERIFY determines if errors exist that would prevent ABACKUP from completing successfully. If no errors have occurred during verification processing, VERIFY specifies that DFSMShsm issue message ARC6166I to the aggregate backup and recovery activity log and list all data sets (migrated and nonmigrated) backed up as a result of inclusion in the INCLUDE/EXCLUDE, ACCOMPANY/ACCOMPANYEXCLUDE, ALLOCATE/ALLOCATEEXCLUDE lists of a selection data set. The data sets are not actually backed up.

**Note:** Either the EXECUTE or the VERIFY parameter must be used. If not, the ABACKUP command will fail.

**Defaults:** None.

---

## Optional Parameters of the ABACKUP Command

This section describes the optional parameters of the ABACKUP command.

### **FILTEROUTPUTDATASET: Specifying the Output Data Set**

**Explanation:** FILTEROUTPUTDATASET(*dsname*) is an optional parameter specifying the name of a data set to which the lists of data sets selected from INCLUDE/EXCLUDE, ALLOCATE/ALLOCATEEXCLUDE, ACCOMPANY/ACCOMPANYEXCLUDE filtering are written.

## **ABACKUP**

*dsname* specifies the name of the output data set. The data set name may be 1 to 44 characters in length. If the data set already exists on DASD and has the correct data set attributes, then the existing data set is used. If the data set does not exist, then a new data set is created.

**Note:** If the user has restricted ABACKUP command authority, then that user must have a minimum of update authority in order to append to the existing RACF protected filter output data set or allocation authority in order to create the new filter output data set.

When the FILTEROUTPUTDATASET parameter is specified along with the PROCESSONLY parameter, then the filter output data set contains those data sets that passed the filtering criteria and also match the category designated in the PROCESSONLY parameter.

**Defaults:** None.

## **LIST: Listing Data Sets Not Backed Up Due to the SKIP Parameter**

**Explanation:** LIST(SKIPPED) is an optional parameter that specifies whether DFSMShsm should list, in the ABARS activity log, those data sets not backed up because the SKIP(PPRC) or SKIP(XRC) parameter is also specified.

The LIST parameter has no effect if you specify VERIFY.

**Defaults:** None.

## **MOVE: Removing the Data Sets**

**Explanation:** MOVE is an optional parameter that specifies whether to delete, uncatalog, or both delete and uncatalog all selected data sets after a successful aggregate backup.

After a successful backup of an application, the MOVE option causes ABACKUP to delete all of the data sets in the application. The data set types in the application are affected in the following manner:

- DASD data sets are deleted
- TAPE data sets are uncataloged
- ACCOMPANY data sets are uncataloged
- ALLOCATE data sets are deleted from DASD (except ICF user catalogs in the ALLOCATE list)
- MIGRATED data sets are deleted

**Defaults:** None.

## **OPTIMIZE: Overriding the SETSYS ABARSOPTIMIZE Command**

**Explanation:** OPTIMIZE(*option*) is used to override the usage of the SETSYS ABARSOPTIMIZE command. The OPTIMIZE parameter is passed to and used by DFSMSdss when backing up level 0 DASD data sets.

The valid specifications for the *option* value are:

- If value is 1, then DFSMSdss reads one track at a time
- If value is 2, then DFSMSdss reads two tracks at a time
- If value is 3, then DFSMSdss reads five tracks at a time

- If value is 4, then DFSMSdss reads one cylinder at a time

**Defaults:** The default value for *option* is the value specified on the SETSYS ABARSOPTIMIZE command. If SETSYS ABARSOPTIMIZE was not specified, then this parameter defaults to 3.

## PROCESSONLY: Designating the Categories to Process

**Explanation:** PROCESSONLY is an optional parameter that directs DFMSHsm to process only the specified subcategories. The subcategories can be specified in any order. Specification of all four subcategories is accepted but is equivalent to not specifying the PROCESSONLY parameter.

Subparameter	Explanation
The following subparameters are mutually exclusive required choices.	
LEVEL0	<b>PROCESSONLY(LEVEL0)</b> specifies that only data sets residing on user DASD are processed.
MIGRATIONLEVEL1	<b>PROCESSONLY(MIGRATIONLEVEL1)</b> specifies that only data sets residing on DFMSHsm migration level 1 DASD are processed.
MIGRATIONLEVEL2	<b>PROCESSONLY(MIGRATIONLEVEL2)</b> specifies that only data sets residing on DFMSHsm migration level 2 tape or DASD are processed.
USERTAPE	<b>PROCESSONLY(USERTAPE)</b> specifies that only data sets residing on user tape are processed.

**Defaults:** None.

## SKIP: Skipping Data Sets on Volumes Protected by PPRC or XRC

**Explanation:** SKIP is an optional parameter that specifies whether DFMSHsm should skip data sets on volumes protected by PPRC or XRC.

Subparameter	Explanation
The following subparameters are mutually exclusive required choices.	
PPRC	<b>SKIP(PPRC)</b> If a data set in the aggregate group is on a volume or volumes protected by peer-to-peer remote copy, specifying SKIP(PPRC) causes ABACKUP to not back up the data set.
NOPPPRC	<b>SKIP(NOPPPRC)</b> If you specify SKIP(NOPPPRC), this causes ABACKUP to back up the corresponding data set.
The following subparameters are mutually exclusive required choices.	
XRC	<b>SKIP(XRC)</b> If a data set is on a volume or volumes that are protected by extended remote copy, specifying SKIP(XRC) causes ABACKUP to not back up the data set.
NOXRC	<b>SKIP(NOXRC)</b> If you specify SKIP(NOXRC), this causes ABACKUP to back up the corresponding data set.

**Defaults:** Each option for this parameter defaults to the corresponding setting of the SETSYS ABARSKIP parameter.

## **STACK | NOSTACK: Overriding the SETSYS ABARSTAPES Setting**

**Explanation:** **STACK | NOSTACK** is an optional parameter used to override the SETSYS ABARSTAPES setting.

**STACK** specifies that DFSMShsm will stack the ABACKUP output files onto a minimum number of tape volumes during ABACKUP processing.

**NOSTACK** specifies that DFSMShsm will not stack the ABACKUP output files during ABACKUP processing.

**Defaults:** This parameter defaults to the setting specified on the SETSYS ABARSTAPES command. If SETSYS ABARSTAPES was not specified, then this parameter defaults to STACK.

## **UNIT: Designating the Output Device**

**Explanation:** **UNIT(*unittype*)** is an optional parameter specifying the type of tape unit where aggregate backup output files can be allocated. For *unittype*, substitute the type of tape unit. If this parameter is not specified on the ABACKUP command, then the UNIT defaults to the UNIT specified in the ABARSUNITNAME parameter of the SETSYS command.

The following are valid types of tape units:

- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:

- 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.
- 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.
- 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.

When you are specifying esoteric names and dealing with units that can use the 3480X or 3490 Improved Data Recording Capability (IDRC), all devices (or none of them) associated with an esoteric name are required to have the 3480X or 3490 IDRC.

**Note:** In a tape library environment, SMS ACS routines override this parameter at allocation time.

**Defaults:** None.

## Examples of How to Code the ABACKUP Command

The following examples present different ways to code the ABACKUP command.

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Displaying the Application Data Sets to Be Backed Up and Verifying Application Backup

**Example:** In this example, the data sets to be backed up, as indicated in the aggregate group PAY1, are displayed. The ABACKUP command is verified to ensure that it can complete successfully with no errors. No data sets are backed up.

```
ABACKUP PAY1 VERIFY
```

### Backing Up the Application Data Sets

**Example:** In this example, the data sets to be backed up, as indicated in the aggregate group PAY1, are backed up. A 3590-1 is specified as the tape unit type for the control and data files.

```
ABACKUP PAY1 EXECUTE UNIT(3590-1)
```

### Backing Up the Application Data Sets to a Minimum Number of Tapes

**Example:** In this example, the data sets to be backed up, as indicated in the aggregate group PAY1, are backed up and the output files are stacked onto a minimum number of tape volumes.

```
ABACKUP PAY1 EXECUTE STACK
```

## Sample Activity Log Created When You Specify ABACKUP with the VERIFY Parameter

**Example:** Figure 1 is a sample activity log created when you specify ABACKUP with the VERIFY parameter. The processing has been successful. The data sets listed in the sample activity log would actually be backed up if you issued the ABACKUP command with the EXECUTE parameter.

```
PAGE 0001 Z/OS DFMSHSM 1.7.0      DATA FACILITY HIERARCHICAL STORAGE MANAGER 05.081 9:29
ARC6054I AGGREGATE BACKUP STARTING FOR AGGREGATE GROUP PAY1, AT 10:56:12, STARTED TASK = DFHSMABR.ABAR0151
ARC6030I ACTIVITY LOG FOR AGGREGATE GROUP PAY1 WILL BE ROUTED TO SYSOUT=A
ARC6166I THE FOLLOWING DATA SETS WERE SELECTED TO BE PROCESSED BY AGGREGATE BACKUP FOR AGGREGATE GROUP PAY1 FOR THE
INCLUDE/EXCLUDE SPECIFICATION:
PAY2.PY002.SOCSEC
PAY2.PY002.STATUS.G0002V00
PAY2.PY002.RETIRE
PAY1.INSTRUCT
PAY1.PY001.CHECK
PAY1.PY001.NAMES
PAY1.PY001.PGMLIB
PAY1.PY002.IRA
PAY1.PY002.LADDER
ARC6166I THE FOLLOWING DATA SETS WERE SELECTED TO BE PROCESSED BY AGGREGATE BACKUP FOR AGGREGATE GROUP PAY1 FOR THE
ACCOMPANY/ACCOMPANYEXCLUDE SPECIFICATION:
PAY2.PY001.TAXES
ARC6166I THE FOLLOWING DATA SETS WERE SELECTED TO BE PROCESSED BY AGGREGATE BACKUP FOR AGGREGATE GROUP PAY1 FOR THE
ALLOCATE/ALLOCATEEXCLUDE SPECIFICATION:
PAY2.PY001.BENEFIT
ARC6250I THE FOLLOWING TAPE VOLSERs WILL BE REQUIRED DURING ABACKUP FOR AGGREGATE GROUP PAY1
A00002
A00003
ARC6055I AGGREGATE BACKUP HAS COMPLETED FOR AGGREGATE GROUP PAY1, AT 10:56:13, RETCODE = 000
```

Figure 1. Sample Activity Log Created When You Specify ABACKUP with the VERIFY Parameter

---

## Chapter 3. ADDVOL: Adding or Changing the Volumes that DFSMShsm Manages or Owns

The ADDVOL command adds new non-SMS-managed volumes to the list of volumes that DFSMShsm manages or owns and defines the attributes of those volumes. You must issue the ADDVOL command for each non-SMS-managed volume that you want DFSMShsm to manage or own, including those volumes defined for aggregate recovery with the DEFINE ARPOOL command. In addition, the initialization procedure for DFSMShsm must issue an ADDVOL command for each primary and migration level 1 volume each time you start DFSMShsm.

— **Attention** —

Do not issue simultaneous ADDVOL commands for backup volumes from multiple systems because this may, in rare cases, create duplicate BVR entries in DFSMShsm control data sets records.

Use the ADDVOL command for the following purposes:

- Add to DFSMShsm control a non-SMS-managed volume that has never been added before.
- Add to DFSMShsm control a primary or migration level 1 volume that has been added previously, but not since the current DFSMShsm startup.

**Note:** You do not need to specify migration level 2, backup, or dump volumes each time you start DFSMShsm.

- Change the attributes specified for a volume previously added.
- Prevent a volume from being selected for migration output.
- Add all aggregate recovery volumes to DFSMShsm as soon as possible after an ARECOVER command has successfully completed processing if the volumes had not been previously added.

**Notes:**

1. In a JES3 environment, you cannot add a primary volume to DFSMShsm after initialization.
2. If you try to issue an ADDVOL command for an SMS-managed volume, a volume whose management cannot be determined, or for a volume that is not online, the ADDVOL command is rejected.

You can change attributes within each volume category, but you cannot change the volume category. Volume categories are:

- PRIMARY
- BACKUP(DAILY)
- BACKUP(SPILL)
- MIGRATIONLEVEL1
- MIGRATIONLEVEL2
- DUMP

For example, if a volume has been added to DFSMShsm as a primary volume, you cannot use the ADDVOL command to change it to a migration or backup volume.

## ADDVOL

You can change any of the following space management techniques to be used for a primary volume:

- Migrate
- Delete-by-age
- Delete-if-backed-up

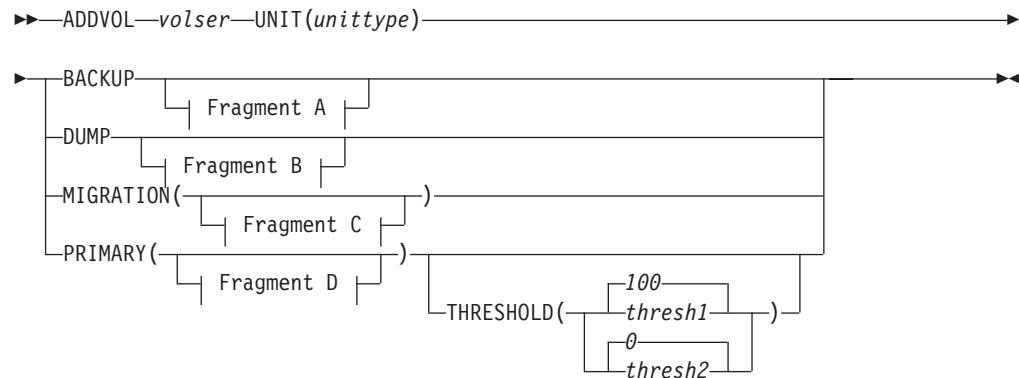
Use caution when you change the attributes of a primary volume if the volume is using migration as the space management technique. If you change the primary volume attributes so that no volume has the same attributes that existed when DFSMShsm first migrated the data set from the primary volume, an undirected recall may fail. The undirected recall *will* fail if *all* of the following are true:

- You are using the LIKE subparameter of the SETSYS RECALL PRIVATEVOLUME or ANYSTORAGEVOLUME command.
- No available volume has a space management technique of MIGRATE and a recall technique of AUTORECALL.
- Pools are not defined.

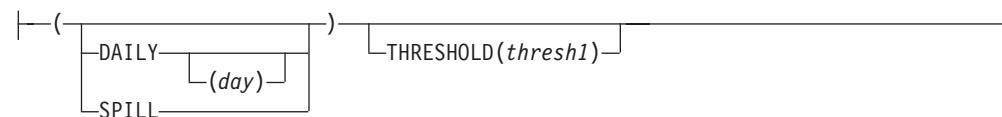
To avoid the problem, you can specify the following UNLIKE subparameters of the SETSYS RECALL command to allow the recall to occur when the attributes do not match:

- AUTOMIGRATION
- AUTOBACKUP
- NOAUTOMIGRATION
- NOAUTOBACKUP
- BACKUPDEVICECATEGORY

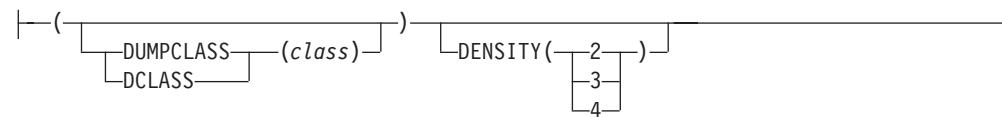
## Syntax of the ADDVOL Command



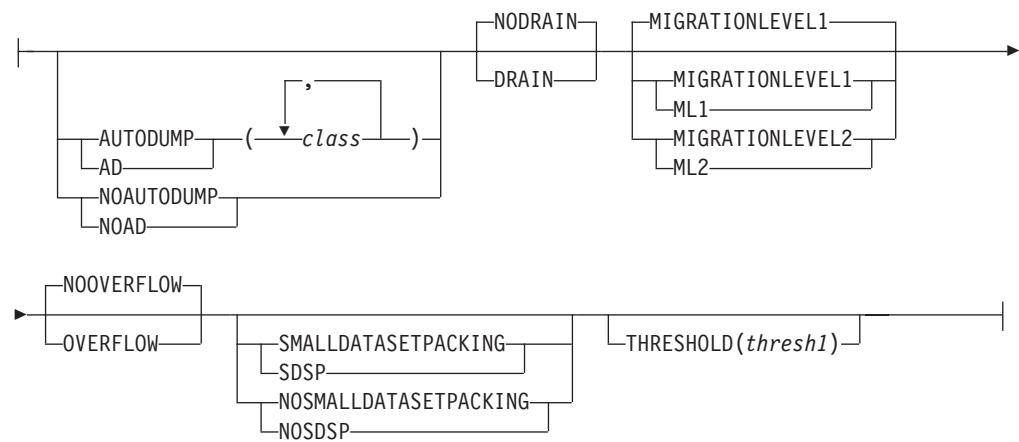
### A: BACKUP Optional Parameters:



### B: DUMP Optional Parameters:

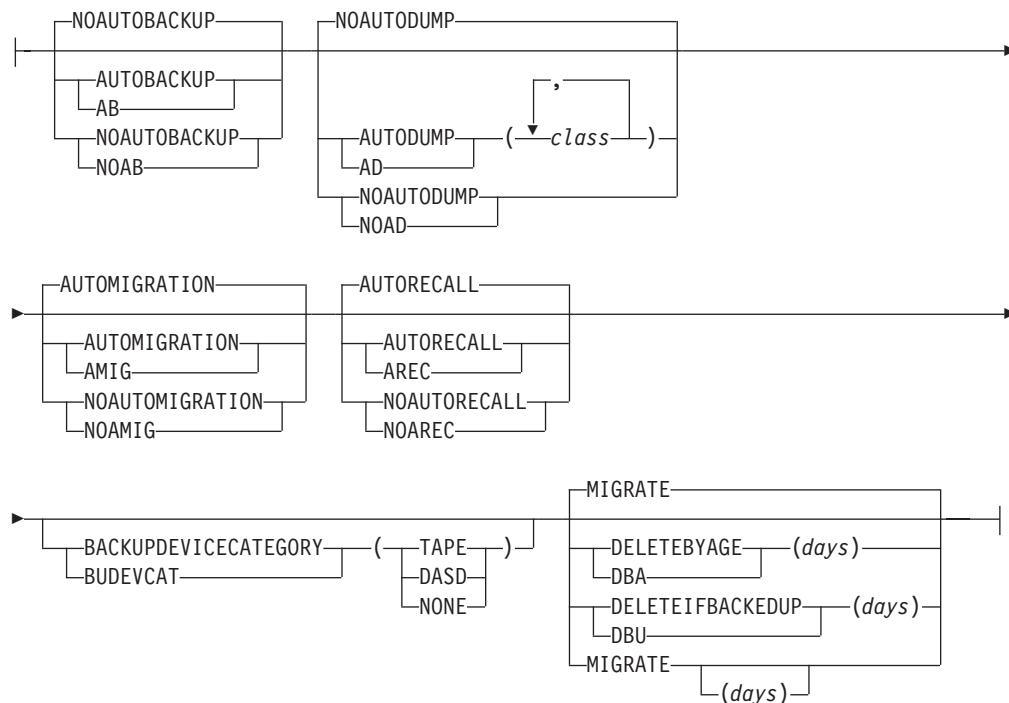


### C: MIGRATION Optional Parameters:



### D: PRIMARY Optional Parameters:

## ADDVOL



### Notes:

1. The required parameters BACKUP, DUMP, MIGRATION, and PRIMARY are volume-type parameters; that is, they specify the type of volume to be managed by DFSMSHsm.
2. The ADDVOL command cannot be used with SMS-managed volumes.
3. If multiple optional subparameters are used in one ADDVOL command, they are placed within one set of parentheses with a space between each subparameter, as shown below:

```
ADDVOL PRIM01 UNIT(3390) +
  PRIMARY(AUTOBACKUP MIGRATE(8) AUTORECALL) THRESHOLD(90 70)
```

---

## Required Parameters of the ADDVOL Command

This section describes the required parameters of the ADDVOL command.

### **volser: Specifying the Volume to Be Added or Changed**

**Explanation:** *volser* is a required positional parameter specifying the serial number of (1) a non-SMS-managed volume to be added to DFSMShsm control, (2) a volume currently managed or owned by DFSMShsm, and (3) a volume previously defined for aggregate recovery.

For *volser*, substitute the serial number of the volume being added or changed.

**Defaults:** None.

**Notes:**

1. Because *volser* is a required positional parameter, you must specify it immediately after the command name.
2. When an attempt is made to add an SMS-managed volume using the ADDVOL command, the command is rejected and a message is issued.
3. A volume previously defined to aggregate recovery with the L0VOLS parameter of the DEFINE ARPOOL command can be subsequently added to DFSMShsm only as a PRIMARY volume.
4. A volume previously defined to aggregate recovery with the ML1VOLS parameter of the DEFINE ARPOOL command can be subsequently added to DFSMShsm only as an ML1 volume.

### **BACKUP | DUMP | MIGRATION | PRIMARY: Identifying the Type of Volume**

**Explanation:** **BACKUP | DUMP | MIGRATION | PRIMARY** are mutually exclusive, required parameters that identify for DFSMShsm the type of volume you are adding or changing.

**BACKUP** identifies a volume to be used as a backup volume.

**DUMP** identifies a volume to be used as the output of a full-volume dump. DFSMShsm supports only tape units for the DUMP function. The *unittype* must be a valid tape unit or the ADDVOL command will fail.

**MIGRATION** identifies a volume to be used as a migration volume. Migration level 1 volumes must be DASD. Migration level 2 volumes can be either DASD or tape.

**PRIMARY** identifies a volume to be used as a primary volume. Primary volumes must be DASD.

**Defaults:** None.

**Note:** If a volume record already exists for the specified *volser*, you cannot change the type of volume.

### **UNIT: Specifying the Type of Device**

**Explanation:** **UNIT(*unittype*)** is a required parameter specifying the type of unit where the volume can be allocated.

## ADDVOL

For *unittype*, substitute the type of DASD or tape unit on which the volume can be allocated.

The following are valid types of DASD units:

- 3380
- 3390
- 9345

The BACKUP, DUMP, and MIGRATE functions use the same types of tape units.

The following are valid types of tape units:

- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:

- 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.
- 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.
- 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.

When you want to add a tape volume to DFSMShsm's control while using the Improved Data Recording Capability (IDRC) of the 3480X, specify 3480X. If output is restricted to 3480X, this may change the unit name. It will not allow an incompatible change, such as an attempt to change a tape volume from 3480X to 3480, when that tape volume already contains compacted data. You may want to refer to the SETSYS TAPEHARDWARECOMPACT parameter for additional information.

When you specify esoteric unit names and when you deal with units that can use the 3480X IDRC, all devices associated with an esoteric name must have the IDRC or none of them can.

**Defaults:** None.

**Notes:**

1. If you specify a tape unit for a primary or migration level 1 volume, the ADDVOL command fails.
2. If you specify a DASD unit for a dump volume, the ADDVOL command fails.
3. If a DASD volume record already exists for the specified *volser*, you cannot change the *unittype*.

You can re-ADDVOL a tape with a different unit type as long as the new one is compatible with the existing device type and the unit type (such as an esoteric) is defined to MVS and known to DFSMShsm. To make the unit type known to DFSMShsm, use the SETSYS USERUNITTABLE command.

---

## Optional Parameters of the ADDVOL Command

This section describes the optional parameters of the ADDVOL command.

### AUTOBACKUP | NOAUTOBACKUP: Specifying Whether the Primary Volume Is Eligible for Automatic Backup

**Explanation:** AUTOBACKUP | NOAUTOBACKUP are mutually exclusive, optional subparameters of the PRIMARY parameter specifying whether the data sets on the primary volume are eligible for automatic backup.

**AUTOBACKUP** specifies that the data sets on the primary volume are eligible for automatic backup.

**NOAUTOBACKUP** specifies that the data sets on the primary volume are not eligible for automatic backup.

**Defaults:** If you are adding a primary volume to DFSMShsm, the default is NOAUTOBACKUP. If you are changing the attributes of a primary volume and do not specify either subparameter, the backup status is not changed.

**Note:** In a multiple-DFSMShsm-host environment, you can add the same volume to different DFSMShsm hosts. When you do, you can also assign to that volume a different automatic backup attribute in each DFSMShsm host.

### AUTODUMP | NOAUTODUMP: Specifying Whether a Volume Is Eligible for Automatic Dumping to Tape

**Explanation:** AUTODUMP(*class*) | NOAUTODUMP are mutually exclusive, optional subparameters of the PRIMARY and MIGRATION parameters specifying whether the volume is eligible for a full-volume automatic dump.

**Note:** The migration volume eligibility is applicable only to migration level 1 volumes and is ignored for migration level 2 volumes.

**AUTODUMP** specifies that the primary or migration volume is eligible for a full-volume automatic dump and selects the dump classes that contain the dump copies. For *class*, substitute one previously defined dump class for each of the output copies wanted for the dump. You must have a minimum of one class selected, but you can select a maximum of five classes. Each dump class, *class*, must be predefined using the DUMPCLASS parameter of the DEFINE command before you attempt to use the AUTODUMP parameter of the ADDVOL command.

The FREQUENCY and DAY subparameters of the DUMPCLASS parameter of the DEFINE command determine how often a primary volume is dumped to a given dump class.

**NOAUTODUMP** specifies that the primary or migration volume is not eligible for a full-volume automatic dump.

**Defaults:** If you are adding a primary or migration level 1 volume to DFSMShsm, the default is NOAUTODUMP.

**Note:** In a multiple-DFSMShsm-host environment, the AUTODUMP parameter can be different in the different DFSMShsm hosts. If you add a volume to more

than one DFSShsm host with different dump class values, the dump classes will be that of the last ADDVOL command processed.

## **AUTOMIGRATION | NOAUTOMIGRATION: Specifying Whether the Primary Volume Is Eligible for Automatic Volume Space Management**

**Explanation:** AUTOMIGRATION | NOAUTOMIGRATION are mutually exclusive, optional subparameters of the PRIMARY parameter specifying whether the data sets on the primary volume are eligible for automatic volume space management.

**AUTOMIGRATION** specifies that the data sets on the primary volume are eligible for automatic volume space management.

**NOAUTOMIGRATION** specifies that the data sets on the primary volume are not eligible for automatic volume space management.

**Defaults:** If you are adding a volume to DFSShsm, the default is AUTOMIGRATION. If you are changing the attributes of a volume and do not specify either subparameter, the volume space management status is not changed.

**Note:** In a multiple-DFSShsm-host environment, you can add the same volume to different DFSShsm hosts. When you do that, you can also assign to that volume a different automatic space management attribute in each DFSShsm host.

## **AUTORECALL | NOAUTORECALL: Specifying Whether the Primary Volume Is Eligible for Automatic Recall**

**Explanation:** AUTORECALL | NOAUTORECALL are mutually exclusive, optional subparameters of the PRIMARY parameter specifying whether the primary volume is eligible to receive data sets that are automatically recalled.

**AUTORECALL** specifies that the primary volume is eligible to receive automatically recalled data sets.

**NOAUTORECALL** specifies that the primary volume is not eligible to receive automatically recalled data sets.

**Defaults:** If you are adding a primary volume to DFSShsm, the default is AUTORECALL. If you are changing the attributes of a volume and do not specify either subparameter, the recall status is not changed.

**Notes:**

1. DFSShsm can override the AUTORECALL and NOAUTORECALL subparameter in certain circumstances. If you use the DEFINE command to associate the same volume to a special recall pool, the volume is always eligible to receive automatically recalled data sets.
2. If you also specify the DELETEBYAGE or DELETEIFBACKEDUP subparameter, DFSShsm ignores the AUTORECALL or NOAUTORECALL subparameter.

## BACKUPDEVICECATEGORY: Specifying Where Backup Versions Reside

**Explanation:** BACKUPDEVICECATEGORY is an optional subparameter of the PRIMARY parameter specifying the type of device that receives the backup versions of the data sets when DFSMShsm backs up the primary volume.

Subparameter	Explanation
TAPE	<b>BACKUPDEVICECATEGORY(TAPE)</b> specifies that the backup version of a data set on the primary volume resides on a tape daily backup volume.
DASD	<b>BACKUPDEVICECATEGORY(DASD)</b> specifies that the backup version of a data set on the primary volume resides on a DASD daily backup volume.
NONE	<b>BACKUPDEVICECATEGORY(NONE)</b> specifies that DFSMShsm selects the first available, nonfull tape or DASD daily backup volume where the backup version of a data set resides.

**Defaults:** If you are adding a primary volume to DFSMShsm and do not specify BACKUPDEVICECATEGORY, the default is NONE. If you are changing the attributes of a volume and do not specify BACKUPDEVICECATEGORY, the previous backup device category remains in effect.

### Notes:

1. If you change the backup device category for a volume with a subsequent ADDVOL command, DFSMShsm could fail an undirected recall of a migrated data set when the LIKE subparameter of the SETSYS RECALL command is in effect. With the LIKE subparameter specified on the SETSYS RECALL command, DFSMShsm automatically recalls a data set to a volume only if that volume has the same backup device category as the primary volume that the data set used to be on. Therefore, if DFSMShsm cannot find a primary volume with the same backup device category as the original primary volume, DFSMShsm cannot automatically recall the migrated data set. To avoid this problem, you can specify the UNLIKE subparameter with the SETSYS RECALL command.
2. In a multiple-DFSMShsm-host environment, you can add the same volume to different DFSMShsm hosts. When you do that, the backup device category for that volume should be the same in all DFSMShsm hosts or the last one specified with the ADDVOL command is the one in effect.

## DAILY | SPILL: Identifying the Type of Backup Volume

**Explanation:** DAILY(*day*) | SPILL are mutually exclusive, optional subparameters of the BACKUP parameter to specify the use of the backup volume.

**DAILY** specifies that the volume receive backup versions of data sets from primary volumes or migration volumes. For *day*, substitute a decimal number from 1 to 31 to represent the day in the backup cycle that you want this volume assigned to. You define the backup cycle with the DEFINE command.

**SPILL** specifies that the volume receive valid backup versions from DASD daily backup volumes. A tape spill backup volume can also receive all valid backup versions of data sets from a recycled tape backup volume.

**Defaults:** If you are adding a backup volume to DFSMShsm and do not specify DAILY or SPILL, DFSMShsm considers the volume to be either a daily or a spill backup volume. DFSMShsm then determines which type of backup volume it needs when it selects a backup volume. If you are changing the attributes of a volume and do not specify either subparameter, the type of backup volume remains in effect.

If you do not specify a day with the DAILY parameter and DFSMShsm needs another daily backup volume, DFSMShsm assigns the volume to a day in the backup cycle.

**Note:** When you specify BACKUP, you can specify DAILY or SPILL, but not both. If you want to use tape for backup for a given day, you must assign at least one tape to that day in the backup cycle or on that day you must back up a volume whose backup device category is tape. Otherwise, you cannot use tape for that day in the backup cycle.

## **DELETEBYAGE | DELETEIFBACKEDUP | MIGRATE: Specifying the Type of Space Management on a Primary Volume**

**Explanation:** **DELETEBYAGE | DELETEIFBACKEDUP | MIGRATE** are mutually exclusive, optional subparameters of the PRIMARY parameter specifying the space management type on the primary volume.

**DELETEBYAGE (days)** specifies that cataloged and uncataloged data sets that reside on a primary volume are scratched if they have been inactive for a specified number of days and the current expiration date has been reached. If you specify this subparameter, a current backup version of the data sets on the primary volume is not required. For *days*, if you are in a single-DFSMShsm-host environment, substitute a number from 1 to 999. In a multiple-DFSMShsm-host environment, you can specify a number from 2 to 999. **Example:** If you specify *days* as 20, DFSMShsm scratches those data sets on a primary volume that have been inactive for at least 20 days.

**DELETEIFBACKEDUP(days)** specifies that the data sets on a primary volume can be scratched if they have been inactive for a specified number of days and if the data sets on the primary volume have current backup versions. For *days*, in a single-DFSMShsm-host environment, substitute a decimal number from 1 to 999. In a multiple-DFSMShsm-host environment, you can specify a decimal number from 2 to 999. For example, if you specify *days* as 30, DFSMShsm scratches those data sets that have been inactive for 30 days and that have a current backup version.

**MIGRATE** specifies that the data sets that reside on a primary volume are migrated according to the number of days they have been inactive.

**MIGRATE(days):** The meaning of MIGRATE(*days*) depends on whether you have defined valid thresholds of occupancy. If you do not define thresholds of occupancy, migration causes all data sets not accessed in the last *days* days to migrate. If you define thresholds of occupancy, DFSMShsm migrates data sets until the low threshold of occupancy is met or until all the data sets inactive for the number of *days* specified have migrated. For *days*, you can specify a decimal number from 0 to 999. **Example:** If *days* is specified as 25, DFSMShsm migrates those data sets on the primary volume that have been inactive for at least 25 days until the low threshold of occupancy is met (if you have defined thresholds of occupancy) or until all data sets inactive for 25 days or longer have been migrated.

**Defaults:** If you are adding a primary volume to DFSMShsm, the default is MIGRATE. If you are changing the attributes of a volume and do not respecify a subparameter, the space management technique does not change.

**Notes:**

1. If you do not specify *days* with the MIGRATE subparameter, or you specify 0, or you specify 1 in a multiple-DFSMShsm-host environment when USERDATASETSERIALIZATION is not specified, the number of days the data set can remain inactive before it is allowed to migrate is the value specified with the DAYS parameter of the SETSYS command.
2. In a multiple-DFSMShsm-host environment, you can add the same volume to different DFSMShsm hosts. When you do that, the space management technique for that volume must be the same in all DFSMShsm hosts, or the last one specified with the ADDVOL command is the one that is in effect.
3. DFSMShsm automatically recalls a data set to a primary volume whose space management technique is MIGRATE even if the data set migrated from a volume whose type of space management is DELETEBYAGE or DELETEIFBACKEDUP. This is true even if you specified SETSYS RECALL(LIKE).

## DENSITY: Specifying the Tape Density

The use of the DENSITY parameter is no longer supported for tape backup or ML2 volumes. The DENSITY parameter is still supported for dump volumes and for existing volumes already defined to DFSMShsm.

**Explanation:** DENSITY(2 | 3 | 4) is an optional parameter specifying the density of the tape dump volume.

DENSITY Value	Meaning
2	Tape density of 32 bytes per millimeter (800 bytes per inch)
3	Tape density of 63 bytes per millimeter (1600 bytes per inch)
4	Tape density of 246 bytes per millimeter (6250 bytes per inch)

**Defaults:** If you are adding a tape dump volume to DFSMShsm, the default is the highest density the device can support. If you are changing the attributes of a tape dump volume and do not specify a subparameter, the density does not change.

**Note:** If you specify DENSITY and UNIT, the density must match the density capability of that type of unit or the command fails. If you specify a density of 2, 3, or 4 for the 3480 Magnetic Tape Subsystem, DFSMShsm ignores it.

## DRAIN | NODRAIN: Specifying Whether a Volume Should Be Selected for Migration Output

**Explanation:** DRAIN | NODRAIN are mutually exclusive, optional subparameters of the MIGRATION parameter that specify whether a volume can be selected for migration output.

**DRAIN** specifies that the DASD volume be emptied. The DRAIN attribute prevents a migration level 1 volume from being selected for migration output. It prevents a migration level 2 volume from being associated with a keyrange.

**NODRAIN** specifies that a migration level 1 volume can be selected for migration output or that a migration level 2 volume can be associated with a keyrange.

## ADDVOL

**Defaults:** When adding a DASD migration volume to DFSMShsm, the default is NODRAIN.

If you are changing the attributes of a migration volume and do not specify either subparameter, the previous drain status is not changed.

### Notes:

1. DRAIN and NODRAIN pertain only to DASD volumes. The ADDVOL command fails if either parameter is specified for tape volumes.
2. The selection of a migration level 1 volume is performed as each data set is being migrated. If a migration level 1 volume has the DRAIN attribute, it will not be selected for migration output.
3. The selection of a DASD migration level 2 volume differs greatly from that of a migration level 1 volume. Migration level 2 selection is the process of associating the volume with a given keyrange of user data sets. The association of a migration level 2 volume with a particular keyrange is recorded in the migration level 2 control record (L2CR). This association takes place during:
  - Processing of the DEFINE MIGRATIONLEVEL2 command.
  - Migration of a data set whose keyrange is not associated with any volume in the L2CR.
  - Migration of a data set when an out-of-space condition occurs on the volume associated with the keyrange for that data set. In this case, another migration level 2 volume is associated with the appropriate keyrange.

The DRAIN attribute does not allow any association of a migration level 2 volume with a keyrange, and thus makes the volume not eligible for migration output. If, however, you use the ADDVOL command with the DRAIN attribute to add a migration level 2 volume that is already recorded in the L2CR, that volume remains eligible for migration output. If you want to prevent migration output eligibility for such a volume, you must (1) issue the DELVOL command with the UNASSIGN subparameter for that volume before (2) adding that volume with the ADDVOL command and the DRAIN attribute. To determine which DASD migration level 2 volumes are associated with a keyrange, use the QUERY MIGRATIONLEVEL2 command.

4. A volume can be reassigned or removed at any time and added again with the same or a different DRAIN attribute.
5. When changing the DRAIN | NODRAIN option for an ML1 volume in a multiple-DFSMShsm-host environment, the target volume selection is affected immediately on only that host where the ADDVOL is entered. Therefore, you need to enter the ML1 DRAIN | NODRAIN option on each system that performs migration to that ML1 volume before that system performs any automatic space management.

## DUMPCLASS: Restricting the Specified Volume to Use a Specific Dump Class

**Explanation:** DUMPCLASS(*class*) is the subparameter of the DUMP parameter restricting the specified volume to use a specific dump class. For *class*, substitute the name of a previously defined dump class for the output copy wanted for the dump.

If *class* is not specified, the dump volume can be used by any dump class. The FREQUENCY and DAY subparameters of the DUMPCLASS parameter of the DEFINE command determine how often a primary volume is dumped to a given dump class.

**Defaults:** None.

**Note:** When you assign a dump volume to a specific dump class, the unit specified by the UNIT parameter of the ADDVOL command is not checked for compatibility with the unit currently defined for the dump class. This allows volumes of multiple unit types to be assigned to the same dump class at the same time. You can switch between using different unit types for the same dump class by redefining the unit for the dump class.

## MIGRATIONLEVEL1 | MIGRATIONLEVEL2: Specifying the Migration Level

**Explanation:** MIGRATIONLEVEL1 | MIGRATIONLEVEL2 are mutually exclusive, optional subparameters of the MIGRATION parameter that you use to specify the level of the migration volumes.

**MIGRATIONLEVEL1** specifies that the migration volume receives migrated data sets from primary volumes. A migration volume specified with this subparameter is called a migration level 1 volume. If the migration level 1 volume you are adding or changing is not mounted when you issue the ADDVOL command, DFSMShsm allocates the volume, which sends a mount request to the operator.

**MIGRATIONLEVEL2** specifies that the migration volume receives data sets migrating automatically from migration level 1 volumes and by command from primary volumes or migration level 1 volumes. A migration volume specified with this subparameter is called a migration level 2 volume.

**Defaults:** If you are adding a migration volume to DFSMShsm, the default is MIGRATIONLEVEL1. If you are changing the attributes of a migration volume, it remains at the same level as it was when it was added to the list of volumes owned or managed by DFSMShsm. If you are changing the attributes of a migration volume and you specify the incorrect level, the ADDVOL command fails.

**Note:** If DFSMShsm migrates data sets from primary volumes directly to a tape migration level 2 volume, you can decide not to add additional migration level 1 volumes to this DFSMShsm host. However, you must have at least one migration level 1 volume added to this DFSMShsm host if:

- SMS data sets require migration level 1 volumes as specified by their management class attributes
- You allow backup versions generated using the BACKDS or HBACKDS commands to be written to migration level 1 volumes.
- You want DFSMShsm to do extent reduction
- You want DFSMShsm to do any type of volume backup and volume dump when you are keeping dump VTOC copy data sets

## OVERFLOW | NOOVERFLOW: Specifying the Usage of a Level 1 Volume for Data Set Backup Versions

**Explanation:** OVERFLOW | NOOVERFLOW are mutually exclusive optional subparameters of the MIGRATION parameter that you use to specify how a level 1 volume is considered during selection for placement of a data set backup version.

**OVERFLOW** specifies that the volume is considered only if: (1) the data set being backed up is larger than a given size, and (2) an out-of-space failure has occurred when using the least-usage and most-free-space selections that do not include the overflow volumes.

**NOOVERFLOW** specifies that the volume is considered with other level 1 volumes for migration data and backup versions of any size.

**Defaults:** If you are adding a migration volume to DFSMShsm, the default is NOOVERFLOW. If you are changing the attributes of a volume and do not specify either subparameter, the overflow attribute is not changed.

**Notes:**

1. The OVERFLOW and NOOVERFLOW subparameters do not apply to the MIGRATIONLEVEL2 parameter. If you specify the OVERFLOW or NOOVERFLOW subparameter when it does not apply, DFSMShsm ignores it.
2. To be considered for placement on a level 1 overflow volume, the data set being backed up must occupy at least 500 tracks.
3. Except for data sets that qualify as SDSPs, data sets migrating to ML1 volumes will not be targeted to OVERFLOW volumes. Migrating data flows to OVERFLOW volumes after you define and use an SDSP on the volume.

## **SMALLDATASETPACKING | NOSMALLDATASETPACKING:** **Specifying Small Data Set Packing on the Level 1 Volume**

**Explanation:** SMALLDATASETPACKING | NOSMALLDATASETPACKING are mutually exclusive, optional subparameters of the MIGRATION parameter specifying whether small data set packing can be done on the migration level 1 volume.

**SMALLDATASETPACKING** specifies that small data set packing can be done on the migration level 1 volume.

**NOSMALLDATASETPACKING** specifies that small data set packing cannot be done on the migration level 1 volume.

**Defaults:** If you are adding a migration level 1 volume to DFSMShsm, the default is NOSMALLDATASETPACKING. If you are changing the attributes of a volume and do not specify either subparameter, the small data set packing status does not change.

**Notes:**

1. The SMALLDATASETPACKING and NOSMALLDATASETPACKING subparameters do not apply to the MIGRATIONLEVEL2 subparameter. If you specify the SMALLDATASETPACKING or NOSMALLDATASETPACKING parameter when it does not apply, DFSMShsm ignores it.
2. Before small data set packing can be done on a migration level 1 volume, you must define a VSAM key-sequenced data set as the small-data-set-packing data set on the migration level 1 volume. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* for details about how to allocate the small-data-set-packing data set. In addition, the SMALLDATASETPACKING parameter must be specified with the SETSYS command. Small-data-set-packing data sets are not required on all migration level 1 volumes.
3. The number of SDSP data sets defined must be at least equal to the maximum number of concurrent volume migration tasks that could be executing in your

complex. Additional SDSPs are recommended for RECALL processing and ABARS processing and if some SDSPs should become full during migration.

## THRESHOLD: Specifying Thresholds of Occupancy

**Explanation:** THRESHOLD is an optional parameter specifying the limits for the percentages of space used on the volume.

The values you specify with THRESHOLD are used differently for the primary volumes, the migration level 1 volumes, and the DASD backup volumes that you define with ADDVOL. To be valid, threshold values must be specified from 0 to 100. A threshold value of 100, however, is interpreted to mean the volume has no thresholds defined.

The following table indicates the threshold values as they apply to each volume type:

Volume Type	Threshold Values
Primary volumes	Both high and low thresholds apply.  If the first limit (high threshold) is specified as 100 or if it is not greater than the second limit (low threshold), or if the low threshold is equal to zero, no thresholds are defined for the volume.
Migration level 1 volumes	Only one threshold applies.  If you specify a <i>thresh2</i> value for migration level 1 volumes, DFSMShsm ignores it.
DASD backup volumes	Only one threshold applies.  If you specify a <i>thresh2</i> value for DASD backup volumes, DFSMShsm ignores it.
Migration level 2 volumes	No threshold values applies.  If you specify the THRESHOLD parameter for migration level 2 volumes, DFSMShsm ignores it.
Tape backup volumes	No threshold values applies.  If you specify the THRESHOLD parameter for tape backup volumes, DFSMShsm ignores it.
Dump volumes	No threshold values applies.  If you specify the THRESHOLD parameter for dump volumes, DFSMShsm ignores it.

For **THRESHOLD(*thresh1*)**, substitute the limit (high threshold) for the percentage of occupied space you want on a volume. When *thresh1* is reached or exceeded, it causes the volume to be eligible for one of the following to occur:

- Interval migration of data sets from a primary volume
- Migration of data sets from level 1 volumes to level 2 volumes during secondary space management

DFSMShsm uses spill or cleanup processing to reduce the amount of occupied space on a full DASD daily backup volume. When the spill process completes on a full DASD daily backup volume or the cleanup process completes on a full DASD spill backup volume and the percentage of occupied space is less than or equal to

the percentage specified by *thresh1*, DFSMShsm no longer considers the DASD volume to be full and uses it for further backup or spill processing.

For **THRESHOLD(*thresh2*)**, substitute the limit (low threshold) for the percentage of space you want to remain occupied on a primary volume after interval migration or volume migration of data sets from the volume that has been completed.

**Defaults:** If you are adding a primary volume to DFSMShsm, the default value for *thresh1* is 100, and the default value for *thresh2* is 0. Therefore, a primary volume has no valid default thresholds. If you are adding a migration level 1 volume to DFSMShsm, the default value for *thresh1* is 100. Therefore, a migration level 1 volume has no valid default threshold. If you are adding a DASD backup volume to DFSMShsm, the default value for *thresh1* is 90.

If you are changing the attributes of a volume and do not specify threshold values, the thresholds are not changed. For a primary volume, if you specify only the high threshold, the low threshold is not changed. If, however, the new high threshold is less than or equal to the low threshold or is equal to 100, the volume no longer has valid thresholds.

**Notes:**

1. If you do not define valid thresholds of occupancy for a primary volume, automatic migration occurs only during automatic primary space management (no interval migration occurs) and is based on the minimum migration age.
2. The *thresh1* and *thresh2* values are positional. For a primary volume, you must specify both a high threshold and a low threshold.
3. In specifying the threshold parameter for migration level 1 volumes, you want to maintain equal free space on all of your migration level 1 volumes. If you use different device types for migration level 1 volumes, you must calculate the appropriate percentages that will make the same amount of free space available on each device type. For example, if you have a mixture of 3390 models 1 and 2, you might specify 88% for model 1 (92M) and 94% for model 2 (96M).

## Selecting Thresholds for Volumes

When you choose thresholds for your volumes, consider the following:

- Size of data sets
- Rate that users require data space
- Frequency of interval migration

Follow this guideline when you set the thresholds of occupancy: The larger the data set is, the lower the threshold. Set the thresholds so users have space for their data sets but data set thrashing is minimized. *Thrashing* is a condition in which the system can do little useful work because of excessive data movement between primary and migration volumes. Data set thrashing can be caused by any of the following reasons:

- Not enough primary volume space
- The high threshold is set too low, causing DFSMShsm to migrate data sets more often than is necessary during interval migration.
- The low threshold is set too low, causing DFSMShsm to migrate too many data sets from primary volumes.
- The minimum migration age is set too low. DFSMShsm uses the minimum migration age for volume processing as a lower limit to determine which data sets are eligible for migration. If the minimum migration age is too low,

automatic primary space management forces the migration of data sets that were recently referred to and are likely to be referred to again soon.

## Examples of How to Code the ADDVOL Command

The following examples present different ways to code the ADDVOL command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Adding a Primary Volume

**Example:** In this example, a primary non-SMS-managed volume is added to the control of DFSMShsm. The volume is added with the characteristics of automatic volume space management, automatic backup, and automatic recall; and thresholds of occupancy are specified.

```
ADDVOL VOL004 UNIT(3390) PRIMARY(AUTOMIGRATION +
AUTOBACKUP AUTORECALL) THRESHOLD(90 65)
```

### Adding a Migration Level 1 Volume

**Example:** In this example, a migration level 1 volume is added to the control of DFSMShsm. The volume is added with the characteristics of no small data set packing, and a threshold of occupancy is specified.

```
ADDVOL VOL123 UNIT(3390) MIGRATION(MIGRATIONLEVEL1 +
NOSMALLDATASETPACKING) THRESHOLD(90)
```

### Adding a Dump Volume

**Example:** In this example, a dump volume is added to the control of DFSMShsm. The volume is specified as a dump volume with a dump class of DAILY.

```
ADDVOL DMP001 UNIT(3590-1) DUMP(DUMPCCLASS(DAILY))
```

### Adding a Tape Spill Backup Volume

**Example:** In this example, a backup volume is added to the control of DFSMShsm. The volume is specified as a spill volume, and a threshold of occupancy is specified.

```
ADDVOL BKP002 UNIT(3590-1) BACKUP(SPILL) THRESHOLD(85)
```

### Adding a Tape Daily Backup Volume

**Example:** In this example, a tape backup volume is added. The volume is specified as a daily backup volume assigned to day 7 in the backup cycle.

```
ADDVOL BKP006 UNIT(3590-1) BACKUP(DAILY(7))
```

### Adding a Tape Migration Level 2 Volume

**Example:** In this example, a tape migration level 2 volume is added.

```
ADDVOL M2TP01 UNIT(3590-1) MIGRATION(MIGRATIONLEVEL2)
```

## Changing the Characteristics of a Primary Volume

**Example:** In this example, the backup characteristics of a primary volume under control of DFSMShsm are changed from no automatic backup to automatic backup, and from a low threshold of 65% to a low threshold of 75%. Because you are changing the low threshold, you must respecify the high threshold to correctly position the new value for the low threshold. You do not have to respecify any parameter for a characteristic that is not to be changed, but the volume must be specified as being in the same volume category.

```
ADDVOL VOL003 UNIT(3390) PRIMARY(AUTOBACKUP) THRESHOLD(90 75)
```

## Assigning the Space Management Attribute to a Primary Volume

**Example:** In this example, the delete-if-backed-up space management attribute is assigned to a primary volume. A backup device category of tape is specified.

```
ADDVOL VOL005 UNIT(3390) PRIMARY(DELETEIFBACKEDUP(10) +  
BACKUPDEVICECATEGORY(TAPE))
```

## Preventing a Volume from Being Selected for Migration Output

**Example:** In this example, DFSMShsm stops targeting a migration volume for any further migration or backup activity.

```
ADDVOL MIG113 U(3390) MIGRATION(ML1 DRAIN)
```

## Specifying a Primary Volume to Be Automatically Dumped

**Example:** In this example, a primary volume is automatically dumped to specified classes (DAILY and WEEKLY) during automatic dump processing.

```
ADDVOL PRIM14 UNIT(3390) PRIMARY(AUTODUMP(DAILY,WEEKLY))
```

## Specifying a Migration Volume to Be Automatically Dumped

**Example:** In this example, a migration volume is to be automatically dumped to specified classes (WEEKLY and MONTHLY) during automatic dump processing.

```
ADDVOL MIG019 UNIT(3390) MIGRATION(ML1 AUTODUMP(WEEKLY,MONTHLY))
```

## Adding a Migration Volume Previously Defined for Aggregate Recovery

**Example:** In this example, a volume that had previously been defined as a migration level 1 volume for aggregate recovery with the DEFINE ARPOOL command is added to DFSMShsm.

```
ADDVOL MIG123 UNIT(3390) MIGRATION(ML1)
```

## Specifying a Migration Volume to Hold Large Backup Versions

**Example:** In this example, a ML1 volume becomes a repository for large data set backup versions, when there is insufficient space on other ML1 volumes.

ADDVOL MIG201 UNIT(3390) MIGRATION(ML1 OVERFLOW)

**ADDVOL**

---

## Chapter 4. ALTERDS: Changing the Parameters that Affect Backup of a Non-SMS-Managed Data Set

The ALTERDS command alters the number of backup versions maintained for a non-SMS-managed data set and the frequency of creating the backup versions for the data set.

If an ALTERDS command is issued for an SMS-managed data set, the command fails and a message is issued. The number of versions and frequency of backup for an SMS-managed data set is determined from the data set's management class attributes.

You can either specify new values with the VERSIONS and FREQUENCY parameters or revert to the DFSMShsm default values with the SYSVERSIONS or SYSFREQUENCY parameters.

- When you specify a frequency of backup for your data set, the value overrides any frequency value you specified with the BACKVOL command or the current DFSMShsm value for FREQUENCY.
- When you specify a value for the VERSIONS parameter for your data set, the value overrides the current DFSMShsm value for VERSIONS.
- When you specify SYSVERSIONS or SYSFREQUENCY, DFSMShsm uses the value you specified with the VERSIONS parameter or the FREQUENCY parameter of the SETSYS command.

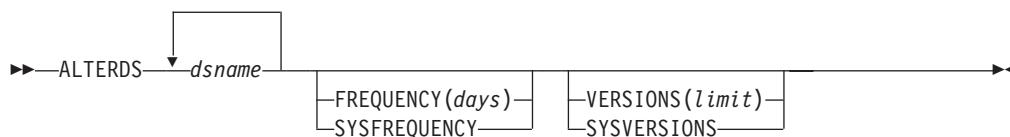
If you did not use the SETSYS command to specify these values, DFSMShsm uses the current DFSMShsm default values for the number of backup versions or the frequency of creation of the backup versions.

You do not have to repeat any of these parameters each time you start DFSMShsm because the values are stored in the BCDS data set record. The record is not deleted even if all of the backup versions for the data set are deleted. To delete this record from the BCDS, along with the record of each backup version, use the ALTERDS command with the SYSVERSIONS and SYSFREQUENCY parameters (reverts to DFSMShsm default values). Then use the BDELETE command to delete the backup versions.

If you specify the ALTERDS command without any parameters, you receive a message that the command has completed successfully. DFSMShsm, however, does not change any of the data set parameters that affect backup.

---

### Syntax of the ALTERDS Command



#### Notes:

1. You can specify VERSIONS or SYSVERSIONS, FREQUENCY or SYSFREQUENCY, or a combination of these parameters with the ALTERDS

## ALTERDS

command, but you must specify at least one parameter with the ALTERDS command to change the backup parameters.

2. Due to the order of processing to determine eligibility for backup, DFSMShsm checks certain conditions prior to processing the ALTERDS parameters. For example, DFSMShsm fails a data set with an unsupported data set organization prior to checking the ALTERDS parameters.

**Note:**

---

## Required Parameters of the ALTERDS Command

This section describes the required parameter of the ALTERDS command.

### **dsname: Specifying the Name of the Data Set Being Altered**

**Explanation:** *dsname* ... is a required positional parameter specifying the fully qualified data set name or list of fully qualified data set names of the non-SMS-managed data sets whose backup attributes are being changed.

**Defaults:** None.

**Notes:**

1. Because *dsname* ... is a required positional parameter, you must specify it immediately after the command name.
2. DFSMShsm does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFSMShsm changes the backup parameters for the entire partitioned data set.

---

## Optional Parameters of the ALTERDS Command

This section describes the optional parameters of the ALTERDS command.

### **FREQUENCY | SYSFREQUENCY: Specifying the Frequency of Backup Versions**

**Explanation:** FREQUENCY | SYSFREQUENCY are mutually exclusive, optional parameters specifying the number of days between backup versions of data sets. If the data set has changed since the last time it was backed up and the specified number of days (frequency) has elapsed since the last backup version was created, a new backup version of the data set is created during incremental volume backup. If, however, the specified number of days has elapsed but the data set was not changed, a new backup version of the data set is not created during volume backup unless you specified the TOTAL parameter of the BACKVOL command.

**FREQUENCY(*days*)** is specified to change the number of days between backup versions of the specified data set. For *days*, substitute a decimal number from 0 to 999. For example, if you specify *days* as 5, DFSMShsm backs up the data set if the data set has changed since the last time DFSMShsm backed it up and the latest backup version is at least five days old. If you specify 0, DFSMShsm creates a backup version of a changed data set every day that automatic backup runs.

**SYSFREQUENCY** is specified to revert to the value you specified with the SETSYS command or to the DFSMShsm default for the frequency of data set backup.

**Defaults:** None.

**Note:** Specify the SYSFREQUENCY parameter only if a previous ALTERDS command has changed the frequency of backup versions for this data set and if you want to return to the frequency specified on the SYSFREQUENCY setting. If you specify the FREQUENCY parameter of the BACKVOL command and also specify the SYSFREQUENCY parameter of the ALTERDS command, DFSMShsm uses the frequency set in the BACKVOL command. DFSMShsm determines the frequency of backup in descending order:

- ALTERDS
- BACKVOL
- SETSYS
- DFSMShsm default

## VERSIONS | SYSVERSIONS: Specifying the Number of Backup Versions to Maintain

**Explanation:** VERSIONS | SYSVERSIONS are mutually exclusive, optional parameters specifying the maximum number of backup versions to be kept when additional versions are made for the data set.

VERSIONS(*limit*) is specified to change the number of backup versions to be kept for the specified data set. The maximum number of backup versions is limited to 29 versions or 100 versions based on the BCDS record length. The following values are the valid maximum allowable number of backup versions for different BCDS record lengths:

- Record length of 2040 to 6543 — 29 versions maximum
- Record length of 6544 or more — 100 versions maximum

For *limit*, substitute a decimal number from 0 to 100. If you specify 0, DFSMShsm does not back up the data set.

SYSVERSIONS is specified to revert to the value you specified with the SETSYS command or to the DFSMShsm default for the number of backup versions to be kept for backup data sets.

**Defaults:** None.

**Notes:**

1. Specify the SYSVERSIONS parameter only if a previous ALTERDS command has changed the number of backup versions for this data set and if you want to return to the number of backup versions specified on the SYSVERSIONS setting. DFSMShsm determines the number of backup versions in the following order:
  - ALTERDS
  - SETSYS
  - DFSMShsm default
2. If you reduce the number of backup versions with this command, DFSMShsm does not delete existing backup versions when the ALTERDS command is processed.

The existing excess backup versions will be deleted to match the specified limit at the time a new backup version is created for the data set. The EXPIREBV command can be used to delete unwanted backup versions of data sets without creating any new backup versions.

## ALTERDS

3. DFSMShsm can keep a maximum of 29 versions or 100 versions, depending on the BCDS record length. Some versions may be kept for a cataloged data set with that name, and some versions kept for uncataloged data sets with that name.

The VERSIONS or SYSVERSIONS parameter indicates the number of backup versions kept for (1) the cataloged data set and (2) the uncataloged data sets. DFSMShsm gives priority, if necessary, to versions of the cataloged data set. For example, if you specify VERSIONS(15), when the 15th backup version of the cataloged data set is made, no more than 14 versions will be kept for the uncataloged data sets.

---

### Examples of How to Code the ALTERDS Command

The following examples present different ways to code the ALTERDS command.

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

#### Changing the Number of Elapsed Days between Backup Versions

**Example:** In this example, the number of elapsed days between creation of backup versions of the specified data set is changed to 3.

```
ALTERDS PAC4485.INPUT.LOAD FREQUENCY(3)
```

#### Changing the Maximum Number of Backup Versions That Are Kept

**Example:** In this example, the maximum number of backup versions kept for the specified data set is changed to twenty-one.

```
ALTERDS JAB3364.REPORT.TEXT VERSIONS(21)
```

#### Specifying Zero Number of Backup Versions That Are Kept

**Example:** In this example, you do not want DFSMShsm to keep any backup versions of the specified data set.

```
ALTERDS RTJ2219.REPORT.TEXT VERSIONS(0)
```

---

## Chapter 5. ARECOVER: Recovering a Specified Aggregate Group

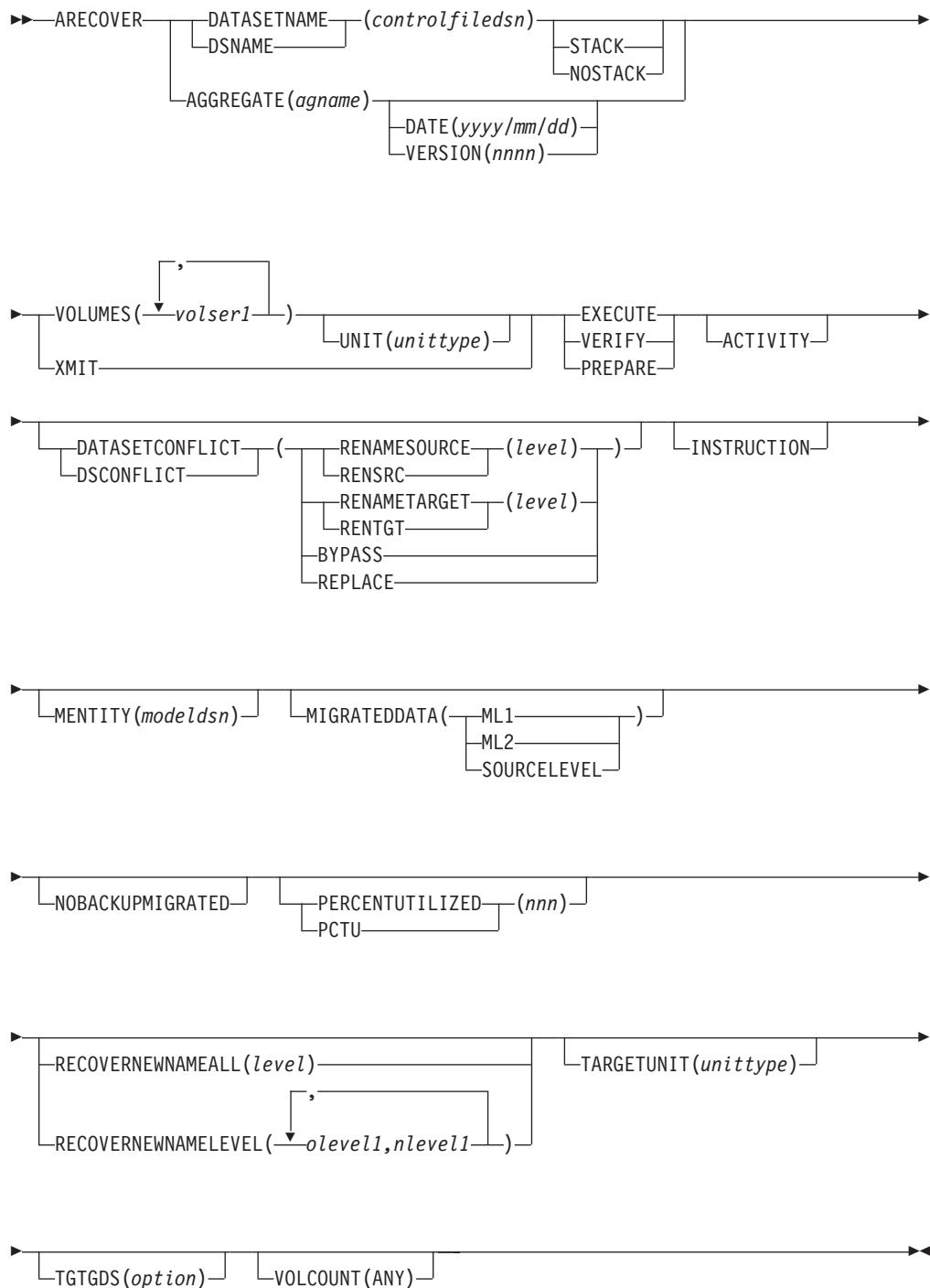
The ARECOVER command performs a recovery of specified aggregated data sets previously backed up with the ABACKUP command. A BCDS must be defined at the aggregate recovery site prior to issuing an ARECOVER command; otherwise, the command fails.

**Note:** In some sections of this book as well as in other books within the DFSMShsm library, you will find the term *Application Backup and Recovery* used rather than *Aggregate Backup and Recovery*. The two terms are interchangeable.

The ABR record contains the information necessary to maintain an inventory of aggregate backup and recovery activities for a particular aggregate group. To create an ABR record, issue the ARECOVER command with the PREPARE option, catalog the aggregate backup files, and add the ABACKUP output volumes to the HSMABR RACF tape volume set if requested. This allows you to issue subsequent ARECOVER commands using the aggregate group name. If the ABR record has not been created prior to issuing the ARECOVER command, the command must include the DATASETNAME and VOLUMES parameters. Once the ARECOVER command is issued and it is determined that an ABR record does not exist, one is automatically created.

If you issue the ARECOVER command with the AGGREGATE parameter, an aggregate backup and recovery support (ABARS) activity record (ABR record for the specific aggregate) must exist in the BCDS at the recovery site in order to perform a successful recovery of the previously backed-up aggregate data sets. To create an ABR record, see “How to Create the ABR Record” on page 56. Refer to the *z/OS DFSMShsm Storage Administration Guide* for a description of the information contained in the ABR record.

## Syntax of the ARECOVER Command



### Notes:

1. The SETSYS MAXABARSADDRESSSPACE command determines the number of ARECOVER commands that can run at one time. The maximum number is 64.
2. DFSMSHsm can process only one ARECOVER command for each control file data set name or aggregate group at one time.

3. The volumes must be listed in the order that they are to be mounted or the command fails.
4. Issuing ARECOVER with AGGREGATE requires that ARECOVER DATASETNAME be issued previously using the PREPARE parameter.
5. In a multiple address space for DFSMShsm environment, ABARS commands, like ARECOVER, can only be issued by the host identified as the main host. DFSMShsm ignores the ABARS commands if directed to a host identified as HOSTMODE=AUX.

## Required Parameters of the ARECOVER Command

This section describes the required parameters of the ARECOVER command.

### AGGREGATE: Specifying the Aggregate Group to be Recovered

**Explanation:** AGGREGATE(*agname*) is a required parameter that identifies the aggregate group to be recovered.

When you specify AGGREGATE(*agname*), the most current version of the backup output is used for recovery unless DATE or VERSION is specified.

An ABR record must exist at the recovery site to support the AGGREGATE parameter. During AGGREGATE processing, the ABR record is read for the aggregate group. All files associated with the ABR record must be catalogued. If the files are not catalogued and ABR records exist for multiple copies, the process is repeated until an ABR record is found for one of the copies, with the proper files catalogued. If no ABR record is found with the proper files catalogued, a message is issued and the ARECOVER AGGREGATE fails. If this occurs, you must use ARECOVER DATASETNAME(*controlfiledsn*) with the PREPARE parameter to create the ABR record and catalog the proper files. See “How to Create the ABR Record” on page 56 to create the ABR record.

**Notes:**

1. Do not specify AGGREGATE when DATASETNAME is specified.
2. You must specify either EXECUTE, VERIFY, or PREPARE when AGGREGATE is specified.
3. If PREPARE is specified with the AGGREGATE parameter, INSTRUCTION, ACTIVITY, or both parameters must also be specified.

**Defaults:** None.

### DATASETNAME: Specifying the Control File

**Explanation:** DATASETNAME(*controlfiledsn*) is a required parameter used to identify the control file that contains information about the aggregated data sets previously backed up with the ABACKUP command.

*controlfiledsn* specifies the aggregate backup control file to be recovered by aggregate recovery. For *controlfiledsn*, substitute the name of the control file you want recovered. The control file name is stored in the volume header label in the format *outputdatasetprefix.C.CcVnnnn*. This is the *outputdatasetprefix* previously specified in the aggregate group.

If the control file is not catalogued at your recovery site, you can use ARECOVER DATASETNAME(*controlfiledsn*) with the PREPARE parameter to create the ABR

## ARECOVER

record, which contains the control file names. See “How to Create the ABR Record” on page 56 to create the ABR record.

**Notes:**

1. You must specify either VOLUMES(*volser1...,volsern*) or XMIT when DATASETNAME is specified.
2. You must specify either EXECUTE, VERIFY, or PREPARE when DATASETNAME is specified.
3. Do not specify AGGREGATE when DATASETNAME is specified.

**Defaults:** None.

### VOLUMES | XMIT: Specifying the Volume Type

**Explanation:** VOLUMES(*volser1...,volsern*) | XMIT are mutually exclusive, required parameters identifying the volumes associated with aggregate recovery processing.

**Note:** VOLUMES and XMIT are valid only when DATASETNAME is specified.

**VOLUMES(*volser1...,volsern*)** specifies from 1 to 15 volumes where the control file to be recovered resides. For (*volser1...,volsern*), substitute the serial numbers of the volumes where the control file resides. The serial numbers must be specified in the same order as they are listed in message ARC6061I issued at the conclusion of the ABACKUP processing.

**XMIT** tells DFSMShsm that the ABACKUP output has been transmitted, and it also tells DFSMShsm *not* to use the *volser* and *unit* information in the control file to drive the recovery. Instead, ARECOVER searches the catalog for the control and data files and, if found, uses the *unit* and *volser* from the catalog when allocating these data sets. UNIT and VOLUMES are invalid if the XMIT parameter is present, and if they are specified, ARC6002E reports an error.

**Defaults:** None.

### EXECUTE | VERIFY | PREPARE: Specifying Whether Data Movement or Verification Should Occur or Whether an ABR Record Should Be Created

**Explanation:** EXECUTE | VERIFY | PREPARE are mutually exclusive, required parameters specifying whether aggregate recovery or error checking is performed or an ABR record is created.

**EXECUTE** specifies that DFSMShsm perform aggregate recovery.

**VERIFY** specifies that DFSMShsm should only verify the aggregate recovery configuration. No data sets will be recovered. Verification determines if errors or data set conflicts exist.

**PREPARE** specifies that an ABR record should be created without further verification processing or data movement if it does not already exist at the recovery site.

When PREPARE is specified, and an ABR record already exists for the specified aggregate group version and all the associated ARECOVER input files are properly cataloged, a message is issued and the PREPARE function ends. If the ABR record already exists but one or more associated files are not cataloged, a message is

issued for each file that is not cataloged, the ABR record is deleted (with an accompanying message), and the PREPARE function continues.

During ARECOVER processing, when VERIFY or PREPARE is specified, messages are issued indicating the amount of storage required to perform a successful aggregate recovery. The amounts of L0, ML1, and ML2 storage required are retrieved from the ABR record and displayed separately along with the combined total storage requirement.

**Notes:**

1. Issue the ARECOVER VERIFY command to determine the storage requirements for data movement prior to issuing the ARECOVER EXECUTE command, and ensure that sufficient storage space is available. Refer to the text below for storage requirement information when using the VERIFY parameter.
2. If the ABR record does not exist at the recovery site when EXECUTE or VERIFY is specified on an ARECOVER DATASETNAME(controlfiledsn) command, the ABR record is created at the recovery site and EXECUTE or VERIFY processing continues.
3. You must specify either EXECUTE, VERIFY, or PREPARE when DATASETNAME or AGGREGATE is specified.
4. If PREPARE is specified with the AGGREGATE parameter, INSTRUCTION, ACTIVITY, or both parameters must also be specified.

**Defaults:** None.

## Optional Parameters of the ARECOVER Command

This section describes the optional parameters of the ARECOVER command.

### ACTIVITY: Recovering the Activity Log

**Explanation:** ACTIVITY is an optional parameter specifying the recovery of the activity log data set if one exists on the output tape for the specified aggregate group.

Specify the ACTIVITY parameter the first time ARECOVER is executed. Specifying ACTIVITY with the EXECUTE, VERIFY, or PREPARE parameters causes recovery of the activity log, if one exists. If the activity log data set does not exist on the ABACKUP output tapes and ACTIVITY is specified, an error message is issued and ARECOVER processing continues.

Refer to the *z/OS DFSMShsm Storage Administration Guide* for the information contained in the activity log data set.

**Defaults:** None.

### DATASETCONFLICT: Resolving Data Set Naming Conflicts

**Explanation:** DATASETCONFLICT is an optional parameter used to resolve any data set naming conflicts.

**Note:** DATASETCONFLICT may be specified in conjunction with the RECOVERNEWNAMEALL or RECOVERNEWNAMELEVEL parameters.

Subparameter	Explanation
RENAMESOURCE	<b>DATASETCONFLICT(RENAMESOURCE(<i>level</i>)</b> specifies that data sets from the aggregate backup output files are recovered with the new high-level qualifier specified by the <i>level</i> option.
RENAMETARGET	<b>RENAMETARGET(<i>level</i>)</b> specifies that existing data sets at the recovery site are renamed with the high-level qualifier specified by <i>level</i> , and data sets from the aggregate backup output files are recovered with their original names.
	An ALTER NEWNAME is performed for the existing data set name. For a detailed explanation of the ALTER NEWNAME function, refer to <i>z/OS DFSMS Access Method Services for Catalogs</i> .
BYPASS	<b>DATASETCONFLICT(BYPASS)</b> specifies that the data sets from the aggregate backup output files are skipped and not recovered.
REPLACE	<b>DATASETCONFLICT(REPLACE)</b> specifies that the existing data set at the recovery site is deleted and replaced with the data set from the aggregate backup output files.

Special care should be taken when changing the high-level qualifier so that the existing data set does not become uncataloged. This may occur when no catalog alias exists for the new high-level qualifier.

**Note:** When using REPLACE, the data set is deleted prior to attempting the recovery of the data set from the aggregate backup output files. If the recovery fails for any reason, the data set remains deleted. Reasons for failure include, among others:

- I/O errors on the input tape
- Failure to allocate the new data set
- Recovering at a site that does not support the type of data set being recovered.

Not all actions performed by DATASETCONFLICT subparameters are valid for all data sets. If conflicts still exist, refer to the *z/OS DFSMShsm Storage Administration Guide* for additional information on data set naming resolution.

**Defaults:** None.

## DATE | VERSION: Specifying the Specific Aggregate Group to be Recovered

**Explanation:** DATE | VERSION are optional parameters you can use to specify the specific aggregate group to recover.

**Note:** DATE or VERSION are valid only when you specify AGGREGATE(*agname*).

DATE(*yyyy/mm/dd*) indicates the date of the aggregate group version you want recovered.

- *yyyy* is the 4-digit year
- *mm* is the month (01-12)
- *dd* is the day of the month (01-31)

**Note:** If more than one aggregate version has been created on the date you specify, the most current version on the specified date is selected.

**VERSION(nn nn)** indicates the specific version of the aggregate group to be recovered.

**Defaults:** If neither DATE nor VERSION is specified, the most current aggregate group version is recovered.

## INSTRUCTION: Recovering the Instruction Data Set

**Explanation:** INSTRUCTION is an optional parameter to recover the instruction data set if one exists on the output tape for the specified aggregate group at the backup site.

Specify the INSTRUCTION parameter the first time ARECOVER is executed for a given aggregate group. Specifying INSTRUCTION with the EXECUTE, VERIFY, or PREPARE parameters causes recovery of the instruction data set, if one exists. If the instruction data set does not exist on the ABACKUP output tapes and INSTRUCTION is specified, an error message is issued and ARECOVER processing continues.

Refer to the *z/OS DFSMShsm Storage Administration Guide* for the information contained in the instruction data set.

**Defaults:** None.

## MENTITY: Specifying a Model Entity

**Explanation:** MENTITY(*modeldsn*) is an optional parameter specifying the predefined model entity. It is used to define discrete profiles to RACF for data sets to be recovered. For *modeldsn*, substitute the data set name of the predefined model entity. Only those data sets previously protected by discrete profiles and defined to RACF before aggregate backup are protected by discrete profiles using the model entity. If the MENTITY parameter is specified in the ARECOVER command but the model entity is not predefined, aggregate recovery fails.

If MENTITY is not specified and a discrete profile is not predefined, the data set is recovered with a default discrete profile. The profile owner is set to the high level qualifier of the data set, and UACC is set to NONE. If a RACF profile has been predefined for the data sets, they are recovered with this predefined profile.

For more information on RACF discrete profiles and model entities, see *z/OS Security Server RACF Security Administrator's Guide*.

**Defaults:** None.

## MIGRATEDDATA: Specifying the Migration Level for Recovering Migrated Data Sets

**Explanation:** MIGRATEDDATA is an optional parameter specifying the migration level when recovering migrated data sets.

Subparameter	Explanation
ML1	<b>MIGRATEDDATA(ML1)</b> specifies that all migrated data sets are recovered to migration level 1 DASD. This is the default if you do not specify MIGRATEDDATA.
ML2	<b>MIGRATEDDATA(ML2)</b> specifies that all migrated data sets are recovered to nonspecific tape volumes which are then managed by DFSMShsm as migration level 2 volumes. <b>Note:</b> You must specify the tape unit name when recovering migrated data sets to nonspecific volumes. Use the SETSYS ARECOVERML2UNIT command to specify the tape unit name in a nonspecific volume request. Valid tape unit names or esoteric unit names specified in the SETSYS USERUNITTABLE command are also accepted. If the unit name is not specified, the default tape unit name is 3590-1.
SOURCELEVEL	<b>MIGRATEDDATA(SOURCELEVEL)</b> specifies that all ML1 migrated data sets at the ABACKUP site are recovered to migration level 1 DASD; all ML2 DASD or ML2 tape migrated data sets are recovered to nonspecific tape volumes and then ADDVOLed as migration level 2 volumes.

**Defaults:** None.

## NOBACKUPMIGRATED: Specifying That Automatic Backup Does Not Occur for Recovered Migrated Data Sets

**Explanation:** NOBACKUPMIGRATED is an optional parameter to specify that recovered migrated data sets are *not* backed up during automatic backup. If you do not specify the parameter, DFSMShsm backs up recovered migrated data sets residing on ML1 DASD the next time automatic backup occurs.

**Defaults:** None.

## PERCENTUTILIZED: Specifying the Percentage of DASD Space Used During ARECOVER of Data Sets to Non-SMS Volumes

**Explanation:** PERCENTUTILIZED(*nnn*) is an optional parameter that allows DFSMSdss to fill the L0 volumes in the associated ARPOOL up to 100% (100) for this aggregate.

For *nnn*, substitute an integer between 1 and 100.

**Defaults:** If you do not specify a PERCENTUTILIZED value, the default value is specified by the SETSYS ARECOVERPERCENTUTILIZED parameter. The SETSYS ARECOVERPERCENTUTILIZED default value is 80% (080).

## RECOVERNEWNAMEALL | RECOVERNEWNAMELEVEL: Specifying a High-Level Qualifier for Recovered Data Sets

**Explanation:** RECOVERNEWNAMEALL is an optional parameters that you use to specify a new high-level qualifier for recovered data sets.

**RECOVERNEWNAMEALL(*level*):** You use this parameter to rename all data sets that you want to recover with the high-level qualifier *level* option.

**RECOVERNEWNAMELEVEL(*olevel1,nlevel1, ...*):** You use this parameter to specify that all data sets having a high-level qualifier of *olevelx* are recovered with a new high-level qualifier of *nlevelx*. The maximum number of *olevelx,nlevelx* qualifier pairs is 30.

### Notes:

1. The RECOVERNEWNAMEALL and RECOVERNEWNAMELEVEL parameters allow data sets to be renamed before verification checks for like-named conflicts. These rename parameters apply to data sets in the INCLUDE and ALLOCATE lists (except for ICF user catalogs in the ALLOCATE list), but do not apply to ACCOMPANY data sets. In addition, migrated source VSAM data sets may not be renamed. If a rename criterion applies to a migrated source VSAM data set, a message is issued and the data set is not renamed.
2. If a rename criterion applies to a nonmigrated source VSAM data set, the new component names are not generated by ARECOVER processing but are generated by DFSMSdss if the data set name is from the INCLUDE list or by SMS VSAM allocation if the data set is from the ALLOCATE list.
3. If RECOVERNEWNAMEALL is specified, a message indicates that all data sets will be renamed with the specified level. If RECOVERNEWNAMELEVEL is specified, a message lists the level pairs specified, indicating that each data set matching the old level will be renamed to the corresponding new level. Each data set meeting a rename criterion is recovered with the new name during data movement. Like-named conflicts created by the new name are evaluated during the conflict resolution process. Refer to the *z/OS DFSMShsm Storage Administration Guide* for additional information about data set name conflict resolution.

**Defaults:** None.

## STACK | NOSTACK: Specifying Whether or Not the ABACKUP Output is STACKED

**Explanation:** STACK | NOSTACK are optional parameters you can use to specify to the ARECOVER DATASETNAME processing whether or not the ABACKUP output was stacked. When the ABACKUP output files are stacked, the ARECOVER processing will allocate file sequence number four.

**STACK** specifies that DFSMShsm stacked the ABACKUP output files onto a minimum number of tape volumes during ABACKUP processing.

**NOSTACK** specifies that DFSMShsm did not stack the ABACKUP output files during ABACKUP processing. The NOSTACK parameter allows an installation the capability to ARECOVER backups performed on a down-level version of DFSMShsm.

## TARGETUNIT: Specifying Unit Types to Be Used for ARECOVER

**Explanation:** TARGETUNIT(*unittype*) is an optional parameter specifying the tape unit type for data sets being recovered to tape devices during an aggregate recovery.

For *unittype*, substitute the type of tape unit.

The following are valid types of tape units:

- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:

- 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.
- 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.
- 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.

**Note:** When you perform an ABACKUP function with the 3480X or 3490 IDRC, you must use the same tape unit (3480X or 3490 IDRC) to do a successful RECOVER. Otherwise, the data cannot be read.

**Defaults:** If you do not specify this parameter, DFSMShsm uses the unit type specified with the SETSYS ARECOVERUNITNAME parameter.

## TGTGDS: Overriding the SETSYS ARECOVERTGTGDS Command

**Explanation:** TGTGDS(*option*) is used to override the specification of the SETSYS ARECOVERTGTGDS command. The TGTGDS parameter is passed to DFSMSdss and provides greater flexibility managing SMS-managed generation data sets that are being restored to level 0 DASD.

The valid values for *option* are as follows:

Option	Explanation
DEFERRED	TGTGDS(DEFERRED) specifies that the target data set is to be assigned the DEFERRED status.
ACTIVE	TGTGDS(ACTIVE) specifies that the target data set is to be assigned the ACTIVE status, for example, rolled into the GDG base.
ROLLEDOFF	TGTGDS(ROLLEDOFF) specifies that the target data set is to be assigned the ROLLEDOFF status.
SOURCE	TGTGDS(SOURCE) specifies that the target data set is to be assigned the same status as that of the source data set.

**Defaults:** This parameter defaults to the setting specified on the SETSYS ARECOVERTGTGDS command. If SETSYS ARECOVERTGTGDS was not specified, then this parameter defaults to SOURCE.

## UNIT: Specifying Unit Types Used for ARECOVER

**Explanation:** UNIT(*unittype*) is an optional parameter specifying the tape unit type to be allocated for the recovering of data sets. The VOLUMES parameter is required when you use UNIT.

For *unittype*, substitute the type of tape unit.

The following are valid types of tape units:

- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:

- 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.
- 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.
- 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.

**Note:** When you perform an ABACKUP with the 3480X or 3490 IDRC, you must use the same tape unit (3480X or 3490 IDRC) to do a successful RECOVER. Otherwise, the data cannot be read.

**Defaults:** If *unittype* is not specified, the default is the *unittype* specified on the SETSYS ABARSUNITNAME command. If UNIT has not been specified with the ARECOVER command nor the SETSYS ABARSUNITNAME command, the default is 3590-1.

## VOLCOUNT: Allowing Data Sets to Expand to Multivolume as Necessary During ARECOVER

**Explanation:** VOLCOUNT(ANY) is an optional parameter that affects how DFSMShsm will invoke DFSMSdss during the ARECOVER of data sets that were dumped by DFSMSdss.

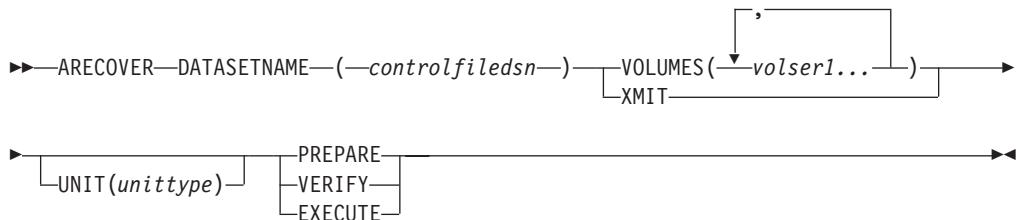
ANY specifies for DFSMShsm to pass the VOLCOUNT(ANY) parameter to DFSMSdss during the ARECOVER of data dumped by DFSMSdss (L0 data sets). This parameter affects the way SMS-managed data set allocations are performed by DFSMSdss for the L0 data sets dumped from primary volumes. Refer to the *z/OS DFSMSdss Storage Administration Reference* under the topic of the RESTORE command for more specific information about the restrictions and limitations of the DFSMSdss VOLCOUNT parameter. The result is the allocation of the target data sets on as many volumes as required, to a maximum of 59.

The VOLCOUNT parameter is used to override the global SETSYS ABARSVOLCOUNT environment. Your current environment can be determined by issuing the QUERY ABARS command and examining the ARC6036I messages.

**Defaults:** None.

## How to Create the ABR Record

If the ABR record does not exist for any reason, one must be created. The ARECOVER command syntax to create the ABR record is shown below. Only the relevant command parameters are listed.



### Notes:

1. DATASETNAME is the keyword parameter used to specify the control file data set name.
2. Either VOLUMES or XMIT is required. When VOLUMES is specified (UNIT is optional), the volume list is used to allocate the control file to read it. When XMIT is specified, the required files must already be cataloged, and the system supplies the volume list.
3. PREPARE, VERIFY, and EXECUTE are mutually exclusive. Use the PREPARE parameter with ARECOVER to create the ABR record without the overhead of verification processing or data movement. If you specify VERIFY or EXECUTE, the ABR record is created followed by the VERIFY or EXECUTE processing.

## Examples of How to Code the ARECOVER Command

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

The following examples reflect the simplified ARECOVER commands, which require the user only to know the name of the aggregate group that has been backed up. You do not need to enter the control file data set name (and VOLUMES/UNIT, if XMIT is not specified) each time an aggregate recovery is performed.

### Preparing a New ABR Record

**Example:** In this example, the ARECOVER command for the aggregate group, PAY1.C.C01V0001, is prepared. This preparation eliminates the overhead of verification processing or data movement associated with the VERIFY or EXECUTE parameter. TAPE23 is specified as the volume for the aggregate group, and 3590-1 is specified as the tape unit type to be allocated for the aggregate group. INSTRUCTION recovers the instruction data set and ACTIVITY recovers the activity log data set.

```

ARECOVER DATASETNAME(PAY1.C.C01V0001) VOLUMES(TAPE23) +
  UNIT(3590-1) PREPARE INSTRUCTION ACTIVITY
  
```

## Verifying Aggregate Recovery

**Example:** In this example, the ARECOVER command for the aggregate group, PAY1.C.G0001V00, is verified. This verification ensures that the command can complete successfully with no errors. The data sets to be recovered, as indicated by the aggregate group, are checked to ensure that no like-named data set conflicts exist. No data sets are recovered.

```
ARECOVER AGGREGATE(PAY1) VERIFY
```

## Recovering the Aggregated Data Sets

**Example:** In this example, the data sets to be recovered, as indicated by the aggregate group, PAY1.C.G0001V00, are recovered. 3590-1 is specified as the tape unit type for receiving data sets recovered to tape devices.

```
ARECOVER AGGREGATE(PAY1) EXECUTE TARGETUNIT(3590-1)
```

## Replacing Like-Named Aggregated Data Sets during Recovery

**Example:** In this example, the data sets specified by the aggregate group, PAY1.C.G0001V00, are recovered. Any like-named data set that exists at the aggregate recovery site is deleted and is replaced with the corresponding aggregate backup data set. DATASETCONFLICT (REPLACE) is the proper parameter which deletes the existing data set at the ARECOVER site and recovers the ABACKUP data set.

```
ARECOVER AGGREGATE(PAY1) EXECUTE DATASETCONFLICT(REPLACE)
```

## Recovering RACF-Protected Aggregated Data Sets

**Example:** In this example, the data sets to be recovered as indicated by the aggregate group, PAY1.C.G0001V00, are recovered. When those data sets previously protected by discrete profiles and defined to RACF before aggregate backup are recovered, they are protected by the predefined model entity, USRT004.MODEL.PROF.

```
ARECOVER AGGREGATE(PAY1) EXECUTE MENTITY(USRT004.MODEL.PROF)
```

## Specifying the Percentage of DASD Space for Non-SMS Volumes

**Example:** This example shows how to fill NON-SMS Level 0 volumes to 90% of capacity during ARECOVER processing.

```
ARECOVER AGGREGATE(PAY1) EXECUTE PERCENTUTILIZED(090)
```

## Specifying the Migration Level of Recovered Migrated Data Sets

**Example:** This example shows how to recover all migrated data sets to ML2 tape volumes during ARECOVER processing.

```
ARECOVER AGGREGATE(PAY1) EXECUTE MIGRATEDDATA(ML2)
```

## Specifying a High-Level Qualifier

**Example:** This example shows how to rename all data sets that are recovered from ABACKUP output files with the high level qualifier of PAY1. The existing high level qualifier will be replaced.

```
ARECOVER AGGREGATE(PAY1) EXECUTE RECOVERNEWNAMELEVEL(PAY1)
```

## Recovering an Aggregate Containing L0 Data Sets in the Include List Which Failed Due to Inadequate Space

**Example:** In this example, L0 data sets were not recovered successfully by DFSMSdss because an inadequate space condition occurred. The ARECOVER command can be issued again with the VOLCOUNT parameter, allowing the failing data sets to be recovered to as many volumes as needed (maximum of 59) for successful allocation.

```
ARECOVER DSNAME(PAY1.C.C01V0002) VOLUMES(TAPE24) VOLCOUNT(ANY) EXECUTE
```

## Sample Activity Log Output for the ARECOVER Command

```

PAGE 0001 Z/OS DFMSHSM 1.7.0 DATA FACILITY HIERARCHICAL STORAGE MANAGER 05.081 09:34
ARC6102I AGGREGATE RECOVERY STARTING USING CONTROL FILE DATA SET PAY1.C.C01V0002, AT 18:16:00,
STARTED TASK = DFHSMABR.ABAR0154
ARC6030I ACTIVITY LOG FOR CONTROL FILE DATA SET PAY1.C.C01V0002 WILL BE ROUTED TO SYSOUT=A
ARC6115I AGGREGATE RECOVERY USING CONTROL FILE DATA SET PAY1.C.C01V0002 WILL USE VOLUMES
A00020
A00016
ARC6120I CONFLICT RESOLUTION ACTION 'REPLACE' WILL BE USED FOR DATA SET PAY1.PY001.NAMES DURING AGGREGATE RECOVERY
ARC6120I CONFLICT RESOLUTION ACTION 'REPLACE' WILL BE USED FOR DATA SET PAY2.PY002.RETIRE DURING AGGREGATE RECOVERY
ARC6120I CONFLICT RESOLUTION ACTION 'REPLACE' WILL BE USED FOR DATA SET PAY2.PY002.SOCSEC DURING AGGREGATE RECOVERY
ARC6120I CONFLICT RESOLUTION ACTION 'REPLACE' WILL BE USED FOR DATA SET PAY2.PY002.STATUS.G0002V00 DURING AGGREGATE RECOVERY
ARC6120I CONFLICT RESOLUTION ACTION 'REPLACE' WILL BE USED FOR DATA SET PAY1.INSTRUCT DURING AGGREGATE RECOVERY
ARC6120I CONFLICT RESOLUTION ACTION 'REPLACE' WILL BE USED FOR DATA SET PAY1.PY002.IRA DURING AGGREGATE RECOVERY
ARC6108I DATA SET PAY1.PY001.NAMES HAS BEEN UNCATALOGED DURING AGGREGATE RECOVERY
ARC6108I DATA SET PAY2.PY002.RETIRE HAS BEEN UNCATALOGED DURING AGGREGATE RECOVERY
ARC6108I DATA SET PAY2.PY002.SOCSEC HAS BEEN DELETED DURING AGGREGATE RECOVERY
ARC6108I DATA SET PAY2.PY002.STATUS.G0002V00 HAS BEEN DELETED DURING AGGREGATE RECOVERY
ARC6108I DATA SET PAY1.INSTRUCT HAS BEEN DELETED DURING AGGREGATE RECOVERY
ARC6108I DATA SET PAY1.PY002.IRA HAS BEEN DELETED DURING AGGREGATE RECOVERY
ARC6004I 000{ ARECOVER PAGE 0001      5695-DF175 DFMSDss V1R1.0 Data Set Services      92.238 18:16
ARC6004I 000{ ARECOVER ADR035I (SCH)-PRIME(06), INSTALLATION EXIT ALTERED BYPASS FAC CLASS CHK DEFAULT TO YES
ARC6004I 000{ ARECOVER RESTORE DATASET(FILTERDD(SYS00016)) -
ARC6004I 000{ ARECOVER INDDNAME(SYS00015) -
ARC6004I 000{ ARECOVER OUTDYNAM( -
ARC6004I 000{ ARECOVER (DUMPDS) -
ARC6004I 000{ ARECOVER ) -
ARC6004I 000{ ARECOVER PERCENTUTILIZED( -
ARC6004I 000{ ARECOVER 080 -
ARC6004I 000{ ARECOVER ) -
ARC6004I 000{ ARECOVER SPHERE -
ARC6004I 000{ ARECOVER TGTGDS(SOURCE) -
PAGE 0002 Z/OS DFMSHSM 1.7.0 DATA FACILITY HIERARCHICAL STORAGE MANAGER 05.081 09:34
ARC6004I 000{ ARECOVER CATALOG FORCE
ARC6004I 000{ ARECOVER ADR101I      RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ARC6004I 000{ ARECOVER ADR109I      RI01 (01), 92238 18:16:41 INITIAL SCAN OF USER CONTROL STATEMENTS COMPLETED.
ARC6004I 000{ ARECOVER ADR006I (001)-SETUP(01), 92238 18:16:42 EXECUTION BEGINS
ARC6004I 000{ ARECOVER ADR780I (001)-TDDS (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN LOGICAL DATA SET FORMAT
ARC6004I 000{ ARECOVER ADR396I (001)-NEWDS(01), DATA SET PAY2.PY002.SOCSEC ALLOCATED, ON VOLUME(S): DUMPDS
ARC6004I 000{ ARECOVER ADR465I (001)-DALOC(01), DATA SET PAY2.PY002.SOCSEC HAS BEEN CATALOGED IN CATALOG TPCMST1
ARC6004I 000{ ARECOVER ADR489I (001)-TDLOG(01), DATA SET PAY2.PY002.SOCSEC WAS RESTORED
ARC6004I 000{ ARECOVER ADR396I (001)-NEWDS(01), DATA SET PAY2.PY002.STATUS.G0002V00 ALLOCATED, ON VOLUME(S): DUMPDS
ARC6004I 000{ ARECOVER ADR465I (001)-DALOC(01),
ARC6004I 000{ ARECOVER DATA SET PAY2.PY002.STATUS.G0002V00 HAS BEEN CATALOGED IN CATALOG TPCMST1
ARC6004I 000{ ARECOVER ADR489I (001)-TDLOG(01), DATA SET PAY2.PY002.STATUS.G0002V00 WAS RESTORED
ARC6004I 000{ ARECOVER ADR396I (001)-NEWDS(01), DATA SET PAY1.INSTRUCT ALLOCATED, ON VOLUME(S): DUMPDS
ARC6004I 000{ ARECOVER ADR465I (001)-DALOC(01), DATA SET PAY1.INSTRUCT HAS BEEN CATALOGED IN CATALOG TPCMST1
ARC6004I 000{ ARECOVER ADR489I (001)-TDLOG(01), DATA SET PAY1.INSTRUCT WAS RESTORED
ARC6004I 000{ ARECOVER ADR454I (001)-TDLOG(01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED
ARC6004I 000{ ARECOVER PAY2.PY002.SOCSEC
ARC6004I 000{ ARECOVER PAY2.PY002.STATUS.G0002V00
ARC6004I 000{ ARECOVER PAY1.INSTRUCT
ARC6004I 000{ ARECOVER PAGE 0002      5695-DF175 DFMSDss V1R1.0 Data Set Services      92.238 18:16
ARC6004I 000{ ARECOVER ADR013I (001)-CLTSK(01), 92238 18:17:00 TASK COMPLETED WITH RETURN CODE 0000
ARC6004I 000{ ARECOVER ADR012I (SCH)-DSSU (01), 92238 18:17:00 DFMSDss PROCESSING COMPLETE. HIGHEST RETURN CODE IS 0000
ARC6109I REPLACE OPTION SPECIFIED,
GDG DATA SET PAY2.PY002.STATUS.G0002V00 HAS BEEN RESTORED USING EXISTING GDG ATTRIBUTES
ARC6116I THE FOLLOWING DATA SETS WERE SUCCESSFULLY RECOVERED USING AGGREGATE GROUP PAY1:
PAY1.PY001.NAMES
PAY2.PY002.RETIRE
PAY2.PY002.SOCSEC
PAY2.PY002.STATUS.G0002V00
PAY1.INSTRUCT
PAY1.PY002.IRA
ARC6116I THE FOLLOWING DATA SETS WERE SUCCESSFULLY ALLOCATED USING AGGREGATE GROUP PAY1:
PAY2.PY001.BENEFIT
ARC6116I THE FOLLOWING DATA SETS WERE SUCCESSFULLY CATALOGED USING AGGREGATE GROUP PAY1:
PAY2.PY001.TAXES
ARC6103I AGGREGATE RECOVERY HAS COMPLETED FOR AGGREGATE GROUP PAY1, USING CONTROL FILE DATA SET PAY1.C.C01V0002,
AT 18:17:31, RETCODE = 000

```



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## Chapter 6. AUDIT: Auditing DFSMShsm

The AUDIT command operates differently depending on whether it is issued for a control data set or for a common queue. The following two sections describe how the AUDIT command works with control data sets and common queues.

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### Auditing Control Data Sets

The AUDIT command detects, reports, diagnoses, and often provides repairs for discrepancies between control data sets.

The purpose of DFSMShsm is to manage your inactive data and to make DASD space available where it is needed. It does this by automating tasks and providing interactive tools. Automated tasks help you to move from a *user-managed* to a *system-managed* environment. The most important goal of DFSMShsm, however, is to provide data integrity.

To ensure that you have data integrity, DFSMShsm uses numerous data set records to track individual data sets. These records are contained in:

- Master catalog, which is a list of data sets for the entire system
- User catalog, which is a list of data sets accessible from that catalog
- Journal, which keeps a running record of backup and migration transactions
- SDSP data sets contained on migration volumes
- MCDS, which is an inventory of migrated data sets
- BCDS, which is an inventory of backed up data sets and volumes, dumped volumes, and backed up aggregates
- OCDS, which contains a tape table of contents (TTOC) inventory of migration and backup tape volumes

In normal operation, these records stay in synchronization. However, because of data errors, hardware failures, or human errors, it is possible for these records to become unsynchronized. The AUDIT command allows the system to cross-check the various records concerning data sets and DFSMShsm resources. AUDIT can list errors and propose diagnostic actions or, at your option, complete most repairs itself.

Consider using the AUDIT command for the following reasons:

- After any CDS restore (highly recommended)
- Periodic checks
- After an ARC184I message (error when reading/writing DFSMShsm CDS records)
- Errors on the RECALL or DELETE of migrated data sets
- Errors on BDELETE or RECOVER of backup data sets
- DFSMShsm tape-selection problems
- RACF messages (mismatches)
- Power or hardware failure

You can use AUDIT to cross-check the following sources of control information:

- MCDS or individual migration data set records
- BCDS or individual backup data set records or ABARS records
- OCDS or individual DFSMShsm-owned tapes
- DFSMShsm-owned DASD volumes
- Migration-volume records

## AUDIT

- Backup-volume records
- Recoverable-volume records (from dump or incremental backup)
- Contents of SDSP data sets

---

### Auditing Common Queues

Common queues have interrelated entries that may become corrupted due to abends and unexpected losses of connectivity. A corrupted common queue may cause certain requests to not be processed. DFSMShsm automatically corrects some inconsistencies, but for others, it is necessary to issue the AUDIT COMMONQUEUE command. The AUDIT command enables DFSMShsm to dynamically correct inconsistencies with minimal impact on processing.

Consider using AUDIT COMMONQUEUE in the following situations:

- After receiving an ARC1506E message
- After receiving an ARC1187E message
- When recall requests are unexpectedly not being selected for processing

The structure of the common queues is not externalized. Message ARC1544I is the only output that AUDIT COMMONQUEUE returns. It does not return a specific message for each error because individual error messages are of no value. The OUTDATASET, SYSOUT, and TERMINAL parameters are not used with AUDIT COMMONQUEUE.

Unlike other AUDIT functions, auditing a common queue is not time intensive and may be performed at any time.

---

### Using the AUDIT Command

Before using the AUDIT command, read the descriptions of the available options in Appendix A, “Using the AUDIT Command,” on page 501. Appendix A discusses which conditions are detected by each option.

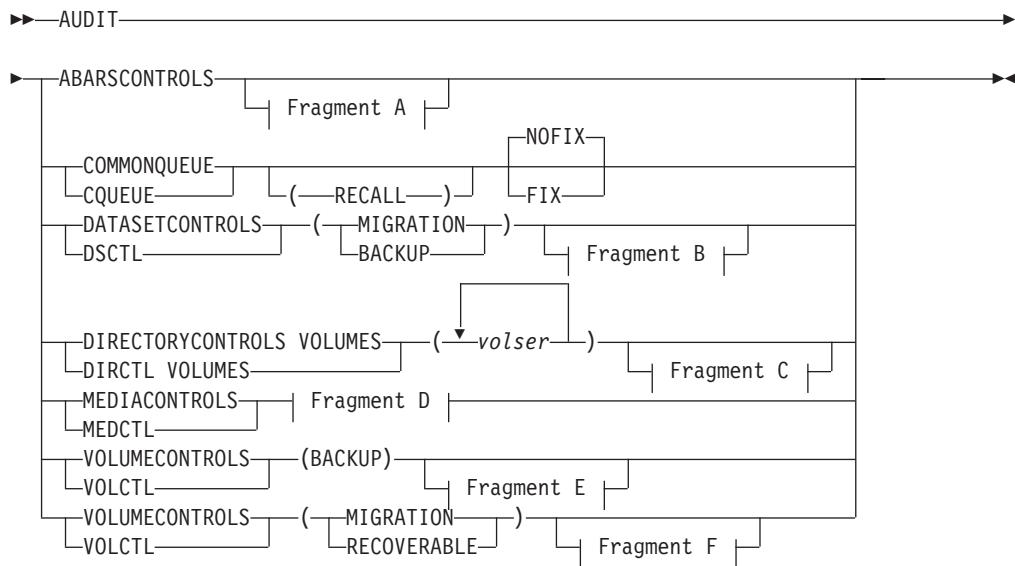
It is best to use AUDIT at times of low system activity, as some audit processes can run for quite some time. However, the AUDIT process can be used at any time.

SMS-managed *volumes* cannot be audited with the AUDIT command and the process for auditing SMS-managed *data sets* is similar to that for auditing non-SMS-managed data sets.

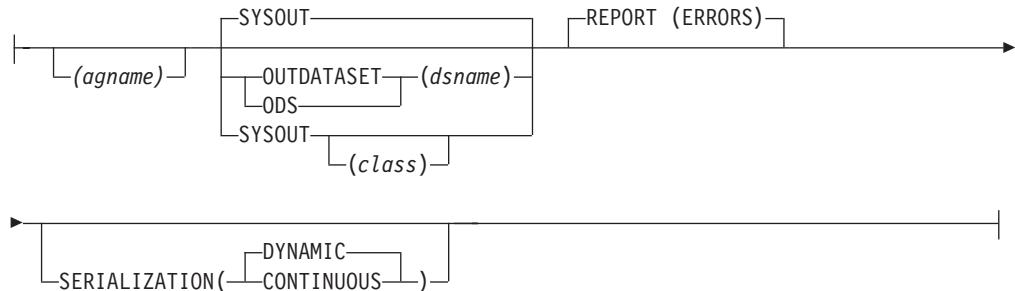
**Note:** If AUDIT is executing and backup of the DFSMShsm control data sets is started (via BACKVOL CDS command or AUTOBACKUP), all DFSMShsm functions on the host that started this backup are halted until the AUDIT function and the backup of the DFSMShsm CDS's have completed.

## Syntax of the Enhanced AUDIT Commands

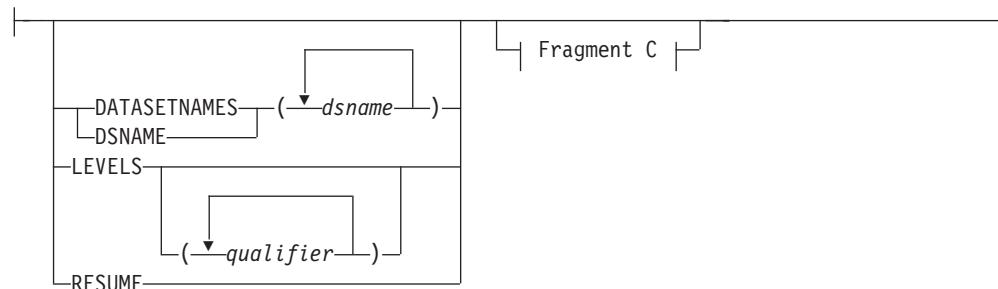
When you issue the AUDIT command, you must specify one of the required parameters, to indicate a primary category of control information, which will “drive” that invocation of AUDIT. The optional parameters qualify what to audit, the output destination, and other qualifying information.



### A: ABARSCONTROLS Optional Parameters:

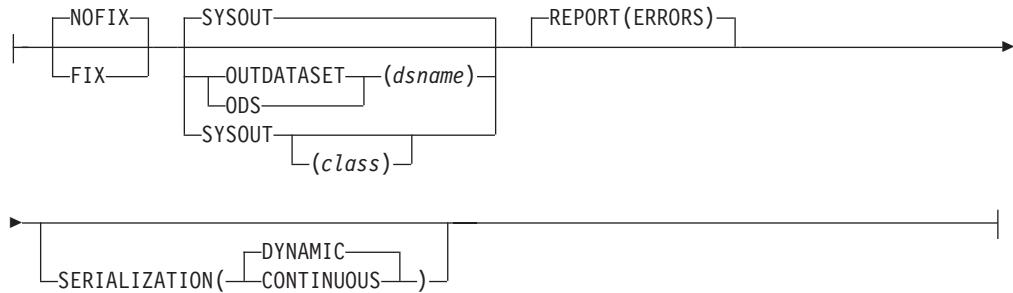


### B: DATASETCONTROLS Optional Parameters:

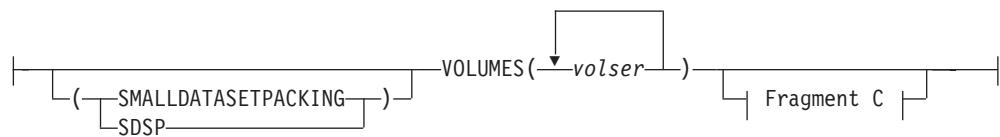


## AUDIT

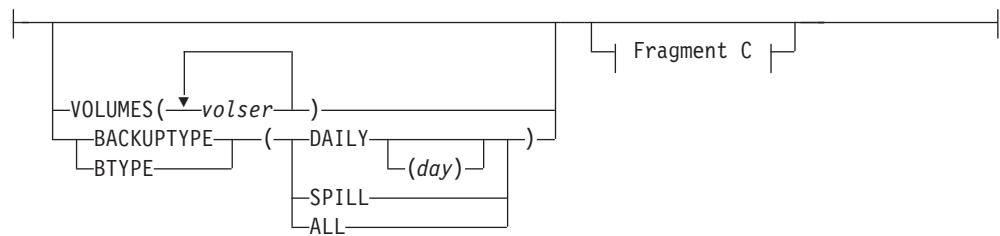
### C: Additional Optional Parameters:



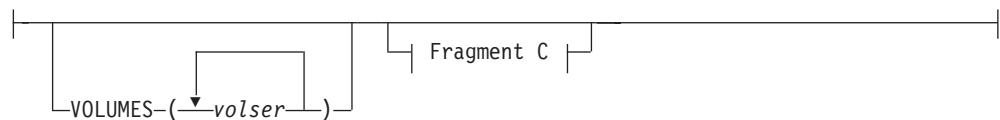
### D: MEDIACONTROLS Parameters:



### E: VOLUMECONTROLS(BACKUP) Optional Parameters:



### F: VOLUMECONTROLS(MIGRATION | RECOVERABLE) Optional Parameters:



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## Syntax of the Original AUDIT Commands

The following options provide less comprehensive auditing, and somewhat less flexible output, than the previous options, but are available for compatibility with CLISTS or job streams developed for use with older versions of DFSMShsm.

---

## Required and Optional Parameters of the AUDIT Command

This section describes the required parameters of the AUDIT command. Some of the parameters listed in this section are used as both required and optional parameters in the syntax diagrams. They are described in this section and identified as such.

### **ABARSCONTROLS: Requesting an Audit of ABR Records in the BCDS**

**Explanation:** ABARSCONTROLS is specified to audit the ABR records in the BCDS.

**ABARSCONTROLS(*agname*)** is an optional parameter that allows you to perform an audit of all ABR records matching the specified aggregate-group name.

IF AUDIT ABARSCONTROLS is issued and no ABR records are found, or if AUDIT ABARSCONTROLS(*agname*) is issued and no ABR records matching the *agname* specified are found, an error message is issued.

**Defaults:** None.

### **ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET: Requesting an Audit of Data Sets**

**Explanation:** ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET are mutually exclusive parameters that you use to audit sources of data set names, such as all control data sets or a specific control data set. Each of these represents a source of data set names.

**ALL** is specified to audit the migration control data set, the backup control data set, and the offline control data set. ALL is not used to audit the common queues.

**BACKUPCONTROLDATASET** is specified to audit the DFSMShsm backup control data set.

**MIGRATIONCONTROLDATASET** is specified to audit the DFSMShsm migration control data set.

**OFFLINECONTROLDATASET** is specified to audit the DFSMShsm offline control data set. The TTOC records are the source of information to determine which data sets are audited. DAILY | ML2 | SPILL | ALL are mutually exclusive, optional subparameters of the OFFLINECONTROLDATASET parameter used to specify which tape volumes to audit.

Subparameter	Explanation
DAILY	<p><b>OFFLINECONTROLDATASET(DAILY)</b> is specified to audit tape daily backup volumes. For DAILY(day), substitute a decimal number from 1 to 31 to represent the day in the backup cycle. If you do not specify a particular day, the audit output occurs in the following order:</p> <ul style="list-style-type: none"> <li>• All volumes assigned to day 1</li> <li>• All volumes assigned to day 2</li> <li>• And so forth, until all tape daily backup volumes have been audited</li> </ul> <p>For each day, the order of the audit output is in ascending volume serial number sequence.</p>
ML2	<b>OFFLINECONTROLDATASET(ML2)</b> is specified to audit all tape migration level 2 volumes. The order of audit output occurs in ascending volume serial number sequence for migration level 2 volumes.
SPILL	<b>OFFLINECONTROLDATASET(SPILL)</b> is specified to audit all tape spill backup volumes. The order of audit output occurs in ascending volume serial number sequence for spill volumes.
ALL	<p><b>OFFLINECONTROLDATASET(ALL)</b> is specified to audit all tape volumes. The audit output occurs in the following order:</p> <ul style="list-style-type: none"> <li>• All daily backup volumes. The daily backup volumes are listed for each day, and the volumes assigned to each day are listed in ascending volume serial number sequence.</li> <li>• All spill backup volumes. The spill backup volumes are listed in ascending volume serial number sequence.</li> <li>• All unassigned backup volumes. The unassigned backup volumes are listed in ascending volume serial number sequence.</li> <li>• All migration level 2 volumes. The migration level 2 volumes are listed in ascending volume serial number sequence.</li> </ul>

**Notes:**

1. When you request an audit of the MCDS or BCDS, DFSMShsm uses the VTOC of the primary volumes to ensure that the volume specified in the catalog contains the data set referred to. Therefore, those primary volumes (including those managed by SMS) must be mounted.
2. If you specify the OFFLINECONTROLDATASET parameter without a subparameter, the AUDIT command fails.
3. Dump volumes are not audited.

## **BACKUPTYPE | BACKUPVOLUMES | VOLUMES: Requesting an Audit of Primary, Migration, or Backup Volumes**

The VOLUMES parameter can be used either as a primary option or as an optional parameter. Therefore, it is listed both ways in the syntax tables starting on page 63.

**Explanation:** **BACKUPTYPE | BACKUPVOLUMES | VOLUMES** are mutually exclusive parameters that you use to audit data set names; such as, one or more backup volumes, non-SMS-managed primary volumes, or migration volumes. Each of these represents a source of data set names.

**BACKUPTYPE** is specified to audit a type of backup volume. **DAILY | SPILL | ALL** are mutually exclusive, optional subparameters of the **BACKUPTYPE** parameter, specifying the type of backup volume DFSMShsm is to audit.

## AUDIT

Subparameter	Explanation
DAILY	<p><b>BACKUPTYPE(DAILY)</b> is specified to audit daily backup volumes. For DAILY(<i>day</i>) , substitute a decimal number from 1 to 31 to represent the day in the backup cycle. If <i>day</i> is specified, DFSMShsm audits all backup volumes assigned to the specified day in the backup cycle. The order of the audit output is by entries in the daily backup cycle volume record (BVR) for the specified day. If you do not specify a particular day, the audit output occurs in the following order:</p> <ul style="list-style-type: none"><li>• All volumes assigned to day 1</li><li>• All volumes assigned to day 2</li><li>• And so forth, until all tape daily backup volumes have been audited</li></ul> <p>For each day, the order of the audit output is by entries in the backup cycle volume record (BVR).</p>
SPILL	<p><b>BACKUPTYPE(SPILL)</b> is specified to audit all spill backup volumes. The order of the audit output is by entries in the spill backup cycle volume record (BVR).</p>
ALL	<p><b>BACKUPTYPE(ALL)</b> is specified to audit all daily and spill backup volumes. The order of the audit output is all daily backup volumes and then all spill backup volumes.</p>

**BACKUPVOLUMES** | **BACKUPVOLUMES(volser...)** is specified to audit specific backup volumes or all backup volumes. For (volser...), substitute the volume serial numbers of the backup volumes you want DFSMShsm to audit. If you specify particular volumes, the order of the audit output is the same as the order of the volumes you specified. If you do not specify a particular volume, the order of the audit output occurs in ascending volume serial number order.

**VOLUMES** | **VOLUMES(volser...)** is specified to audit one or more non-SMS-managed volumes. For (volser...), substitute a volume serial number or list of volume serial numbers for volumes that you want in the audit. SMS-managed volumes are not included in the audit. If a volume serial number for an SMS-managed volume is specified, DFSMShsm does not audit that volume. VOLUMES(volser...) can be used with the VOLUMECONTROLS primary option and is required with the DIRECTORYCONTROLS and MEDIACONTROLS primary options.

**Defaults:** If you specify VOLUMES without (volser...), DFSMShsm audits all non-SMS-managed primary volumes, migration level 1 volumes, and all migration level 2 DASD volumes.

If you specify BACKUPVOLUMES without (volser...), DFSMShsm audits all backup volumes with a volume record in the BCDS.

There is no default for BACKUPTYPE. If you do not specify a subparameter with the BACKUPTYPE parameter, the AUDIT command fails.

**Note:** If the VOLUMES parameter specifies a migration level 1 volume, be aware of the following items:

- The MEDIACONTROLS (SDSP) primary option must be used to audit the control information in a small-data-set-packing data set.
- When you use the BACKDS command to back up a data set, the backup version temporarily resides on a migration level 1 volume. DFSMShsm audits these data sets.

## COMMONQUEUE : Requesting an Audit of Common Queues

**Explanation:** COMMONQUEUE is a parameter you specify to audit all of the DFSMShsm common queues. The data in a common queue can be corrupted by abends and unexpected losses of connectivity. A corrupted common queue may cause certain requests to not be processed. Specify COMMONQUEUE to enable DFSMShsm to dynamically correct inconsistencies with minimal impact on processing.

Specify COMMONQUEUE(RECALL) to audit just the common recall queue.

If possible, issue AUDIT COMMONQUEUE(RECALL) when all the typical hosts are connected to the common queue.

**Defaults:** None.

## DATASETCONTROLS: Requesting an Audit of Data Set Control Records

**Explanation:** DATASETCONTROLS audits either the records in the MCDS or the records in the BCDS. It checks all (or specified) records for synchronization with other CDS records.

Subparameter	Explanation
MIGRATION	<b>DATASETCONTROLS (MIGRATION)</b> specifies that the data set records in the MCDS are cross-checked and a list of errors is produced.
BACKUP	<b>DATASETCONTROLS (BACKUP)</b> specifies that the data set records in the BCDS are cross-checked and a list of errors is produced.

Along with this parameter, other useful optional parameters are DATASETNAMES(*dsname...*), LEVELS(*qualifier...*), or RESUME.

**Defaults:**

- When using the DATASETCONTROLS command, you must specify either MIGRATION or BACKUP. If you do not specify one or the other, you will get an error message.
- If you specify AUDIT DATASETCONTROLS(MIGRATION) without optional parameters, you will get an audit of all data set records in the MCDS.
- If you specify AUDIT DATASETCONTROLS(BACKUP) without optional parameters, you will get an audit of all data set records in the BCDS.

## DATASETNAMES | LEVELS | RESUME: Requesting an Audit of Data Sets

The DATASETNAMES and LEVELS parameter can be used either as a primary option or as an optional parameter. Therefore, each is listed both ways in the syntax tables starting on page 63.

**Explanation:** DATASETNAMES(*dsname...*) | LEVELS(*qualifier...*) | RESUME are mutually exclusive parameters to audit a data set, a list of data sets, a data set group, or a list of data set groups.

## AUDIT

**DATASETNAMES(*dsname...*)** is specified to audit a data set or list of data sets. For (*dsname...*) substitute the fully qualified name or a list of fully qualified names for the data sets you want DFSMShsm to audit. You can specify a data set name of up to 44 characters.

**LEVELS(*qualifier...*)** is specified to audit a group or list of groups of data sets with the same set of initial characters in the data set name. If you specify this parameter, DFSMShsm audits all MCDS records for data sets that begin with the supplied qualifiers. If a qualifying data set found in the MCDS also has a BCDS entry, the BCDS entry will also be audited. For (*qualifier...*), substitute the set of initial characters in the data set name or list of the set of initial characters for the data sets you want DFSMShsm to audit. You can specify a qualifier of up to 44 characters.

**RESUME** applies only to the DATASETCONTROLS(MIGRATION) and DATASETCONTROLS(BACKUP) parameters of the AUDIT command. The RESUME function enables you to continue a previous audit of DATASETCONTROLS that for some reason has not been completed.

AUDIT processing will not run to completion if an operator issues a HOLD command. AUDIT processing may not complete if DFSMShsm or DFSMS/MVS terminates abnormally. If you issued the original command without the DATASETNAMES or LEVELS parameters, you can reissue the command, using the RESUME parameter, and the audit will resume.

**Note:** The HOLD command informs DFSMShsm to stop the audit as soon as AUDIT finishes processing the current data set. All AUDIT commands that have not been processed remain in the queue. The RELEASE command allows the execution of AUDIT commands that are in the queue, but will not cause an interrupted command to be restarted; thus you must issue another AUDIT command that includes the RESUME parameter.

**Defaults:** None.

**Notes:**

1. When you specify the DATASETNAMES parameter, DFSMShsm prints all audit information for each audited data set, whether or not errors are found for that data set.
2. When you specify the LEVELS parameter, DFSMShsm prints MCDS and BCDS entries for each group.
3. DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name, DFSMShsm audits the entire partitioned data set.

## DIRECTORYCONTROLS VOLUMES: Comparing a VTOC or a TTOC to CDS Records

**Explanation:** DIRECTORYCONTROLS VOLUMES(*volser...*) is specified to compare information in the DASD VTOC or the TTOC with that of the control records in the MCDS or BCDS.

**VOLUMES(*volser...*)** is a required parameter. For (*volser...*), substitute a volume serial number or a list of volume serial numbers. Each serial number must identify a DFSMShsm-owned tape backup or migration volume or a DFSMShsm-owned DASD migration volume.

**Defaults:** None.

## MASTERCATALOG | USERCATALOG: Requesting an Audit of a Catalog

**Explanation:** **MASTERCATALOG** | **USERCATALOG** are mutually exclusive parameters that you use to audit data set entries in a catalog, which is a source of data set names.

**MASTERCATALOG** is specified to audit the master catalog.

**USERCATALOG(catname)** is specified to audit a particular user catalog. For *(catname)*, substitute the name of the user catalog you want DFSMShsm to audit.

**Defaults:** None.

**Note:** You cannot specify the TERMINAL parameter with the **MASTERCATALOG** or **USERCATALOG** parameters.

## MEDIACONTROLS VOLUMES | MEDIACONTROLS(SDSP) VOLUMES: Requesting an Audit of Control Information

**Explanation:** **MEDIACONTROLS VOLUMES** | **MEDIACONTROLS(SDSP) VOLUMES(volser...)** are mutually exclusive parameters that are specified to audit control records as follows:

**MEDIACONTROLS** audits control information contained in migration copies and backup versions.

**MEDIACONTROLS(SMALLDATASETPACKING)** audits only the SDSP (small data set packing) data sets on the specified volumes.

In either case, **VOLUMES(volser...)** is a required parameter. For *(volser...)* substitute a volume serial number or a list of volume serial numbers. Each serial number must identify a DFSMShsm-owned, *single-file format*, tape backup or migration volume or a DASD migration volume.

**Defaults:** None.

**Notes:**

1. If DFSMShsm is unable to complete output processing to backup or migration tapes, an incomplete TTOC is created. When an audit is performed against these tapes, the AUDIT function positions to the last data set described by that portion of the TTOC that was written successfully and then proceeds to audit the tape from that point forward.

## VOLUMECONTROLS (BACKUP | MIGRATION | RECOVERABLE): Requesting an Audit of Control Information

**Explanation:** **VOLUMECONTROLS (BACKUP | MIGRATION | RECOVERABLE)** are mutually exclusive parameters that are specified to audit control records as follows:

Subparameter	Explanation
BACKUP	BCDS control records for backup volumes are audited.
MIGRATION	MCDS control records for migration volumes are audited.

## AUDIT

Subparameter	Explanation
RECOVERABLE	BCDS control records that concern recoverable volumes (volumes which have been backed up, dumped, or both) are audited.

**Note:** The optional parameter VOLUMES(volser...) can be used to specify a volume serial number or a list of volume serial numbers for any of the VOLUMECONTROLS options listed above.

**Defaults:** None.

## Optional Parameters of the AUDIT Command

This section describes the optional parameters of the AUDIT command.

### FIX | NOFIX: Specifying Whether AUDIT Repairs Problems

**Explanation:** FIX | NOFIX are mutually exclusive, optional parameters specifying whether AUDIT repairs any error it can when DFSMShsm finds an error.

**FIX** specifies that AUDIT is to repair any error it can.

**NOFIX** specifies that AUDIT is to report errors, not repair them. For COMMONQUEUE, only the number of errors is reported.

**Recommendation:** The OUTDATASET contains executable FIXCDS commands to create or correct CDS records, but those CDS changes are only a subset of the corrective actions taken by AUDIT. In addition, the CDS records may be read multiple times during the course of an audit. If the NOFIX option is specified, the changes to a record generated on its initial read are not reflected in that record when it is read a subsequent time, which may result in incorrect actions being taken. For these reasons, the later submission of output from an AUDIT NOFIX as a substitute for an AUDIT FIX is generally discouraged.

**Defaults:** The default is NOFIX.

#### Notes:

1. The number of errors reported by AUDIT COMMONQUEUE FIX may be lower than the number of errors reported by a previous AUDIT COMMONQUEUE NOFIX. This is acceptable since the errors in the common queues are interrelated. Hence, fixing one error may actually fix several other errors.
2. If you specify the FIX parameter and the parameter applies, DFSMShsm issues a message indicating whether the fix was successful or unsuccessful.
3. The FIX parameter can degrade performance. When you specify it with the MASTERCATALOG or USERCATALOG parameter, DFSMShsm does not fix the audited information. If you specified the FIX parameter with the MASTERCATALOG or USERCATALOG parameter, DFSMShsm allows the operator to cancel an audit by replying N to the following message:

ARC0803A WARNING: AUDIT OF CATALOG MAY DEGRADE PERFORMANCE,  
REPLY 'Y' TO START AUDIT OR 'N' TO CANCEL  
AUDIT COMMAND

4. You must use the FIXCDS command to correct any discrepancies between the catalog and the MCDS.

5. If you specify the FIX parameter when you audit a primary or migration volume, DFSMShsm scratches and uncatalogs all utility data sets on the volume even if the utility data sets have expiration dates.
6. If you use the CDSR=YES startup parameter, DFSMShsm issues the RESERVE macro to keep the other z/OS images from accessing the three volumes containing the MCDS, BCDS, and OCDS under the following conditions:
  - You are in a multiple-image environment.
  - You have specified the FIX command.
  - You have specified SERIALIZATION(CONTINUOUS).
  - When the primary audit category is one of the following:
    - ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET(DAILY(day) | ML2 | SPILL | ALL)
    - MASTERCATALOG | USERCATALOG(catname)
    - BACKUPTYPE(DAILY(day) | SPILL | ALL) | BACKUPVOLUMES | BACKUPVOLUMES(volser...) | VOLUMES | VOLUMES(volser...)
    - DATASETNAMES(dsname...) | LEVELS(qualifier...)
7. The reserve applies to the three volumes that contain the control data sets; therefore, no other data sets on those volumes can be accessed from another z/OS image.
8. If you specify the FIX parameter when you audit a volume, DFSMShsm catalogs the uncataloged data sets (excluding rolled-off GDG data sets) on the volume. Consequently, AUDIT should not be run concurrently with other jobs that are creating uncataloged data sets.

## **OUTDATASET | SYSOUT | TERMINAL: Specifying the Output Location for the Report**

**Explanation:** OUTDATASET(dsname) | SYSOUT | TERMINAL are mutually exclusive, optional parameters that specify the output location for the report you are requesting.

**OUTDATASET(dsname)** specifies the name of the data set where DFSMShsm is to write the output data. For *(dsname)*, substitute the fully qualified name of the data set to receive the audit report. These parameters are not applicable with AUDIT COMMONQUEUE.

If the data set does not exist, DFSMShsm dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified *(dsname)*
- Record format of fixed-blocked with ANSI control characters (FBA)
- Logical record length of 121
- Data set is system reblockable
- Primary allocation of 20 tracks (see second note)
- Secondary allocation of 50 tracks (see second note)
- Unit of SYSALLDA (see second note)

If the data set already exists, DFSMShsm will use the data set. The data set must have the following characteristics:

- The data set must be cataloged and on DASD.
- The data set record format must be FBA, and the logical record length must be 121.
- The data set is system reblockable.
- The user can choose the primary space allocation.

## AUDIT

- If the data set does not contain data, DFSMShsm starts writing output data at the beginning of the data set.
- If the data set contains data, DFSMShsm writes the output data after the existing data.

**SYSOUT(class)** specifies that the report is to go to the specified output class. For (class), substitute one alphanumeric character for the class you want.

**TERMINAL** specifies that the report is to be printed at the same terminal where the command was issued, and is to be printed to SYSOUT using only the output class specified with the SYSOUT parameter of the SETSYS command or the DFSMShsm default for SYSOUT.

**Defaults:** The default is SYSOUT, and the default for (class) is the value specified with the SETSYS command. If you do not use the SYSOUT parameter of the SETSYS command to specify the output location, the default is class A.

**Notes:**

1. DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name as the output data set, the audit report could be written over existing data.
2. If you select the OUTDATASET option, you can use the PATCH command to change the unit name, primary allocation, and secondary allocation. If you select the SYSOUT option, you can use the PATCH command to change whether, and how, DFSMShsm limits the lines of SYSOUT output. Refer to the *z/OS DFSMShsm Implementation and Customization Guide*, SC35-0418 for the PATCH command.

## REPORT: Specifying How Much Audit Information to Print

**Explanation:** REPORT is an optional parameter specifying how much audit information you want printed. These parameters are not applicable with AUDIT COMMONQUEUE.

Subparameter	Explanation
ALL	<b>REPORT(ALL)</b> specifies that all audit information, including the error-condition information for the specified data sets, volumes, levels, catalogs, or control data sets is printed.
ERRORS	<b>REPORT(ERRORS)</b> specifies that only the error-condition information for the specified volumes, catalogs, or control data sets is printed.

**Defaults:** The default is ERRORS, except when using the DATASETNAMES parameter. For DATASETNAMES, the ALL parameter always applies.

**Note:** The ERRORS subparameter of REPORT does not apply for DATASETNAMES. If you specify ERRORS when it does not apply, DFSMShsm ignores it and uses the ALL parameter.

## SERIALIZATION: Stabilizing Control Information

**Explanation:** SERIALIZATION is an optional parameter stabilizing the control information. DFSMShsm control information changes dynamically as DFSMShsm operates. For AUDIT to detect an out-of-synchronization condition, diagnose the problem, and apply a repair, AUDIT must stabilize (serialize) access to control data sets and records to maintain a stable environment. These parameters are not applicable with AUDIT COMMONQUEUE.

Subparameter	Explanation
DYNAMIC	<b>SERIALIZATION(DYNAMIC)</b> specifies that an enqueue is placed on the CDSs only when the audit function finds a discrepancy in a record relationship. This enqueue is released periodically to allow other functions access to the CDSs. <b>SERIALIZATION(DYNAMIC)</b> is the option of choice; however, if you need to complete an audit function in the shortest time possible, <b>SERIALIZATION(CONTINUOUS)</b> is the better performer.
CONTINUOUS	<b>SERIALIZATION(CONTINUOUS)</b> specifies that an enqueue is placed on the CDSs for the entire audit. Use <b>SERIALIZATION(CONTINUOUS)</b> when it is important for the DFSMShsm AUDIT command to complete in the shortest period of time, such as just after a CDS RESTORE. Be careful if you select the <b>SERIALIZATION(CONTINUOUS)</b> option, as no other DFSMShsm functions can process until the audit function is complete.

**Note:** Continuous is functional only when DFSMShsm is processing in a multihost environment and the FIX parameter is specified on the AUDIT command.

**Defaults:** The default for the Enhanced Audit commands is **SERIALIZATION(DYNAMIC)** and the default for the Original Audit commands is **SERIALIZATION(CONTINUOUS)**.

---

## Using the AUDIT Command

For additional discussion of the AUDIT function, see Appendix A, “Using the AUDIT Command,” on page 501.



---

## Chapter 7. AUTH: Identifying Authorized DFMSHsm Users

There are two methods used to authorize user commands. DFMSHsm allows an installation to control the authorization of its commands through the use of either RACF FACILITY class profiles or the AUTH command.

If the RACF FACILITY class is active when DFMSHsm starts, the following processing occurs:

- DFMSHsm uses RACF FACILITY class checking for all authorized and user commands
- DFMSHsm honors profiles in the FACILITY class that are added or modified

See "Authorizing and Protecting DFMSHsm Commands in a FACILITY Class Environment" in the *z/OS DFMSHsm Implementation and Customization Guide* for information on setting up the RACF environment.

If the RACF FACILITY class is not active when DFMSHsm starts, DFMSHsm uses the AUTH command to determine authorized DFMSHsm users and commands.

The AUTH command identifies both the authorized user who can only issue authorized DFMSHsm commands and the authorized user who cannot only issue authorized DFMSHsm commands but can also add, delete, and change the authority of other DFMSHsm users. When DFMSHsm is installed, the storage administrator with responsibility for DFMSHsm should be identified as the authorized user who can affect the authority of other DFMSHsm users.

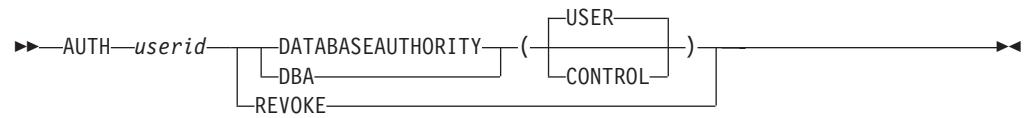
The AUTH command can be submitted only by users who are already authorized users having the database authority control attribute, or the command must be part of the PARMLIB member being processed during DFMSHsm startup.

You need not repeat the AUTH command each time you start DFMSHsm. If you do not specify any parameters with the AUTH command, DFMSHsm accepts the command but does not add or remove any names from the list of authorized users.

**Notes:**

1. Use the AUTH command carefully because anyone who is an authorized user can issue DFMSHsm user commands without having RACF check the security of the command issuer.
2. The AUTH command cannot be issued from the system console.
3. If you issue the AUTH command when the RACF FACILITY class is active, it completes with a return code of four. The authorized user record (MCU) is still created or updated, but access to the DFMSHsm storage administrator commands is still controlled by the RACF FACILITY class. Maintaining accurate MCU records is helpful when the RACF FACILITY class is not active or when using StorWatch™ DFMSHsm Monitor.

---

**Syntax of the AUTH Command**

## Required Parameters of the AUTH Command

This section describes the required parameters of the AUTH command.

### **userid: Specifying the User Whose Authorization Is to Be Changed**

**Explanation:** *userid* is a required positional parameter specifying the identification of the user whose authority to issue any authorized command is to be changed. Authorized user commands are the storage administrator, operator, and system programmer commands.

For *userid*, substitute a string of one to seven alphanumeric characters for the identification of the user whose authorization is to be changed. The first character of the character string must be alphabetic or #, \$, or @, and the remainder of the string can be alphanumeric and #, \$, or @.

**Defaults:** None.

**Notes:**

1. Because *userid* is a required positional parameter, you must specify it immediately after the command name.
2. The first authorized user, CONTROL or USER (preferably CONTROL), must be authorized by the PARMLIB member.

### **DATABASEAUTHORITY | REVOKE: Giving Authority to or Revoking Authority of a User**

**Explanation:** DATABASEAUTHORITY | REVOKE are mutually exclusive, required parameters giving or revoking DFSMShsm authorization of the specified user.

**DATABASEAUTHORITY** specifies the level of authorization of the specified user.

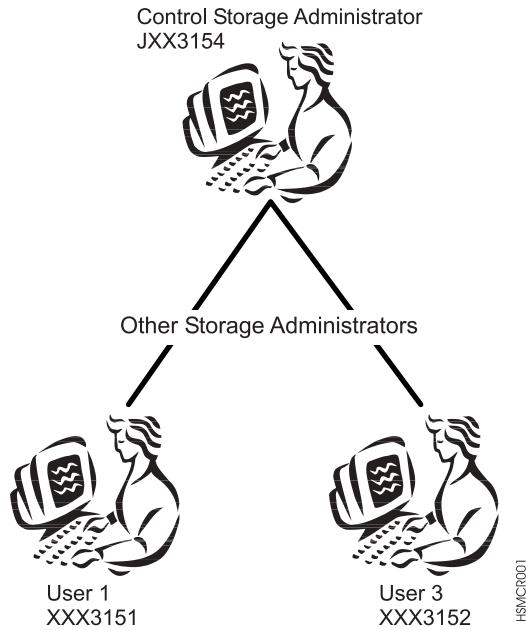
Subparameter	Explanation
USER	<b>DATABASEAUTHORITY(USER)</b> is an optional parameter that gives authorization to the specified user. The user specified with <i>userid</i> is authorized to use any DFSMShsm command except the AUTH command.
CONTROL	<b>DATABASEAUTHORITY(CONTROL)</b> is an optional parameter that gives a higher-level of authorization to the specified user. The user specified with <i>userid</i> is authorized to use the AUTH command to add, delete, or change the DFSMShsm authorization of other users. <b>Note:</b> The CONTROL subparameter should be limited to as few user IDs as possible.

**REVOKE** specifies that the *userid* identified is no longer authorized to issue all DFSMShsm commands. The user can still issue DFSMShsm user commands.

See Figure 2 on page 80 for an illustration of DFSMShsm authorization.

The DFSMShsm user commands are described in *z/OS DFSMShsm Managing Your Own Data*.

**Defaults:** If the DATABASEAUTHORITY parameter is specified without a subparameter, the default is USER.



*Figure 2. Identifying Authorized DFSMShsm Users.* The control storage administrator is identified as the authorized user who can affect the authority of other storage administrators and end users.

## Examples of How to Code the AUTH Command

The following examples present different ways to code the AUTH command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Authorizing a User to Issue All DFSMShsm Commands

**Example:** The following command allows user ID JXX3154 to add, delete, or change the DFSMShsm authorization of other users.

```
AUTH JXX3154 DATABASEAUTHORITY(CONTROL)
```

### Authorizing a User to Issue DFSMShsm Commands

**Example:** The following command allows user ID XXX3151 to issue all authorized user commands except the AUTH command. This command can be issued by user ID JXX3154 or placed in the PARMLIB member.

```
AUTH XXX3151 DATABASEAUTHORITY
```

### Revoking Authority of a User

**Example:** The following command cancels the authority to issue authorized DFSMShsm commands for user ID XXX3152. This command can be issued by JXX3154 or placed in the PARMLIB member.

```
AUTH XXX3152 REVOKE
```

---

## Chapter 8. BACKDS: Backing Up a Specific Data Set

The BACKDS command creates a backup version of a specific data set. When you enter the BACKDS command, DFSMShsm does not check whether the data set has changed or has met the requirement for frequency of backup. When DFSMShsm processes a BACKDS command, it stores the backup version on either tape or the ML1 volume with the most available space.

**Note:** If the size of a data set that is targeted to DASD exceeds the free space on the ML1 volume having the most free space, then the data set backup fails. If there is no overflow ML1 volume available or the data set does not qualify for placement on an overflow ML1 volume, then the data set backup fails.

You can issue a BACKDS command for the following:

- An SMS-managed data set (if allowed by its management class).
- A data set that resides on a level 0 volume.
- A migrated data set currently residing on a migration level 1 volume.
- An uncataloged data set (DFSMShsm is used as the datamover).
- A user data set that resides on a migration level 1 or a DASD migration level 2 volume. We do not recommend that users directly allocate data sets on migration volumes.

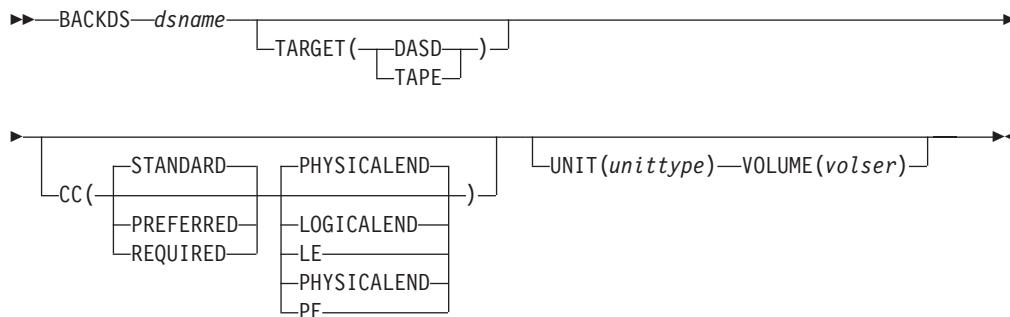
Regardless of the status or location of the data set, the volume containing the data set must be mounted and online, or the command fails.

When you want to back up an uncataloged data set, you must specify the volume serial number of the volume that contains the data set. In addition, you must specify the type of unit of the volume specified.

**Note:** If you specify a data set currently migrated to a migration level 2 volume, DFSMShsm does not back up the data set.

---

### Syntax of the BACKDS Command



**Note:** The UNIT and VOLUME parameters do not apply to cataloged data sets.

---

## Required Parameters of the BACKDS Command

This section describes the required parameter of the BACKDS command.

### dsname: Specifying the Name of the Data Set to Be Backed Up

**Explanation:** *dsname* is a required positional parameter specifying the fully qualified name of the data set you want DFSMShsm to back up. For *dsname*, substitute the fully qualified name of the data set.

**Defaults:** None.

**Notes:**

1. Because *dsname* is a required positional parameter, you must specify it immediately after the command name. You cannot specify an alias for *dsname*. If you do, DFSMShsm does not backup the data set.
2. The volume where the data set resides must be mounted before you issue the BACKDS command.
3. DFSMShsm does not handle partitioned data set members individually. A member name of a partitioned data set, DFSMShsm backs up the entire partitioned data set.

---

## Optional Parameters of the BACKDS Command

This section describes the optional parameters of the BACKDS command.

### CC: Specifying Concurrent Copy for Data Set Backup

**Explanation:** CC is an optional parameter specifying that you want to use concurrent copy during BACKDS processing to provide a point-in-time backup copy.

Subparameter	Explanation
The following subparameters are mutually exclusive required choices.	
STANDARD	CC(STANDARD) specifies that standard backup methods are used. DFSMShsm backs up your data set without using concurrent copy.
PREFERRED	CC(PREFERRED) specifies that concurrent copy is the preferred backup method that is used for backup, if it is available. If concurrent copy is not available or the user has no authorization to use the CC parameter on the command, DFSMShsm ignores the PREFERRED parameter and backs up the data set by using standard backup methods
REQUIRED	CC(REQUIRED) specifies that concurrent copy must be used as the backup method and the data set backup fails if concurrent copy is not available or if the user has no authorization to use the CC parameter.
The following subparameters are mutually exclusive required choices.	
PHYSICALEND	CC(PHYSICALEND) specifies that control returns to the application or user only after the backup physically completes.
LOGICALEND	CC(LOGICALEND) specifies that control returns to the application or user when concurrent copy initialization completes.

**Defaults:** If you do not specify any subparameters with the CC parameter, the defaults are STANDARD and PHYSCALEND.

If you do not specify CC, then DFSMShsm does not use concurrent copy for non-SMS data sets. However, for SMS data sets, DFSMShsm uses the values from the management class.

**Notes:**

1. LOGCALEND with PREFERRED and concurrent copy is unavailable for the data set, the backup continues and DFSMShsm ignores the CC options.
2. LOGCALEND with STANDARD, the command fails.

## TARGET: Specifying a Required Target Output Device

**Explanation:** TARGET is an optional parameter specifying a required output device type, such as ML1 DASD or backup tape. If you do not specify the TARGET parameter, DFSMShsm selects the output device.

Subparameter	Explanation
DASD	<b>TARGET(DASD)</b> specifies that DFSMShsm backs up the data set to ML1 DASD.
TAPE	<b>TARGET(TAPE)</b> specifies that DFSMShsm backs up the data set to tape.

**Defaults:** None.

## UNIT: Specifying the Type of Device

**Explanation:** UNIT(*unittype*) is an optional parameter specifying the type of unit where the volume containing the uncataloged data set to be backed up can be allocated. For *unittype*, substitute the type of unit.

The following are valid types of DASD units:

- 3380
- 3390
- 9345

**Defaults:** None.

**Note:** You must specify the UNIT parameter if you want to back up an uncataloged data set. UNIT, you must also specify the VOLUME parameter. Do not specify this parameter if you want to back up a cataloged data set.

## VOLUME: Specifying the Volume Where the Data Set Resides

**Explanation:** VOLUME(*volser*) is an optional parameter specifying the volume where the uncataloged data set to be backed up resides. For *volser*, substitute the serial number of the volume where the uncataloged data set to be backed up resides.

**Defaults:** None.

**Note:** You must specify the VOLUME parameter if you want to back up an uncataloged data set. VOLUME, you must also specify the UNIT parameter. Do not specify this parameter if you want to back up a cataloged data set.

---

## Examples of How to Code the BACKDS Command

The following examples present different ways to code the BACKDS command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Backing Up an SMS-Managed Data Set

**Example:** In this example, DFSMShsm backs up an SMS-managed data set to a target device of tape. DFSMShsm requires a concurrent copy session, and DFSMShsm returns control after the session is established and before DFSMShsm makes the copy.

```
BACKDS P234823.PSFB.H39SC230.DS230 TARGET(TAPE) CC(REQUIRED LE)
```

### Backing Up a Cataloged Data Set

**Example:** In this example, DFSMShsm backs up a cataloged data set.

```
BACKDS JBH6798.PSFB.F40RC001.DSET01
```

### Backing Up an Uncataloged Data Set

**Example:** In this example, DFSMShsm backs up an uncataloged data set. You must specify the VOLUME and UNIT parameters to back up an uncataloged data set.

```
BACKDS FMT1315.PROJ53.REV VOLUME(VOL110) UNIT(3390)
```

---

## **Chapter 9. BACKVOL: Backing Up Data Sets from a Volume, Dumping Volumes, or Backing Up the Control Data Sets**

You can use the BACKVOL command to request that DFSMShsm perform any of the following tasks:

- Back up eligible data sets on one or a list of volumes, or dump one or a list of DASD volumes
- Back up eligible data sets from all primary volumes
- Back up control data sets and the journal
- Back up eligible data sets from all volumes in one or more storage groups
- Dump all volumes in one or more storage groups

Use the BACKUPDEVICECATEGORY parameter to specify whether to back up the data sets to tape or to DASD daily backup volumes.

Backup messages are always recorded in the backup activity log.

When you issue the BACKVOL command with the DUMP optional parameter, DFSMShsm requests that DFSMSdss does a full-volume dump of either (1) each DASD volume specified with the VOLUMES parameter or (2) each eligible DASD volume in each storage group specified with the STORAGEGROUP parameter. In the first case, the full-volume dumps are stacked on dump volumes in those dump classes if:

- Dump classes specified on the command call for stacking, or
- The STACK subparameter is specified

In the second case, the full-volume dumps are stacked on dump volumes if:

- Dump classes specified on the command call for stacking, or
- The STACK subparameter is specified, or
- The dump classes associated with a storage group or volume call for stacking

For full-volume dumps, you can decide to print dump messages at the system console (TERMINAL). Dump messages are always recorded in the dump activity log.

You can specify the BACKVOL command with the CONTROLDATASETS parameter to back up the DFSMShsm control data sets and journal or you can specify CONTROLDATASETS(NULLJOURNALONLY) to null the journal without backing up the control data sets. Backup messages for the control data sets are written to the backup activity log.

---

## **Backing Up Data Sets from One or More SMS-Managed Volumes or Dumping SMS-Managed Volumes**

The BACKVOL command requests that DFSMShsm backs up eligible data sets from specific SMS-managed volumes or from the volumes in one or more storage groups. Only those data sets for which the management class allows command backup are processed. The frequency of backup for an SMS-managed data set is obtained from the data set management class attribute.

When you issue the BACKVOL command for an SMS-managed volume, that volume becomes DFSMShsm-managed. DFSMShsm maintains control records for the volume until you issue the DELVOL command against it. When processing a BACKVOL command having the STORAGEGROUP parameter, the management class selection criterion that is used is AUTOBACKUP instead of COMMAND. This means that DFSMShsm treats a BACKVOL STORAGEGROUP command as if it is autobackup running for the referenced volumes.

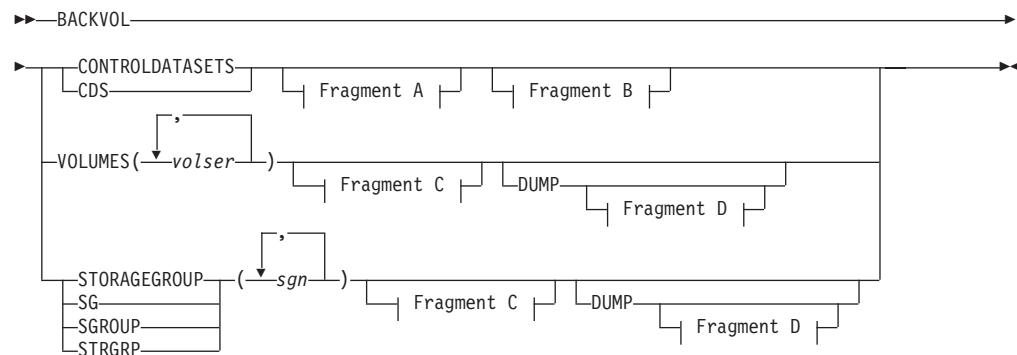
You can specify, on the command, the type of backup to be done. You can choose to back up the following:

- Data sets that have changed since the last backup (INCREMENTAL)
- All data sets on a volume (TOTAL)

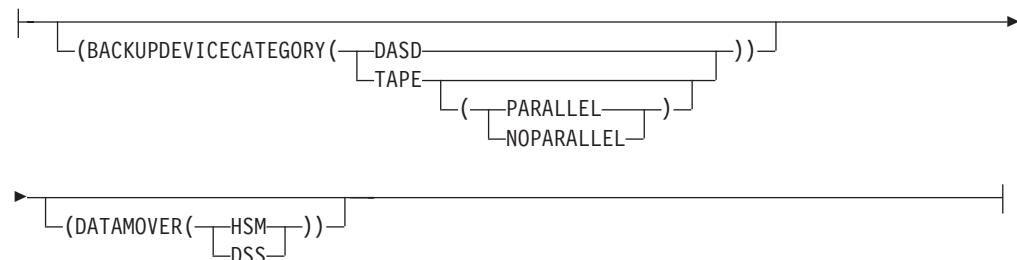
The BACKVOL command requests DFSMShsm to dump specific SMS-managed volumes or volumes in one or more storage groups. When a BACKVOL command with the DUMP parameter is issued for an SMS-managed volume, the dump functions performed for the volume are the same as those performed for an automatic dump of that volume.

If dump classes are specified on the BACKVOL command, those dump classes are used to perform the dump function, overriding the dump classes defined for the SMS storage group associated with that volume.

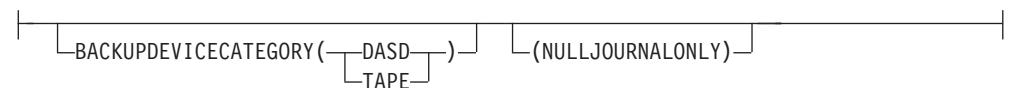
## Syntax of the BACKVOL Command with SMS-Managed Volumes



### A: CONTROLDATASETS Optional Backup Parameters:



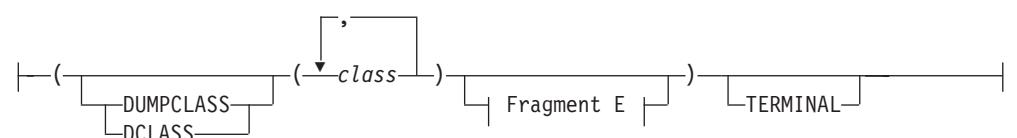
### B: CONTROLDATASETS Optional Backup Parameters:



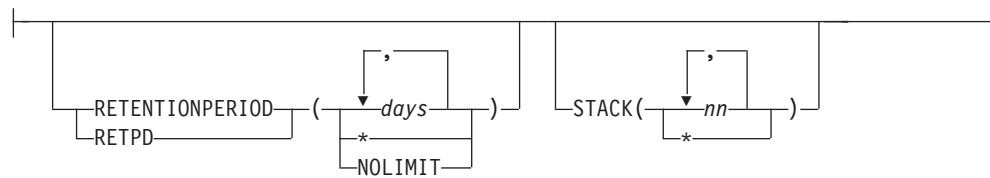
### C: STORAGEGROUP | VOLUMES Optional Backup Parameters:



### D: DUMP Optional Parameters:



### E: DUMP Optional Parameters:



## Required Parameters for SMS-Managed Volumes

This section describes the required parameters of the BACKVOL command.

### CONTROLDATASETS: Specifying the Control Data Sets to Be Backed Up

**Explanation:** CONTROLDATASETS is a required parameter specifying that DFSMShsm back up the control data sets and journal.

**Defaults:** None.

**Notes:**

1. Do not issue the CONTROLDATASETS parameter of the BACKVOL command during a period of high DFSMShsm activity, because the control data sets cannot be changed while this function is running. However, this is *not* true if you are using DFMSDss with the concurrent copy function as the datamover. Most DFSMShsm functions change the control data sets. The only way to prevent DFSMShsm from backing up the control data sets after someone issues the BACKVOL command with the CONTROLDATASETS parameter is to stop DFSMShsm.
2. DFMSDss must be specified as the datamover for CDS backup when you are using RLS mode. If BACKVOL CDS is issued, and DFMSDss was not specified as the datamover, or is not the default, or the backup is directed to tape and PARALLEL was not specified or is not the default, then message ARC0792I will be issued, and the command will fail. If CDS backup is invoked automatically, and either DFMSDss is not specified as the datamover, or the backup is directed to tape and PARALLEL was not specified, then these values will override the existing values and message ARC0793I will be issued.

### STORAGEGROUP: Specifying the Storage Group to Back Up or Dump

**Explanation:** STORAGEGROUP(*sgn*,...) is a required parameter specifying that DFSMShsm backs up the eligible data sets on the volumes in one or more storage groups or it dumps the volumes in one or more storage groups. For *sgn*, substitute the names of the storage groups that DFSMShsm processes. (A storage group name appearing more than once in the list is backed up or dumped only once.)

If you specify DUMP, DFSMShsm concurrently targets dump copies to one or more dump classes (specified in the command or associated with the storage groups). If stacking is specified (in the command or in the dump class definitions), DFSMShsm uses its dump stacking process to stack multiple dump copies on dump volumes. Specifying DUMPCLASS means that DFSMShsm dumps all storage groups specified to the same set of specified dump classes.

**Defaults:** None.

**Notes:**

1. A message is issued, and the backup or dump is not processed if DFSMShsm is running in a non-SMS environment.
2. A message is issued and the backup or dump will not be processed for any volumes which are in initial status or can not be determined to be SMS-managed volumes.
3. If you specify STORAGEGROUP without *sgn*, the command fails. If you specify STORAGEGROUP with more than 30 storage groups, only the first 30 are processed.
4. If you specify DUMP with DUMPCLASS, and at least one of the dump classes specified has a stacking value greater than one (specified with the STACK subparameter or within a dump class definition), DFSMShsm uses its dump stacking process to stack one or more dump copies on each dump volume selected.
5. If you specify DUMP but not DUMPCLASS, and at least one of the dump classes associated with a specified storage group has a stacking value greater than one, DFSMShsm uses its dump stacking process to stack one or more dump copies of the volumes in that storage group on dump volumes in the associated dump classes.
6. For any dump class with a stacking value of one (specified on the command or within a dump class definition), DFSMShsm limits that class's dump volumes to one dump copy per volume.
7. If you specify DUMP but not DUMPCLASS, then depending on how storage groups and their associated dump classes are defined, DFSMShsm may not dump the eligible volumes in the order in which the storage groups are specified. In particular, if the dump classes for a given storage group do **not** specify stacking, the volumes of that storage group are dumped (one dump copy per dump volume) after the volumes of those storage groups using stacking.
8. Dump copies of volumes in more than one storage group (specified on the same BACKVOL command) can be stacked on a given dump volume.
9. All stacking to a given dump volume is done while that tape is mounted. DFSMShsm always selects empty dump volumes to mount as targets for DUMP.
10. When you use BACKVOL to dump one or more storage groups, DFSMShsm treats all volumes being dumped as having affinity to the host issuing the command which means that they are all processed on the single host where the command is submitted.
11. If a batch job issues the WAIT BACKVOL STORAGEGROUP command, DFSMShsm processes the command, but does not ensure that the action completes before returning control to the caller. As a result, it is possible for the batch job to complete with return code zero before all of the volumes are processed.

## **VOLUMES: Specifying the Volumes to Be Backed Up or Dumped**

**Explanation:** VOLUMES(*volser*,...) is a required parameter specifying that DFSMShsm is to (1) back up the eligible data sets on, or (2) dump, each of the specified volumes. For *volser*, substitute the serial number of the volumes to be backed up or dumped. (A volume serial number appearing more than once in the list is backed up or dumped only once.) A message is issued and the backup or dump of an SMS-managed volume is not processed if:

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- DFSMShsm is running in a non-SMS environment
- The SMS-managed volume is in *initial* status (contains both SMS-and non-SMS-managed data sets while in the process of being converted to an SMS-managed volume).
- DFSMShsm cannot determine if the specified volume is SMS-managed.

**Defaults:** None.

**Notes:**

1. A volume list can include both SMS-managed volumes and non-SMS-managed volumes.
2. If you specify the VOLUMES parameter with more than 80 volumes, DFSMShsm processes only the first 80 volumes.
3. If DUMP is specified with DUMPCLASS, and at least one of the specified dump classes (or the optional STACK subparameter) specifies a stacking value greater than one, DFSMShsm attempts to stack the dumps of the volumes in the order specified. A volume in use by another DFSMShsm volume function will be moved to the end of the stack.

---

## Optional Parameters for SMS-Managed Control Data Sets

This section describes the optional parameters of the BACKVOL command.

### BACKUPDEVICECATEGORY: Specifying the Backup Device for the Control Data Sets and Journal

**Explanation:** BACKUPDEVICECATEGORY is an optional subparameter of CONTROLDATASETS that specifies the type of device that receives the backup copies of the DFSMShsm control data sets and the journal when DFSMShsm backs them up.

Subparameter	Explanation
DASD	BACKUPDEVICECATEGORY(DASD) specifies that DASD is the device on which the backup copies will be recorded.
TAPE	BACKUPDEVICECATEGORY(TAPE) specifies that tape is the device on which the backup copies will be recorded.  TAPE(PARALLEL) specifies that all control data sets and the journal should be backed up in parallel. By specifying this subparameter, you can cause one tape drive to be allocated for each control data set and the journal.  TAPE(NOPARALLEL) specifies that the control data sets and the journal should be backed up serially. When NOPARALLEL is specified, the control data sets are backed up one at a time followed by the backup of the journal. By specifying this parameter, you can cause only one tape drive to be allocated for all the control data set backups. TAPE(NOPARALLEL) may not be specified when DATAMOVER(DSS) is specified.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify BACKUPDEVICECATEGORY, the backup device used will be determined by the SETSYS CDSVERSIONBACKUP subparameter BACKUPDEVICECATEGORY. If the SETSYS CDSVERSIONBACKUP

subparameter BACKUPDEVICECATEGORY has not been previously specified, the DFSMShsm default is BACKUPDEVICECATEGORY(TAPE(NOPARALLEL)).

**Notes:**

1. If BACKVOL CDS specifies DATAMOVER(DSS), or if BACKVOL CDS does not specify a datamover and the DFSMShsm CDS Version Backup environment indicates DATAMOVER(DSS), then TAPE(NOPARALLEL) may not be specified.
2. If you are attempting to backup to tape, ensure that you have previously issued the SETSYS CDSVERSIONBACKUP(BACKUPDEVICECATEGORY(TAPE (UNITNAME(*unit*))) command to properly configure the CDSVERSIONBACKUP parameter table.

## DATAMOVER: Specifying the Type of Data Movement Used When Backing Up the Control Data Sets

**Explanation:** DATAMOVER is an optional subparameter of CONTROLDATASETS specifying the type of data movement to be used when performing a backup of the DFSMShsm control data sets. DFMSDss must be specified as the datamover for CDS backup when you are using RLS mode.

Subparameter	Explanation
HSM	DATAMOVER(HSM) specifies that the DFSMShsm control data sets are backed up using the AMS EXPORT function. The journal is backed up using sequential I/O.
DSS	DATAMOVER(DSS) specifies that the DFSMShsm control data sets are backed up using a DFMSDss logical dump. Using DFMSDss as the datamover allows you to exploit the concurrent copy function. The journal is backed up using sequential I/O. Data sets are backed up in parallel.

When you use DFMSDss rather than DFSMShsm as the data mover, concurrent copy can be used and the CDSs will be validated as they are backed up.

Concurrent copy allows the CDS backup to complete as soon as the journal has been backed up so that DFSMShsm can begin processing requests before the CDS backups are completed.

**BACKVOL Defaults:** None.

**DFSMShsm Defaults:** If you do not specify DATAMOVER, the type of data movement used is determined by the SETSYS CDSVERSIONBACKUP command subparameter DATAMOVER. If the SETSYS CDSVERSIONBACKUP command subparameter DATAMOVER has not been previously specified, the DFSMShsm default is DATAMOVER(HSM).

**Notes:**

1. If DATAMOVER is specified, either HSM or DSS must be specified.
2. If BACKVOL CDS specifies DATAMOVER(DSS) without BACKUPDEVICECATEGORY, and the DFSMShsm CDS version backup environment indicates TAPE(NOPARALLEL), the BACKVOL CDS command will not be successful, and an error message will be generated.
3. Each control data set and the journal will be backed up to separate data sets whose names are generated using the values specified in the SETSYS CDSVERSIONBACKUP command subparameters of MCDSBACKUPDSN, BCDSBACKUPDSN, OCDSBACKUPDSN, and JRNLBACKUPDSN. These names are appended with a DFSMShsm-defined final qualifier of 'Vnnnnnnn' if

## **BACKVOL—SMS**

the datamover is DFMSHsm, or ‘Dnnnnnnn’ if the datamover is DFMSDss. If the backup fails, independent of the datamover specified, the data set name field of the failed backup will be given a final qualifier of ‘Xnnnnnnn’.

### **NULLJOURNALONLY: Specifying that DFMSHsm Null the Journal**

**Explanation:** **NULLJOURNALONLY** is an optional subparameter of **CONTROLDATASETS** specifying that DFMSHsm null the journal without making backup copies of the control data sets.

**Defaults:** None.

**Notes:**

1. If you specify this parameter, no other parameters for the BACKVOL CDS are allowed.
2. **NULLJOURNALONLY** must be explicitly entered in the command.
3. The journal must have been inhibited by a journal processing error before this parameter is specified, otherwise the BACKVOL CDS **NULLJOURNALONLY** command will fail.

---

## **Optional Parameters for SMS-Managed Volumes**

This section describes the optional parameters of the BACKVOL command.

### **BACKUPDEVICECATEGORY: Specifying Where the Backup Versions Are to Reside**

**Explanation:** **BACKUPDEVICECATEGORY** is an optional parameter of **VOLUME** specifying the type of device, tape or DASD, that receives the backup versions of the data sets when they are backed up.

Subparameter	Explanation
TAPE	<b>BACKUPDEVICECATEGORY(TAPE)</b> specifies that the backup versions of the data sets on the volume reside on a tape daily backup volume when the data sets are backed up.
DASD	<b>BACKUPDEVICECATEGORY(DASD)</b> specifies that the backup versions of the data sets on the volume reside on a DASD daily backup volume when the data sets are backed up.

**Defaults:** If you do not specify this parameter on any SETSYS command, the DFMSHsm default is TAPE.

**Notes:**

1. When you specify **BACKUPDEVICECATEGORY**, you can specify either TAPE or DASD, but not both.
2. The **BACKUPDEVICECATEGORY** parameter does not apply when you specify the **DUMP** parameter.

### **DUMP | INCREMENTAL | TOTAL: Specifying Which Data Sets Are Backed Up**

**Explanation:** **DUMP | INCREMENTAL | TOTAL** are mutually exclusive, optional parameters of **VOLUME** specifying which data sets are to be backed up. A message is issued and the backup or dump is not processed if:

- DFSMShsm is running in a non-SMS environment.
- The SMS-managed volume is in *initial* status (contains both SMS-and non-SMS-managed data sets while in the process of being converted to an SMS-managed volume).
- DFSMShsm cannot determine if the specified volume is SMS-managed.

**DUMP** specifies that a DFMSDSS full-volume dump be performed for a single volume. All specified subparameters process the volume and thereby override the dump classes, defined for the storage group which is associated with the volume.

**Note:** The DUMP subparameters DUMPCLASS, RETENTIONPERIOD, and STACK, are described separately.

**INCREMENTAL** specifies that only those data sets that have never been backed up or have been changed since their last backup version was created are eligible for backup. If a data set is a changed data set, the frequency requirement as defined in the data set's management class must be met before DFSMShsm backs up the data set.

**TOTAL** specifies that all the data sets on the volume are to be backed up unless the data set is excluded by its management class.

**Defaults:** The default is INCREMENTAL.

## DUMPCLASS: Specifying That Each Dump Copy Be Targeted to a Particular Dump Class

**Explanation:** DUMPCLASS(*class*) is an optional parameter of DUMP requesting that each dump copy be targeted to a particular dump class. At least one *class* and no more than five *classes* must be specified if DUMPCLASS is specified. If dump classes are not specified, they are taken from the storage group definition to which the volume belongs. If none exist for the storage group and none are specified on the command, the command fails.

**Defaults:** If the DUMPCLASS parameter is not specified, the dump classes from the storage group definition to which the volume belongs are used.

### Notes:

1. DUMPCLASS is applicable only when the DUMP parameter is used.
2. Do not specify the same dump class more than once.

## RETENTIONPERIOD: Requesting a Specific Retention Period for the Dump Copy

**Explanation:** RETENTIONPERIOD is an optional parameter of DUMP, requesting a specific retention period for the dump copy or copies.

The list of retention periods corresponds to the list of dump classes. The dump copy targeted to the first dump class in the list is retained for the number of days specified by the first retention period in the list, and so forth.

Subparameter	Explanation
days	RETENTIONPERIOD(days) specifies a number of days to retain the dump copy. For <i>days</i> , substitute a decimal number from 1 to 9999 or NOLIMIT. If <i>days</i> is specified as 5, DFSMShsm retains the dump copy for five days before expiring the dump copy.

Subparameter	Explanation
*	<b>RETENTIONPERIOD(*)</b> is specified as a placeholder to denote that the retention period for the corresponding dump class specified with the DUMPCLASS parameter should be used.
NOLIMIT	<b>RETENTIONPERIOD(NOLIMIT)</b> indicates to DFSMShsm to not expire the dump copy automatically.

**Defaults:** If fewer retention periods are listed than dump classes, the retention periods are taken from the corresponding dump class definitions.

**Notes:**

1. The BACKVOL command fails if the number of retention periods that are specified for RETENTIONPERIOD is greater than the number of classes specified for DUMPCLASS.
2. If DUMPCLASS is specified without RETENTIONPERIOD, the retention periods are taken from the dump classes specified.
3. RETENTIONPERIOD is applicable only if DUMPCLASS is specified.
4. DFSMShsm will not automatically delete the last and only copy of a source volume, regardless of the RETENTIONPERIOD set. To delete the dump volumes in this copy, issue the DELVOL command with the LASTCOPY option for one of the dump volumes. All of the volumes in the copy will be deleted.

## STACK: Specifying the Maximum Number of Dump Copies to be Stacked for the Specified Dump Classes

**Explanation:** STACK is an optional subparameter of DUMP, specifying the maximum number of dump copies to stack on a dump volume in a specified dump class.

The list of stack values corresponds to the list of dump classes. A dump volume in the first specified dump class will have no more dump copies than specified in the first stack value, and so on.

Subparameter	Explanation
nn	<b>STACK(nn)</b> specifies a number of days to retain the dump copy. For nn, substitute a decimal number from 1 to 99.
*	<b>STACK(*)</b> is specified as a placeholder to denote that the stack value for the corresponding dump class should be taken from that dump class definition.

**Defaults:** If fewer stack values are listed than dump classes, stack values beyond those specified are taken from the corresponding dump class definitions.

**Notes:**

1. The BACKVOL command fails if the number of stack values that are specified for STACK is greater than the number of classes that are specified for DUMPCLASS.
2. If you specify STACK, you must specify DUMPCLASS, and the STACK values apply to the specified dump classes.
3. If DUMPCLASS is specified without STACK, the stack values are taken from the dump classes that are specified.

4. If neither DUMPCLASS nor STACK is specified, the stack values for each storage group are taken from the dump classes that are associated with that storage group.
5. If you use BACKVOL to dump a single volume, DFSMSHsm ignores the STACK subparameter.

## TERMINAL: Requesting That Backup or Dump Messages Appear at the Terminal

**Explanation:** TERMINAL is an optional parameter of VOLUME specifying that any data set backup or dump messages be sent to the system console and to either the backup activity log or the dump activity log.

**Defaults:** If you do not specify TERMINAL, the backup messages are sent only to the backup activity log, and the dump messages are sent to the dump activity log.

---

## Examples of How to Code the BACKVOL Command for SMS-Managed Volumes

The following examples present different ways to code the BACKVOL command for SMS-managed volumes:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Backing Up Control Data Sets

**Example:** In this example, control data sets are backed up to DASD, using DFSMSdss as the datamover.

```
BACKVOL CDS(BACKUPDEVICECATEGORY(DASD) DATAMOVER(DSS))
```

### Nulling the Journal

**Example:** In this example, the journal is nulled and the control data sets are not backed up.

```
BACKVOL CDS(NULLJOURNALONLY)
```

### Backing Up All the Data Sets on an SMS-Managed Volume

**Example:** In this example, all the data sets on an SMS-managed volume are backed up if their management class attributes allow command backup. Because you did not specify TERMINAL, the data set backup messages go only to the backup activity log.

```
BACKVOL VOLUMES(SMS025) TOTAL
```

### Backing Up Eligible Data Sets on an SMS-Managed Volume

**Example:** In this example, the eligible data sets, as defined by their management-class attributes, are backed up. The backup versions of these data sets will reside on tape. The data set backup messages appear at the system console and in the backup activity log.

## BACKVOL—SMS

```
BACKVOL VOLUMES(VOL003) INCREMENTAL TERMINAL +
BACKUPDEVICECATEGORY(TAPE)
```

### Dumping an SMS-Managed Volume to a Specified Dump Class and Retention Period

**Example:** In this example, an SMS-managed volume, SMS13, is dumped to a specific class, EXTRA, and the dump copy is assigned a retention period of 10 days.

```
BACKVOL VOLUMES(SMS13) +
DUMP(DUMPCLASS(EXTRA) RETENTIONPERIOD(10))
```

### Dumping an SMS-Managed Volume to a Dump Class

**Example:** In this example, the volume SMS13 is dumped to a dump class called OLDCLASS. The retention period is taken from the definition of class OLDCLASS.

```
BACKVOL VOLUME(SMS13) DUMP(DUMPCLASS(OLDCLASS))
```

In this example, the volume SMS13 is dumped to the dump classes associated with its storage group definition.

```
BACKVOL VOLUME(SMS13) DUMP
```

In this example, five dump copies are made of volume SMS13. The retention periods for the first three dump copies are the retention periods from the corresponding dump classes. The retention period for the fourth dump copy is 60 days. The retention period for the fifth dump class is unlimited.

```
BACKVOL VOLUME(SMS13) +
DUMP(DCLASS(WK,MNTH,DLY,VITREC,SPEC) +
RETPD(*,*,*,60,NOLIM))
```

### Backing Up All Defined Control Data Sets

**Example:** The following example shows how to code the BACKVOL command to back up all defined control data sets.

```
BACKVOL CONTROLDATASETS
```

### Backing Up Data Sets in Several Storage Groups

**Example:** In this example, all the supported data sets on the volumes in the storage groups: HSMONE, HSMTWO, and HSMFOUR are to be backed up by DFMSHsm.

```
BACKVOL STORAGEGROUP(HSMONE,HSMTWO,HSMFOUR) TOTAL
```

## Dumping All Volumes of a Storage Group to a Specific Dump Class

**Example:** In this example, DFSMShsm dumps all volumes in storage group, SGSMALL. The dump stacking and retention options are obtained from the definition of dump class, SPECIAL.

```
BACKVOL STORAGEGROUP(SGSMALL) DUMP(DUMPCLASS(SPECIAL))
```

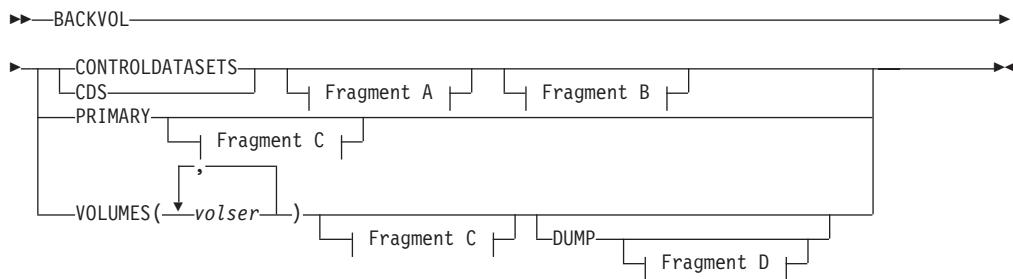
## **BACKVOL—NON SMS**

## **Backing Up Data Sets from One or More Non-SMS-Managed Volumes or from All Primary Volumes or Dumping Non-SMS-Managed Volumes**

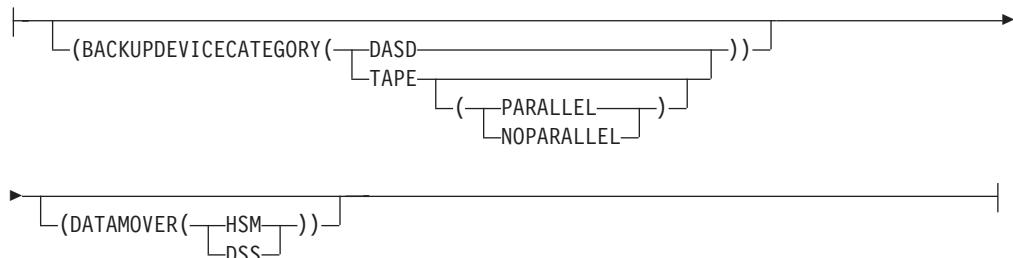
The BACKVOL command can be used to request that DFSMShsm back up eligible data sets from specific volumes or from all primary volumes, or that it dumps all the data sets from the specified volumes. When backing up non-SMS-managed volumes, you can specify, on the command, the type of backup to be done. You can choose to back up the following:

- Data sets that have not been backed up for a specified number of days (FREQUENCY)
  - Data sets that have changed since the last backup (INCREMENTAL)
  - All data sets on a volume (TOTAL).

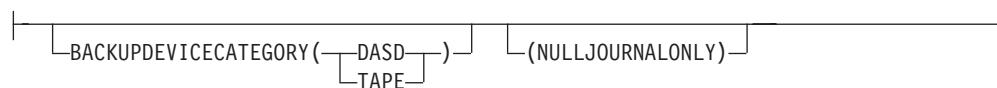
## Syntax of the BACKVOL Command with Non-SMS-Managed Volumes



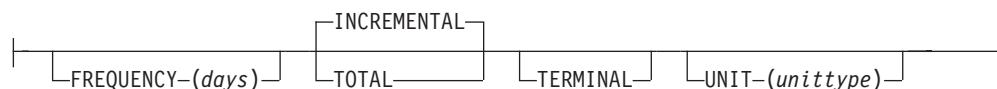
#### A: CONTROLDATASETS Optional Backup Parameters:



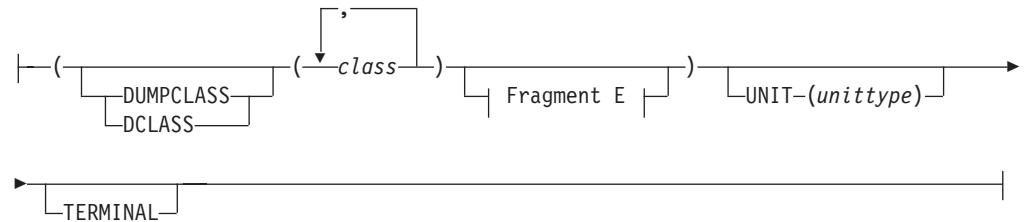
#### B: CONTROLDATASETS Optional Backup Parameter:



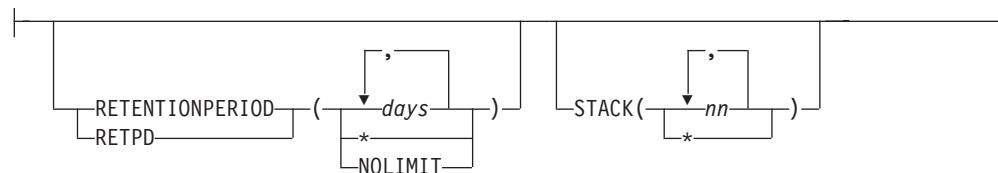
#### C: PRIMARY | VOLUMES Optional Backup Parameters:



#### D: DUMP Optional Parameters:



#### E: DUMP Optional Parameters:



## Summary of Parameters

The following table is a summary of the combination of parameters you can specify to back up eligible data sets, using the BACKVOL command:

Parameter	Related Parameters
BACKUPDEVICECATEGORY	None
CONTROLDATASETS	None
FREQUENCY	INCREMENTAL
INCREMENTAL	None
PRIMARY	None
TOTAL	None
TERMINAL	None
UNIT	VOLUMES( <i>volser</i> )
VOLUMES( <i>volser</i> )	UNIT (volume not managed or owned by DFSMShsm)

The following table is a summary of the combination of parameters you can specify to dump all data sets from a volume, using the BACKVOL command:

Parameter	Related Parameters
DUMP	VOLUMES( <i>volser</i> )
DUMPCLASS	DUMP
RETENTIONPERIOD	DUMPCLASS
STACK	DUMPCLASS
TERMINAL	None
UNIT	VOLUMES( <i>volser</i> )
VOLUMES( <i>volser</i> )	UNIT (volume not managed or owned by DFSMShsm)

---

## Required Parameters for Non-SMS-Managed Volumes or All Primary Volumes

This section describes the required parameters of the BACKVOL command.

### CONTROLDATASETS: Specifying the Control Data Sets to Be Backed Up

The description of this parameter is the same in both the SMS-environment and in the non-SMS-environment, refer to “CONTROLDATASETS: Specifying the Control Data Sets to Be Backed Up” on page 88 for a description of this parameter.

### PRIMARY | VOLUMES: Specifying the Volumes to Be Backed Up or Dumped

**Explanation:** PRIMARY | VOLUMES(*volser,...*) are mutually exclusive, required parameters specifying whether DFSMShsm backs up the eligible data sets on the specified volumes or all primary volumes, or whether DFSMShsm dumps all data sets on the specified volumes.

**PRIMARY** specifies that DFSMShsm back up the eligible data sets on all primary volumes, not just those with the primary-volume attribute of automatic backup.

**VOLUMES(*volser,...*)** specifies that DFSMShsm is to back up the eligible data sets on the specified volumes or dump all data sets on those volumes. For *volser*, substitute the volume serial number of the volumes to be backed up or dumped. (A volume serial number appearing more than once in the list is backed up or dumped only once.)

**Defaults:** None.

**Notes:**

1. A volume list can include both SMS-managed volumes and non-SMS-managed volumes.
2. If you specify the VOLUMES parameter with more than 80 volumes, DFSMShsm processes only the first 80 volumes.
3. If DUMP is specified with DUMPCLASS, and at least one of the specified dump classes (or the optional STACK subparameter) specifies a stacking value greater than one, DFSMShsm attempts to stack the dumps of the volumes in the order specified.
4. All stacking to a given dump volume is done while that tape is mounted. DFSMShsm always selects empty dump volumes as targets for DUMP.
5. When you use BACKVOL to dump one or more specific volumes, DFSMShsm treats all volumes being dumped as having affinity to the host issuing the command which means that they are all processed on the single host where the command is submitted.

The following notes apply if you have not specified the optional parameter DUMP with the BACKVOL command:

- The FREQUENCY and INCREMENTAL parameters set up the eligibility criteria for data sets.
- You are not required to specify UNIT if you specify a volume managed or owned by DFSMShsm. If, however, you specify a volume not managed by DFSMShsm, you must also specify the UNIT parameter. If the list of volumes

contains any not managed by DFSMShsm, each volume must be capable of being allocated on the *unittype* specified with UNIT.

- If you request that DFSMShsm back up more than one volume (you specified the PRIMARY parameter or the VOLUMES parameter by specifying a list of volume serial numbers), DFSMShsm starts a separate volume backup task for each primary volume until it reaches the maximum number of backup tasks specified with the MAXBACKUPTASKS parameter of the SETSYS command.

The following notes apply only if you have specified the optional parameter DUMP with the BACKVOL command:

- The DUMP optional parameter is allowed only if you specify VOLUMES(*volser*,...), and *volser* can be for any DASD volume, including DFSMShsm-owned volumes.
- You are not required to specify UNIT if you specify a volume managed or owned by DFSMShsm.

## **Optional Parameters for Non-SMS-Managed Control Data Sets**

This section describes the optional parameters of the BACKVOL command.

### **BACKUPDEVICECATEGORY: Specifying the Backup Device for the Control Data Sets and Journal**

The description of this parameter is the same in both the SMS-environment and in the non-SMS-environment, refer to “**BACKUPDEVICECATEGORY: Specifying the Backup Device for the Control Data Sets and Journal**” on page 90 for a description of this parameter.

### **DATAMOVER: Specifying the Type of Data Movement Used When Backing Up the Control Data Sets**

The description of this parameter is the same in both the SMS-environment and in the non-SMS-environment, refer to “**DATAMOVER: Specifying the Type of Data Movement Used When Backing Up the Control Data Sets**” on page 91 for a description of this parameter.

### **NULIJOURNALONLY: Specifying that DFSMShsm Null the Journal**

The description of this parameter is the same in both the SMS-environment and in the non-SMS-environment, refer to “**NULIJOURNALONLY: Specifying that DFSMShsm Null the Journal**” on page 92 for a description of this parameter.

## Optional Parameters for Non-SMS-Managed Volumes or All Primary Volumes

This section describes the optional parameters of the BACKVOL command.

### BACKUPDEVICECATEGORY: Specifying Where the Backup Versions Reside

**Explanation:** BACKUPDEVICECATEGORY(TAPE | DASD) is an optional parameter of PRIMARY and VOLUME specifying the type of device, tape or DASD, that receives the backup versions of the data sets when they are backed up.

Subparameter	Explanation
TAPE	BACKUPDEVICECATEGORY(TAPE) specifies that the backup versions of the data sets on the volume reside on a tape daily backup volume when the data sets are backed up.
DASD	BACKUPDEVICECATEGORY(DASD) specifies that the backup versions of the data sets on the volume reside on a DASD daily backup volume when the data sets are backed up.

**Defaults:** If you do not specify BACKUPDEVICECATEGORY and the volume has been added with the ADDVOL command, the default is the backup device category specified in the ADDVOL command.

**Notes:**

1. When you specify BACKUPDEVICECATEGORY, you can specify either TAPE or DASD, but not both.
2. The BACKUPDEVICECATEGORY parameter does not apply when you specify the DUMP parameter.
3. If you are attempting to backup to tape, ensure that you have previously issued the SETSYS CDSVERSIONBACKUP (BACKUPDEVICECATEGORY(TAPE (UNITNAME(*unit*))) command to properly configure the CDSVERSIONBACKUP parameter table.

### DUMP | INCREMENTAL | TOTAL: Specifying Which Data Sets Are Backed Up

**Explanation:** DUMP | INCREMENTAL | TOTAL are mutually exclusive optional parameters of the VOLUME parameter specifying which data sets are to be backed up.

**DUMP** specifies that a DFSMSdss full-volume dump be performed for a single volume. All subparameters specified are used to process the volume, overriding the dump classes associated with the volume.

**Note:** The DUMP subparameters DUMPCLASS, RETENTIONPERIOD, and STACK are described separately.

**INCREMENTAL** specifies that only those data sets that have never been backed up or have been changed since their last backup version was created are eligible for backup. If a data set is a changed data set, the frequency requirement as defined in the data set's management class must be met before DFSMShsm backs up the data set.

**TOTAL** specifies that all the data sets on the volume or volumes are backed up by DFSMShsm if it supports the data set organization. DFSMShsm backs up all other data sets on the volume, except for data sets that have been excluded by an ALTERDS or HALTERDS VERSIONS(0) command, not just changed data sets that have met the frequency of backup.

**Defaults:** The default is INCREMENTAL.

## DUMPCLASS: Specifying That Each Dump Copy Be Targeted to a Particular Dump Class

**Explanation:** DUMPCLASS(*class*) is an optional parameter of DUMP requesting that each dump copy be targeted to a particular dump class. Dump classes, *class*, must be predefined with the DUMPCLASS optional parameter of the DEFINE command.

DUMPCLASS is required unless the specified volume is a primary volume with a dump class specified for it with its ADDVOL command. At least one *class* and no more than five *classes* must be specified if DUMPCLASS is specified.

**Defaults:** If the DUMPCLASS parameter is not specified and the volume is a primary volume with DUMPCLASS specified with its ADDVOL command, the dump classes specified with the ADDVOL command are used.

**Notes:**

1. DUMPCLASS is applicable only when the DUMP parameter is used.
2. Do not specify the same dump class more than once.

## FREQUENCY: Specifying the Frequency of Backup for Data Sets

**Explanation:** FREQUENCY(*days*) is an optional parameter of PRIMARY and VOLUME specifying the number of days required between backup versions of a data set. DFSMShsm does not back up the data set unless the specified number of days has elapsed since DFSMShsm last backed up the data set. For *days*, substitute a decimal number from 0 to 999. For example, if *days* is specified as 5, only those data sets that have not been backed up in the last five days are eligible for backup. When you specify 0, DFSMShsm backs up changed data sets no matter how recently they were backed up.

**Defaults:** If you do not specify the FREQUENCY parameter with the BACKVOL command or have not specified the FREQUENCY parameter with an ALTERDS command, the current DFSMShsm value for FREQUENCY previously specified on the SETSYS command or the DFSMShsm default for FREQUENCY is used.

**Notes:**

1. The FREQUENCY parameter does not apply when you specify either the DUMP or the TOTAL parameter. If you specify FREQUENCY when it does not apply, DFSMShsm ignores it.
2. The frequency specified with this command does not override the frequency specified with the ALTERDS command; however, it overrides the frequency specified with the SETSYS command or the DFSMShsm default. So, DFSMShsm determines the frequency of backup in the following order:
  - ALTERDS
  - BACKVOL
  - SETSYS

## **BACKVOL—NON SMS**

- DFSMShsm default

### **RETENTIONPERIOD: Requesting a Specific Retention Period for the Dump Copy**

The description of this parameter is the same in both the SMS-environment and in the non-SMS-environment, refer to “RETENTIONPERIOD: Requesting a Specific Retention Period for the Dump Copy” on page 93 for a description of this parameter.

### **STACK: Specifying the Maximum Number of Dump Copies to be Stacked for the Specified Dump Classes**

The description of this parameter is the same in both the SMS-environment and in the non-SMS-environment, refer to “STACK: Specifying the Maximum Number of Dump Copies to be Stacked for the Specified Dump Classes” on page 94 for a description of this parameter.

### **TERMINAL: Requesting That Backup or Dump Messages Appear at the Terminal**

The description of this parameter is the same in both the SMS-environment and in the non-SMS-environment, refer to “TERMINAL: Requesting That Backup or Dump Messages Appear at the Terminal” on page 95 for a description of this parameter.

### **UNIT: Specifying the Type of Device**

**Explanation:** UNIT(*unittype*) is an optional parameter of PRIMARY and VOLUME specifying the type of unit where the volume being backed up can be allocated.

For *unittype*, substitute the type of unit where the volume can be allocated.

The following are valid types of DASD units:

- 3380
- 3390
- 9345

**Defaults:** None.

**Notes:**

1. You need not specify UNIT if you specify a volume that DFSMShsm manages or owns. If, however, you specify a volume DFSMShsm does not manage, you must also specify the UNIT parameter.
2. The UNIT parameter is ignored if you specify the PRIMARY parameter on the BACKVOL command.
3. If you specify the UNIT parameter for a volume that DFSMShsm owns or manages, DFSMShsm uses that *unittype* rather than the one in its volume record.

---

## **Examples of How to Code the BACKVOL Command for Non-SMS-Managed Volumes**

The following examples present different ways to code the BACKVOL command for non-SMS-managed volumes:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

## Backing Up Control Data Sets

**Example:** In this example, control data sets are backed up to DASD, using DFSMSdss as the datamover.

```
BACKVOL CDS(BACKUPDEVICECATEGORY(DASD) DATAMOVER(DSS))
```

The following example shows how to code the BACKVOL command to back up all defined control data sets according to options specified by the SETSYS CDSVERSIONBACKUP parameter or its defaults.

```
BACKVOL CONTROLDATASETS
```

## Nulling the Journal

**Example:** In this example, the journal is nulled and the control data sets are not backed up.

```
BACKVOL CDS(NULLJOURNALONLY)
```

## Backing Up All the Data Sets on a Volume

**Example:** In this example, all the data sets on a volume not managed by DFSMSHsm are backed up. Because you have not specified TERMINAL, the data set backup messages go only to the backup activity log.

```
BACKVOL VOLUMES(PUB025) UNIT(3390) TOTAL
```

## Backing Up Eligible Data Sets on DFSMSHsm-Managed Volumes

**Example:** In this example, only two kinds of data sets are backed up:

- Data sets that have never been backed up
- Data sets that have been changed since the last backup version was created and that meet the specified frequency of two days since the last backup version was created.

The backup versions of these data sets will reside on tape. The data set backup messages appear at the console and in the backup activity log.

```
BACKVOL VOLUMES(VOL003,VOL004,VOL005) FREQUENCY(2) INCREMENTAL +
TERMINAL BACKUPDEVICECATEGORY(TAPE)
```

## Dumping a Primary Volume to a Dump Class

**Example:** In this example, a primary volume, PRIM13, is dumped to a specific class, EXTRA, and assigns the dump copy a retention period of 10 days.

```
BACKVOL VOLUMES(PRIM13) +
DUMP(DUMPCCLASS(EXTRA) RETENTIONPERIOD(10))
```

## **A Second Example of Dumping a Primary Volume to a Dump Class**

**Example:** In this example, the volume PRIM13 is dumped to a dump class called OLDCLASS. The retention period is the retention period of OLDCLASS.

```
BACKVOL VOLUMES(PRIM13) DUMP(DUMPCLASS(OLDCLASS))
```

**Example:** In this example, the volume PRIM13 is a primary volume dumped to the classes associated with it by the previous ADDVOL command with the AUTODUMP parameter.

```
ADDVOL PRIM13 PRIMARY(AD(WEEKLY,MONTHLY)) +
UNIT(3390)
```

```
BACKVOL VOLUMES(PRIM13) DUMP
```

**Example:** In this example, five dump copies are made of volume PRIM13. The retention periods for the first three dump copies are the retention periods for the corresponding dump classes. The retention period for the fourth dump copy is 60 days. The fifth dump class has an unlimited retention period.

```
BACKVOL VOLUMES(PRIM13) +
DUMP(DCLASS(WK,MNTH,DLY,VITREC,SPEC) +
RETPD(*,*,*,60,NOLIM))
```

---

## Chapter 10. BDELETE: Deleting Backup Versions of a Data Set

The BDELETE command deletes all the backup versions of a specific data set or deletes specific backup versions by version number. You can specify multiple data set names with the BDELETE command.

If you have cataloged and uncataloged data sets with the same name, DFSMSHsm deletes the backup versions of either the cataloged or uncataloged data sets, not the backup versions of both. See note 2 on page 108.

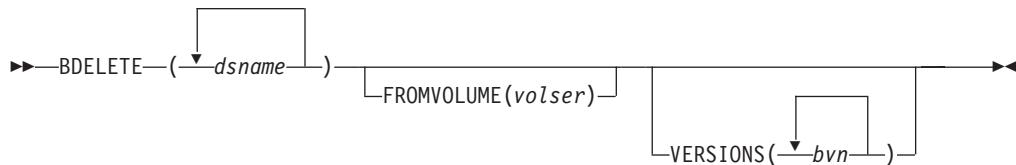
To delete retired versions, you must use the BDELETE command and must specify the version number of the retired version.

If all backup versions of a data set are deleted, parameters previously specified with the ALTERDS command are no longer in effect.

When the BDELETE command is submitted from a batch environment, no messages indicating the success of this function are issued. You can use the LIST command to obtain information on existing backup versions.

---

### Syntax of the BDELETE Command



**Note:** The FROMVOLUME parameter does not apply to either SMS-managed data sets or to cataloged data sets.

---

## Required Parameters of the BDELETE Command

This section describes the required parameters of the BDELETE command.

### **dsname: Specifying the Name of the Data Set Whose Backup Versions Are to Be Deleted**

**Explanation:** (*dsname* ...) is a required positional parameter specifying the name of the data set or list of data set names whose backup versions you want to delete. Each data set name you specify must be fully qualified. For *dsname*, substitute the fully qualified name or list of names of the data sets whose backup versions are to be deleted.

**Defaults:** None.

**Note:** Because *dsname* is a required positional parameter, you must specify it immediately after BDELETE.

---

## Optional Parameters of the BDELETE Command

This section describes the optional parameters of the BDELETE command.

### **FROMVOLUME: Specifying the Volume Where the Data Set Resided When the Backup Versions Were Created**

**Explanation:** FROMVOLUME(*volser*) is an optional parameter specifying the volume where the uncataloged data set or data sets resided when DFSMShsm backed up the data sets. You specify this parameter only if the data set was uncataloged. For *volser*, substitute the serial number of the volume where the uncataloged data set or data sets resided when the backup versions were created.

**Defaults:** None.

**Notes:**

1. The data sets you specified should have been either all cataloged or all uncataloged when DFSMShsm created the backup versions. If the data sets were all uncataloged, they should have been on the same volume. If the backup versions were not created from the same volume, the backup versions of the data sets are not deleted.
2. If you have cataloged and uncataloged data sets with the same name, DFSMShsm deletes the backup versions of the cataloged data set unless you specify the FROMVOLUME parameter. If you specify the FROMVOLUME parameter, only the backup version of the uncataloged data set is deleted.
3. FROMVOLUME does not apply to SMS-managed data sets.
4. FROMVOLUME does not apply to cataloged data sets.

### **VERSIONS: Specifying the Backup Versions to Delete**

**Explanation:** VERSIONS(*bvn* ...) is an optional parameter specifying which of the backup versions of a data set to delete. You can specify multiple version numbers. For *bvn*, substitute the one-to-three-digit decimal number of a particular backup version to be deleted. You can get the backup version number by issuing a LIST command and specifying the data set name and the BACKUPCONTROLDATASET parameter.

A list of backup version numbers applies to the backup versions of any data sets you specify. For example, assume you specify the following command:

```
BDELETE (VLS6492.PQR.CLIST, VLS6493.STU.CLIST) +
 VERSIONS(115,118,120)
```

DFSMShsm deletes backup version numbers 115, 118, and 120 for data sets VLS6492.PQR.CLIST and VLS6493.STU.CLIST.

If you do not specify the VERSIONS parameter, DFSMShsm deletes all backup versions of the specified data set except for the retired versions if they exist.

**Note:** If you want to delete a retired version, you must specify the version number. A retired version is the backup version DFSMShsm creates before it scratches a data set during data set retirement. DFSMShsm does not automatically delete retired versions.

**Defaults:** None.

---

## Examples of How to Code the BDELETE Command

The following examples present different ways to code the BDELETE command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Deleting Specific Backup Versions of Two SMS-Managed Data Sets

**Example:** In this example, the specified backup versions of the two SMS-managed data sets are to be deleted.

```
BDELETE AMS6607.PDS.CLIST VERSIONS(3,8)
BDELETE AMS6609.PDS.CLIST VERSIONS(16,17)
```

### Deleting All Backup Versions of Two Cataloged Data Sets

**Example:** In this example, all the backup versions of the two data sets are deleted if all the data sets except for the retired version have been cataloged prior to backup.

```
BDELETE (AMS6607.A.CLIST, AMS6608.B.CLIST)
```

### Deleting Particular Backup Versions of an Uncataloged Data Set

**Example:** In this example, backup versions numbered 9, 11, 13, and 15 of an uncataloged data set backed up from volume VOL001 are deleted.

```
BDELETE AMS6607.UNC.CLIST FROMVOLUME(VOL001) +
 VERSIONS(9,11,13,15)
```

**BDELETE**

---

## Chapter 11. CANCEL: Canceling a Queued DFSMShsm Request

The CANCEL command cancels an existing queued DFSMShsm request. You can cancel the following types of requests:

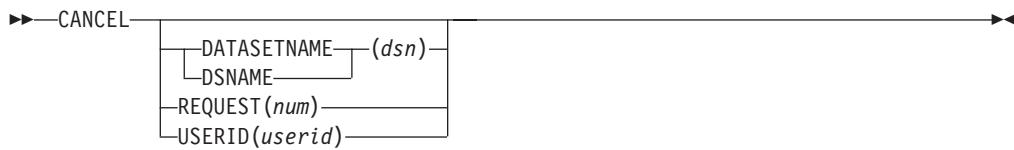
- A specific request
- All requests for a particular user
- All requests for a particular data set

In a common recall queue environment, recall requests can only be canceled from the host that originated the request

Use the QUERY command to determine the request number of the existing queued DFSMShsm requests. The CANCEL and QUERY commands have the highest processing priority. Therefore, the CANCEL and QUERY commands cannot be canceled.

---

### Syntax of the CANCEL Command



**Note:** Although the CANCEL command has no required parameters, specify at least one optional parameter with the CANCEL command.

---

### Optional Parameters of the CANCEL Command

This section describes the optional parameters of the CANCEL command.

#### DATASETNAME | REQUEST | USERID: Specifying Command Requests

**Explanation:** DATASETNAME | REQUEST | USERID are mutually exclusive, optional parameters specifying which existing, queued DFSMShsm requests to cancel.

**DATASETNAME(dsname)** specifies that all requests for a particular data set be canceled. For *dsname*, substitute the fully qualified name of the data set for which all requests be canceled.

**REQUEST(*num*)** specifies that a specific DFSMShsm request be canceled. For *num*, substitute the DFSMShsm request number of the request you want to cancel.

You can issue the following command to determine the current requests and their request numbers:

QUERY REQUEST

## CANCEL

**USERID(*userid*)** specifies that all requests of a particular user be canceled. For *userid*, substitute a one-to-seven alphanumeric character string for the identification of the particular user.

**Defaults:** None.

**Notes:**

1. No function results if the CANCEL command is issued with no parameters.
2. The CANCEL command can only be used to cancel queued requests that have not yet been selected for processing. Requests that have been selected for processing, even if these requests are later suspended by a HOLD or SETSYS EMERGENCY command, cannot be canceled with the CANCEL command.
3. If you issue the CANCEL command for any request created by:
  - A BACKVOL STORAGEGROUP command
  - A BACKVOL volumes list
  - A single volume recovery from incrementals

all queued requests associated with that request number are canceled. This is because these functions spin-off multiple requests with the same request number and cancelling this request number cancels all queued requests with this request number.

## Examples of How to Code the CANCEL Command

The following examples present how to code the CANCEL command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Canceling All Requests for a Specified User ID

**Example:** In this example, all requests submitted by the specified *userid* are canceled.

```
CANCEL USERID(L541563)
```

### Canceling All Requests for a Specified Data Set Name

**Example:** In this example, all requests for a specified data set name are canceled.

```
CANCEL DATASETNAME(L541563.PSU.N.F230EP03.DSET1)
```

### Canceling a Particular Request

**Example:** In this example, request number 0015 is canceled.

```
CANCEL REQUEST(15)
```

### Canceling All Requests Issued from the System Console

**Example:** In this example, all requests submitted from the system console are canceled. Note that \*\*OPER\* in the example below is a pseudo *userid* representing the system operator.

```
CANCEL USERID(**OPER*)
```

---

## **Chapter 12. DEFINE: Defining Control Structures for Use by DFSMShsm**

The DEFINE command allows you to specify the following control structures that are used by DFSMShsm:

- Backup cycle, start date for the backup cycle, and the number of daily backup volumes to be used for each day in the backup cycle
- Dump class attributes
- Dump cycle and start date for the dump cycle
- Automatic primary space management cycle
- Automatic secondary space management cycle
- Key ranges for DASD migration level 2 volumes
- Pool of volumes to which non-SMS-managed data sets with the same set of initial characters are recalled
- Pool of volumes, that together can be used as a target for recalling a data set migrated from one of the volumes
- Pool of volumes to which backed-up aggregated data sets will be restored during aggregate recovery
- When to release a data set backup tape that is mounted to process data set backup commands and the status of the released tape.

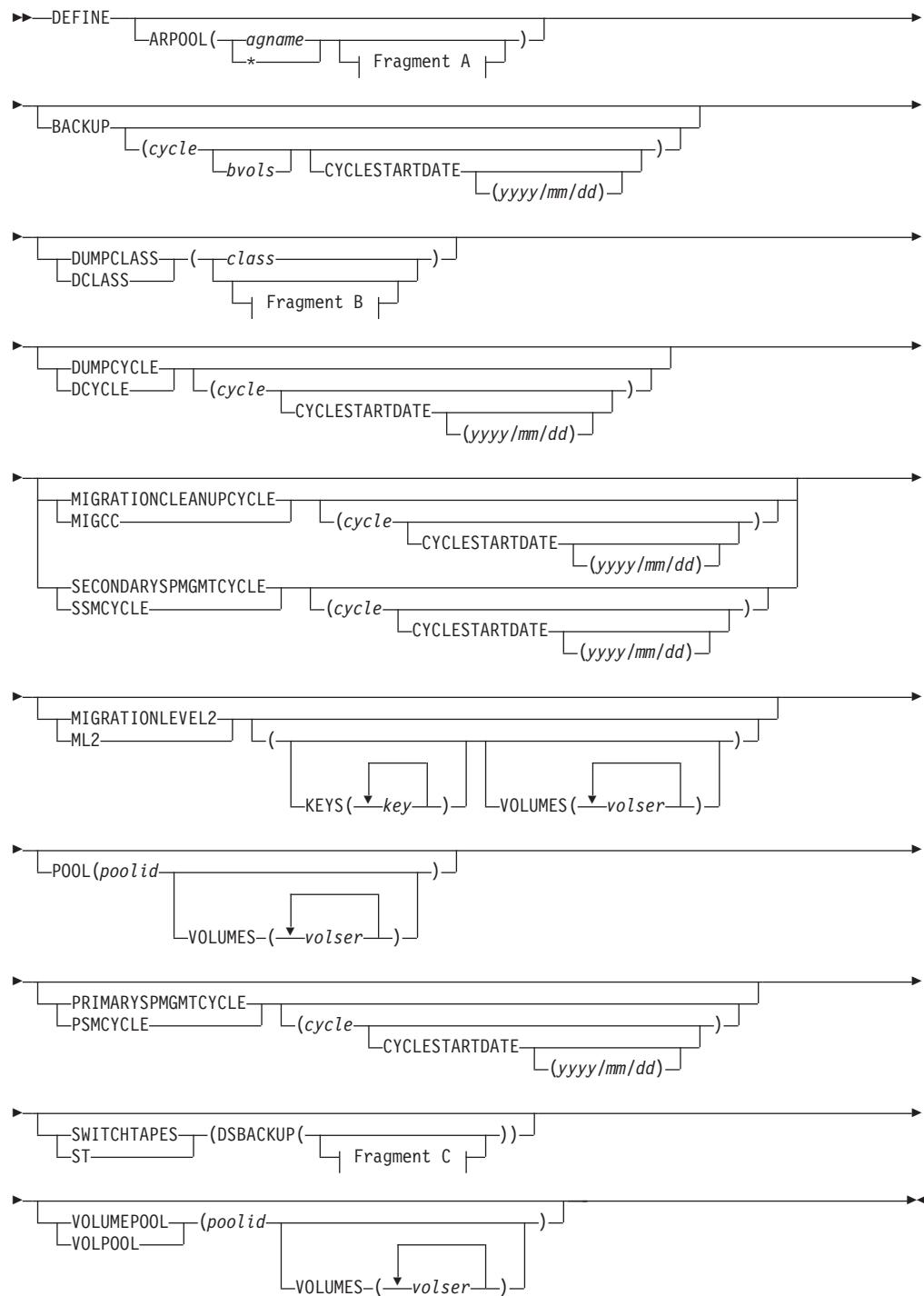
When you use JES3, you must use the ADDVOL command to add primary volumes to DFSMShsm before you can specify the volumes with the POOL or the VOLUMEPOOL parameter of the DEFINE command.

If an SMS-managed volume is specified as part of a data set pool, a message is issued indicating that the volume has not been added to the data set pool. Processing continues for the DEFINE command. If, however, only SMS-managed volumes are specified for the definition of the data set pool, the data set pool definition is rejected, and the DEFINE command fails.

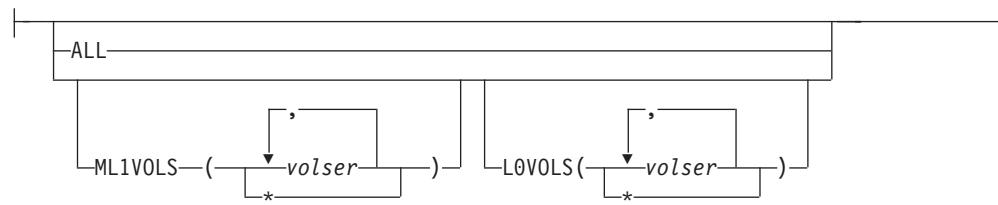
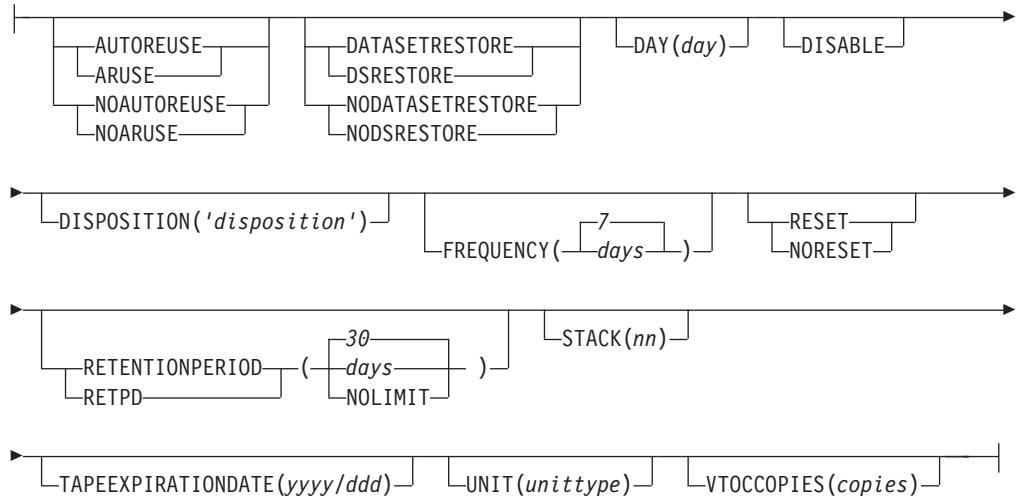
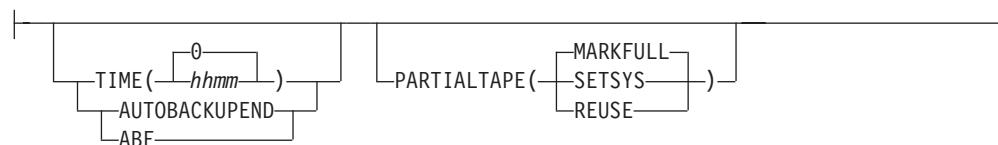
With the exception of the ARPOOL, POOL and VOLUMEPOOL parameters, you do not have to redefine any optional parameters each time you start DFSMShsm.

## DEFINE

## Syntax of the DEFINE Command



## A: ARPOOL Optional Parameters:

**B: DUMPCLASS Optional Parameters:****C: SWITCHTAPES Optional Parameters:****Notes:**

1. You must specify at least one of the optional parameters with each `DEFINE` command.
2. The single quotes (' ') are required if `disposition` is more than one word or if it contains a special character.

## Optional Parameters of the DEFINE Command

This section describes the optional parameters of the DEFINE command.

### ARPOOL: Identifying the Volumes for Aggregate Recovery

**Explanation:** ARPOOL is an optional parameter specifying a pool of volumes to be used as target volumes during an aggregate recovery.

Subparameter	Explanation
<i>agname</i>	<b>ARPOOL(<i>agname</i>)</b> specifies the name of the aggregate group. For <i>agname</i> substitute an aggregate group name that has been defined. The defined pool will be used for recovery of that aggregate group's data sets.  If no <i>agname</i> is specified, the command fails.
*	<b>ARPOOL(*)</b> specifies that the volumes are assigned to a general pool of aggregate recovery volumes. The general pool of volumes is used when recovering an aggregate group that does not have a specific ARPOOL defined.

You can use the following optional subparameters with the ARPOOL parameter.

Subparameter	Explanation
The ALL subparameter is an optional subparameter that is mutually exclusive with the L0VOLS and ML1VOLS parameters.	
ALL	ALL specifies that all currently mounted ADDVOL ML1 and primary volumes be defined as the respective volume pools for aggregate recovery. Specifying the ALL parameter is equivalent to specifying the L0VOLS(*) and ML1VOLS(*) parameters. For this reason, do not specify the L0VOLS(*) parameter, the ML1VOLS(*) parameter, or both when you specify ALL.

The following subparameters are optional parameters that are mutually exclusive with the ALL subparameter. You can use one or both of the following parameters.

L0VOLS	<b>L0VOLS(volser ...)</b> specifies the list of volumes used as target volumes during recovery of nonmigrated non-SMS-managed data sets. If you specify a parameter of L0VOLS(*), all currently mounted ADDVOL primary volumes (up to 59) will be used as the primary volume pool for aggregate recovery.
ML1VOLS	<b>ML1VOLS(volser ...)</b> specifies the list of volumes as target volumes during recovery of migrated data sets to ML1 volumes. If you specify a parameter of ML1VOLS(*), all currently mounted ADDVOL ML1 volumes will be used as the ML1 volume pool for aggregate recovery.

**Defaults:** None.

**Notes:**

- If the DEFINE ARPOOL is issued without the ALL, ML1VOLS, and L0VOLS parameters, the aggregate recovery pool specified by *agname* is deleted. If an aggregate group name of \* is issued without the ALL, M1VOLS, and L0VOLS parameters, the general pool of aggregate recovery volumes is deleted.
- If a DEFINE ARPOOL command has not been issued when an ARECOVER command is issued, DFSMShsm uses all currently mounted ADDVOL primary and ML1 volumes as a temporary ARPOOL.

3. The L0VOLS in an ARPOOL are used to recover non-SMS-managed data sets. In an SMS environment, allocation is directed by the ACS routines. L0VOLS are used only in an SMS environment if the ACS routines do not direct allocation to any other volume.
4. You cannot define the same volume as both L0VOLS and ML1VOLS within a pool or between pools.
5. You cannot define SMS-managed volumes to an ARPOOL.
6. A volume previously added to DFSMShsm with the PRIMARY parameter of the ADDVOL command can subsequently be defined to the ARPOOL only by using the L0VOLS optional parameter.
7. A volume previously added to DFSMShsm with the ML1 parameter of the ADDVOL command can subsequently be defined to the ARPOOL only by using the ML1VOLS optional parameter.
8. Since the DEFINE ARPOOL command is only in effect for the duration of DFSMShsm startup, it is recommended that you add this command to the DFSMShsm parmlib member (ARCCMDxx) on the system that is the target of the aggregate recovery.
9. Do not allow the DEFINE ARPOOL to default to the current ADDVOL volumes for all aggregates. If you allow this, all aggregate recoveries will choose the same volume as target volumes, causing contention for those volumes. To reduce volume contention and to improve performance, it is more beneficial to define a unique set of volumes to each aggregate being recovered, especially if more than 1 ABARS address space is active simultaneously.

## BACKUP: Specifying the Backup Cycle

**Explanation:** BACKUP is an optional parameter specifying the days in a backup cycle when automatic backup is done and the number of backup volumes DFSMShsm uses each day that volume backup runs.

**BACKVOL(*cycle*):** For *cycle*, substitute a string of alphabetic Ys and Ns. Each Y represents a day in the cycle when you want automatic backup done and each N represents a day in the cycle when you do not want automatic backup done. You can represent up to 31 days with the Ys and Ns. When you specify BACKUP, the current day is the first day of a cycle unless you specify the cycle start date.

**BACKVOL(*cycle bvol*):** For *bvol*, substitute a decimal number from 1 to 9999 to represent the number of DASD backup volumes DFSMShsm assigns to a given day in the backup cycle before initiating spill or cleanup processing on full DASD daily backup volumes. This value is called the *daily limit*.

CYCLESTARTDATE can be used with this parameter and is listed alphabetically after this discussion.

**Defaults:** If you specify BACKUP without *cycle*, the backup cycle defaults to a seven-day cycle with automatic backup every day. If you do not specify a minimum number of backup volumes with *bvol*, the number defaults to one.

### Notes:

1. You must specify BACKUP if you want to use DFSMShsm backup.
2. For DASD backup, ensure that the number of backup cycle days is greater than the number of SETSYS VERSIONS. (For example, if you specify SETSYS VERSIONS(3), then BACKUP cycle days must be 4 or greater.)

## CYCLESTARTDATE: Specifying the Start Date of a Cycle

**Explanation:** CYCLESTARTDATE is an optional subparameter specifying the start date or reset date of a cycle. It can be used with the following parameters:

- DEFINE BACKUP
- DEFINE DUMPCYCLE
- DEFINE MIGRATIONCLEANUPCYCLE
- DEFINE PRIMARYSPMGMTCYCLE
- DEFINE SECONDARYSPMGMTCYCLE

A leading zero is not required for a one-digit month or day. For a start date, specify *yyyy/mm/dd*.

**Defaults:** If CYCLESTARTDATE is specified without a start date or if CYCLESTARTDATE is not specified at all, then:

- If a date is not already stored, DFSMShsm sets the start date to the current date.
- Or, if a date is already stored and the cycle length is changed, DFSMShsm sets the start date to the current date.
- Or, if a date is already stored and the cycle length is unchanged, DFSMShsm does not change the cycle start date.

### Notes:

1. The cycle start date is saved between DFSMShsm startups.
2. The start date specified with the CYCLESTARTDATE parameter cannot be a date in the future. The date must be a date prior to or equal to the date when the DEFINE command is issued.
3. Understanding the difference between cycle days and calendar days is important. The first cycle day, DAY 1, begins at the start time of the function. The second cycle day, DAY 2, begins when this start time has again been reached, regardless of when the new calendar day begins. Third and subsequent days follow the same pattern. For instance, if the cycle start time for a function is 1100 (11 a.m.) on Monday, DAY 1 is from 11 a.m. on Monday to 10:59 a.m. on Tuesday. DAY 2 begins after 11 a.m. on Tuesday and continues until 10:59 am. on Wednesday.
4. If you specify CYCLESTARTDATE, you must also specify *cycle*; otherwise, the command will fail.

## DUMPCCLASS: Specifying the Addition or Changing of a Volume Dump Class

**Explanation:** DUMPCCLASS is an optional parameter specifying that a volume dump class be added or changed.

Subparameter	Explanation
class	DUMPCCLASS( <i>class</i> ): For <i>class</i> , substitute from one to eight characters for the class name to be defined. The first character must be an alphabetic or national (# @ \$) character. The remaining characters can be alphabetic, national, or numeric characters. Only one class can be specified on a single DEFINE command.

**Tape Library Relationship:** A unit name can be used for filtering in the ACS routines. If you specify the unitype for this command, it will be sent to the ACS routines in SMS for the DEFINE function.

If the class has not been defined previously, a new backup control data set (BCDS) record is created describing the dump class. Unspecified parameters will have their DFSMShsm defaults supplied.

A previously defined class will have its existing BCDS record. Unspecified parameters remain unchanged from the previous definition, unless either the DATASETRESTORE or AUTOREUSE subparameters, or both, have been specified and the RETENTIONPERIOD is specified as NOLIMIT. In this case, the DATASETRESTORE and AUTOREUSE subparameters are set to NODATASETRESTORE and NOAUTOREUSE.

For SMS-managed volumes, you must use the DUMPCLASS parameter to define dump classes referred to by storage groups.

**Defaults:** None.

The subparameters of the DUMPCLASS parameter are listed in alphabetical order and can be found at the following locations:

Subparameter	See Page
AUTOREUSE   NOAUTOREUSE	119
DATASETRESTORE   NODATASETRESTORE	120
DAY	121
DISABLE	122
DISPOSITION	123
FREQUENCY	123
RESET   NORESET	124
RETENTIONPERIOD	124
STACK	125
TAPEEXPIRATIONDATE	126
UNIT	127
VTOCCOPIES	127

## DUMPCLASS(AUTOREUSE | NOAUTOREUSE): Specifies Whether DUMP Volumes Are Automatically Available for Reuse When Invalidated

**Explanation:** AUTOREUSE | NOAUTOREUSE are mutually exclusive, optional subparameters of DUMPCLASS, specifying whether dump volumes with retention periods in the defined class are automatically available for reuse when automatically invalidated.

Subparameter	Explanation
AUTOREUSE	DUMPCLASS(AUTOREUSE) specifies that when DFSMShsm initiates the invalidation of a dump copy, the dump volumes are automatically made available for reuse.

## DEFINE

Subparameter	Explanation
NOAUTOREUSE	DUMPCLASS(NOAUTOREUSE) specifies that when DFSMShsm initiates the invalidation of a dump copy, the dump volumes are marked unavailable for selection by DFSMShsm. The ADDVOL command can be used to identify to DFSMShsm that the volume is available for reuse. The use of NOAUTOREUSE is dependent upon using the SETSYS TAPEDELETION option of HSMTAPE for the dump category.

**Defaults:** If neither AUTOREUSE nor NOAUTOREUSE is specified, the default is NOAUTOREUSE when a dump class is being defined for the first time.

If a dump class is already defined and certain characteristics are being changed, and if neither AUTOREUSE nor NOAUTOREUSE is specified, then the previous specification remains unchanged unless the retention period is NOLIMIT. In this case the dump class is set for NOAUTOREUSE.

**Notes:**

1. You can use the DELVOL command with the PURGE parameter to invalidate the only valid dump copy.
2. NOAUTOREUSE must be specified if volumes for this dump class are to leave the confines of the data processing center and the SETSYS TAPEDELETION option of HSMTAPE has been specified for this dump class. The NOAUTOREUSE parameter prevents mount requests for volumes that are not immediately available. These volumes must be identified to DFSMShsm by issuing the ADDVOL command, but not until they are returned from their off-site storage location. If AUTOREUSE is used in this environment, then DFSMShsm may call for a specific mount for output of a recently released tape before the tape is again physically present in the data processing center.
3. The disposition of tapes automatically made available for reuse depends on the TAPEDELETION parameter of the SETSYS command. If you are using the TAPEDELETION option of SCRATCH, then the tape is released from DFSMShsm when invalidated and DFSMShsm does not know of it to consider it for subsequent use.
4. If you use NOLIMIT, you can use only the NOAUTOREUSE subparameter.

## DUMPCLASS(DATASETRESTORE | NODATASETRESTORE): Data Set Restore Is Allowed from a Full-Volume Dump Copy in This Dump Class

**Explanation:** DATASETRESTORE | NODATASETRESTORE are mutually exclusive, optional subparameters of DUMPCLASS, specifying whether or not to allow a physical data set restore from a full-volume dump copy in this dump class. This support applies to the RECOVER or HRECOVER commands issued for a single data set.

Subparameter	Explanation
DATASETRESTORE	<b>DUMPCLASS(DATASETRESTORE)</b> specifies that physical restores of individual data sets from dump volumes in this class are allowed. The dump volumes must remain available to satisfy mount requests. A physical data set restore requires the mounting of one or more tapes to complete the request. Neither DFSMShsm nor DFSMSdss keeps track of exactly where the data set is located on the dump tapes. A dump VTOC copy data set is needed for data set restores.
NODATASETRESTORE	<b>DUMPCLASS(NODATASETRESTORE)</b> specifies that dump volumes in this class are not available to do individual physical data set restores. All data set recoveries are from incremental backup versions unless a dump volume is explicitly requested on the RECOVER command.

**Defaults:** If neither DATASETRESTORE nor NODATASETRESTORE is specified, the default is NODATASETRESTORE when a dump class is being defined for the first time.

If a dump class is already defined and certain characteristics are changed, and if neither DATASETRESTORE nor NODATASETRESTORE is specified, the previous specification remains unchanged unless the retention period is NOLIMIT. In this case, the dump class is set for NODATASETRESTORE.

**Notes:**

1. If DATASETRESTORE is selected and the data set resides or has resided on a volume that was dumped to this class, DFSMShsm determines whether the most current backup has been done by the incremental backup process or by the full-volume process. When the most current version is on a dump volume, DFSMSdss performs a physical data set restore from the copy. When the most current version is an incremental backup version or if the backup version cannot be determined, DFSMShsm performs a data set recovery of an incremental version. If there are no records in BCDS and there is no catalog entry for the data set on the volume from which the dump copy has been made, the recovery fails unless you specify the RECOVER command with the FROMDUMP parameter.
2. If NODATASETRESTORE is selected and the request was explicitly from a dump copy (FROMDUMP keyword), DFSMShsm fails the recovery request unless the dump volume was specified (DUMPVOLUME(valid)).
3. If NODATASETRESTORE is selected and the request was not explicitly from a dump copy, DFSMShsm always performs a data set recovery of an incremental backup version.
4. A RETENTIONPERIOD(NOLIMIT) for the class overrides the DATASETRESTORE option and prevents physical data set restores from a dump volume in this class.
5. If you use NOLIMIT, you can use only the NODATASETRESTORE subparameter.

## DUMPCLASS(DAY): Specifying the Target Day of the Dump Cycle for This Class

**Explanation:** DAY is an optional subparameter of DUMPCLASS specifying the target day of the dump cycle for this class. DAY restricts that this class be targeted during automatic dump processing only on the specified day of the cycle.

## DEFINE

**DUMPCLASS(DAY(day)):** For *day*, substitute a decimal number to specify the target day of the dump cycle. A value of zero indicates that a previous association with a day in the dump cycle should be removed. Any other numeric value must be from one to a value less than or equal to the number of days specified in the dump cycle. *day* must be a 'Y' day specified in the DUMPCYCLE parameter. If a frequency is also specified, the frequency must be satisfied before the class is chosen. Full-volume dumps requested by command, however, are processed independently of the DAY specified.

DAY can be used instead of the FREQUENCY parameter, if you desire to dump to this class every cycle repeat. DAY allows a subset of the primary volumes to be dumped on one day and another subset to be dumped on another day. For example, if the primary volume subsets are defined by two dump classes and the dump classes are identical except for the DAY parameter, one subset of primary volumes can be dumped on one day and the other subset of primary volumes can be dumped on another day. The primary volumes can retain the same frequency and retention characteristics.

**DUMPCLASS Defaults:** If the DAY parameter is not specified for the DUMPCLASS, determination of whether to dump a volume is based on other parameters. If the FREQUENCY parameter criterion is met, a volume will be dumped on each 'Y' day specified in the DEFINE DUMPCYCLE.

**Note:** The FREQUENCY parameter defaults to seven days. However, in some cases, you may want to specify FREQUENCY(1). If for some reason autodump does not run during its normally scheduled time and manual dumps are requested later, and if the DAY specified in this parameter occurs sooner in the cycle than the FREQUENCY days specified, autodump does not run on the day specified. This problem can be avoided by specifying FREQUENCY(1).

## DUMPCLASS(DISABLE): Specifying the Volume Dump Class and Making it Unavailable as a Target of Any Full-Volume Dump

**Explanation:** DISABLE is an optional subparameter of DUMPCLASS specifying that a dump class be unavailable as the target of any full-volume dumps. When you specify DISABLE, DFSMShsm automatically unassigns any dump volumes that are empty and currently added to this class. The unassigned dump volumes are available for selection to any other class that uses the same unit type. Information about valid dumps remains in the BCDS, but no further dumps to this class are allowed, and no more dump volumes can be added to this class. The definition of the dump class also remains in the BCDS and the dump class definition will be shown in the LIST DUMPCLASS output.

**Defaults:** None.

**Notes:**

1. You can enable a disabled dump class by issuing a DEFINE command without specifying the DISABLE subparameter.
2. Any other parameters specified on the same command are ignored.
3. Use the LIST command to find any volumes that are currently assigned to a particular class.

## DUMPCLASS(DISPOSITION): Specifying the Disposition of Dump Volumes

**Explanation:** **DISPOSITION** is an optional subparameter of DUMPCLASS specifying the disposition of the dump volumes after they have received part of a dump copy.

**DUMPCLASS(DISPOSITION('disposition')):** For *disposition*, substitute a character string from 1 to 20 characters describing the intended disposition of the dump volumes. The *disposition* is inserted into message ARC0637I, which is issued for each dump copy successfully created for a source volume. If *disposition* is not specified, message ARC0637I is sent to the dump activity log, but not to the system console.

**Defaults:** None.

**Restriction:** The single quotes (' ') are required if *disposition* is more than one word or if it contains a special character.

## DUMPCLASS(FREQUENCY): Specifying the Minimum Number of Days That Must Elapse Between Volume Dumps of a Volume to This Class

**Explanation:** **FREQUENCY** is an optional subparameter of DUMPCLASS specifying the minimum number of days that must elapse from the last volume dump of the volume to this class before the volume can be automatically dumped again.

**DUMPCLASS(FREQUENCY(days)):** For *days*, substitute a decimal number from 0 to 999.

Automatic full-volume dumps are included in the test for satisfying the requirement defined by the FREQUENCY parameter. Full-volume dumps requested by command, however, are processed independently of the FREQUENCY specified with the DEFINE command. The frequency for the class is considered met if DFSMShsm has no record of dumping the volume in question to this class. Therefore, the frequency is met for each volume dumped to the class for the first time. DFSMShsm keeps track of only the last five distinct dump classes to which a volume has been dumped.

**Defaults:** If you do not specify FREQUENCY, the default for *days* is 7.

### Notes:

- Coordinate the FREQUENCY parameter with DUMPCYCLE parameter days to ensure that schedules for automatic dumps do not conflict. **Example:** The following example shows an apparent conflict:

```
DEFINE DUMPCYCLE(NNNNNNY CYCLESTARTDATE(84/01/01)) +
      DUMPCLASS( A FREQ(8) )
```

In this example, DUMPCYCLE specifies a 7-day cycle, with the dumps taken on a Saturday. The dump frequency, FREQ, specifies an 8-day elapsed time. The dumps to class A would be performed every other Saturday, beginning with the second Saturday, because the dump frequency would not have elapsed by the time the dump cycle had completed. If, however, the volume had never been dumped by DFSMShsm, the initial dump would be on the first Saturday, and then every other Saturday.

## DEFINE

To be more consistent with the dump cycle, choose the following value: FREQ(7). This causes the required number of days to elapse before the next 'Y' day in the processing of automatic dump.

2. The DUMPCLASS parameter FREQUENCY is calculated from the last date that the level 0 volume was dumped while not in debug mode. The date that the level 0 volume was last dumped is not updated when DFSMSHsm is running in debug mode because the dump prevents volume dumps from processing on schedule when no debug is specified. In debug mode, if the date last dumped is zeros, and if the frequency value is not calculated, then the level 0 volume is eligible to be dumped, and the date last dumped is not updated.

## DUMPCLASS(RESET | NORESET): Specifying Whether DFSMSdss Resets the Change Bit for Each Data Set Following a Full-Volume Dump

**Explanation:** RESET | NORESET are mutually exclusive, optional subparameters of DUMPCLASS specifying whether DFSMSdss resets the change bit for each data set after a full-volume dump is successfully performed.

Subparameter	Explanation
RESET	DUMPCLASS(RESET) specifies that the change bit for each data set should be reset.
NORESET	DUMPCLASS(NORESET) specifies that the change bit for each data set should not be reset.

The specified option affects whether DFSMSHsm makes an incremental backup version of the data sets the next time the volume is processed by incremental backup with the BACKVOL command and whether the data sets have not been changed since the full-volume dump.

If multiple dump copies are made concurrently, then each copy is associated with a different dump class. If RESET is specified for any of these dump classes, then the RESET option is specified on the command to DFSMSdss.

**Defaults:** If neither RESET nor NORESET is specified, the default is NORESET when a dump class is defined for the first time.

### Notes:

1. If a dump class is already defined (certain characteristics are changed) and neither RESET nor NORESET is specified, the previous specification remains unchanged.
2. If you use the APPLYINCREMENTAL subparameter with the FROMDUMP parameter of the RECOVER command, specify the NORESET subparameter.

## DUMPCLASS(RETENTIONPERIOD): Specifying the Enforcement of Retention Periods for the Dump Copies in This Class

**Explanation:** RETENTIONPERIOD is an optional subparameter of DUMPCLASS specifying whether you want DFSMSHsm to enforce retention periods for the dump copies in this class.

Subparameter	Explanation
days	<b>DUMPCLASS(RETENTIONPERIOD(days))</b> specifies that DFSMShsm enforces retention periods for the dump copies in this dump class and then automatically invalidates them when the retention period has been met. After the number of days has elapsed, the dump volumes are automatically reused if the AUTOREUSE subparameter is specified for the class. If AUTOREUSE is not specified, days may be used to specify an expected date to delete the volumes. If the maximum number of dump generations is reached, another dump is performed. If the oldest generation contains a dump copy with an explicit retention period that has not been reached, DFSMShsm invalidates the oldest dump generation and issues a message reporting this action. The maximum number of dump generations is 100 generations. For days, enter a decimal number between 1 and 9999.
NOLIMIT	<b>DUMPCLASS(RETENTIONPERIOD(NOLIMIT))</b> specifies that there is no predetermined expiration date for the dump copies in this DUMPCLASS. DFSMShsm does not automatically enforce an expiration date. The dump copy can be invalidated only by an explicit request using the DELVOL command. If the maximum number of dump generations is reached, another dump will be performed. The oldest generation contains a dump copy with RETENTIONPERIOD(NOLIMIT). The maximum number of dump generations is 100 generations. If DFSMShsm must invalidate a dump copy without a retention period, a message is issued reporting this action.

**Defaults:** If you do not specify RETENTIONPERIOD, the default is 30 days.

**Notes:**

1. If you use NOLIMIT, also use the NOAUTOREUSE and the NODATASETRESTORE subparameters. If you use AUTOREUSE or DATASETRESTORE, the NOLIMIT parameter overrides the values. The values become NOAUTOREUSE and NODATASETRESTORE respectively.
2. DFSMShsm does not automatically delete the last and only copy of a source volume, regardless of the RETENTIONPERIOD set. To delete the dump volumes in this copy, issue the DELVOL command with the LASTCOPY option for one of the dump volumes. All of the volumes in the copy are deleted.

## DUMPCLASS(STACK): Specifying the Maximum Number of Dump Copies that Are Stacked for this Dump Class

**Explanation:** STACK is an optional subparameter of DUMPCLASS that specifies how many dump copies DFSMShsm should place on a dump volume that is assigned to this dump class during one invocation of automatic dump or BACKVOL dump.

**DUMPCLASS(STACK(nn)):** For nn, substitute a value from 1 to 99.

Given typical values of compression and the capacity of tape cartridges such as 3590, STACK values should be in the range of 10 to 12. All stacking to a given tape is done while that tape is mounted. DFSMShsm selects empty dump volumes as targets for auto or command dump. Each dump copy is written in its own file, with a unique data set name. As dump generations are rolled off when new dumps are created, a dump volume may contain a combination of valid and not valid dump copies.

## DEFINE

A given dump volume:

- Regardless of the STACK value that is used to write to it, is associated with only one dump class.
- Never contains more than one dump copy of the same source volume.
- Can contain dump copies of both SMS-managed volumes and non-SMS-managed volumes.
- Contains dump copies of only source volumes with affinity to the autodump host, or source volumes without such affinity, not a combination of both.

**Defaults:** If you do not specify STACK for a new dump class, DFSMShsm uses the value of 1. If you do not specify STACK for a dump class that is already defined, the previous STACK value remains unchanged.

**Notes:**

1. DFSMShsm ignores any STACK value from DEFINE during a BACKVOL DUMP command for a list of volumes, unless you specify the dump class with the DUMPCLASS parameter on the BACKVOL command.
2. VTOCCOPIES are created or not created in the same manner for all volumes dumped to the same dump class.
3. Any RETENTIONPERIOD or EXPIRATIONDATE for the dump class applies to all the dump copies that are written to its dump volumes (all dump copies stacked on a dump volume expire on the same day).

## DUMPCLASS(TAPEEXPIRATIONDATE): Specifying a Unique Expiration Date for All Dump Copies Created in a Dump

**Explanation:** TAPEEXPIRATIONDATE is an optional subparameter of DUMPCLASS specifying a unique expiration date for the dump tape header labels of all dump copies created in this dump class.

**DUMPCLASS(TAPEEXPIRATIONDATE(yyyyddd)):** For *yyyyddd*, specify a 7-digit number in the format of *yyyyddd*. The *yyyy* value and the *ddd* value are the year and day of the year for the expiration date of the dump copies. For *yyyy*, specify a year between the current year and 2155. For *ddd*, specify a day between 001 and 366.

**Defaults:** None.

**Notes:**

1. For TAPEEXPIRATIONDATE to be effective, the security options in effect, as established with a SETSYS command, must include EXPIRATION or EXPIRATIONINCLUDE.
2. Values for *yyyyddd* of 1999365 and 1999366 are recognized as “never expire” dates. Values of 1998000 and 1999000 are recognized as meaningful to certain tape management systems.
3. If you do not specify TAPEEXPIRATIONDATE for a dump class and a tape security option of EXPIRATION or EXPIRATIONINCLUDE is in effect, DFSMShsm provides an expiration date of 1999 for 365 days for dump volumes written for this class.
4. Past dates are not recognized as expiration dates.

## DUMPCLASS(UNIT): Specifying a Default Tape Unit Name

**Explanation:** UNIT is an optional subparameter of DUMPCLASS specifying the default unit name for allocation when no volumes are added to the class and when the class has been selected as the target of a dump copy.

**DUMPCLASS(UNIT(*unittype*)):** For *unittype*, substitute a valid esoteric name or a valid unit type.

The following are valid types of tape units:

- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:

- 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.
- 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.
- 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.

**Defaults:** If you do not specify UNIT when you define a dump class for the first time, the unit type specified with the SETSYS UNITNAME parameter is the default.

If a dump class is already defined and certain characteristics are being changed, and if UNIT is not specified, the previous specification remains unchanged.

### Attention

If UNIT is **not** specified on either the DEFINE or the SETSYS command, the default unit name that is used for allocation is a 3590-1 unit type.

## DUMPCLASS(VTOCCOPIES): Specifying the Number of Dump VTOC Copy Data Sets to Keep for Dump Copies Created in This Class

**Explanation:** VTOCCOPIES is an optional subparameter of DUMPCLASS specifying the number of dump VTOC data sets to keep for dump copies created in this class.

**DUMPCLASS(VTOCCOPIES(*copies*)):** For *copies*, substitute a number from 0 to 100. The value indicates how many of the existing dump copies of a given volume dumped to this class should have dump VTOC copy data sets kept associated with them. For example, use 3 as a value for *copies*. If there are six generations of dumps for a given volume and generations 0, 2, and 4 have copies in a class with VTOCCOPIES(3), then all of these generations have VTOC copy data sets kept for them. This happens regardless of what other dump copies might exist in the same dump generations, or whether generations 1, 3, and 5 have dump VTOC copies. If a new dump copy is created in the same class for the same volume, the oldest dump copy in this dump class no longer requires the dump VTOC copy data set. The dump VTOC copy data set is deleted if no other dump copy in the same generation requires it to be kept.

## DEFINE

VTOCCOPIES is also used to determine if a dump VTOC copy data set should be created when a volume is dumped. If *copies* is greater than 0, a dump VTOC copy data set is created. If *copies* is 0 and the volume is not dumped to multiple dump classes concurrently, a dump VTOC copy data set is not created. If *copies* is 0 and the volume is dumped to multiple dump classes concurrently, a dump VTOC copy data set is created if any of the dump classes being dumped to has VTOCCOPIES(*copies*) greater than 0.

The dump VTOC copy data sets are written to migration level 1 volumes. Space required for these data sets varies with the size of the original VTOC. Only part of the data set VTOC entry for each data set from the original VTOC is contained in the VTOC copy data set. When a dump generation no longer has a dump VTOC copy data set associated with it, or when the number of dump VTOC copies kept is zero, DFSMShsm cannot provide the following:

- Physical data set restore support from the associated dump copies.
- Listing capabilities for the dump copy using the DUMPCONTENTS parameter with the LIST DUMPVOLUME command.

Dump VTOC copy data sets are not created for or maintained for dumps of DFSMShsm-owned volumes.

**Defaults:** If you do not specify VTOCCOPIES when a dump class is defined for the first time, 2 is the default.

If a dump class is already defined and certain characteristics are changed, and if VTOCCOPIES is not specified, the previous specification remains unchanged.

## DUMPCYCLE: Specifying the Automatic Dump Cycle

**Explanation:** DUMPCYCLE is an optional parameter specifying the days in a cycle when the automatic dump process should run.

**DUMPCYCLE(*cycle*):** For *cycle*, substitute a string of alphabetic Ys and Ns. Each Y represents a day in the cycle when automatic dump is to run, and each N represents a day in the cycle when automatic dump is not to run. You can represent up to 31 days with the Ys and Ns. When you specify *cycle*, the current day is the first day of the cycle unless you specify the cycle start date.

CYCLESTARTDATE can be used with this parameter and is covered separately under “CYCLESTARTDATE: Specifying the Start Date of a Cycle” on page 118.

**Defaults:** None.

**Notes:**

1. *Cycle* must be defined sometime before the automatic dump process is permitted to run.
2. *Cycle* is ignored if a volume dump is requested with the BACKVOL command.
3. *Cycle* has no meaning unless the AUTODUMPSTART and BACKUP parameters of the SETSYS command are specified for the DFSMShsm startup.
4. Dump cleanup also runs on an ‘N’ day in the dump cycle. Cleanup functions include expiration of expired dump copies and deletion of excess dump VTOC copy data sets.

## MIGRATIONCLEANUPCYCLE | SECONDARYSPMGMTCYCLE: Specifying the Cycle for Automatic Secondary Space Management Functions

**Explanation:** MIGRATIONCLEANUPCYCLE | SECONDARYSPMGMTCYCLE are mutually exclusive, optional parameters that apply to all secondary space management functions, including migration cleanup and ML1 to ML2 migration.

Both of these parameters allow you to specify the days in a cycle when migration cleanup and ML1 to ML2 migration run.

These two parameters have identical function. The parameter name MIGRATIONCLEANUPCYCLE has been retained in order to maintain compatibility, but the parameter name SECONDARYSPMGMTCYCLE has been selected as the preferred name, because it more accurately describes the function.

**MIGRATIONCLEANUPCYCLE(*cycle*) or SECONDARYSPMGMTCYCLE(*cycle*):** For *cycle*, substitute a string of alphabetic Ys and Ns. Each Y represents a day in the cycle when migration cleanup and level 1 to level 2 migration run. Each N represents a day in the cycle when migration cleanup and level 1 to level 2 migration do not run. You can represent up to 31 days with the Ys and Ns. When you specify MIGRATIONCLEANUPCYCLE or SECONDARYSPMGMTCYCLE, the current day is the first day of the cycle, unless you specify a cycle start date.

CYCLESTARTDATE can be used with either parameter and is covered separately under “CYCLESTARTDATE: Specifying the Start Date of a Cycle” on page 118.

**Defaults:** If you do not specify MIGRATIONCLEANUPCYCLE or SECONDARYSPMGMTCYCLE, *cycle* defaults to a one-day cycle. Therefore, if a start time has been specified by a SETSYS SECONDARYSPMGMTSTART command, automatic secondary space management functions will run every day.

If you do not specify both *cycle* and CYCLESTARTDATE, DFSMShsm sets *cycle* to a one-day cycle and CYCLESTARTDATE to the current date. Therefore, if a start time has been specified by a SETSYS SECONDARYSPMGMTSTART command, automatic secondary space management functions run every day.

**Note:** It is important to understand the difference between cycle days and calendar days. The first cycle day, DAY 1, begins at the start time of the function. The second cycle day, DAY 2, begins when this start time has again been reached, regardless of when the new calendar day begins. Third and subsequent days follow the same pattern. For instance, if the cycle start time for a function is 1100 (11 a.m.) on Monday, DAY 1 runs from 11 a.m. on Monday to 10:59 a.m. on Tuesday. DAY 2 begins after 11 a.m. on Tuesday and continues until 10:59 a.m. on Wednesday.

## MIGRATIONLEVEL2: Specifying DASD Level 2 Volumes and Their Associated Key Range Structure

**Explanation:** MIGRATIONLEVEL2 is an optional parameter specifying the division of key ranges for DASD migration level 2 volumes. When you specify MIGRATIONLEVEL2, you can also specify KEYS to indicate how data sets are assigned to the available DASD migration level 2 volumes.

## DEFINE

Subparameter	Explanation
KEYS	<p><b>MIGRATIONLEVEL2(KEYS(key ...))</b> specifies an ascending alphanumeric sequence of lower key-range boundaries, where the set of initial characters of the data set name is compared against the key. Any data set having the set of initial characters within the specified alphanumeric range migrates to the volume associated with that range. You specify only the lower boundary of the key range for a volume. The maximum number of key ranges you can define is 61.</p> <p>You specify one key less than the number of key ranges being defined because the lower boundary for the first key range defaults to the lowest key possible. For example, KEYS(L T) identifies three key ranges: the first key range begins with A and ends with K9999999, the second key range begins with L and ends with S9999999, and the third key range begins with T and ends with Z9999999.</p> <p>For <i>key</i> ..., substitute one or more strings of 1 to 8 characters, starting with an alphabetic or \$, #, or @. The remaining characters can be alphanumeric and \$, #, or @.</p>
VOLUMES	<p><b>MIGRATIONLEVEL2(VOLUMES(volser ...))</b> VOLUMES is an optional subparameter specifying a list of DASD migration level 2 volumes, assigned to the specified key ranges. If you specify fewer volumes than key ranges, DFSMShsm assigns an available DASD migration level 2 volume to the key range when it needs another volume. An available DASD migration level 2 volume is one that is not associated with a key range and has not been associated with a key range since the last ADDVOL or DELVOL command was issued. If you specify more volumes than key ranges, the extra volumes are not associated with any key range. Before you can specify any DASD migration level 2 volumes with the DEFINE command, you must add the volumes to DFSMShsm control by using the ADDVOL command.</p> <p>For <i>volser</i> ..., substitute the serial numbers of the DASD migration level 2 volumes, assigned to the corresponding specified key ranges. Only one volume is associated with each key range at a time.</p> <p>When the specified volume for a key range is full, DFSMShsm assigns an available DASD migration level 2 volume to that key range. To cover all specified key ranges, you must specify one more volume than you specify keys.</p>

**Defaults:** If you do not specify KEYS, DFSMShsm assumes that you are defining one key range for all possible keys.

**Notes:**

1. You must issue a DEFINE command with the MIGRATIONLEVEL2 parameter before DFSMShsm can process level 1 to level 2 migration.
2. If you want to reuse the DASD migration level 2 volume after it has been removed from a key range, you must use the DELVOL command with the UNASSIGN parameter.
3. DFSMShsm does not process a change to the key range definition while migration to DASD migration level 2 volumes is occurring.

## POOL: Identifying the Non-SMS-Managed Volumes Where the Data Sets with the Same First Qualifier Are Recalled

**Explanation:** POOL is an optional parameter specifying the set of initial characters of the data set name for a group of data sets and the set of non-SMS-managed

volumes where the group of data sets is to be recalled. Each *poolid* and associated volume list is a user-defined pool. When recall occurs, the set of initial characters of the data set name forces the recall of those data sets to one of the specific volumes identified with the VOLUMES subparameter. To remove the association between a pool ID and its associated volumes from pool control, you omit the VOLUMES subparameter when you specify POOL.

**POOL(*poolid*):** For *poolid*, substitute the set of initial characters of the data set name of those data sets you want recalled to the specified volume or volumes. The *poolid* can end with a period if POOL is the first keyword on the command.

Subparameter	Explanation
VOLUMES	<p><b>POOL(<i>poolid</i> VOLUMES(<i>volser ...</i>))</b> specifies the volumes where the data sets with the set of initial characters specified with the POOL parameter are recalled. When you specify multiple volumes for a pool ID, DFSMShsm tries to recall data sets to the volume with the most space. If there is not enough space on the volume, DFSMShsm can try recalling the data set to up to four different volumes from the same pool.</p> <p>For <i>volser ...</i>, substitute the serial numbers of the volumes where the group of data sets is to be recalled.</p>

**Defaults:** None.

**Notes:**

- When DFSMShsm checks whether a data set belongs to a pool, it checks the pools in the order you defined them and chooses a pool whose ID matches the initial characters of the data set name. If you define pools, so one is a subset of the other such as MYDSN and MYDSNAME, define the more restrictive pool first (in this case, MYDSNAME) as shown in the following example:

```
DEFINE POOL(MYDSNAME VOLUMES(VOL001))
DEFINE POOL(MYDSN VOLUMES(VOL002 VOL004))
```

If you do not define the pools in the order shown in the example, as soon as DFSMShsm sees the MYDSN part of MYDSNAME, it finds a match, and chooses VOL002 even if you wanted to use VOL001.

- The z/OS *DFSMShsm Storage Administration Guide* contains detailed information about defining pools in a JES3 environment.
- You can specify up to 140 volumes.
- If an SMS-managed volume is specified as part of a data set pool, a message is issued indicating that the volume was not added to the data set pool. Processing continues for the DEFINE command. If, however, only SMS-managed volumes are specified for the definition of the data set pool, the data set pool definition is rejected and the DEFINE command fails.
- Volumes specified in the DEFINE POOL command must also be added as primary volumes. To do this, use of the ADDVOL command.

## PRIMARYSPMGMTCYCLE: Specifying the Cycle for Automatic Primary Space Management

**Explanation:** PRIMARYSPMGMTCYCLE is an optional parameter specifying the days in a cycle when automatic primary space management runs.

## DEFINE

**PRIMARYSPMGMTCYCLE(*cycle*):** For *cycle*, substitute a string of alphabetic Ys and Ns. Each Y represents a day in the cycle when automatic primary space management is to run. Each N represents a day in the cycle when automatic primary space management is not to run. You can represent up to 31 days with the Ys and Ns. The current day is the first day of the cycle, unless you specify the cycle start date.

CYCLESTARTDATE can be used with this parameter and is covered separately under “CYCLESTARTDATE: Specifying the Start Date of a Cycle” on page 118.

**Defaults:** If you do not specify PRIMARYSPMGMTCYCLE or if you specify PRIMARYSPMGMTCYCLE without specifying *cycle*, automatic primary space management will default to a one-day cycle. Therefore, if a start time has been specified by a SETSYS PRIMARYSPMGMTSTART or AUTOMIGRATIONSTART command, automatic primary space management functions run every day.

If you do not specify both *cycle* and CYCLESTARTDATE, DFSMShsm will set the cycle to a one-day cycle. Therefore, if a start time has been specified by a SETSYS PRIMARYSPMGMTSTART or AUTOMIGRATIONSTART command, automatic primary space management functions will run every day.

**Notes:**

1. If you specify CYCLESTARTDATE, you must also specify *cycle*; otherwise, the DEFINE PRIMARYSPMGMTCYCLE command will fail.
2. The first day of the cycle is DAY 1. The second day in the cycle is DAY 1 until the start time for the function is reached; then it becomes DAY 2. Third and subsequent days follow the same pattern.

## SWITCHTAPES: Releasing Mounted Tapes for Command Data Set Backup

**Explanation:** SWITCHTAPES is an optional parameter that defines when to release those tapes mounted to process data set backup commands.

Subparameter	Explanation
DSBACKUP	SWITCHTAPES(DSBACKUP) is a required subparameter that specifies that the data set backup function performs a demount of all mounted data set backup tapes.

You can use the following optional parameters with the SWITCHTAPES parameter.

Subparameter	Explanation
TIME	<p><b>SWITCHTAPES(DSBACKUP(TIME(<i>hhmm</i>)))</b> specifies the time of day to demount mounted data set backup tapes. For <i>hhmm</i>, specify the planned demount time. If you specify TIME with <i>hhmm</i> as zero, DFSMShsm does not demount any mounted tapes. If the tape is mounted but not actively processing a data set, the demount occurs at the time indicated by TIME. If a tape is actively processing a data set, DFSMShsm demounts the tape at the end of the current data set.</p> <p><b>Note:</b> The <i>hhmm</i> format expresses time as a four-digit decimal number that is based on the 24-hour clock. The <i>hh</i> specifies the hour and <i>mm</i> specifies the minutes. For example, you can specify 1:15 p.m. as 1315, and you can specify midnight as 2400. The maximum value you can specify for <i>hh</i> is 24, the maximum value you can specify for <i>mm</i> is 59, and the maximum value you can specify for <i>hhmm</i> is 2400.</p>
AUTOBACKUPEND	<b>SWITCHTAPES(DSBACKUP(AUTOBACKUPEND))</b> specifies that DFSMShsm demounts all tapes that were mounted for data set backup at the end of the autobackup cycle. Before the autobackup cycle ends, all retries (data sets that were in use when the initial attempt to backup occurred) complete.
PARTIALTAPE	<b>SWITCHTAPES(DSBACKUP(PARTIALTAPE))</b> specifies the method that DFSMShsm uses to mark a single-file format output tape as full or available for reuse when a switch tape event occurs.
SETSYS	<b>SWITCHTAPES(DSBACKUP(SETSYS))</b> specifies that the SETSYS PARTIALTAPE value is used.
REUSE	<b>SWITCHTAPES(DSBACKUP(REUSE))</b> specifies that all partial tapes demounted with the SWITCHTAPES option remain selectable in the DFSMShsm inventory as partial tapes.
MARKFULL	<b>SWITCHTAPES(DSBACKUP(MARKFULL))</b> specifies that DFSMShsm marks full all partial tapes demounted with the SWITCHTAPES option. If backups are going to the IBM Virtual Tape Server (VTS) subsystem, refer to the SETSYS PARTIALTAPE parameter description for performance considerations.

**Defaults:** TIME(0) is the default if you specify the SWITCHTAPES(DSBACKUP) command without specifying the TIME or AUTOBACKUPEND parameters. MARKFULL is the default if you specify the SWITCHTAPES(DSBACKUP) command without specifying the PARTIALTAPE parameter.

**Note:** If you specify the MARKFULL parameter of the SWITCHTAPES(DSBACKUP) command, DFSMShsm marks full the tapes that are released from command data set backup. Any other partial tapes in the DFSMShsm backup inventory are unaffected, and those partials remain as selection candidates and can be immediately selected and mounted for new output processing.

## VOLUMEPOOL: Identifying Groups of Volumes Where Data Sets Are Recalled

**Explanation:** VOLUMEPOOL is an optional parameter specifying a set of volumes where a data set is recalled based on the volume from which the data set migrated. A data set that migrates from a volume in the volume pool is recalled to a volume in the volume pool.

## DEFINE

**VOLUMEPOOL(*poolid*):** For *poolid*, substitute from 1 to 8 alphanumeric characters for the name of the volume pool.

Subparameter	Explanation
VOLUMES	<p><b>VOLUMEPOOL(<i>poolid</i> VOLUMES(<i>volser</i>))</b> specifies the volumes belonging to the volume pool where the data sets are recalled. When you specify multiple volumes for a pool ID, DFSMShsm tries to recall data sets to the volume with the most space. If there is not enough space on the volume, DFSMShsm tries recalling the data set to up to four different volumes in the volume pool.</p> <p>For <i>volser</i>, substitute the serial number of the primary volume or volumes making up the volume pool where data sets are recalled.</p>

**Defaults:** None.

**Notes:**

1. In a JES3 environment, at least one of the volumes in the volume pool must be added by the ADDVOL command. This JES3 requirement prevents the user from defining a volume pool that cannot be changed and fails the recall every time it is selected. It fails the recall because a volume cannot be selected for recall unless it has been added by the ADDVOL command. It cannot be changed, except at DFSMShsm startup, because the DEFINE and ADDVOL commands can be used only at DFSMShsm startup.
2. In a JES2 environment, no volume in the volume pool needs to be added with the ADDVOL command or mounted for the DEFINE command. The RECALL command, however, still requires a volume added by the ADDVOL command before the volume can be selected for the recall. After DFSMShsm startup, the ADDVOL command can be issued to add a volume, or the DEFINE command can be reissued with a new combination of volumes to change the association between volumes within a volume pool.
3. No checking is done to see if a volume is SMS-managed. A data set migrated from a volume that has been converted to SMS is recalled (if it is to be recalled as non-SMS) to a non-SMS-managed volume in the volume pool. The pool is not used for data sets recalled as SMS.
4. If *poolid* is specified without VOLUMES being specified, the volume pool becomes empty.
5. The hierarchy of selecting a candidate volume for recall is as follows:
  - If a data set being recalled is associated with a data set pool, the candidate volumes are selected from the data set pool.
  - If the volume from which the data set migrated is part of a volume pool, the candidate volume is selected from the volume pool.
  - If the volume from which the data set migrated is not part of a volume pool, the candidate volumes are selected based upon the SETSYS RECALL values of ANYSTORAGEVOLUME or PRIVATEVOLUME.
  - A limit of 140 volumes can be defined to a VOLUMEPOOL.

## Examples of How to Code the DEFINE Command

The following examples present different ways to code the DEFINE command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Specifying Key Ranges for DASD Migration Level 2 Volumes

**Example:** In this example, key ranges are assigned to the specified migration level 2 volumes. Data sets with the set of initial characters of the data set name within key range A through F9999999 migrate to the level 2 volume with volume serial number VOL002. Data sets with the set of initial characters of the data set name within key range G through L9999999 migrate to the level 2 volume with volume serial number VOL005. Data sets with the set of initial characters of the data set name within key range M through R9999999 migrate to the level 2 volume with volume serial number VOL007. Data sets with the set of initial characters of the data set name within key range S through Z9999999 migrate to the level 2 volume with volume serial number VOL009.

```
DEFINE MIGRATIONLEVEL2(KEYS(G M S) VOLUMES(VOL002 VOL005 +
VOL007 VOL009))
```

### Specifying a Pool of Volumes

**Example:** In this example, two volumes are specified as the pool used when data sets with the pool ID FE.T3322 are recalled.

```
DEFINE POOL(FE.T3322 VOLUMES(FET001 FET002))
```

### Specifying the Automatic Primary Space Management Cycle

**Example:** In this example, an automatic primary space management cycle of five days is defined. The automatic primary space management functions are to run on the fifth day of the cycle. CYCLESTARTDATE without a date specified is redefined to today's date.

```
DEFINE PRIMARYSPMGTCYCLE(NNNNY CYCLESTARTDATE)
```

### Specifying the Automatic Secondary Space Management Cycle

**Example:** In this example, an automatic secondary space management cycle of seven days is defined. The automatic secondary space management functions are to run on the seventh day of the cycle. CYCLESTARTDATE without a date specified is redefined to today's date.

```
DEFINE SECONDARYSPMGTCYCLE(NNNNNNY CYCLESTARTDATE)
```

### Specifying a Backup Cycle

**Example:** In this example, a backup cycle of seven days is defined, with two volumes used for each day in the cycle when volume backup is processed. The example specifies that the automatic backup function is processed on the second and fifth days of the cycle. The starting date for the backup cycle is October 1, 1997.

## DEFINE

```
DEFINE BACKUP(NYNLYNN 2 CYCLESTARTDATE(1997/10/01))
```

### Specifying a Dump Cycle

**Example:** In this example, a dump cycle of seven days is defined, with a cycle start date of 96/12/29. If the cycle start date is a Sunday, the specified dump cycle results in the automatic dump function running Monday through Friday, but not running on Saturday or Sunday.

```
DEFINE DUMPCYCLE(NYYYYYN +  
CYCLESTARTDATE(1996/12/29))
```

### Specifying the Number of VTOC Copy Data Sets to Keep for Each Volume Dumped

**Example:** In this example, 12 copies of the VTOC copy data sets are to be kept for a dumped volume.

```
DEFINE DUMPCLASS(class VTOCCOPIES(12))
```

### Specifying a Dump Class for a Volume

**Example:** In this example, a dump class for a 3590-1 type volume with a class name of *weekly* is defined. The other parameters used in our example are:

- DFSMSdss resets the change bit for each data set.
- A physical data set restore is allowed.
- The volume can be automatically reused when invalidated by the retention period of 15 days.
- The target day of the dump for this dump class is the sixth day of the dump cycle.
- The dump volume is to be dumped every Friday night.
- A maximum of ten dump copies can be placed on this volume.

```
DEFINE DUMPCLASS(WEEKLY UNIT(3590-1) +  
RESET DATASETRESTORE AUTOREUSE +  
RETENTIONPERIOD(15) DAY(6) +  
DISPOSITION('DUMP EVERY FRI NITE.') +  
(STACK(10)))
```

### Specifying a Pool of Volumes to Be Used for Recovering an Aggregate Group

**Example:** In this example, four volumes are specified to be used for recovery of the aggregate group *PAY1*. Two volumes are for recovery of level 0 non-SMS-managed data sets, and two volumes are for recovery of migrated data sets.

```
DEFINE ARPOOL(PAY1 ML1VOLS(MPAY1 MPAY2) +  
L0VOLS(PAY001 PAY002))
```

## Specifying When To Demount and Deallocate Output Tapes that are Used by Command Data Set Backup

**Example:** In this example, output tapes that are used by command data set backup are demounted at the end of the autobackup cycle, and the devices are deallocated. Single-file format output tapes are not available for reuse when a switch tape event occurs.

```
DEFINE SWITCHTAPES(DSBACKUP(AUTOBACKUPEND PARTIALTAPE(MARKFULL)))
```

## **DEFINE**

---

## Chapter 13. DELETE: Deleting a Migrated Data Set from a Migration Volume

The DELETE command deletes a migrated data set without recalling the data set. When you specify the DELETE command, DFSMShsm deletes the MCDS data set record and the migrated data set. DFSMShsm does not delete backup versions of the data set. If you want to delete the backup versions of a deleted data set, you must use the BDELETE command. See Chapter 10, “BDELETE: Deleting Backup Versions of a Data Set,” on page 107 for information about the BDELETE command.

---

### Syntax of the DELETE Command

```
►—DELETE—dsname—►
          |—————PURGE—————|
```

---

### Required Parameters of the DELETE Command

This section describes the required parameter of the DELETE command.

#### **dsname: Specifying the Data Set to Be Deleted**

**Explanation:** *dsname* is a required parameter specifying the fully qualified name of the migrated data set that you want to delete. DFSMShsm deletes the data set without recalling it. For *dsname*, substitute the fully qualified name of the migrated data set you want to delete. You cannot specify an alias for *dsname*. If you do, DFSMShsm does not delete the data set.

**Defaults:** None.

**Notes:**

1. DFSMShsm fails any DFSMShsm delete command that specifies a member name of a partitioned data set.
2. DFSMShsm will not uncatalog an original data set unless the cataloged volume serial is MIGRAT. This prevents DFSMShsm from inadvertently scratching a newly cataloged data set of the same name.
3. The command fails for both SMS-managed and non-SMS-managed data sets if the *dsname* specified on the command is determined by DFSMShsm to be one of the following:
  - An associated part of a VSAM data set (for example, a data component name, index component name, path name) rather than the base cluster name.
  - The name of a migration copy data set.

---

## Optional Parameters of the DELETE Command

This section describes the optional parameter of the DELETE command.

### PURGE: Specifying Deletion of a Data Set

**Explanation:** PURGE is an optional parameter specifying deletion of the data set *dsname* even if the data set is still within its retention period.

**Defaults:** If PURGE is not specified, DFSMShsm deletes data set *dsname* only if it has exceeded its retention period.

---

## Examples of How to Code the DELETE Command

The following examples present different ways to code the DELETE command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Deleting a Migrated Data Set

**Example:** In this example, a migrated data set (SMS or non-SMS) is deleted from a migration volume without recalling the data set.

```
DELETE WIN3357.PLAN.PLI
```

### Deleting a Migrated Data Set within Its Retention Period

**Example:** In this example, a migrated data set (SMS or non-SMS) is deleted from a migration volume even if it is within its retention period.

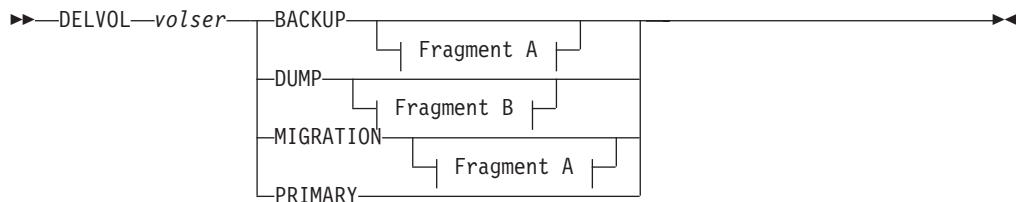
```
DELETE L541563.PSF.N.F230EP03.DSET1 PURGE
```

## **Chapter 14. DELVOL: Removing a Volume from the List of Volumes that DFSMShsm Manages or Owns**

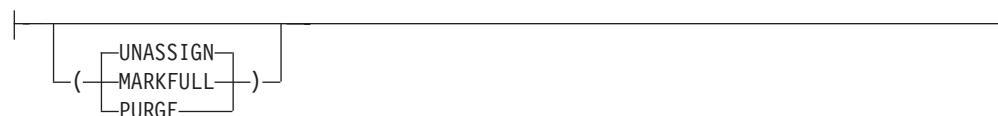
The DELVOL command reassigns the volume as not managed or owned by DFSMShsm. You can remove a primary volume (in this instance, PRIMARY includes both volumes added using the ADDVOL command and SMS-managed volumes), migration volume, dump volume, or backup volume from the list by specifying the serial number and the category of the volume you want to remove. If a DELVOL command is entered for an SMS-managed volume, the MCV record for the volume, if it exists, is deleted. You can remove only one volume each time you issue the DELVOL command unless the volume specified is part of a valid dump copy, then all volumes containing part of the same dump copy are removed from DFSMShsm.

Although you can respecify a deleted non-SMS-managed volume with the ADDVOL command, historical information about the deleted volume is lost. This information is included in the MCDS and BCDS volume records. If you use ADDVOL to respecify the volume, DFSMShsm recreates the volume record without the historical information.

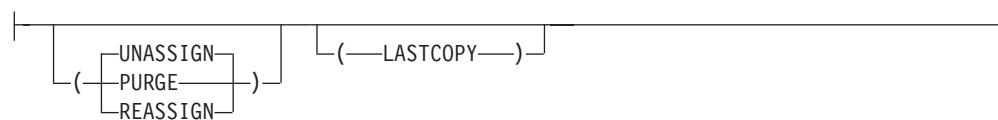
## Syntax of the DELVOL Command



## A: BACKUP | MIGRATION Optional Parameters:



## B: DUMP Optional Parameters:



## Notes:

1. If you specify the LASTCOPY, MARKFULL, PURGE, REASSIGN, or UNASSIGN subparameter of the BACKUP, DUMP, or MIGRATION parameter, you must put parentheses around the subparameter.
  2. If the volume serial number is for an SMS-managed volume, only the PRIMARY parameter applies.

## DELVOL

3. If a DELVOL MIGRATION command is used to delete a migration volume while the automatic secondary space management function is running, the DELVOL MIGRATION command fails.
4. If SMS storage groups change, use the DELVOL command to remove from DFSMShsm control those volumes that were removed from the SMS storage groups before daily automatic functions started. Remove those volumes on all DFSMShsm systems that know about them so that the MVT entries are no longer present.

---

## Required Parameters of the DELVOL Command

This section describes the required parameters of the DELVOL command.

### **volser: Specifying the Volume You Are Deleting**

**Explanation:** *volser* is a required positional parameter for which you substitute the serial number of the volume you want to delete.

**Defaults:** None.

**Notes:**

1. Because *volser* is a required positional parameter, you must specify it immediately after the command name.
2. Intermittent DELVOLS of active SMS-managed volumes have little effect, because the list of volumes is obtained prior to each automatic function, and MVT and MCV records for the volumes are built at that time.

### **BACKUP | DUMP | MIGRATION | PRIMARY: Specifying the Type of Volume**

**Explanation:** **BACKUP | DUMP | MIGRATION | PRIMARY** are mutually exclusive, required parameters specifying what type of volume to delete.

**BACKUP** specifies that a backup volume is reassigned as an unassigned volume or, if the PURGE subparameter is specified, deleted from DFSMShsm control.

**DUMP** specifies that a dump volume is disassociated from the dump class to which it is currently assigned and all record of its contents is discarded. In addition, the PURGE or REASSIGN subparameters can be specified to remove the volume from the control of DFSMShsm or to retain the associated dump class respectively. If the volume specified is part of a valid dump copy, all volumes containing part of the same dump copy are treated similarly.

**MIGRATION** specifies that a migration volume is changed as follows:

- In the case of a migration level 1 volume, the volume is deleted from DFSMShsm control.
- In the case of a DASD migration level 2 volume, the volume is no longer associated with its key range and is available for selection. If the optional PURGE subparameter is specified, the volume is removed from the control of DFSMShsm.
- In the case of a tape migration level 2 volume, the volume is marked as not selected and is therefore available unless full. If the optional PURGE subparameter is specified, the volume is removed from the control of DFSMShsm if no valid data exists on the volume.

**Note:** In the preceding cases, DFSMShsm determines from the serial number whether the volume you have identified with the *volser* positional parameter is a migration level 1 volume or a migration level 2 volume.

**PRIMARY** specifies that a primary volume (a volume added using the ADDVOL command or an SMS-managed volume) is deleted from DFSMShsm control. DFSMShsm removes the record of the deleted volume from the MCDS.

**Defaults:** None.

**Notes:**

1. If you issue the BACKUP parameter of the DELVOL command while the backup volume is in use, the command fails.
2. If you issue the MIGRATION parameter of the DELVOL command while automatic volume space management or automatic secondary space management is running, the command fails.
3. If you issue the PRIMARY parameter of the DELVOL command while that volume is being processed by automatic space management, automatic backup, or automatic dump, the command fails.
4. If you issue the DUMP parameter of the DELVOL command while automatic dump is running, the command fails.
5. If you use the MIGRATION parameter of the DELVOL command to delete a migration level 2 tape volume that has incomplete data set information saved in the OCDS TTOC record, the command fails.

## Optional Subparameters of the DELVOL Command

This section describes the optional parameters of the DELVOL command.

### LASTCOPY: Invalidating the Only Valid Dump Copy of a Source Volume

**Explanation:** LASTCOPY is an optional subparameter that must be specified to delete a dump volume that is part of the only valid dump copy of a source volume. LASTCOPY is ignored if it is not part of the only copy.

**Defaults:** None.

### MARKFULL | PURGE | REASSIGN | UNASSIGN: Specifying the Options for Deleting a Backup, Dump, or ML2 Volume

**Explanation:** MARKFULL | PURGE | REASSIGN | UNASSIGN are mutually exclusive, optional subparameters of the BACKUP, DUMP, and MIGRATION parameters specifying whether the volume is deleted, reassigned, or marked full.

**Notes:**

1. MARKFULL applies only to tape backup and migration volumes.
2. These subparameters do not apply to primary or migration level 1 volumes.

#### Markfull with Backup | Migration

When you specify MARKFULL with the BACKUP or MIGRATION parameters, MARKFULL specifies that the requested backup or migration volumes be marked full. No other processing will be performed. This subparameter allows you to make a tape volume available for RECYCLE or TAPECOPY processing by marking the volume full. It can also be used to prevent a volume from being selected for further output processing.

### Purge with Backup

When you specify PURGE with the BACKUP parameter, PURGE specifies that DFSMShsm delete all volume information, including the tape table of contents (TTOC) for a tape backup volume. DFSMShsm removes the record of the deleted volume from the BCDS. In addition, DFSMShsm deletes any association with a day in the backup cycle or with a set of spill backup volumes.

If the volume is a tape volume, all valid backup versions that exist on the tape volume are deleted, and the data on the tape is no longer usable. If an error occurs in deleting a valid backup version, DFSMShsm continues deleting all other backup versions but does not delete the backup volume in which the error has occurred.

### Purge with Dump

When you specify PURGE with the DUMP parameter, PURGE specifies that DFSMShsm delete all volume information for a dump volume. DFSMShsm removes the record of the deleted volume from the BCDS. In addition, DFSMShsm deletes any association with the day in the dump cycle or with the dump class. DFSMShsm also deletes any valid dump copies. The dump volume then becomes a scratch tape.

Depending upon the tape security option used for protection by DFSMShsm, the volume may have to be reinitialized before being reused by another user or job.

### Purge with Migration

When you specify PURGE with the MIGRATION parameter, PURGE specifies that DFSMShsm delete all volume information for a non-SMS migration level 2 volume, including the TTOC for a tape non-SMS migration level 2 volume. Before DFSMShsm removes a tape migration level 2 volume from its control, DFSMShsm checks whether the volume still contains valid data. If it does, DFSMShsm fails the DELVOL command and issues message ARC0260I.

If the PURGE parameter has been used because the ML2 tape was lost or destroyed and if the command fails and message ARC0260I is displayed, perform the following steps:

1. Issue the MIGRATE VOLUME (*volser DBA(0)*) command to remove all record of valid data. Only non-SMS data sets whose expiration dates have been reached are scratched. If the ML2 tape volume contains SMS data, the volume is not eligible for DELVOL processing.
2. Reissue the DELVOL PURGE command.

**Note:** Do this only if the tape is totally unusable because the DELVOL PURGE command removes what may be the only copy of the data. If backup copies are available, recover the data sets that the MIGRATE command deleted. If the volume is DASD or if the volume is a tape that does not contain valid data, DFSMShsm removes the record of the deleted volume from the MCDS.

### Reassign with Dump

When you specify the REASSIGN subparameter with the dump parameters, REASSIGN specifies that the contents of that volume are to be discarded. The volume is also made available and is associated with its original dump class. The original dump class is the class specified with the ADDVOL command. If no class is specified with ADDVOL, then there is no associated dump class after the DELVOL REASSIGN. DFSMShsm can reuse the reassigned volume without reinitialization. REASSIGN is applicable only for dump volumes.

## Unassign with Backup

When you specify the UNASSIGN subparameter with the BACKUP parameter, UNASSIGN specifies that the volume is no longer associated with the day in the backup cycle or with the set of spill volumes. The volume becomes an unassigned backup volume. All volume and data set information is kept in the BCDS and, for tape backup volumes, in the OCDS. The unassigned volume can be selected as a daily or spill backup volume.

## Unassign with Dump

When you specify UNASSIGN with the DUMP parameter, UNASSIGN specifies that the volume is to remain known to DFSMShsm but must be removed from its current use. The volume is also disassociated from the dump class to which it is currently assigned. All records of the volume's contents must be discarded. DFSMShsm can reuse the volume without reinitialization. If the volume is available for reuse, it is available to any dump class requiring a volume of the same unit type.

## Unassign with Migration

When you specify UNASSIGN with the MIGRATION parameter, UNASSIGN specifies that the DASD migration level 2 volume is no longer associated with its key range and is available for selection. If the volume is a tape migration level 2 volume, DFSMShsm marks the volume as not selected. Therefore, the tape migration level 2 volume is available unless it is full.

**Defaults:** If you do not specify PURGE, REASSIGN, or UNASSIGN, the default is UNASSIGN.

### Notes:

1. You can delete valid data from a tape backup volume or dump volume if you specify the PURGE parameter. DFSMShsm deletes all control data set information associated with each valid backup version dump copy on the purged tape backup volume or dump volume. As a result, DFSMShsm can no longer recover backup versions from the tape volume.
2. You specify only a migration level 2 volume when you use the PURGE or UNASSIGN subparameter with the MIGRATION parameter. If you specify a migration level 1 volume, DFSMShsm ignores the parameter and a purge is performed.
3. If you use the PURGE parameter to remove a tape volume from control of DFSMShsm and the tape volume is protected by a password or expiration date, reinitialize the tape volume. You reinitialize the tape volume with the IEHINITT utility. If you do not reinitialize the purged tape volume and another program tries to write on the tape volume, message IEC512I is issued and the tape volume is unloaded.
4. If you do not reinitialize the purged tape volume, and if DFSMShsm protected the tape volume with an expiration date, and another program tried to write on the tape volume, the following occurs:
  - Message IEC507D is issued.
  - The operator is prompted to approve or disapprove the attempt to write over an expiration-date-protected data set whose expiration date has not been reached. If the operator disapproves the use of the tape volume, the tape volume is unloaded and removed from the inventory of backup or migration volumes.
5. Messages IEC512I and IEC507D occur only if the program trying to write on the tape volume is not using the volume verification exit to override the password or expiration date protection on the first file on the tape volume.

6. If you use the ADDVOL command to add a purged tape volume to the list of tape volumes owned by DFSMShsm and the purged tape volume was previously protected by a password or expiration date, reinitialize the tape volume. If you do not reinitialize the purged tape volume and another program tries to write on the tape volume, message IEC512I is issued, the tape volume is unloaded, and the tape volume is removed from the inventory of backup, dump, and migration volumes.
7. If a dump volume has more than one dump copy stacked on it, you must use the PURGE parameter to delete the volume.

---

## Examples of How to Code the DELVOL Command

The following examples present different ways to code the DELVOL command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Deleting a Primary Volume

**Example:** In this example, a primary volume (added using the ADDVOL command or SMS-managed) is deleted from DFSMShsm control.

```
DELVOL VOL005 PRIMARY
```

### Deleting a Migration Level 1 Volume

**Example:** In this example, a migration level 1 volume is deleted from DFSMShsm control.

```
DELVOL MIG003 MIGRATION
```

### Marking a Migration Level 2 Tape Volume Full

**Example:** In this example, a migration level 2 tape volume is marked full. The MARKFULL parameter does not delete the volume.

```
DELVOL MIG003 MIGRATION(MARKFULL)
```

### Unassigning a Backup Volume

**Example:** In this example, a backup volume becomes an unassigned backup volume of DFSMShsm.

```
DELVOL BAC001 BACKUP(UNASSIGN)
```

### Deleting a Tape Migration Level 2 Volume

**Example:** In this example, a tape migration level 2 volume is purged from DFSMShsm if it does not contain any valid data.

```
DELVOL TML203 MIGRATION(PURGE)
```

### Deleting a DASD Migration Level 2 Volume

**Example:** In this example, a DASD migration level 2 volume is purged from DFSMShsm.

```
DELVOL DML201 MIGRATION(PURGE)
```

## Deleting a Tape Backup Volume

**Example:** In this example, a tape backup volume is deleted from DFSMShsm's control. All record of any valid backup versions on the tape is also deleted.

```
DELVOL TAPE01 BACKUP(PURGE)
```

## Deleting a Dump Volume

**Example:** In this example, a dump volume is deleted and its contents are discarded. The volume is made available and is associated with its original dump class.

```
DELVOL DUPT01 DUMP(REAASSIGN)
```

## Deleting a Dump Volume That is Part of the Only Valid Dump Copy of a Source Volume

**Example:** In this example, a dump volume is part of the only valid dump copy of a source volume. The volume is made available but is not associated with any dump class.

```
DELVOL DUPT02 DUMP(UNASSIGN LASTCOPY)
```

## Purging the Records for a Dump Volume That is Part of the Only Valid Dump Copy of a Source Volume

**Example:** In this example, a dump volume is part of the only valid dump copy of a source volume. The volume is purged from DFSMShsm.

```
DELVOL DUPT02 DUMP(PURGE LASTCOPY)
```

**DELVOL**

---

## **Chapter 15. DISPLAY: Displaying DFSMShsm Storage Locations**

The DISPLAY command is used only for maintenance purposes and is explained in the *z/OS DFSMShsm Diagnosis*.



---

## Chapter 16. EXPIREBV: Deleting Unwanted Backup Versions of Data Sets

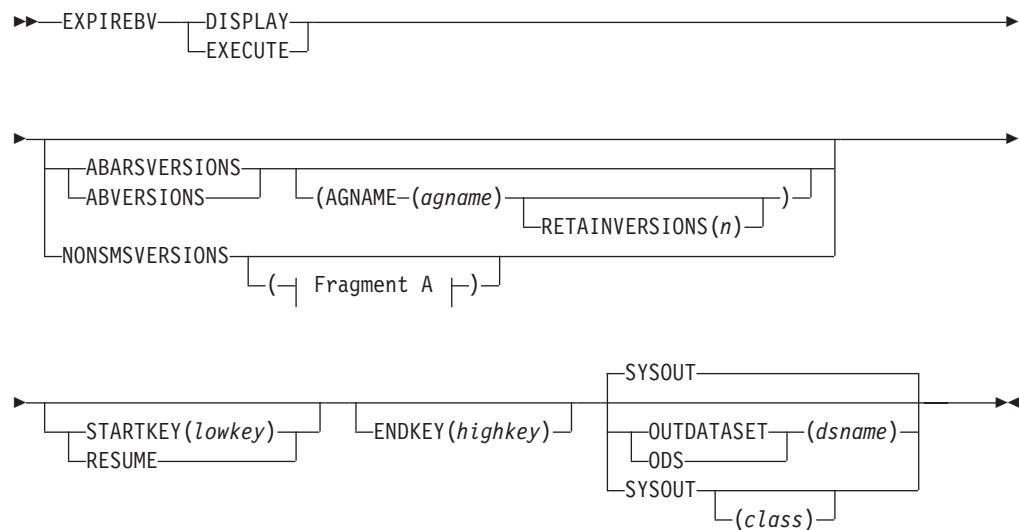
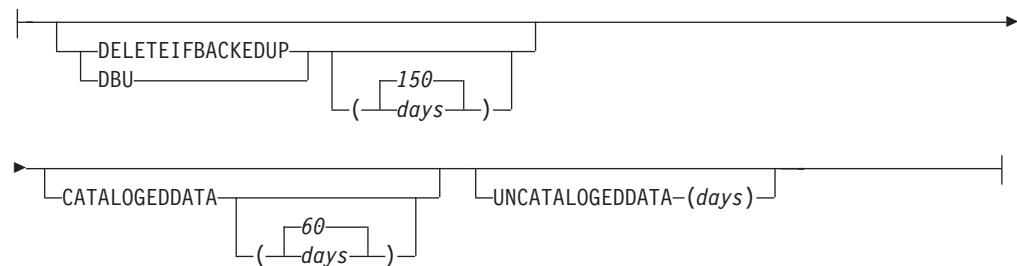
The EXPIREBV command is used to delete *unwanted* backup and expired ABARS versions of SMS-managed and non-SMS-managed data sets from DFSMShsm-owned storage. The optional parameters of the EXPIREBV command determine the deletion of the backup versions of non-SMS-managed data sets. The management class attributes determine the deletion of backup versions of SMS-managed data sets. The management class fields, “Retain Extra Versions” and “Retain Only Version”, determine which ABARS versions or incremental backup versions are deleted.

A detailed description of eligibility considerations for both SMS-managed and non-SMS-managed data sets is provided in the *z/OS DFSMShsm Storage Administration Guide*.

EXPIREBV determines if a backed-up data set should be considered SMS-managed (and thus whether to apply management-class attributes or EXPIREBV command parameters in expiring cataloged backup versions) by the most recent status of the data set:

- If the data set is still cataloged, SMS-managed status is taken from the data set's current catalog entry.
- If the data set has been deleted (that is, if it is no longer cataloged), SMS-managed status is the same as it was the last time the data set was backed up.

---

**Syntax of the EXPIREBV Command****A: NONSMSVERSIONS Optional Parameters:**

**Note:** The NONSMSVERSIONS parameter does not apply to SMS-managed data sets.

---

## Required Parameters of the EXPIREBV Command

This section describes the required parameters of the EXPIREBV command.

### DISPLAY | EXECUTE: Specifying Whether to Delete the Backup Versions

**Explanation:** DISPLAY | EXECUTE are mutually exclusive, required parameters specifying whether to delete the ABARS or backup versions or just to produce a listing of the ABARS or backup versions eligible for deletion.

**DISPLAY** produces a line in the listing for every ABARS or backup version eligible for deletion based on the appropriate input parameters or management class attributes. The listing is written to a particular output class or DASD data set, depending on the value of the OUTDATASET | SYSOUT parameter.

**EXECUTE** specifies that the ABARS or backup versions should be deleted based on the input parameters and management class attributes. The output consists of an ARC0734I message for each backup version eligible for deletion. The messages are written to the backup activity log, depending on the values specified by SETSYS ACTLOGMSGLVL:

- FULL specifies that all ARC0734I messages are produced.
- EXCEPTIONONLY specifies that an ARC0734I message is produced only when there is a failure.
- REDUCED has the same effect as EXCEPTIONONLY.

**Defaults:** None.

**Notes:**

1. If the DISPLAY parameter is specified, no backup versions are deleted. If, however, any backed up, cataloged data sets have been scratched and do not already have a scratch date recorded, the current date is recorded as the scratch date for those data sets. This scratch date is used by subsequent EXPIREBV commands to determine whether backup versions of these cataloged data sets are eligible for deletion.
2. When EXPIREBV is invoked and it detects a scratched data set, it creates a scratch date for that data set. The date is stored in the BCDS MCB record in a 4-byte field MCBSCDR (offset X'48', packed decimal). The date can be displayed using the FIXCDS command. When EXPIREBV is again invoked and it encounters the same data set—which now has an established scratch date—it deletes the data set (when the data set meets the criteria for deletion). Thus, if you are running EXPIREBV for the first time, you do not get a list of deleted data sets. On subsequent occurrences, you will get a list, as long as the data sets meet the criteria for deletion.

---

## Optional Parameters of the EXPIREBV Command

This section describes the optional parameters of the EXPIREBV command.

### ABARSVERSIONS: Specifying That Only Aggregate Group Versions Are to be Processed

**Explanation:** ABARSVERSIONS is an optional parameter specifying that only ABARS activity records (ABR) in the BCDS are processed by the EXPIREBV command. This parameter is mutually exclusive with the NONSMSVERSIONS parameter and is functionally exclusive to processing backup versions of SMS data sets.

This parameter can be used to delete old ABR records. Running EXPIREBV for ABARS should only be needed if you have an aggregate that you no longer use and you need to clean up old records. For more information on this topic, refer to the *z/OS DFSMSHsm Storage Administration Guide*, the ABARS chapter, under the section titled “Expiring ABR Records in the BCDS”.

Subparameter	Explanation
AGNAME	ABARSVERSIONS (AGNAME( <i>agname</i> )) is an optional parameter that you can use to process only the activity records associated with the specified aggregate group.
RETAINVERSIONS	ABARSVERSIONS (AGNAME( <i>agname</i> ) RETAINVERSIONS( <i>n</i> )) is an optional parameter you can use with <i>agname</i> when the EXECUTE option is specified to tell DFSMSHsm to retain a specific number of ABR versions. If you do not want to retain any versions of a particular aggregate group's ABR record, specify zero. This allows you to clean up the ABR records for aggregate groups no longer being processed.

**Defaults:** None.

### NONSMSVERSIONS: Specifying Expiration Criteria for Backup Versions of Data Sets Not Managed by SMS

**Explanation:** NONSMSVERSIONS is an optional parameter specifying that you want backup versions of non-SMS-managed data sets processed during this execution of the EXPIREBV command.

Subparameter	Explanation
DELETEIFBACKEDUP	NONSMSVERSIONS(DELETEIFBACKEDUP ( <i>days</i> )) specifies that the deletion of retired versions is controlled. For <i>days</i> , specify the number of days (0–9999) to keep a retired version. If the age of the retired version exceeds <i>days</i> , EXPIREBV command deletes it, along with all other backup versions that were made for the same catalogued non-SMS-managed data set.

Subparameter	Explanation
CATALOGEDDATA	NONSMSVERSIONS(CATALOGEDDATA ( <i>days</i> )) specifies that the deletion of backup versions (other than the retired version) of non-SMS-managed data sets that were cataloged when they were backed up is controlled. The <i>days</i> subparameter specifies the number of days (0–9999) to keep a backup version of a cataloged data set after the EXPIREBV command has determined that the data set has been deleted. If the difference between the scratch date recorded by a prior EXPIREBV command and the current date exceeds <i>days</i> , the EXPIREBV command deletes all backup versions of the cataloged data set, except the retired version. If the cataloged data set has not been deleted, the <i>days</i> subparameter is ignored and all excess backup versions (as a result of an (H)ALTERDS command) are deleted.
UNCATALOGEDDATA	NONSMSVERSIONS(UNCATALOGEDDATA ( <i>days</i> )) specifies that the deletion of backup versions made of non-SMS-managed data sets that were uncataloged when they were backed up is controlled. For <i>days</i> , specify the number of days (0–9999) to keep a backup version of an uncataloged data set. If the age of such a backup version exceeds <i>days</i> , the EXPIREBV command deletes it.

**Defaults:** If you do not specify NONSMSVERSIONS on the command, backup versions of non-SMS-managed data sets are not processed.

If you specify DELETEIFBACKEDUP with no *days* value, the DFSMShsm default is 150 days. If you do not specify DELETEIFBACKEDUP on the command, retired versions are not processed.

If you specify CATALOGEDDATA with no *days* value, the default for *days* is 60. If you do not specify CATALOGEDDATA on the command, backup versions of cataloged, non-SMS-managed data sets are not processed.

If you specify UNCATALOGEDDATA, you must specify *days*. If you do not specify UNCATALOGEDDATA on the command, backup versions of uncataloged, non-SMS-managed data sets are not processed.

**Notes:**

1. The result of the CATALOGEDDATA and UNCATALOGEDDATA subparameters is based on whether a data set was cataloged or uncataloged when a given backup version was created, not its current status.
2. Eligibility for deletion of a backup version under the CATALOGEDDATA criterion is based on the number of days that have passed since a prior EXPIREBV command determined that a cataloged data set has been scratched. This means that you must issue the EXPIREBV command a minimum of two times: once to record that the cataloged data set has been scratched and once to calculate whether the difference between the current date and the recorded scratch date exceeds the specified number of days.
3. At least one of the optional subparameters of NONSMSVERSIONS must be specified.
4. The EXPIREBV command examines only the latest backup version for a data set name to determine the existence of a retired version, and it treats all backup versions older than the latest version (and all versions of data sets uncataloged at the time of backup) as nonretired versions. (A retired version is the backup version DFSMShsm creates before it scratches a data set during data set retirement. DFSMShsm does not automatically delete retired versions.)

5. If the SETSYS versions parameter is decreased and the EXPIREBV command is executed prior to the time the next backup version is created, all excess versions—whether cataloged or uncataloged—are deleted.
6. Eligibility for deletion of a backup version under the CATALOGEDDATA criterion for existing cataloged data sets is based on the current version limit.

## **STARTKEY | RESUME: Determining the Starting Point for BCDS Processing during Command Execution**

**Explanation:** STARTKEY | RESUME are mutually exclusive, optional parameters that you specify to control from which BCDS record the processing is started during command execution.

**STARTKEY(*lowkey*):** You must specify *lowkey* if STARTKEY is specified. Entering *lowkey* provides a starting point for processing in the BCDS. The value of *lowkey* can be up to 44 alphanumeric characters that identify the data set for which you want the deletion of backup versions to begin. Numbers are higher in the range (they follow Z) than letters. The value specified cannot end in a period. If fewer than 44 characters are entered, the value specified is appended with X'00' to make 44 characters.

**RESUME** is entered if you want to start processing at the point the EXPIREBV command left off the last time an EXPIREBV command was processed on this host.

**Defaults:** If you do not specify STARTKEY or RESUME, processing begins at the beginning of the BCDS. If you specify RESUME and the most recent EXPIREBV command processed on this DFSMShsm host did not end early, processing begins at the beginning of the BCDS.

**Note:** During processing of the EXPIREBV command, the current key (data set name) is saved periodically.

## **ENDKEY: Determining the Ending Point for BCDS Processing during Command Execution**

**Explanation:** ENDKEY is an optional parameter that you specify to control on which BCDS record the processing is completed during command execution.

**ENDKEY(*highkey*):** You must specify *highkey* if ENDKEY is specified.

Entering *highkey* provides an ending point for processing in the BCDS. The value of *highkey* can be up to 44 alphanumeric characters that identify the data set for which you want the deletion of backup versions to end. Numbers are higher in the range (they follow Z) than letters. The value specified cannot end in a period. If fewer than 44 characters are entered, the value specified is appended with X'FF' to make 44 characters.

If the value of *highkey* is equal to the value of *lowkey*, DFSMShsm attempts to process only the data set (MCB) records with those initial characters. If the value of *highkey* is less than the value of *lowkey*, DFSMShsm fails the command with an error message.

**Defaults:** If the ENDKEY subparameter is not specified, the planned end key is different, depending upon whether you specify RESUME. If the RESUME parameter is specified without ENDKEY, processing continues until the last specified planned end key, saved from the last EXPIREBV command issued for this

host. If RESUME is specified without ENDKEY and the most recent EXPIREBV command processed in this host did not end early, processing continues to the end of the BCDS. If neither RESUME nor ENDKEY is specified, processing continues to the end of the BCDS.

**Note:** When processing is started for the EXPIREBV command, the planned ending key is saved.

## OUTDATASET | SYSOUT: Specifying the Output Location for EXPIREBV DISPLAY Listing

**Explanation:** OUTDATASET | SYSOUT are mutually exclusive, optional parameters specifying the output location for the listing produced while running the EXPIREBV command with the DISPLAY option. These parameters do not apply when the EXECUTE option is specified. If either of these parameters is entered when it does not apply, it is ignored.

**OUTDATASET(*dsname*)** specifies the name of the data set to which DFSMShsm writes the output data. For *dsname*, substitute the fully qualified name of the data set that receives the EXPIREBV output.

If the data set does not exist, DFSMShsm dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified (*dsname*)
- Record format of fixed-blocked with ANSI control characters (FBA)
- Logical record length of 121
- Data set is system reblockable
- Primary allocation of 20 tracks (see note)
- Secondary allocation of 50 tracks (see note)
- Unit of SYSALLDA (see note)

If the data set already exists, DFSMShsm will use the data set. The data set must have the following characteristics:

- The data set must be cataloged and on DASD.
- The data set record format must be FBA and the logical record length must be 121.
- The data set is system reblockable.
- The user can choose the primary space allocation.
- If DFSMShsm needs additional extents after the primary space allocation, DFSMShsm uses a secondary space allocation of 50 tracks. (see note)
- If the data set does not contain data, DFSMShsm starts writing output data at the beginning of the data set.
- If the data set contains data, DFSMShsm writes the output data after the existing data.

**SYSOUT(*class*)** specifies that the output goes to the specified output class. For *class*, substitute one alphanumeric character.

**Default:** The default is SYSOUT, and the default for *class* is the value specified with the SETSYS command. If you do not use the SYSOUT parameter of the SETSYS command to specify the output location, the default is class A.

**Note:** If you select the OUTDATASET option, you can use the PATCH command to change the unit name, primary allocation, and secondary allocation. If

## EXPIREBV

you select the SYSOUT option, you can use the PATCH command to change whether, and how, DFMSHsm limits the lines of SYSOUT output. Refer to the *z/OS DFMSHsm Implementation and Customization Guide*, SC35-0418 for a list of the available PATCH commands.

### Examples of How to Code the EXPIREBV Command

The following examples present different ways to code the EXPIREBV command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Displaying Backup Versions within a Key Range That Qualify for Deletion

**Example:** In this example, a starting message is issued to the user. An output line is directed to SYSOUT class H for every SMS backup version that qualifies for deletion. All SMS backup versions with key ranges from A000 to L888 are processed. Deletion qualification is determined by the SMS management class attributes for each data set as they are defined for that data set. No deletions are performed and no non-SMS processing is done. An ending message is issued to the user.

```
EXPIREBV DISPLAY STARTKEY(A000) ENDKEY(L888) SYSOUT(H)
```

### Deleting SMS Backup Versions and Specific Non-SMS Versions That Qualify for Deletion

**Example:** In this example, a starting message is directed to the backup activity log and to the user. DFMSHsm attempts to delete all SMS backup versions that qualify for deletion. An ARC0734I message is directed to the backup activity log under the control of the SETSYS ACTLOGMSGLEVEL. Deletion is determined by the SMS management class attributes as they are defined for each data set.

DFMSHsm processes all retired versions of non-SMS data sets. DFMSHsm attempts to delete all retired versions and associated cataloged backup versions which are over 100 days old. An ARC0734I message is written to the backup activity log under control of the SETSYS ACTLOGMSGLEVEL command. An ending message is directed to the backup activity log and to the user.

```
EXPIREBV EXECUTE NONSMSVERSIONS(DBU(100))
```

### Displaying SMS Backup Versions and Non-SMS Cataloged Versions That Qualify for Deletion

**Example:** In this example, a starting message is directed to the user. DFMSHsm processes all SMS backup versions. An output line is directed to SYSOUT class A for each backup version that qualifies for deletion. Deletion is determined by the SMS management class attributes as they are defined for each data set.

An output line is directed to SYSOUT class A for all non-SMS backup versions of deleted data sets that have been cataloged and more than five days have elapsed since EXPIREBV determined that the data set was deleted. DFMSHsm does not perform any deletions. An ending message is directed to the user.

```
EXPIREBV DISPLAY NONSMSVERSIONS(CATALOGEDDATA(5))
```

## Displaying, in an Outdataset, the SMS Backup Versions and Non-SMS Uncataloged Versions That Qualify for Deletion

**Example:** In this example, a starting message is directed to the user. DFSMShsm processes all SMS backup versions. An output line is directed to the outdataset for each backup version that qualifies for deletion. Deletion is determined by the SMS management class attributes as they are defined for each data set.

DFSMShsm processes all uncataloged backup versions, and an output line is directed to the outdataset for each uncataloged backup version that is over 10 days old, thereby qualifying for deletion. DFSMShsm does not perform any deletions. An ending message is directed to the user.

```
EXPIREBV DISPLAY NONSMSVERSIONS(UNCATALOGEDDATA(10)) ODS(DSNAME)
```

## Resuming Deletion of SMS Backup Versions That Qualify Following Release of a Previously Held EXPIREBV Command

**Example:** In this example, EXPIREBV processing had been held, via the HOLD EXPIREBV command, before a prior EXPIREBV had finished. Later, EXPIREBV processing was released via the RELEASE EXPIREBV command.

A starting message is directed to the backup activity log and the user. Processing begins where the prior EXPIREBV command left off and continues to the ENDKEY specified in the prior command. If no ENDKEY is specified, processing continues to the end of the BCDS.

DFSMShsm attempts to delete all SMS backup versions that qualify for deletion. An ARC0734I message is directed to the backup activity log under the control of the SETSYS ACTLOGMSGLEVEL. Deletion is determined by the SMS management class attributes as they are defined for each data set.

No non-SMS backup versions are processed. An ending message is directed to the backup activity log and the user.

```
EXPIREBV RESUME EXECUTE
```

## Sample of a Printer Listing When You Specify EXPIREBV ABARSVERSIONS with the DISPLAY Parameter

Figure 3 is a sample of a printer listing when you specify EXPIREBV ABARSVERSION with the DISPLAY parameter.

```

DISPLAY OF ABARS VERSIONS ELIGIBLE FOR EXPIRATION AT 18:21:50 ON 1992/08/25 FOR 381A
COMMAND INPUT: ABARSVERSIONS AGNAME(PAY1) RETAINVERSIONS(0000)
SUBMITTER'S USERID: **OPER-
AGNAME = PAY1          VERSION = 0001
AGGREGATE VERSION KEY = PAY1.1992238000101          DELETED*
(* DETERMINED ON 1992/08/25)

AGGREGATE GROUP FILES          FILE STATUS
PAY1.C.C01V0001          NOT IN CATALOG
PAY1.D.C01V0001          NOT IN CATALOG
PAY1.O.C01V0001          NOT IN CATALOG

AGNAME = PAY1          VERSION = 0002
AGGREGATE VERSION KEY = PAY1.1992238000201          DELETED*
(* DETERMINED ON 1992/08/25)

AGGREGATE GROUP FILES          FILE STATUS
PAY1.C.C01V0002          UNCATALOGED
PAY1.D.C01V0002          UNCATALOGED
PAY1.O.C01V0002          UNCATALOGED

END OF DISPLAY - 00000002 ABARS VERSIONS ELIGIBLE FOR EXPIRATION

```

Figure 3. Sample Printer List of Data Sets When You Specify EXPIREBV ABARSVERSIONS and DISPLAY

## Sample of a Printer Listing When You Specify EXPIREBV with the DISPLAY Parameter

Table 1 presents the header information when you specify EXPIREBV and DISPLAY.

Table 1. Headings of Output When You Specify EXPIREBV and DISPLAY

Printer Output Heading	Description
SYS CAT	YES indicates that the backup version was made from a cataloged data set.
GEN NMBR	This field contains the generation number of the backup version. The most recent backup version is 0, the next most recent is 1, and so forth.
AGE	This is the number of days between the creation of the backup version and the execution of the EXPIREBV command.
RET VERS	YES indicates that the version being listed is a retired version. NO indicates that the version is not a retired version.
BACK PROF	YES indicates that a RACF discrete backup profile exists. NO indicates that a RACF discrete backup profile does not exist.

Figure 4 is a sample of a printer listing when you specify EXPIREBV with the DISPLAY parameter. Each data set listed is deleted if the same EXPIREBV command is issued with the EXECUTE parameter.

```

DISPLAY OF BACKUP VERSIONS ELIGIBLE FOR EXPIRATION AT 05:44:14 on 1991/01/07 for SYSTEM=3081

COMMAND INPUT: STARTKEY(M734413.F240BV09.N02.NAME44.XXX.NAMEIS44.BYT) ENDKEY(M734413.F240BV09.N04.NAME44.XXX.NAMEIS44.BYT)

DSNAME = M734413.F240BV09.N02.NAME44.XXX.NAMEIS44.BYT NOW CATALOGED, AS SMS
MANAGEMENT CLASS USED = DEFAULT1

BACKUP VERSION DSNAME          SYS GEN     RET BACK
                                CAT NMBR AGE  VERS PROF
DFHSM.BACK.T074205.M734413.F240BV09.H7001 YES 003 006 NO   NO
DFHSM.BACK.T214205.M734413.F240BV09.H7001 YES 002 006 NO   NO
DFHSM.BACK.T534105.M734413.F240BV09.H7001 YES 004 006 NO   NO
DFHSM.BACK.T464205.M734413.F240BV09.H7003 YES 001 004 NO   NO

DSNAME = M734413.F240BV09.N03.NAME44.XXX.NAMEIS44.BYT NOW CATALOGED, AS SMS
MANAGEMENT CLASS USED = DEFAULT1

BACKUP VERSION DSNAME          SYS GEN     RET BACK
                                CAT NMBR AGE  VERS PROF
DFHSM.BACK.T094205.M734413.F240BV09.H7001 YES 003 006 NO   NO
DFHSM.BACK.T234205.M734413.F240BV09.H7001 YES 002 006 NO   NO
DFHSM.BACK.T554105.M734413.F240BV09.H7001 YES 004 006 NO   NO
DFHSM.BACK.T474205.M734413.F240BV09.H7003 YES 001 004 NO   NO

DSNAME = M734413.F240BV09.N04.NAME44.XXX.NAMEIS44.BYT NOW CATALOGED, AS SMS
MANAGEMENT CLASS USED = DEFAULT1

BACKUP VERSION DSNAME          SYS GEN     RET BACK
                                CAT NMBR AGE  VERS PROF
DFHSM.BACK.T104205.M734413.F240BV09.H7001 YES 003 006 NO   NO
DFHSM.BACK.T244205.M734413.F240BV09.H7001 YES 002 006 NO   NO
DFHSM.BACK.T564105.M734413.F240BV09.H7001 YES 004 006 NO   NO
DFHSM.BACK.T494205.M734413.F240BV09.H7003 YES 001 004 NO   NO

END OF DISPLAY - 00000012 BACKUP VERSIONS ELIGIBLE FOR EXPIRATION

```

*Figure 4. Sample Printer List of Data Sets When You Specify EXPIREBV and DISPLAY*



---

## **Chapter 17. FIXCDS: Displaying or Modifying MCDS, BCDS, and OCDS Records**

The FIXCDS command is issued only for maintenance purposes and is explained in the *z/OS DFSMShsm Diagnosis*.



---

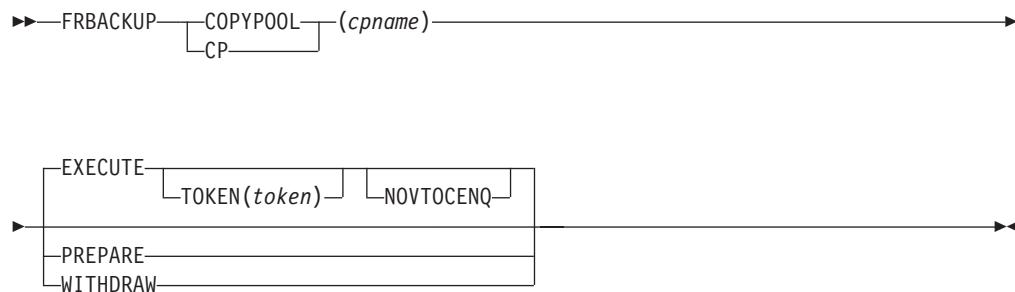
## Chapter 18. FRBACKUP: Requesting a Fast Replication Backup Version

The FRBACKUP command enables you to create a fast replication backup version for sets of storage groups . A set of storage groups is defined through the SMS construct termed 'copy pool'. Storage groups are defined to a copy pool and all of the volumes in those storage groups are backed up by the fast replication function. Refer to the *z/OS DFSMSdfp Storage Administration Reference* for discussions of the copy pool construct.

This command is successful when DFSMShsm establishes a fast replication relationship for each source volume. If one of the volumes fails, the entire function fails.

---

### Syntax of the FRBACKUP Command



---

### Required Parameter of the FRBACKUP Command

This section describes the required parameter of the FRBACKUP command.

#### COPYPOOL: Specifying the Name of the Copy Pool for Backup

**Explanation:** COPYPOOL(*cpname*) is a required parameter that is used to identify the copy pool for backup. For *cpname*, substitute the name of the copy pool for which to create a backup version.

**Defaults:** None.

---

### Optional Parameters of the FRBACKUP Command

This section describes the optional parameters of the FRBACKUP command.

#### EXECUTE | PREPARE | WITHDRAW: Specifying the Backup Action

**Explanation:** EXECUTE | PREPARE | WITHDRAW are mutually exclusive, optional parameters that indicate to DFSMShsm the type of backup action that you are initiating.

## FRBACKUP

**EXECUTE:** The EXECUTE parameter indicates that DFSMShsm is to create a fast replication backup for each volume defined in the specified copy pool storage group. EXECUTE is the default action.

**PREPARE:** When you use this parameter, DFSMShsm assigns specific target volumes to each source volume for each version of the copy pool.

This PREPARE processing enables validation of the fast replication environment outside the backup window. The PREPARE processing does not create a backup of the copy pool.

**WITHDRAW:** The WITHDRAW parameter indicates that all outstanding FlashCopy relationships are withdrawn for the most recent valid version. DFSMShsm marks that version invalid if any FlashCopy relationships are withdrawn.

You should use the WITHDRAW parameter when it is necessary to withdraw one or more relationships established by FRBACKUP. If a version other than the most recent is invalidated, then that version is also deleted because it is no longer usable. Withdraw of a relationship can only be performed at the copy pool level. If any part of a copy pool backup version is invalidated, then the entire version is invalidated.

**Note:** If you withdraw the only backup version, recovery cannot be performed. Use the LIST COPYPOOL command or the ARCXTRCT macro to ensure that the backup version you wish to withdraw is not the only backup version.

**Defaults:** If you do not specify any of these optional parameters with the FRBACKUP command, the default is EXECUTE.

## NOVTOCENQ: Requesting DFSMShsm to Not Serialize the VTOC of Processed Volumes

NOVTOCENQ is an optional parameter that you use to request DFSMShsm to not serialize on the VTOCs of the volumes being processed. Do not use this parameter unless you have taken specific action to ensure that no update activity will occur to the volumes being processed.

**Defaults:** None.

## TOKEN: Specifying an Identifier for Each Copy Pool Backup Version

TOKEN(*token*) is an optional parameter that is a string (up to 40 bytes) that DFSMShsm maintains with each backup version of the copy pool. The token may be used to identify a specific backup version to recover. The token is returned as part of the LIST and ARCXTRCT data for the copy pool backup version. If the value specified for TOKEN is less than 40 bytes, the TOKEN value is left justified and binary zeros fill the remainder of the positions to fill the 40 byte space. If TOKEN is not specified, binary zeros are returned with the data.

**Defaults:** None.

---

## Examples of How to Code the FRBACKUP Command

The following examples present different ways to code the FRBACKUP command.

**Note:** Any values specified here are examples. Do not interpret these examples as the values that you need to use for your system.

## Validating the Current Environment

**Example:** In this example, DFSMShsm submits a request for validation of the current environment. DFSMShsm assigns specific target volumes to each source volume for each version.

```
FRBACKUP COPYPOOL(CPDATABASE3) PREPARE
```

## Creating a Fast Replication Backup for Each Volume in the Copy Pool's Storage Groups

**Example:** In this example, DFSMShsm creates a fast replication backup version.

```
FRBACKUP COPYPOOL(CPDATABASE2) EXECUTE TOKEN(FRBACKUP_JULYDATA)
```

## Withdrawing Copy Pool Relationships

**Example:** In this example, DFSMShsm submits a request to withdraw outstanding FlashCopy relationships that were established for the previous backup version. This invalidates the previous backup version and immediately creates a new backup version.

```
FRBACKUP COPYPOOL(CPDATABASE1) WITHDRAW
```



---

## Chapter 19. FRDELETE: Deleting Fast Replication Backup Versions

The FRDELETE command enables you to delete one or more fast replication backup versions. This is useful when you rename a copy pool, when you no longer need a copy pool, or when you no longer need an individual backup version. Before a version is deleted, any outstanding FlashCopy relationships are withdrawn.

---

### Syntax of the FRDELETE Command



**Note:** You must specify either ALL, TOKEN, or VERSIONS with each FRDELETE command.

---

### Required Parameters of the FRDELETE Command

This section describes the required parameters of the FRDELETE command.

#### COPYPOOL: Specifying the Name of the Copy Pool for Deletion

**Explanation:** COPYPOOL(*cpname*) is used to identify the copy pool for which backup versions are deleted. For *cpname*, substitute the name of the copy pool for which to delete the backup version.

**Defaults:** None.

#### ALL | TOKEN | VERSIONS: Specifying the Delete Action

**Explanation:** ALL | TOKEN | VERSIONS are mutually exclusive parameters that indicate to DFSMShsm the type of delete action that you are initiating.

**ALL** indicates that DFSMShsm is to delete all fast replication backup versions.

**TOKEN(*token*)** indicates to DFSMShsm the token of the backup version to delete. If the token is not unique, then DFSMShsm deletes the most recent backup version with the specified token. For *token*, substitute the alphanumeric or hexadecimal token.

**VERSIONS(*bvn,bvn,. . .*)** indicates to DFSMShsm the backup versions to delete. For *bvn*, substitute the number of the backup versions.

**Defaults:** None.

---

### Examples of How to Code the FRDELETE Command

The following examples present different ways to code the FRDELETE command.

## FRDELETE

**Note:** Any values specified here are examples. Do not interpret these examples as the values you need to use for your system.

### Deleting all Versions of a Fast Replication Backup

**Example:** In this example, DFSMShsm deletes all fast replication backup versions for a copy pool.

```
FRDELETE COPYPOOL(CPDATABASE1) ALL
```

### Deleting One Version of a Fast Replication Backup by Version Number

**Example:** In this example, DFSMShsm deletes one fast replication backup version for a copy pool. The specific version number is specified.

```
FRDELETE COPYPOOL(CPDATABASE1) VERSIONS(2)
```

### Deleting One Version of a Fast Replication Backup by Token

**Example:** In this example, DFSMShsm deletes the fast replication backup version for a copy pool. The specific token is specified.

```
FRDELETE COPYPOOL(CPDATABASE1) TOKEN(53800)
```

---

## Chapter 20. FREEVOL: Freeing DFSMShsm-Owned Volumes

The FREEVOL command allows you to empty a migration or backup DASD volume in preparation for new equipment or to replace old or partially damaged volumes. If the intended use is to make more space available on an ML1 volume, use the MIGRATE ML1 command instead. In addition, FREEVOL removes selected data sets from a volume based on management class attributes or age. FREEVOL moves valid backup versions and migration copies from DFSMShsm-owned DASD volumes to either tape or DASD.

The FREEVOL command moves migration copies of SMS-managed data sets from:

- A migration level 1 volume based on each data set's management class attribute values
- A migration level 2 volume based on the age specified on the AGE parameter of the FREEVOL command.

The FREEVOL command moves all migration copies of non-SMS-managed data sets meeting a specified age criterion from DFSMShsm migration volumes.

Migration copies meeting the specified age criterion are:

- Moved from a specified migration level 1 volume to other migration level 1 or level 2 volumes
- Moved from a specified migration level 2 DASD volume to other migration level 2 volumes.

The FREEVOL command moves all backup versions of SMS-managed and non-SMS-managed data sets meeting a specified age criterion from DFSMShsm daily backup volumes. Backup versions are moved from a specified backup volume to spill DASD or tape volumes. A parameter can be specified to prevent the movement of the most recent backup version for each data set.

**Notes:**

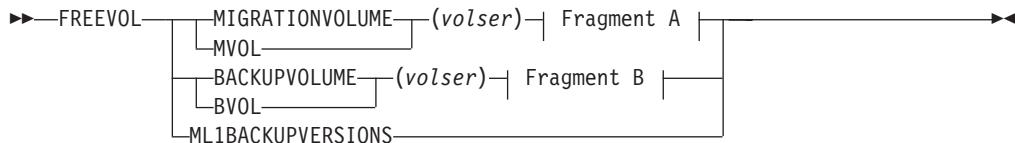
1. FREEVOL can be used to move migration copies from one unit type to another unit type.
2. Each time automatic backup processing runs, backup copies are moved off migration level 1 volumes. FREEVOL ML1BACKUPVERSIONS provides this same function. However, FREEVOL of a single migration volume does not move backup versions.
3. FREEVOL does not move user data sets, SYS1.VVDS, the VTOC index data set, or any kind of catalog.
4. FREEVOL of a migration level 1 volume moves VTOC copy data sets on the freed volume to other migration level 1 volumes, regardless of the target level of the FREEVOL command.
5. Unless you want DFSMShsm to continue to use the freed *migration* volume as a target for migration, you should either delete the volume or add it again with the DRAIN attribute.
6. Unless you want DFSMShsm to continue to use the freed *backup* volume as a target for backup, you should delete the volume.
7. For migrated SMS data sets, the values specified for the management class attribute of *COMMAND-OR-AUTO-MIGRATE* are ignored.
8. FREEVOL does not move any SDSP data sets, although it can move or delete any data sets that are in an SDSP data set. Small data sets that move to another

## FREEVOL

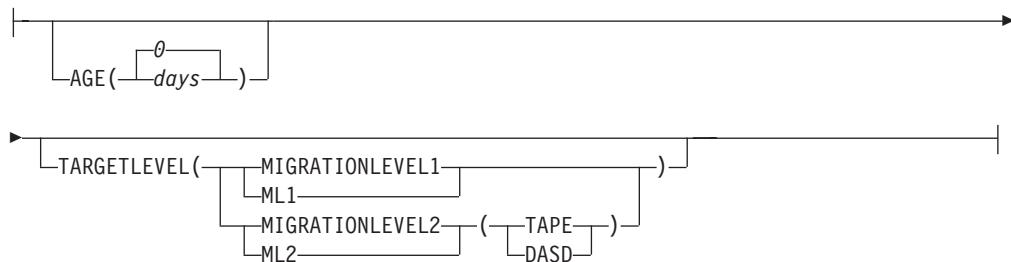
ML1 volume may go into an SDSP data set. Refer to *z/OS DFSMShsm Storage Administration Guide* for removing an SDSP.

9. When FREEVOL AGE(0) is specified, BACKDS backup versions and data sets that have migrated but are awaiting automatic backup are not moved off the volume. Running automatic backup on the DFSMShsm primary host performs this function. When you are planning to remove an ML1 volume, run autobackup on the primary host shortly before running the FREEVOL function with the AGE(0) parameter.

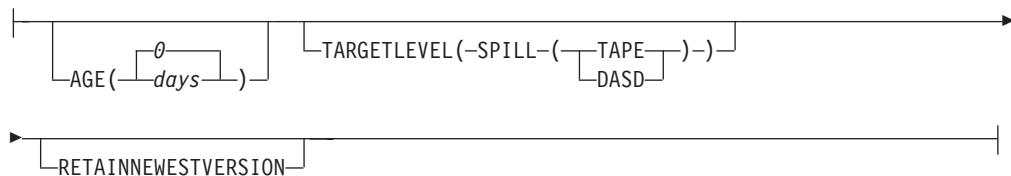
## Syntax of the FREEVOL Command



### A: MIGRATIONVOLUME Optional Parameters:



### B: BACKUPVOLUME Optional Parameters:



---

## Required Parameters of the FREEVOL Command

This section describes the required parameters of the FREEVOL command.

### MIGRATIONVOLUME | BACKUPVOLUME: Specifying a Volume to Free

**Explanation:** MIGRATIONVOLUME(*volser*) | BACKUPVOLUME(*volser*) are mutually exclusive, required parameters. Issue one or the other with the FREEVOL command when a volume serial number is specified. For (*volser*), substitute the serial number of the migration or daily backup volume you want processed.

**Defaults:** None.

**Notes:**

1. When you are using MIGRATIONVOLUME, all data set movement statistics appear as SUBSEQUENT MIGS on the REPORT summary.
2. When you are using BACKUPVOLUME, all data set movement statistics appear as SUBSEQUENT BACKUP on the REPORT summary.

### ML1BACKUPVERSIONS: Moving Backup Versions Off Migration Volumes

**Explanation:** ML1BACKUPVERSIONS is mutually exclusive with the MIGRATIONVOLUME and BACKUPVOLUME parameters. There are no subparameters specified with this parameter.

When this parameter is specified, backup versions are moved from all migration level 1 volumes to daily backup volumes. This processing occurs on a primary or secondary host, but does not allow processing from two hosts concurrently. While this processing occurs, volume backups are not permitted to start on this host. This parameter does not support wait processing in the HSENDCMD command or the ARCHSEND invocation macro.

All data set movement statistics appear as SUBSEQUENT BACKUP on the report summary.

**Defaults:** None.

---

## Optional Parameters of the FREEVOL Command

This section describes the optional parameters of the FREEVOL command.

### AGE: Specifying Data Set Use

**Explanation:** AGE(*days*) is an optional parameter specifying the age criterion for moving data sets.

- When processing a migration volume, substitute a decimal value from 0 to 999 for the number of days since data sets were last referred to.
- When processing a backup volume, substitute a decimal value from 0 to 999 for the number of days since the backup version was created. If the RETAINNEWESTVERSION subparameter is specified, the newest versions created are retained on the volume independent of the age criterion specified.

If AGE(0) is entered for a migration level 1 volume, migration copies of all SMS-managed data sets are moved from the volume and placed on other migration

level 1 volumes or migration level 2 volumes, depending on each data set's management class. If the management class has a value specified for the LEVEL-1-DAYS-NONUSAGE and the age is met, the data set migrates to a migration level 2 volume. If the management class has a value specified for LEVEL-1-DAYS-NONUSAGE and the data set age does not meet the criterion or if the data set has an attribute of NOLIMIT, the data set migrates to another migration level 1 volume.

If an AGE other than zero is specified for migration level 1 volumes, the management class for each SMS data set is used to determine whether the migration copy is moved to another volume.

If AGE (0–999) is entered for a migration level 2 volume, the age specified applies to all of the data sets on the volume, because there are no management class attributes that apply to SMS data sets on migration level 2 volumes.

If AGE (0–999) is entered for a backup volume, the age specified applies to all of the data sets on the volume. Expiration processing of backup versions is not performed during FREEVOL.

**Defaults:** If you do not specify AGE, the default is zero. A default of zero clears the volume of all migrated data except the ones in need of backup, or it clears the backup volume if the RETAINNEWESTVERSION subparameter is not specified.

## TARGETLEVEL: Specifying the Target to Which Data Sets Are Moved

**Explanation:** TARGETLEVEL specifies the level and the unit type for migration copies that are eligible to be moved.

**For SMS-Managed Migrated Data Sets:** The target levels of MIGRATIONLEVEL1 and MIGRATIONLEVEL2 do not apply because their target levels are determined by management class as described in the AGE parameter description. The device category of DASD or TAPE applies only to those SMS-managed data sets migrating to ML2:

Subparameter	Explanation
DASD	<b>TARGETLEVEL (MIGRATIONLEVEL2 (DASD))</b> specifies that the eligible data sets migrate from MIGRATIONVOLUME( <i>volser</i> ) to DASD migration level 2 volumes.
TAPE	<b>TARGETLEVEL (MIGRATIONLEVEL2 (TAPE))</b> specifies that the eligible data sets migrate from MIGRATIONVOLUME( <i>volser</i> ) to tape migration level 2 volumes.

**For Non-SMS-Managed Migrated Data Sets:** The TARGETLEVEL (MIGRATIONLEVEL1 | MIGRATIONLEVEL2 (TAPE | DASD)) parameters apply to these migrated data sets.

Subparameter	Explanation
MIGRATIONLEVEL1	<b>TARGETLEVEL (MIGRATIONLEVEL1)</b> specifies that volumes defined as migration level 1 receive migrated data sets from MIGRATIONVOLUME( <i>volser</i> ).

Subparameter	Explanation
MIGRATIONLEVEL2	<p><b>TARGETLEVEL (MIGRATIONLEVEL2)</b> specifies that volumes defined for migration level 2 receive migrated data sets from MIGRATIONVOLUME(<i>volser</i>).</p> <p><b>TARGETLEVEL (MIGRATIONLEVEL2 (DASD))</b> specifies that the eligible data sets migrate from MIGRATIONVOLUME(<i>volser</i>) to DASD migration level 2 volumes.</p> <p><b>TARGETLEVEL (MIGRATIONLEVEL2 (TAPE))</b> specifies that the eligible data sets migrate from MIGRATIONVOLUME(<i>volser</i>) to tape migration level 2 volumes.</p>

**For BACKUP Data Sets:** The **TARGETLEVEL(SPILL(TAPE | DASD))** parameters are used to specify the level and the unit type for backup versions eligible to be moved. The device category applies to all data sets moving to SPILL backup volumes:

Subparameter	Explanation
DASD	<b>TARGETLEVEL(SPILL(DASD))</b> specifies that the eligible data sets move from BACKUPVOLUME( <i>volser</i> ) to DASD spill backup volumes.
TAPE	<b>TARGETLEVEL(SPILL(TAPE))</b> specifies that the eligible data sets move from BACKUPVOLUME( <i>volser</i> ) to tape spill backup volumes.

**Defaults:** If you do not specify either DASD or TAPE, the default is the type of migration set up by the SETSYS command. For migration volumes, the TAPEMIGRATION parameter is used to set up this default. For backup volumes, the SPILL parameter is used.

#### Notes:

1. If MIGRATIONVOLUME and TARGETLEVEL are the same level, the current source volume (MIGRATIONVOLUME(*volser*)) is excluded from the target volume selection process.
2. If the source volume you specified is a migration level 2 volume, the specification of a target level migration level 1 volume is invalid.
3. If you do not specify TARGETLEVEL, migration copies of non-SMS-managed data sets are moved to migration level 2 volumes.
4. If you specify either DASD or TAPE, the one selected overrides the environment specified with the SETSYS TAPEMIGRATION command or the SETSYS SPILL command.
5. After a FREEVOL command has been processed against a migration level 2 volume with an associated key range, that volume must be further processed by a DELVOL and an ADDVOL command in order to become eligible again as a target volume for that key range.

## RETAINNEWESTVERSION: Preventing Movement of Backup Versions

**Explanation:** RETAINNEWESTVERSION specifies that the FREEVOL process not move the most recent backup version of a data set from the volume.

If both AGE and RETAINNEWESTVERSION are specified, the most recent backup versions are retained on the current volume, regardless of the age criterion.

## **FREEVOL**

**Defaults:** If you do not specify this parameter, all backup versions are selected by the number of days specified by the AGE parameter.

### **Examples of How to Code the FREEVOL Command**

Coding of the FREEVOL command is demonstrated in the examples that follow.

**Note:** Values specified here are only examples and should not be interpreted as the values to be used for your system.

#### **Moving Migration Copies from One Migration Volume to Other Migration Volumes**

**Example:** In this example, migration copies of SMS-managed data sets are moved from a specific migration volume to migration level 1 or migration level 2 DASD volumes based on their management class attributes. Non-SMS-managed data sets are moved from a specific migration volume to migration level 2 DASD volumes.

```
FREEVOL MIGRATIONVOL(MIG100) TARGETLEVEL(ML2(DASD))
```

#### **Moving Backup Versions from One Backup Volume to Tape**

**Example:** In this example, backup versions are moved from a specific backup volume to spill tape volumes.

```
FREEVOL BACKUPVOL(BACK01) TARGETLEVEL(SPILL(TAPE))
```

#### **Moving Backup Versions Selectively**

**Example:** In this example, backup versions are moved from a specific backup volume to the type of volumes set up by the SETSYS SPILL parameter. Backup versions are moved if they were created 30 or more days ago. Backup versions that are the most recently created copies of their source data sets remain on the volume and are not affected by the AGE parameter.

```
FREEVOL BACKUPVOL(BACK02) AGE(30) RETAINNEWEST
```

#### **Moving Backup Versions from ML1 Volumes**

**Example:** In this example, backup versions are moved from all ML1 volumes to daily backup volumes.

```
FREEVOL ML1BACKUPVERSIONS
```

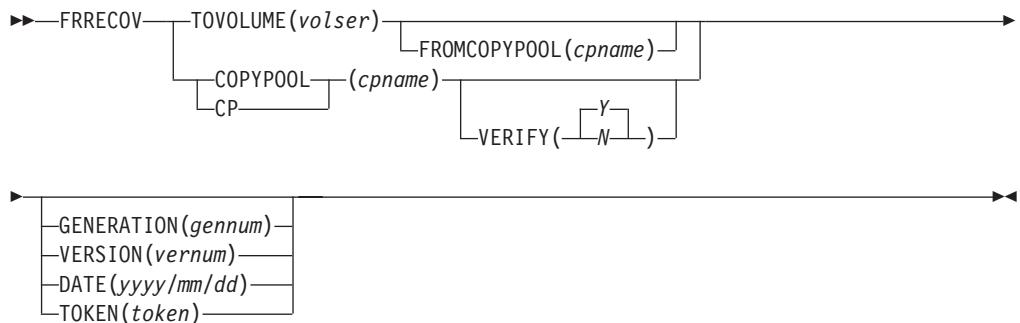
---

## Chapter 21. FRRECOV: Requesting a Fast Replication Recover

The FRRECOV command invokes the fast replication function to recover a single volume or a pool of volumes from the managed copies. A target volume can never be used directly as a source volume replacement. Instead you must recover the source volume by fast replicating the target volume back to the source volume. Use the DFSMShsm FRRECOV command to fast replicate the target to the source volume.

**Note:** Because fast replication is a volume-level function, there are important factors to consider to ensure that the backup and recovery process restores your data to a usable state. Before using the fast replication function, see the topic on managing volume backups with fast replication in SC35-0421.

### Syntax of the FRRECOV Command



---

### Required Parameters of the FRRECOV Command

This section describes the required parameters of the FRRECOV command.

#### TOVOLUME: Specifying a Single Volume Within a Copy Pool to Recover

**Explanation:** TOVOLUME(*volser*) is a required parameter that is mutually exclusive with the COPYPOOL parameter. The TOVOLUME parameter indicates to DFSMShsm to recover a single volume within a copy pool.

For *volser*, substitute the source volume serial number that you want to recover. If you specify a source volume that is contained within a storage group that is defined within multiple copy pools, then you must also specify FROMCOPYPOOL(*cpname*).

**Defaults:** None.

#### COPYPOOL: Specifying the Copy Pool for Which to Recover All Backup Volumes

**Explanation:** COPYPOOL is a required parameter that is mutually exclusive with the TOVOLUME parameter. The COPYPOOL parameter indicates to DFSMShsm to recover all source volumes associated with the named copy pool.

## FRRECOV

For *cpname*, substitute the name of the copy pool that you want to recover. DFSMShsm recovers all volumes that are associated with this copy pool.

**Defaults:** None.

---

## Optional Parameters of the FRRECOV Command

This section describes the optional parameters of the FRRECOV command.

### FROMCOPYPOOL: Recovering a Volume that Belongs to Multiple Copy Pools

**Explanation:** FROMCOPYPOOL(*cpname*) is an optional parameter that you must specify if the volume you want DFSMShsm to recover belongs to a storage group that is defined within multiple copy pools. For *cpname*, substitute the name of the copy pool that contains the volume.

You can use the LIST PRIMARYVOLUME BCDS command to determine which copy pool(s) a volume is contained within. You can then use the LIST COPYPOOL(*cpname*) command to determine which of those copy pools contains the version that you want recovered.

**Defaults:** None.

### GENERATION | VERSION | DATE | TOKEN: Specifying a Specific Backup Version to Recover

**Explanation:** GENERATION | VERSION | DATE | TOKEN are mutually exclusive, optional parameters that indicate to DFSMShsm a specific backup version to recover.

**GENERATION:** Specify GENERATION(*gennum*) to recover a backup version of a particular generation. The generation number can be from 0 to 84. The most recent version is generation 0, the next is 1, etc.

**VERSION:** Specify VERSION(*vernum*) to recover a backup of a particular version. The version number can be from 1 to 999.

**DATE:** Specify DATE(yyyy/mm/dd) to recover a backup version from a particular date. If more than one version exists for the specified date, then DFSMShsm recovers the most recent version from that date. The FRRECOV command fails if no version exists for the specified date. A version may not exist because either no valid backup copy exists or the version exists, but it is flagged invalid. You do not need to include a leading zero to specify single digit months and days.

**TOKEN:** Specify TOKEN(*token*) to recover a backup version with a particular token. If the token is not unique, then the most recent backup version with the specified token is recovered. If the specified token is less than 40 characters, then the token is left justified and padded with binary zeroes before the backup version search. You can specify a hexadecimal token using the X'...' syntax.

**Defaults:** If you do not specify GENERATION | VERSION | DATE | TOKEN, DFSMShsm uses the most recent backup version to perform the recovery.

## VERIFY: Verifying that No FlashCopy Relationship Exists for a Volume in a Copy Pool

**Explanation:** VERIFY(Y|N) is an optional parameter that is used to ensure that no source volumes in the copy pool are in an existing FlashCopy relationship. If one or more volumes are in an existing FlashCopy relationship, the recover fails. VERIFY(Y) is the default. VERIFY(N) indicates that source volumes do not require verification for existing FlashCopy relationships. Specify VERIFY(N) only if all volumes are SnapShot capable or if the QUERY COPYPOOL command has been issued to verify that there are no existing FlashCopy relationships.

**Defaults:** If you do not specify the VERIFY parameter, the default is Y.

### Examples of How to Code the FRRECOV Command

The following examples present different ways to code the FRRECOV command.

**Note:** Any values specified here are examples. Do not be interpret these examples as the values you need to use for your system.

#### Recovering Each Volume in a Copy Pool

**Example:** In this example, DFSMShsm requests a fast replication recovery for each volume in a copy pool named CPDATABASE1. The most recent versions are recovered since a specific version is not requested.

```
FRRECOV COPYPOOL(CPDATABASE1) VERIFY(Y)
```

#### Recovering Each Volume in a Copy Pool from a Specific Date

**Example:** In this example, DFSMShsm requests a fast replication recovery for each volume in a copy pool named CPDATABASE1 from a specific date.

```
FRRECOV COPYPOOL(CPDATABASE1) DATE(2002/1/15)
```

#### Recovering Volumes in a Copy Pool with a Specific Token

**Example:** In this example, DFSMShsm requests a fast replication recovery of each volume in a copy pool named CPDATABASE1 with a specific token.

```
FRRECOV COPYPOOL(CPDATABASE1) TOKEN(FRBACKUP_JULYDATA)
```

#### Recovering a Specific Source Volume

**Example:** In this example, DFSMShsm requests a fast replication recovery of the most recent fast replication backup version to a specific source volume.

```
FRRECOV TOVOLUME(VOL186)
```

#### Recovering a Specific Source Volume From a Specific Copy Pool

**Example:** In this example, DFSMShsm requests a fast replication recovery for a specific source volume from the copy pool named CPDATABASE1.

```
FRRECOV TOVOLUME(VOL186) FROMCOPYPOOL(CPDATABASE1)
```

## **Recovering a Specific Generation of a Source Volume From a Specific Copy Pool**

**Example:** In this example, DFSMShsm requests a fast replication recovery for a specific generation of a source volume from the copy pool named CPDATABASE1.

```
FRRECOV TOVOLUME(VOL186) FROMCOPYPOOL(CPDATABASE1) GENERATION(1)
```

## **Chapter 22. HOLD: Preventing All or Some DFSMShsm Functions from Running**

The HOLD command prevents all or some DFSMShsm functions from running. For example, you specify HOLD when a temporary software or hardware problem occurs that can be compounded if data movement continues in DFSMShsm.

Migration, backup, dump, recovery, and restore have an optional keyword related to stopping volume processing after the current data set (EOD) or delaying until the end of processing the user volume (EOV).

The WAIT and NOWAIT parameters of the HSENDCMD command have implications to HOLD command processing that are function specific. Refer to the specific processing function for an explanation.

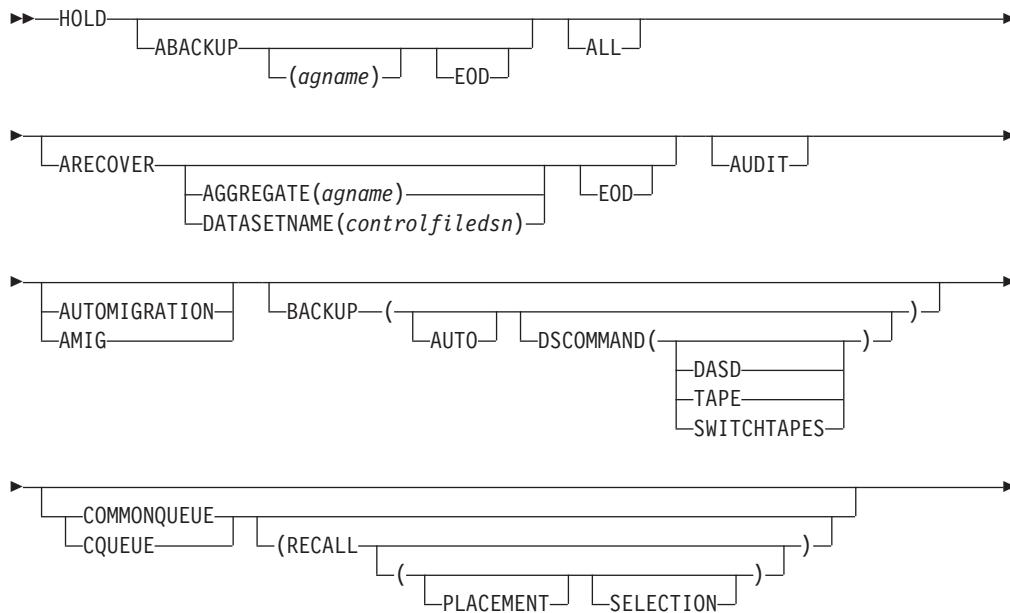
All nonWAIT-type requests remain on the processing queue when the appropriate HOLD command is in effect.

If the HOLD command is issued while the TAPECOPY or TAPEREPL commands are processing more than one volume, either from a volume list from the command or from an input data set, processing stops after the current volume.

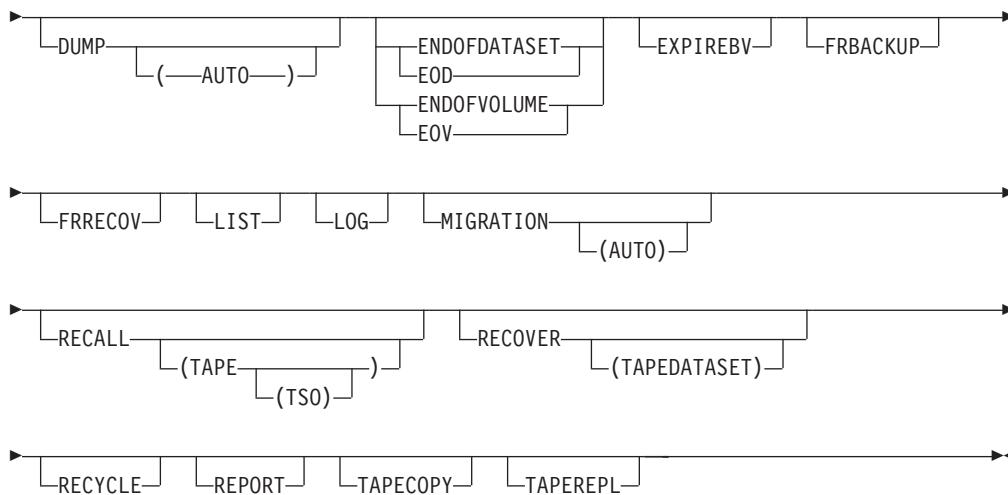
You can issue the RELEASE command to release for processing all or some of the DFSMShsm functions held with the HOLD command.

Functions held from processing by the HOLD command are no longer prevented from processing if DFSMShsm is reinitialized.

# Syntax of the HOLD Command



## HOLD



### Notes:

1. The ENDOFDATASET and ENDOFVOLUME optional parameters affect the following optional parameters:
  - AUTOMIGRATION
  - BACKUP | BACKUP(AUTO)
  - DUMP | DUMP(AUTO)
  - MIGRATION | MIGRATION(AUTO)
  - RECOVER | RECOVER(TAPEDATASET)
2. Although the HOLD command has no required parameters, you must specify at least one optional parameter if you want to prevent a DFSMSHsm function from processing.
3. In a multiple address space for DFSMSHsm environment, ABARS commands, like HOLD ABACKUP or HOLD ARECOVER, can only be issued by the host identified as the main host. DFSMSHsm ignores the ABARS commands if directed to a host identified as HOSTMODE=AUX.

---

## Optional Parameters of the HOLD Command

This section describes the optional parameters of the HOLD command.

### ABACKUP: Preventing Aggregate Backup

**Explanation:** ABACKUP is an optional parameter specifying that the process of backing up aggregated data sets stops after completion of any currently running aggregate backup. Any ABACKUP commands not processed remain in the queue until ABACKUP is released.

Subparameter	Explanation
agname	ABACKUP(agname) is an optional parameter specifying an aggregate group. For agname, substitute the name of the SMS aggregate group.

Subparameter	Explanation
EOD	<p><b>ABACKUP EOD</b> If the EOD option is specified with a HOLD ABACKUP command, the currently executing aggregate backup is stopped at the end of the data set currently processing, and the ABACKUP command is purged from the queue. All open data sets and tapes are closed and all allocated data sets and tapes are deallocated before the termination. The ABACKUP output files are uncataloged and the tape volume serial numbers are removed from the HSMABR tape volume set if they were indicated to be protected. During ABACKUP processing, if the control file has already been written and a HOLD EOD is issued, ABACKUP is allowed to complete normally. However, if ABACKUP was issued with the MOVE option, ABACKUP will be held. If an aggregate group name was specified with the HOLD ABACKUP command, the above processing only occurs when the specified name matches a currently running or pending ABACKUP command.</p> <p>If the ABACKUP parameter is specified with the HOLD command and without the EOD option, the currently executing ABACKUP commands run to completion. If an aggregate group name has been specified, subsequent commands for that name are held. When an aggregate group name was specified, the above processing only occurs if the specified name matches a currently running or pending ABACKUP command.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. If you issue an ABACKUP command with a WAIT option when ABACKUP is held, that request fails and an error message is issued.</li> <li>2. If you issue an ABACKUP command with a NOWAIT option when ABACKUP is held, that request is queued and processed when ABACKUP is released.</li> <li>3. To ensure data integrity, you should HOLD ABACKUP from processing aggregated data sets whose data is being heavily used, or when automatic functions are running.</li> </ol>

**Defaults:** None.

## ALL: Preventing All DFSMShsm Functions

**Explanation:** ALL is an optional parameter specifying that all functions controlled by this command, except logging, are prevented.

If the EOD or EOF parameter is specified, then all functions (except FRBACKUP and FRRECOV) are held using that parameter. If neither EOD nor EOF is specified, then each function is held according to its default: BACKUP, MIGRATION, and RECOVER are held as EOD, and DUMP is held as EOF. ABACKUP and ARECOVER are held without the EOD parameter.

**Defaults:** None.

**Note:** HOLD ALL does not control the hold level of the common recall queue (CRQ) placement and selection functions. To place a hold on CRQ placement and selection, specify HOLD COMMONQUEUE. To place a hold on only one of the two functions (placement or selection), specify the appropriate optional subparameter.

## ARECOVER: Preventing Aggregate Recovery

**Explanation:** ARECOVER is an optional parameter specifying that the process of recovering aggregated data sets stop after completion of any currently running aggregate recovery. Any ARECOVER commands not processed remain in the queue until ARECOVER is released.

Subparameter	Explanation
AGGREGATE	<b>ARECOVER AGGREGATE(<i>agname</i>)</b> is an optional parameter specifying an aggregate group. For <i>agname</i> , substitute the name of the SMS aggregate group against which you want DFSMShsm to hold processing.
DATASETNAME	<b>ARECOVER DATASETNAME(<i>controlfiledsn</i>)</b> is an optional parameter specifying a control file name. For <i>controlfiledsn</i> , substitute the name of the control file against which you want DFSMShsm to hold processing.
EOD	<p><b>ARECOVER EOD</b> If the EOD option is specified with a HOLD ARECOVER command, the currently executing aggregate recovery is stopped at the end of the data set currently processing, and the ARECOVER command is purged from the queue. All open data sets and tapes are closed and all allocated data sets and tapes are deallocated before the termination. If an aggregate group name or control file data set name has been specified with the HOLD ARECOVER command, the above processing only occurs when the specified name matches a currently running or pending ARECOVER command. During ARECOVER processing, the restart data set is written when the HOLD EOD command is selected so that if the ARECOVER is reissued, data sets already processed are skipped.</p> <p>If the ARECOVER parameter is specified with the HOLD command and without the EOD option, the currently executing ARECOVER commands run to completion. If AGGREGATE(<i>agname</i>) or DATASETNAME(<i>controlfiledsn</i>) has been specified, subsequent commands for that name will be held. When AGGREGATE(<i>agname</i>) or DATASETNAME(<i>controlfiledsn</i>) has been specified, the above processing only occurs if the specified name matches a currently running or pending ARECOVER command.</p>

**Notes:**

1. If you issue an ARECOVER command with a WAIT option when ARECOVER is held, that request fails and an error message is issued.
2. If you issue an ARECOVER command with a NOWAIT option when ARECOVER is held, that request is queued and processed when ARECOVER is released.

**Defaults:** None.

## AUDIT: Ending the Audit Function

**Explanation:** AUDIT is an optional parameter specifying that DFSMShsm stop the audit function after it finishes processing the current data set. WAIT-type command requests fail, and NOWAIT-type command requests remain queued.

**Defaults:** None.

**Note:** When you issue the HOLD command, you lose any part of the AUDIT command that has not finished running.

## AUTOMIGRATION: Preventing Automatic Volume and Automatic Secondary Space Management

**Explanation:** AUTOMIGRATION is an optional parameter specifying that automatic volume and automatic secondary space management are prevented. If automatic volume and automatic secondary space management are running when you issue the HOLD command, automatic volume and automatic secondary space management stop. The point at which processing stops is controlled by the ENDOFDATASET and ENDOFVOLUME parameters.

**Defaults:** None.

**Notes:**

1. When you specify AUTOMIGRATION, DFSMShsm does not prevent the running of any space management functions that were issued by command.
2. HOLD AUTOMIGRATION has the same meaning as HOLD MIGRATION(AUTO).

## BACKUP: Preventing Backups

**Explanation:** BACKUP is an optional parameter that specifies whether you want DFSMShsm to prevent all backup processing or to prevent only the following processing:

- All data set backup requests
- All data set backup requests to either DASD or tape
- Data set backups to DASD
- Data set backups to tape
- All automatic backups

The BACKUP parameter also specifies whether you want DFSMShsm to demount tapes that are used by command backup.

The BACKUP parameter, without any subparameters, prevents all backup processing tasks and demounts all tapes mounted for command data set backup. No more tasks are started for backup processing. Any command requests that specified the WAIT keyword are failed.

## HOLD

Subparameter	Explanation
AUTO	<p><b>BACKUP(AUTO)</b> specifies that automatic backup processing is prevented. No more automatic backup processing tasks are started. You can still perform command backup processing tasks.</p> <p>The ENDOFDATASET and ENDOFVOLUME parameters control volume backup processing. Data set processing is always ENDOFDATASET.</p>
DSCOMMAND	<p><b>BACKUP(DSCOMMAND)</b> specifies that all data set backups by command (BACKDS, HBACKDS, ARCHBACK, and ARCINBACK) and all INUSE RETRY backups from autobackup are prevented. All WAIT-type requests fail, and control returns to the requester.</p> <p><b>BACKUP(DSCOMMAND(DASD))</b> specifies that only data set backups by command that are directed to ML1 DASD are prevented. All WAIT-type requests fail that specifically target DASD, and the requester is returned control.</p> <p><b>BACKUP(DSCOMMAND(TAPE))</b> specifies that only data set backups by command that are directed to tape are prevented. All WAIT-type requests that specifically target tape or are too large for DASD fail, and the requester is returned control. Based on the setting used in the SETSYS DSBACKUP (DASDSELECTIONSIZE) parameter, DFSMShsm directs some WAIT-type requests to tape. DFSMShsm fails these WAIT-type requests when you specify DSCOMMAND(TAPE). To redirect these requests to DASD, you can do one of the following tasks:</p> <ul style="list-style-type: none"><li>• Issue SETSYS DSBACKUP(TAPE(TASKS(0))). This directs to DASD all but those requests that specifically target tape. DFSMShsm fails those BACKDS requests that specifically target tape.</li><li>• Increase the SETSYS DSBACKUP(DASDSELECTIONSIZE) settings. This directs to DASD all larger data sets.</li></ul> <p><b>BACKUP(DSCOMMAND(SWITCHTAPES))</b> specifies that command data set backup demounts any mounted tapes at the end of the current data set or immediately, if the mounted tape is waiting for additional work. When command data set backup has additional work, processing continues with new tapes. This SWITCHTAPES type of HOLD does not require the use of a RELEASE command.</p> <p>Use the SWITCHTAPES parameter for the following tasks:</p> <ul style="list-style-type: none"><li>• You have tapes that are continuously mounted, and the need arises to demount a tape so that it or its alternate tape can be taken to another site for disaster backup purposes</li><li>• To introducing new tape devices to the installation, these continuously mounted tapes also need to be demounted and the drives deallocated</li></ul> <p>If you want to change the PARTIALTAPE options from what was originally defined in the DEFINE SWITCHTAPES(DSBACKUP) command, you must do so before you issue the HOLD command.</p>

**Defaults:** Issuing the HOLD BACKUP command with no parameters prevents all backup processing.

**Note:** If you are using the SETSYS BACKUP command or a data set backup installation exit to direct DFSMShsm to retry backup requests that fail because data sets are in use, and if DFSMShsm has scheduled any such

retries during automatic backup, those backup retries will not be affected by the HOLD BACKUP(AUTO) command. You will need to use HOLD BACKUP or HOLD ALL.

## COMMONQUEUE: Preventing Common Queue Functions

**Explanation:** COMMONQUEUE is an optional parameter that specifies that DFSMShsm prevent all common queue processing. If you specify COMMONQUEUE without any parameters, a host neither places recall requests in the CRQ, nor selects recall requests from the CRQ.

Subparameter	Explanation
RECALL	<b>COMMONQUEUE(RECALL)</b> specifies that a host neither places recall requests in the CRQ, nor selects recall requests from the CRQ.
	<b>COMMONQUEUE(RECALL(PLACEMENT))</b> specifies that the host does not place additional requests in the CRQ. All new requests will be placed on the host's local recall queue.
	<b>COMMONQUEUE(RECALL(SELECTION))</b> specifies that the host does not select recall requests from the CRQ.

For more information about using HOLD COMMONQUEUE, see the *z/OS DFSMShsm Storage Administration Guide*.

**Defaults:** None.

## DUMP: Preventing Dumps

**Explanation:** DUMP is an optional parameter specifying whether DFSMShsm prevents all dump processing (command and automatic) or prevents only automatic dump processing. The DUMP parameter, without any subparameters, specifies that all dump processing tasks are prevented. No more dump processing tasks are started. Also, any command requests that specified the WAIT keyword are failed.

Subparameter	Explanation
AUTO	<b>DUMP(AUTO)</b> specifies that automatic dump processing is prevented. No more automatic dump processing tasks are started. You can still perform command dump processing tasks.

The point at which DFSMShsm stops dump processing is controlled by the ENDOFDATASET and ENDOFVOLUME parameters.

**Defaults:** If AUTO is not specified, command dump and automatic dump processing are prevented.

## ENDOFTDATASET: Specifying When Aggregate Group Processing Should Stop

**Explanation:** ENDOFTDATASET is an optional parameter that you can use with the ABACKUP and ARECOVER parameters to specify when processing stops during aggregate backup or aggregate recovery.

## HOLD

Refer to “ABACKUP: Preventing Aggregate Backup” on page 182 and “ARECOVER: Preventing Aggregate Recovery” on page 184 for a description of aggregate processing when using the ENDOFDATASET parameter with the ABACKUP or ARECOVER parameters.

**Defaults:** None.

## ENDOFDATASET | ENDOFVOLUME: Specifying When Volume Processing Should Stop

**Explanation:** ENDOFDATASET | ENDOFVOLUME are optional parameters specifying when to stop volume processing of one of the following:

- Space management (automatic or command)
- Backup (automatic or command)
- Dump (automatic or command)
- Recover
- Restore

**Note:** This description does not apply to aggregate group processing or fast replication backup or recovery processing. See “ENDOFDATASET: Specifying When Aggregate Group Processing Should Stop” on page 187 for information on holding aggregate group processing. See “FRBACKUP: Preventing Fast Replication Backup Processing” on page 189 and “FRRECOV: Preventing Fast Replication Recovery Processing” on page 189 for information on holding fast replication backup or recovery processing.

**ENDOFDATASET** specifies that currently processing volume tasks stop after the current data set finishes processing. In the case of DUMP, the current dump copies being written by each dump task are discarded; if any dump task is stacking output, any dump copies successfully completed by that task are preserved.

**ENDOFVOLUME** specifies that volume tasks stop after the current user volume finishes processing. In the case of DUMP, the current dump copies being written by each dump task are allowed to complete; if any dump task is stacking output, no further dump copies are stacked or processed.

When the level functions are running at the time a HOLD EOV command is issued, the command is interpreted to mean that the particular function runs to completion before the stop occurs. **Example:** If a HOLD EOV is entered while the movement of backup versions is running, the movement of the backup versions is allowed to complete all of its requests but the backup of migrated data sets does not start. In other words, HOLD EOV means stop processing a specific function at the end of a volume, or at the end of the movement of backup versions from a migration volume to a daily backup volume, or at the end of the movement of backup versions from one volume to another volume.

Either parameter prevents processing another user volume.

**Defaults:** If neither ENDOFDATASET nor ENDOFVOLUME is specified, the default is ENDOFDATASET. If the function being held is DUMP, the default is ENDOFVOLUME.

**Note:** If you hold dump processing with the ENDOFDATASET parameter while DFSMShsm is automatically deleting expired dump copies or deleting excess dump VTOC copy data sets, processing is ended after DFSMShsm finishes processing the current dump generation.

## **EXPIREBV: Ending the Expire Backup Function**

**Explanation:** EXPIREBV is an optional parameter specifying that DFSMShsm stop the process of deleting old, unwanted backup versions from the BCDS at the end of the current data set and not allow an EXPIREBV command to be started. If the expire backup function is running at the time the HOLD command is entered, the key of the last data set processed is saved, which allows processing to continue from that point if the RESUME parameter is specified on the next EXPIREBV command processed by this host. WAIT-type command requests fail, and NOWAIT-type command requests remain queued.

**Defaults:** None.

## **FRBACKUP: Preventing Fast Replication Backup Processing**

**Explanation:** FRBACKUP is an optional parameter that you specify to prevent new FRBACKUP command from processing. When you issue the HOLD FRBACKUP command, DFSMShsm completes any FRBACKUP requests that have already started.

**Defaults:** None.

## **FRRECOV: Preventing Fast Replication Recovery Processing**

**Explanation:** FRRECOV is an optional parameter that you specify to prevent new FRRECOV commands from processing. When you issue the HOLD FRRECOV command, DFSMShsm completes any FRRECOV requests that have already started.

**Defaults:** None.

## **LIST: Ending the List Function**

**Explanation:** LIST is an optional parameter specifying that DFSMShsm stop the list function after it finishes processing the control data set record of the current request. WAIT-type command requests fail, and NOWAIT-type command requests remain queued.

**Defaults:** None.

**Note:** When you issue the HOLD command, you lose any part of the LIST command that did not finish running.

## **LOG: Preventing Logging**

**Explanation:** LOG is an optional parameter specifying that DFSMShsm stop recording in the DFSMShsm log. No records are written in the DFSMShsm log for those DFSMShsm functions that continue to run. DFSMShsm continues recording information in the activity logs.

**Defaults:** None.

## **MIGRATION: Preventing Space Management**

**Explanation:** MIGRATION is an optional parameter specifying whether DFSMShsm should prevent all space management processing or prevent only automatic space management processing. The MIGRATION parameter, without any subparameters, specifies that all space management functions are prevented. No more space management tasks are started.

## HOLD

Subparameter	Explanation
AUTO	<b>MIGRATION(AUTO)</b> specifies that automatic volume and automatic secondary space management processing are prevented. No more automatic volume and automatic secondary space management processing tasks are started. You can still perform command space management.

The point at which DFSMShsm stops space management processing is controlled by the ENDOFDATASET and ENDOFVOLUME parameters. WAIT-type command requests are failed, and NOWAIT command requests remain queued.

**Defaults:** If AUTO is not specified, automatic volume space management, automatic secondary space management, and command space management are prevented.

## RECALL: Preventing Recall and Deletion

**Explanation:** RECALL is an optional parameter specifying which recalls (automatic or command) and deletions of a migrated data set are prevented.

The RECALL parameter, without any subparameters, specifies that all recall and data set deletion tasks from all volumes are prevented. No more recall or data set deletion tasks are started.

Subparameter	Explanation
TAPE	<b>RECALL(TAPE)</b> specifies that recall requests from all tape volumes do not process. If you specify RECALL(TAPE) for a host that is participating in a common recall queue, the host selects only recall requests that do not require tape.
	<b>RECALL(TAPE(TSO))</b> specifies that TSO recall requests from migration level 2 tapes are prevented. Recall requests from tape submitted from a batch job and all nontape volumes are still processed.

**Defaults:** None.

**Notes:**

1. All nonWAIT requests remain queued when the appropriate function is held.
2. If TSO tape recalls are held, a WAIT-type recall from tape that was submitted via TSO is changed to a non-WAIT-type request. The user is told that the request remains on the queue to be processed when the function is released.
3. All WAIT recall or deletion requests from batch or from the storage administrator are failed when RECALL is held.
4. All WAIT recall requests from tape, from batch, or from the storage administrator are failed when tape recall is held.

## RECOVER: Preventing Recovery and Restore

**Explanation:** RECOVER is an optional parameter specifying whether DFSMShsm prevents all recovery and restore processing or prevents only tape data set recovery processing. The RECOVER parameter, without any subparameters, specifies that all recover and restore processing tasks are prevented. No additional recovery and restore processing tasks are started. The RECOVER parameter prevents any request for backup data sets on a mounted tape volume.

Subparameter	Explanation
TAPEDATASET	RECOVER(TAPEDATASET) specifies that tape recover and restore processing is prevented. No additional tape data set processing tasks are started. You can still perform recover processing tasks from DASD.

The point at which DFSMShsm stops recovery processing is controlled by the ENDOFDATASET and ENDOFVOLUME parameters. WAIT-type command requests fail, and NOWAIT-type command requests remain queued.

**Defaults:** If TAPEDATASET is not specified, command recovery for both data sets and volumes is prevented.

**Note:** If a HOLD RECOVER(TAPEDATASET) has been issued, any request for backup data sets on a mounted backup tape volume is processed, and any requests for the new tape volume mounts are not processed.

## RECYCLE: Ending the Recycle Function

**Explanation:** RECYCLE is an optional parameter specifying that the recycle function ends after DFSMShsm processes the current backup version or migration copy on each volume being recycled. WAIT-type command requests fail, and NOWAIT-type command requests remain queued.

**Defaults:** None.

**Note:** When you issue the HOLD command, you lose any part of the RECYCLE command that has not finished running.

## REPORT: Ending the Report Function

**Explanation:** REPORT is an optional parameter specifying that DFSMShsm stop the report function after it has finished processing the control data set record for the current request. WAIT-type command requests fail, and NOWAIT-type command requests remain queued. When you issue the HOLD command, you lose any part of the REPORT command that has not finished running.

**Defaults:** None.

## TAPECOPY: Preventing DFSMShsm from Copying a Tape

**Explanation:** TAPECOPY is an optional parameter specifying that DFSMShsm hold all tape copy processes. WAIT-type command requests fail, and NOWAIT-type command requests remain queued.

If DFSMShsm was processing an explicit volume list when the HOLD command was issued, the remaining volumes in the list may not process when the TAPECOPY command is released.

**Defaults:** None.

## HOLD

### TAPEREPL: Preventing DFSMShsm from Replacing an Original Tape Volume with an Alternate

**Explanation:** TAPEREPL is an optional parameter specifying that DFSMShsm hold all tape replacement processes. WAIT-type command requests fail, and NOWAIT-type command requests remain queued.

**Defaults:** None.

---

### Examples of How to Code the HOLD Command

The following examples present different ways to code the HOLD command:

#### Preventing Space Management and Recall

**Example:** In this example, DFSMShsm prevents processing of automatic space management, space management by command, and recall and deletion of migrated data sets.

HOLD MIGRATION RECALL

#### Preventing All DFSMShsm Functions and Logging

**Example:** In this example, DFSMShsm prevents processing of all DFSMShsm functions, including logging.

HOLD ALL LOG

#### Ending the Report Function

**Example:** In this example, DFSMShsm stops the report function at the end of the current unit of work. No more REPORT commands are started.

HOLD REPORT

#### Ending All Recalls from Tape

**Example:** In this example, DFSMShsm stops all recalls from tape.

HOLD RECALL(TAPE)

#### Ending All Recalls from Tape Submitted by an Interactive TSO User

**Example:** In this example, DFSMShsm stops all recalls from tape submitted by an interactive TSO user. DFSMShsm allows recalls from tape that are submitted from a batch job to process.

HOLD RECALL(TAPE(TSO))

## Preventing Placement and Selection of Recall Requests in the CRQ

**Example:** In this example, DFSMShsm prevents the host from placing recall requests in the common recall queue (CRQ) and selecting recall requests from the CRQ.

HOLD COMMONQUEUE(RECALL)

## Preventing Placement of Recall Requests in the CRQ

**Example:** In this example, DFSMShsm prevents the host from placing recall requests in the CRQ, but the host selects recall requests for processing from the CRQ.

HOLD COMMONQUEUE(RECALL(PLACEMENT))

## Preventing Selection of Recall Requests from the CRQ

**Example:** In this example, DFSMShsm prevents the host from selecting recall requests for processing from the CRQ, but the host places recall requests in the CRQ.

HOLD COMMONQUEUE(RECALL(SELECTION))

## Ending All Tape Copying

**Example:** In this example, DFSMShsm stops all tape copying.

HOLD TAPECOPY

## Ending All Tape Replacement

**Example:** In this example, DFSMShsm stops all tape replacement.

HOLD TAPEREPL

## Preventing Backup Function from Running

**Example:** In this example, DFSMShsm prevents the backup function from running.

HOLD BACKUP

## Preventing the Fast Replication Backup Function from Running

**Example:** In this example, DFSMShsm prevents new FRBACKUP commands from processing. When you issue this command, DFSMShsm completes any FRBACKUP requests that have already started.

HOLD FRBACKUP

## HOLD

### Preventing the Fast Replication Recovery Function from Running

**Example:** In this example, DFSMShsm prevents new FRRECOV commands from processing. When you issue this command, DFSMShsm completes any FRRECOV requests that have already started.

HOLD FRRECOV

### Preventing the Automatic Volume and Automatic Secondary Space Management Functions from Running

**Example:** In this example, DFSMShsm prevents the automatic volume and automatic secondary space management functions from running. Command migration can still run.

HOLD MIGRATION(AUTO)

### Preventing Processing of a Specific Function at the End of the Data Set

**Example:** In this example, DFSMShsm stops backup processing at the end of the data set currently being processed.

HOLD BACKUP ENDOFDATASET

### Preventing Dump Processing

**Example:** In this example, DFSMShsm prevents the dump function from running. Dumps currently in progress complete.

HOLD DUMP

**Note:** This is equivalent to HOLD DUMP ENDOFVOLUME.

### Ending Dump Processing

**Example:** In this example, DFSMShsm stops all dumps the next time DFSMSdss reads or writes a record. Dumps in progress are stopped and invalidated.

HOLD DUMP ENDOFDATASET

### Preventing Automatic Dump Processing

**Example:** In this example, DFSMShsm prevents the automatic dump function from running. Any automatic dumps currently in progress complete, but no new automatic dumps start. Command dumps can still run.

HOLD DUMP(AUTO)

### Preventing the Expire Backup Versions Function from Running

**Example:** In this example, DFSMShsm stops deleting backup versions at the end of the current data set.

HOLD EXPIREBV

## Preventing Aggregate Backup

**Example:** In this example, DFSMShsm stops backing up aggregated data sets after completion of any currently running aggregate backup.

HOLD ABACKUP(PAY1) EOD

## Preventing Aggregate Recovery

**Example:** In this example, DFSMShsm stops recovering aggregated data sets after completion of any currently running aggregate recovery.

HOLD ARECOVER(PAY1.C.C01V0001)

## Preventing Automatic Backup and Command Data Set Backups to DASD

**Example:** In this example, DFSMShsm holds automatic backups and command data set backups directed to ML1 DASD. Command data set backups to tape continue processing.

HOLD BACKUP(AUTO DSCOMMAND(DASD))

## Preventing Automatic Backup and Command Data Set Backups to Tape

**Example:** In this example, DFSMShsm holds automatic backups and command data set backups directed to tape. Command data set backups to ML1 DASD continue processing.

HOLD BACKUP(AUTO DSCOMMAND(TAPE))

## Interrupting Command Data Set Backup to Change Output Tapes

**Example:** In this example, you have tapes that are scheduled to be taken offsite for disaster backup and you need to switch the output tapes used by command data set backup.

HOLD BACKUP(DSCOMMAND(SWITCHTAPES))

**HOLD**

---

## Chapter 23. HSENDCMD: Issuing DFSMShsm Authorized-User Commands from a TSO Terminal

In a RACF FACILITY class environment, permission to issue the HSENDCMD is not checked by DFSMShsm. Instead, permission to issue the command submitted by HSENDCMD is checked by DFSMShsm using RACF FACILITY class checking.

In an AUTH environment, if you are an authorized user, you can use the HSENDCMD command to issue any DFSMShsm operator, storage administrator, or system programmer commands from a TSO terminal, instead of from the system console.

In this AUTH environment, DFSMShsm allows an unauthorized user to use the HSENDCMD to issue the ALTERDS, BDELETE, and the QUERY commands. The subcommands ALTERDS and BDELETE are processed in the same manner as the HALTERDS and HBDELETE.

In a RACF FACILITY class environment, an unauthorized user can only use the HQUERY, HCANCEL, HBDELETE, and HALTERDS commands. Users no longer have access to any storage administrator commands unless the security administrator has given them access to those command profiles.

### Related Reading:

- For a list of the operator commands, refer to “Storage Administrator Commands” on page 2
- For a list of the storage administrator commands, refer to “Operator Commands” on page 1
- For a list of the system programmer commands, refer to “System Programmer Commands” on page 3
- To authorize users under different environments, refer to “Submitting DFSMShsm Commands” on page 9.

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### Syntax of the HSENDCMD Command



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### Required Parameters of the HSENDCMD Command

This section describes the required parameter of the HSENDCMD command.

#### command: Specifying DFSMShsm Authorized Command

**Explanation:** *command* is a required positional parameter specifying the authorized command from a TSO terminal. For *command*, substitute the DFSMShsm command you want and its associated parameters. You cannot use more than 1024 bytes. The command and its associated parameters are treated as a group of parameters.

---

## Optional Parameters of the HSENCMD Command

This section describes the optional parameters of the HSENCMD command.

### **WAIT | NOWAIT: Specifying Whether to Wait for Command Completion**

**Explanation:** WAIT | NOWAIT are mutually exclusive, optional parameters to specify whether you want to wait for the HSENCMD requested function *command* to complete before control is returned to the user. If WAIT | NOWAIT is used, it must immediately follow HSENCMD and precede *command*.

WAIT specifies that you want to wait for the HSENCMD requested function *command* to complete before control is returned to the user. The following DFSMSHsm commands (when used with the HSENCMD WAIT) cannot ensure that the action will have completed at the time control is returned to the requester, because the processing of the command merely sets a flag or builds a request that is subsequently processed by another task.

- LOG
- QUERY SPACE
- STOP
- SWAPLOG

When you use the WAIT parameter with a command that processes a single item (such as one data set) or a volume as a single unit (such as DUMP), an ARC1000I message is issued if the process is successful, or an ARC1001I message is issued if the process is not successful. The following is a list of these commands:

- ABACKUP
- ARECOVER
- BACKDS
- BACKVOL with DUMP parameter
- DELETE of a migrated data set
- MIGRATE of a data set
- RECALL
- RECOVER of a data set
- RECOVER of a volume from a DFSMSdss physical full-volume copy

Other commands, when issued with the WAIT parameter, do not issue a successful termination message or set an HSENCMD failing return code; however, they do issue explicit error messages for failing conditions.

If you press the TSO attention key when the WAIT parameter has been specified on a command request, and you confirm your intention to “attention out” of the request, an ARC1800I message is issued. This action makes your terminal available for use but does not cause DFSMSHsm to discontinue processing the request. If the request is for recalling or recovering a data set, a volume mount request (ARC0612I) message can be issued.

NOWAIT specifies that you do not want to wait for the HSENCMD requested function *command* to complete before control is returned to the user. The completion message does not occur until the requested function is complete. If the NOWAIT option is being used with the ABACKUP, ARECOVER, BACKDS, BACKVOL, DELETE, MIGRATE, RECALL, or RECOVER commands, an ARC1007I message is issued after the command has been communicated to DFSMSHsm. After DFSMSHsm has processed the request, a completion message (ARC1000I or

ARC1001I) is written, indicating respectively success or failure of the request. If the request is for recalling or recovering a data set, a volume mount request (ARC0612I) message is issued.

The following are HSENDCMD return codes and their meanings:

Return Code	Meaning
0	With the WAIT option, communication with DFSMShsm is successful and the function is successful.
	With the NOWAIT option, communication with DFSMShsm is successful. It is not known if the function is or is not successful.
4	With the WAIT option, the function has encountered an error.
8	With the WAIT or NOWAIT option, communication with DFSMShsm has failed.

**Defaults:** The default is NOWAIT.

**Restrictions:** You can specify either WAIT or NOWAIT, but not both.

**Notes:**

1. The HSENDCMD command name must precede each authorized command you issue from a TSO terminal.
2. An HSENDCMD return code of 4 indicates that a functional error occurred during processing when one of the previously identified commands was being performed. Specific errors can be determined by the ARC1001I message and the DFSMShsm messages accompanying it. However, if the command was BACKVOL CDS, then specific errors can be determined by the ARC0741I, ARC0744E, and ARC0747I messages. Return code 4 means a functional error only when one of these specifically identified commands is issued. Note that a return code of 4 will be returned from any request when DFSMShsm cannot recognize the command or all of its parameters.
3. These HSENDCMD return codes are set in Register 15. They can be tested in a CLIST using as variables &LASTCC or &MAXCC; They can also be tested with the COND parameter within JCL when the commands are issued in the TSO batch environment.
4. If you issue multiple HSENDCMD commands at the same time, some specifying the WAIT parameter and others the NOWAIT parameter, all of the commands with the WAIT parameter are processed first, regardless of the order in which the commands were received.
5. The WAIT and NOWAIT parameters of the HSENDCMD command have implications for HOLD command processing that are function specific. Refer to the specific processing function for an explanation.

---

## Examples of How to Code the HSENDCMD Command

The following examples present different ways to code the HSENDCMD command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

## Sending an Authorized Command with WAIT from a TSO Terminal

**Example:** In this example, the ADDVOL command is issued from a TSO terminal. Control returns to the user when the command is completed. The syntax of the ADDVOL command does not change when it is used with the HSENCMD command.

```
HSENCMD WAIT ADDVOL VOL004 UNIT(3390) +
    PRIMARY(NOAUTOMIGRATION AUTOBACKUP NOAUTORECALL)
```

## Sending an Authorized Command from a TSO Terminal

**Example:** In this example, the ADDVOL command is issued from a TSO terminal. Control is returned to the user before the command completes. The syntax of the ADDVOL command does not change when it is used with the HSENCMD command.

```
HSENCMD ADDVOL VOL004 UNIT(3390) +
    PRIMARY(NOAUTOMIGRATION AUTOBACKUP NOAUTORECALL)
```

---

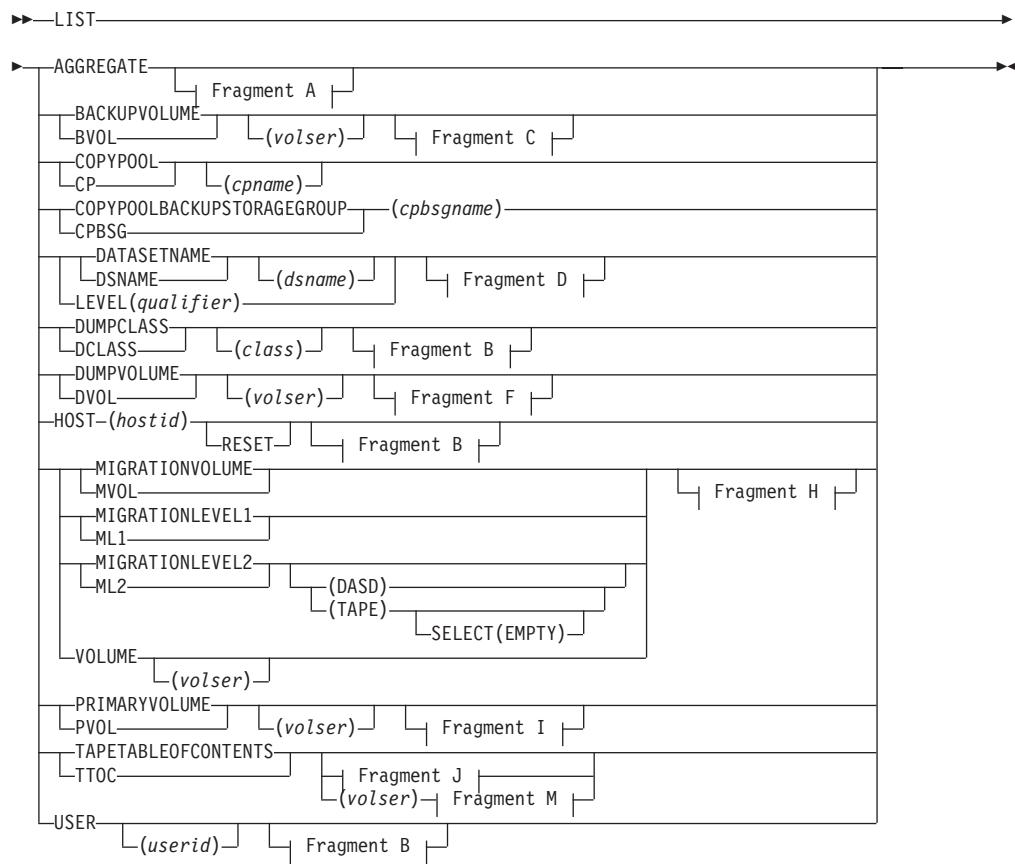
## Chapter 24. LIST: Listing Information from the MCDS, BCDS, and OCDS

The LIST command lists selected data set, aggregate, user, DFSMSshm host serialization, and volume information from the MCDS, BCDS, and OCDS. You can list the following categories of information:

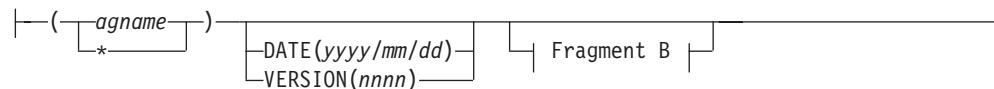
Category of Information	See Page
Aggregate backup and recovery activity information	206
Backup volume information	206
Copy pool information	206
Copy pool backup storage group information	206
Data set information	207
Dump class information	207
Dump volume information	208
Host information	208
Migration information	208
Primary volume information	209
Tape volume information	210
User authorization information	211

For examples of LIST command output, see Appendix B, “Using the LIST Command,” on page 585.

## Syntax of the LIST Command



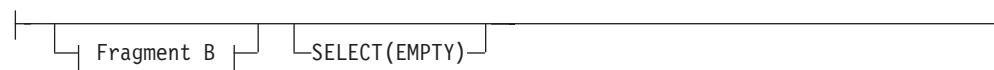
### A: AGGREGATE Optional Parameters:

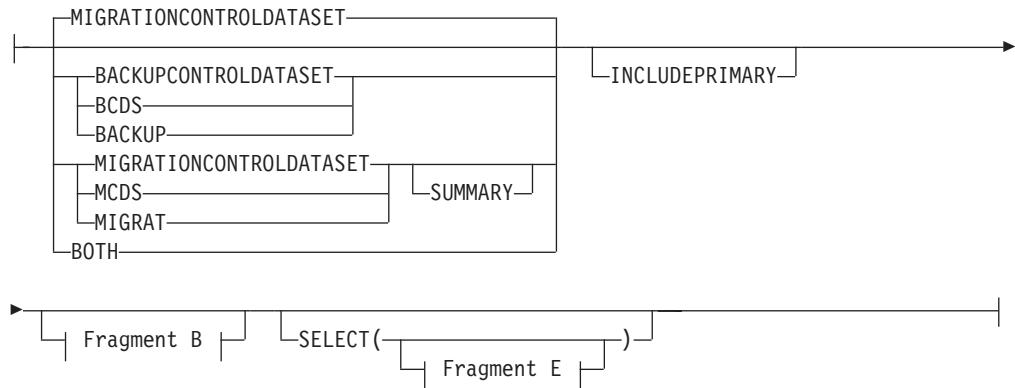
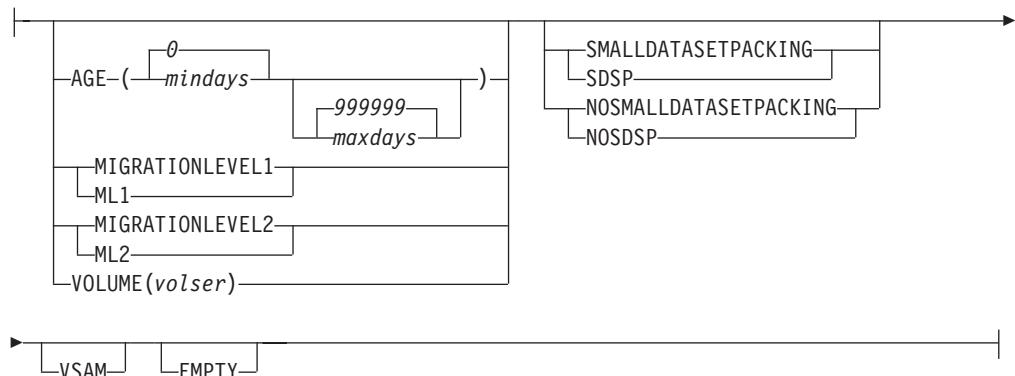
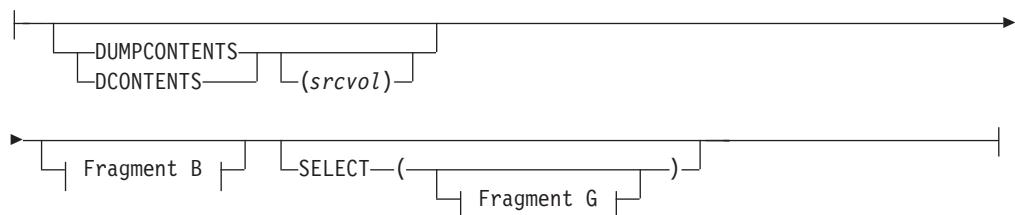
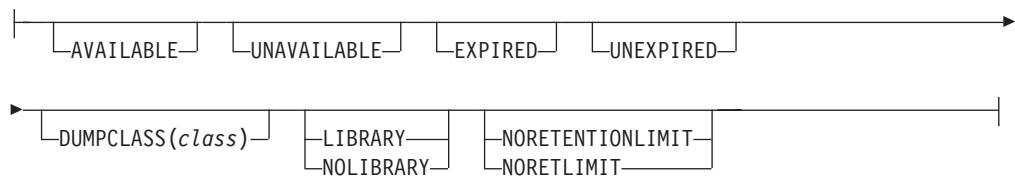


### B: LIST Optional Parameters:

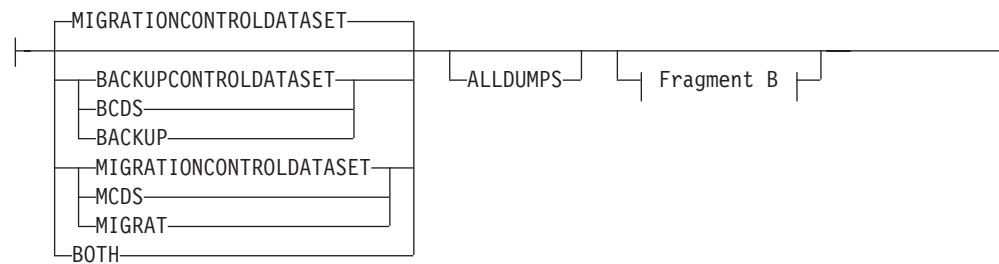


### C: BACKUPVOLUME Optional Parameters:

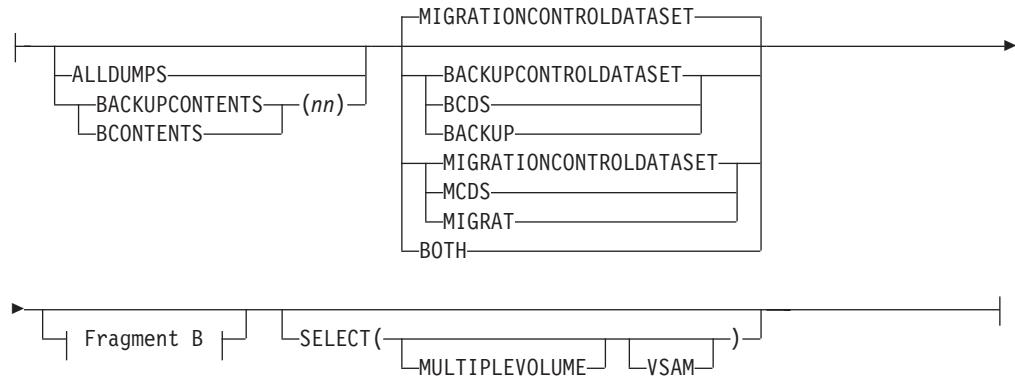


**D: DATASETNAME Optional Parameters:****E: DATASETNAME SELECT Optional Parameters:****F: DUMPVOLUME Optional Parameters:****G: DUMPVOLUME SELECT Optional Parameters:****H: MVOL | ML1 | ML2 | VOLUME Optional Parameters:**

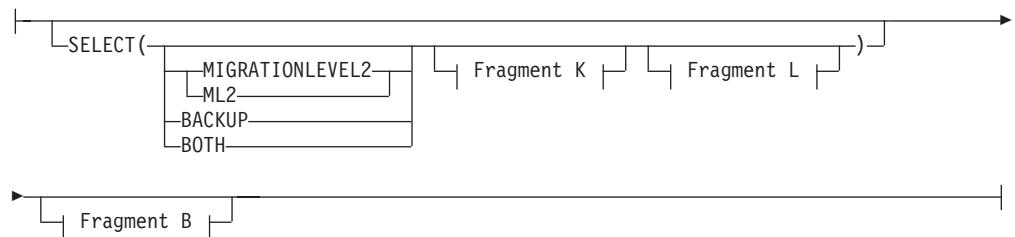
## LIST



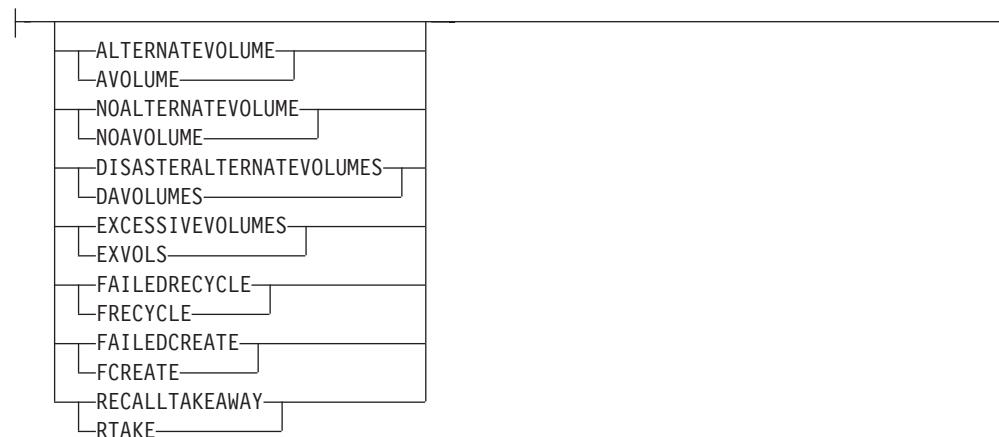
## I: PRIMARYVOLUME Optional Parameters:

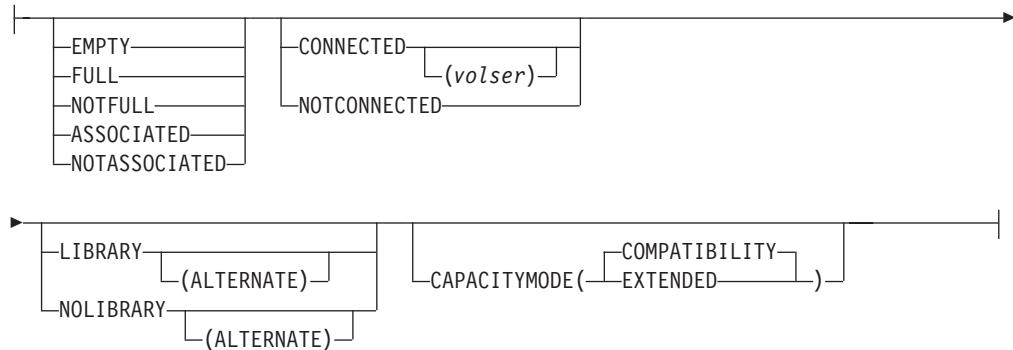
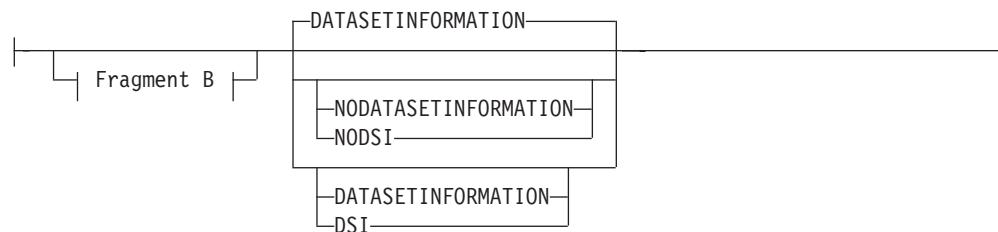


## J: TTOC Optional Parameters:



## K: TTOC SELECT Optional Parameters:



**L: TTOC SELECT Optional Parameters:****M: TTOC Optional Parameters:****Notes:**

1. The SELECT(CONNECTED) subparameter of the LIST TTOC command cannot be specified with any of the SELECT subparameters shown in the **L** syntax fragment.
2. The BACKUPCONTROLDATASET or BCDS parameter and the BACKUP parameter are not valid with the LIST ML2(TAPE) SELECT(EMPTY) command.

---

## Required Parameters of the LIST Command

This section describes the required parameters of the LIST command.

### AGGREGATE: Listing the Aggregate Backup and Recovery Activity Information

**Explanation:** AGGREGATE is a required parameter you specify to request a list of information for selected backed up and recovered aggregates. This information is contained in the BCDS.

Subparameter	Explanation
agname	AGGREGATE(agname) specifies the name of the specific aggregate group whose records are listed.
*	AGGREGATE(*)specifies that all records for all aggregate groups are listed.

**Defaults:** None.

### BACKUPVOLUME: Listing of Backup Volume Entries

**Explanation:** BACKUPVOLUME is a required parameter you specify to request a list of selected information from backup volume entries contained in the BCDS.

BACKUPVOLUME specifies that you want a list of all backup volumes.

For *volser*, substitute the serial number of the specific backup volume you want listed.

**Defaults:** If you specify BACKUPVOLUME without (*volser*), DFSMShsm lists all backup volume entries contained in the BCDS.

**Note:** If you specify this parameter, you get a list, but you do not get any additional information about the data sets on the backup volume.

### COPYPOOL: Listing Information for Each Version of a Copy Pool

**Explanation:** COPYPOOL is a required parameter that you can specify to request a list of information for each version of each copy pool.

**COPYPOOL:** Specify COPYPOOL to request a list of information for each version of each copy pool that has at least one fast replication backup version.

**Defaults:** None.

### COPYPOOLBACKUPSTORAGEGROUP: Listing of Copy Pool Information for Each Volume in the Specified Copy Pool Backup Storage Group

**Explanation:** COPYPOOLBACKUPSTORAGEGROUP is a required parameter that you specify to request copy pool information for each volume in the specified copy pool backup storage group.

Specify COPYPOOLBACKUPSTORAGEGROUP(*cpbsgname*) to request a list of volumes in the copy pool backup storage group that DFSMShsm has assigned as a target volume. The corresponding source volumes are also listed.

**Defaults:** None.

## DATASETNAME | LEVEL: Listing of Data Set Entries

**Explanation:** DATASETNAME | LEVEL) are mutually exclusive, required parameters you specify to request a list of data set entries.

**DATASETNAME(dsname)** is specified to request a data set entry with a specific data set name. For *dsname*, substitute the fully qualified name of the particular data set you want listed. You can specify a data set name of up to 44 characters.

**LEVEL(qualifier)** is specified to request a list of all data set entries that have the same set of initial characters of the data set name. For *qualifier*, substitute the set of initial characters of the data set name for the data sets you want listed. The set of initial characters can contain imbedded periods. The *qualifier* can end with a period if LEVEL is the first keyword on the command. You can specify a *qualifier* of up to 44 characters.

**Defaults:** If you specify DATASETNAME without *dsname*, DFSMShsm lists all data set entries.

### Notes:

1. If you used the SETMIG command to prevent a data set from migrating, DFSMShsm does not list the data set.
2. DFSMShsm does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFSMShsm lists the entire partitioned data set.
3. You can specify DATASETNAME or LEVEL with a LIST COMMAND, but not both. If you specify both parameters, the last parameter specified overrides the previous one.

## DUMPCLASS: Listing Dump Class Profile

**Explanation:** DUMPCLASS is a required parameter you specify to request a list of one or more dump-class profiles. For *class*, substitute from 1 to 8 alphanumeric characters for the class to be listed.

The following information is listed for each dump class:

- Class name
- Class disposition
- Retention period
- Frequency and/or day
- Automatic reuse option (Y/N)
- Data set restore option (Y/N)
- Change bit reset option (Y/N)
- Unit type
- Class disable (Y/N)
- Stack value

**Defaults:** If you specify DUMPCLASS without *class*, DFSMShsm lists the profiles for all dump classes.

## LIST

### DUMPVOLUME: Listing Information about a Single Dump Volume or a Set of Dump Volumes

**Explanation:** DUMPVOLUME is a required parameter you specify to request a list of information about a single dump volume or a set of dump volumes. For *volser*, substitute any *volser* from a set of volumes that collectively represents a dump of a user volume. The following information is listed first about the dump volume:

- Dump volume serial number
- Volume status
- Dump volume unit type
- Dump class
- Dump expiration date
- IDRC status
- Physical percent full
- Library status

The following information is then listed about each valid dump copy that is stacked on the dump volume:

- File sequence number
- Source volume serial number
- SMS status
- Dump creation date and time
- Set of dump volume serial numbers

See Figure 36 on page 606 for an example of the listed information.

**Defaults:** None.

**Note:** If the *volser* specified is not part of a valid dump copy, only the dump class, volume serial, and volume unit type of the specified *volser* is listed.

### HOST: Listing of All Control Data Sets Serialized by the DFSMShsm Host

**Explanation:** HOST is a required parameter you use in a multiple-DFSMShsm-host environment to request a list of all control data set records currently serialized by the specified DFSMShsm host. The serialized control data set records are:

- Backup cycle volume record (BVR)
- MCDS data set record (MCD)
- MCDS volume record (MCV)
- Tape table of contents record (TTOC)

You can issue the LIST HOST command to receive information about SMS-managed volumes that have MCV records serialized with a host-ID. For *hostid*, substitute the identification character of the DFSMShsm host whose serialization information you want listed.

**Defaults:** None

### MIGRATIONVOLUME | MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME: Listing Migration Volumes

**Explanation:** MIGRATIONVOLUME | MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME are mutually exclusive, required parameters you specify to request a list of selected information for migration volumes. These parameters can also be used as subparameters of the SELECT parameter.

**MIGRATIONVOLUME** specifies that you want a list of the volume entries for all migration volumes.

**MIGRATIONLEVEL1** specifies that you want a list of the volume entries for all migration level 1 volumes.

**MIGRATIONLEVEL2** specifies that you want a list of the volume entries for all migration level 2 volumes.

Subparameter	Explanation
DASD	<b>MIGRATIONLEVEL2(DASD)</b> is an optional parameter that you specify for a list of the volume entries for all DASD migration level 2 volumes is generated.
TAPE	<b>MIGRATIONLEVEL2(TAPE)</b> is an optional parameter that you specify for a list of the volume entries for all tape migration level 2 volumes is generated.

**VOLUME** specifies that you want a list of all primary and migration volumes. **VOLUME(volser)** specifies that you want a list of a particular primary or migration volume. For *volser*, substitute the serial number of the specific volume you want listed. Both SMS and non-SMS volumes can be listed.

When using **VOLUME(volser)** as a subparameter of **SELECT** and when *volser* is specified as a backup volume, the output contains a list of the latest backup versions on the volumes.

**Defaults:** If you specify **VOLUME** without *volser*, DFSMShsm lists all the primary and migration volumes it owns or manages. If you specify **PRIMARYVOLUME** without *volser*, DFSMShsm lists all primary volumes it owns or manages.

**Note:** When you specify any of these parameters, DFSMShsm does not list information about the data sets on the primary or migration volume, and DFSMShsm does not give you any information about the amount of space left on the volume. To find out how much space is left on a primary or migration level 1 volume, use the **SPACE** parameter of the **QUERY** command.

## PRIMARYVOLUME: Listing Primary Volumes

**Explanation:** **PRIMARYVOLUME** is a required parameter you can specify to list selected information for primary volumes.

**PRIMARYVOLUME** specifies that you want a list of the volume entries for all primary volumes.

**PRIMARYVOLUME(volser)** specifies that you want a list for a particular primary volume. For *volser*, substitute the serial number of the specific volume you want listed. Both SMS and non-SMS volumes can be listed.

**Defaults:** If you specify **PRIMARYVOLUME** without *volser*, DFSMShsm lists all primary volumes it owns or manages except when the optional **ALLDUMPS** parameter is specified.

### Notes:

1. The **PRIMARYVOLUME** parameter returns a list of copy pools that the volume is a part of when **BCDS** or **BOTH** are specified.

## LIST

2. When you specify PRIMARYVOLUME, DFSMShsm does not list information about the data sets on the primary volume, and DFSMShsm does not give you any information about the amount of space left on the volume. To find out how much space is left on a primary volume, use the SPACE parameter of the QUERY command.

### TAPETABLEOFC CONTENTS: Listing Tape Volume Information from the OCDS

**Explanation:** TAPETABLEOFC CONTENTS is a required parameter you can specify to list tape volume information from an OCDS, without listing all the data-set-related information for the volume.

You can direct the output of the list command using the optional parameters OUTDATASET(*dsname*) | SYSOUT(*class*) | TERMINAL.

**Defaults:** LIST TAPETABLEOFC CONTENTS defaults to a condition of NODATASETINFORMATION. When you require data set information, use the LIST TAPETABLEOFC CONTENTS(*volser*) command, which is discussed in the following section.

### TAPETABLEOFC CONTENTS(*volser*): Listing Tape Volume Information and Data Set Names from the TTOC

**Explanation:** TAPETABLEOFC CONTENTS(*volser*) is a required parameter that can be specified to list migration level 2 or backup tape volume information from the OCDS. At your option, you can choose whether or not to list data set information for the volume. For *volser*, substitute the serial number of the specific tape volume you want listed. If you specify a *volser* shorter than 6 characters, you must enclose it in quotes and pad it to the right with blanks.

If the volume specified in the LIST command is added to DFSMShsm's control (ADDVOL) as an esoteric unit, the field, UNIT NAME, that appears in the LIST output, contains the esoteric unit name until DFSMShsm uses the volume. Once DFSMShsm has used the volume, this UNIT NAME field will contain the generic unit name.

You can direct the output of the list command using the optional parameters OUTDATASET(*dsname*) | SYSOUT(*class*) | TERMINAL.

You can specify NODATASETINFORMATION | DATASETINFORMATION. When you specify NODATASETINFORMATION, you will get a list of volume information, without data set information. When you specify DATASETINFORMATION, you will get a list of volume information and data set information for the volume.

If you use extended TTOCs at your installation and you do not use 3390s for SYSALLDA, consider patching MCVTODS\_SECONDARY( PATCH .MCVT.+4b2) to a be X'A0' (160 tracks).

**Defaults:** LIST TAPETABLEOFC CONTENTS(*volser*) defaults to DATASETINFORMATION. You can change this to NODATASETINFORMATION when you do not require data set information for the volume.

## USER: Listing of User Entries

**Explanation:** USER is a required parameter you specify to request a list of DFSMShsm authorized users. For *userid*, substitute a string of 1 to 7 alphanumeric characters for the identification of the user whom you want listed.

**Defaults:** If you specify USER without *userid*, all user entries are listed from the MCDS.

**Note:** The USER list does not include any information about data sets associated with specified users.

## Optional Parameters of the LIST Command

When you issue the LIST command, you may specify one or more of the optional parameters. Refer to the syntax diagrams at the beginning of this chapter for the recommended use of the LIST command and its subparameters.

## ALLDUMPS | BACKUPCONTENTS: Determining Existence of Dumps or Listing Incremental Backup Contents

**Explanation:** ALLDUMPS | BACKUPCONTENTS(*nn*) are optional parameters you specify to determine the existence of all full-volume dumps and to determine the contents of the user volume at the time of incremental backup.

ALLDUMPS is specified to determine the existence of all volume dumps and on which dump volumes the dumps exist for a single level 0 or migration level 1 volume. The following information is provided for each selected dump:

- Source volume serial number
- Dump class
- Dump date
- Dump time
- Dump relative generation number
- Dump expiration date
- Volume serial numbers of the set of volumes containing the dump

BACKUPCONTENTS(*nn*), when used with the PRIMARYVOLUME(*volser*) parameter, is specified to list the contents of the user volume when the latest or next-to-latest backup of (*volser*) was made. For *nn*, substitute a 0 or 1 to indicate whether the latest or the next to latest backup volume table of contents (VTOC) is listed. A 0 (zero) indicates the latest. A 1 (one) indicates the next latest.

The listing is from the requested VTOC data set. If 0 is specified, the listing represents the contents of the user volume at the time when the last incremental backup was done.

BACKUPCONTENTS, when used with the PRIMARYVOLUME(*volser*) parameter, is not processed for volumes that have not been incrementally backed up by DFHSM 2.3.0 or a subsequent release. This happens because the VTOC copy data set is not on a migration level 1 volume for incremental volume backups performed by previous releases of DFSMShsm. With the PRIMARYVOLUME, the listing can include data sets that are not eligible for incremental backup by DFSMShsm. In addition to information provided for this variation of the command, the following information is provided:

- Data set name
- Data set organization
- Date of last reference to data set

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- Data set creation date

**Defaults:** If you do not specify a 0 or 1 for *nn*, the default is 0 (list the latest backup VTOC copy data set). If you specify any value other than 0 or 1, the default is 0.

### Notes:

1. BACKUPCONTENTS is meaningful only when *volser* is specified with the PRIMARYVOLUME parameter.
2. The BACKUPCONTENTS parameter is not equivalent to the DUMPCONTENTS parameter.
3. BACKUPCONTENTS is ignored when DUMPVOLUME is specified.
4. ALLDUMPS is valid with PRIMARYVOLUME and VOLUME when specified with *volser* and with BCDS.
5. Since DFSMShsm does not handle partitioned data set members individually, the entire partitioned data set will be listed.

## BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | BOTH: Controlling the Source of Information

**Explanation:** BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | BOTH are mutually exclusive, optional parameters. When the information to be listed can exist in the MCDS and BCDS, you can tell DFSMShsm where to look for the information. These parameters apply to data set entries, primary volume entries, and migration volume entries.

**BACKUPCONTROLDATASET** is specified to request a list of the BCDS entries for a specific data set, level, or volume, or for migration volumes, or primary volumes. BACKUP is allowed as an alias for BACKUPCONTROLDATASET.

**MIGRATIONCONTROLDATASET** is specified to request a list of the MCDS entries for a specific data set, level, or volume, or for migration volumes, or primary volumes. MIGRAT is allowed as an alias for MIGRATIONCONTROLDATASET.

**BOTH** is specified to request a list of the MCDS and BCDS data set entries.

**Defaults:** The default is MIGRATIONCONTROLDATASET.

## DATE | VERSION: Specifying the Date or Version of the Aggregate Group

**Explanation:** DATE | VERSION are optional parameters of AGGREGATE.

**DATE(yyyy/mm/dd)** specifies that all versions of the aggregate group created on that date are listed:

- *yyyy* is the 4-digit year (1992)
- *mm* is the month (01-12)
- *dd* is the day of the month (01-31)

**VERSION(*nnnn*)** specifies the version number of a specific aggregate group version to be listed. VERSION is not valid when AGGREGATE(\*) is specified.

If you do not specify either DATE or VERSION with the LIST AGGREGATE command, you receive a listing of all active versions of an aggregate.

**Defaults:** None.

## DUMPCONTENTS: Listing Contents of a Set of Dump Volumes

**Explanation:** DUMPCONTENTS is an optional parameter. You can specify a contents list for a set of dump volumes. The listing is from a full-volume dump VTOC copy data set and represents the contents of the user volume at the time the dump was done.

For any dump volume that is stacked with more than one valid dump copy, you must specify the *srcvol* subparameter to indicate which dump contents you desire.

The following information is listed for each data set on the source volume:

- Data set name
- Data set organization
- Multivolume or single volume
- Data set creation date
- Date data set was last referred to
- Data set expiration date
- RACF indicated
- Password protected
- Change indicated

**Defaults:** None.

**Notes:**

1. DUMPCONTENTS is meaningful only when *volser* is specified with the DUMPVOLUME parameter.
2. The DUMPCONTENTS parameter is not equivalent to the BACKUPCONTENTS parameter.
3. DUMPCONTENTS is ignored when PRIMARYVOLUME is specified.
4. DUMPCONTENTS applies only to dumps made from level 0 volumes. VTOC copies are not made for migration level 1 volumes. If this parameter is specified for a migration level 1 dump copy, it is ignored.

## INCLUDEPRIMARY: Listing of Entries for Any Data Set That Has Migrated

**Explanation:** INCLUDEPRIMARY is an optional parameter requesting that a list of data set entries include data set entries from the MCDS, even though DFSMShsm might have already recalled the data sets. A recalled data set can still have an entry in the MCDS.

**Defaults:** If you do not specify INCLUDEPRIMARY, DFSMShsm does not list entries for recalled data sets.

**Note:** The INCLUDEPRIMARY parameter applies only to the DATASETNAME and LEVEL parameters and only when DFSMShsm lists information from the MCDS. If you specify INCLUDEPRIMARY when it does not apply, DFSMShsm ignores it.

## NODATASETINFORMATION | DATASETINFORMATION: Including or Not Including Data Set Information

**Explanation:** NODATASETINFORMATION | DATASETINFORMATION are mutually exclusive, optional parameters that can be used only when you specify LIST TAPETABLEOFCODENTENTS(*volser*).

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**NODATASETINFORMATION:** When you specify NODATASETINFORMATION, you get a list of only volume-related information. Data set information for the volume is not included.

**DATASETINFORMATION:** When you specify DATASETINFORMATION, you get a list of volume-related information and data set information for the volume.

**Defaults:** LIST TAPETABLEOFC CONTENTS(*volser*) defaults to DATASETINFORMATION.

## OUTDATASET | SYSOUT | TERMINAL: Specifying the Location of Output for the List

**Explanation:** OUTDATASET | SYSOUT | TERMINAL are mutually exclusive, optional parameters specifying the output location for the list.

**OUTDATASET(*dsname*)** specifies the name of the data set where DFSMShsm is to write the output data. For *dsname*, substitute the fully qualified name of the data set to receive the LIST command output.

If the data set does not exist, DFSMShsm dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified (*dsname*)
- Record format of fixed-blocked with ANSI control characters (FBA)
- Logical record length of 121
- Data set is system reblockable
- Primary allocation of 20 tracks (see third note)
- Secondary allocation of 50 tracks (see third note)
- Unit of SYSALLDA (see third note)

If the data set already exists, DFSMShsm will use the data set. The data set must have the following characteristics:

- The data set must be cataloged and on DASD.
- The data set record format must be FBA, and the logical record length must be 121.
- The data set must be system reblockable.
- The user chooses the primary space allocation.
- DFSMShsm uses a secondary space allocation of 50 tracks, if DFSMShsm needs additional extents after the primary space allocation. (See third note.)
- If the data set does not contain data, DFSMShsm starts writing output data at the beginning of the data set.
- If the data set contains data, DFSMShsm writes the output data after the existing data.

**SYSOUT(*class*)** specifies that the list is printed to the specified system output class. For *class*, substitute the alphanumeric character for the system output class you want.

**TERMINAL** specifies that the list is printed at your terminal.

**Default:** The default is SYSOUT, and *class* defaults to the class specified with the SETSYS SYSOUT command. If you did not specify the type of class with the SETSYS command, the default is class A.

**Notes:**

1. DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name as the output data set, the list can be written over existing data.
2. If you specify an output data set that does not have the required characteristics, I/O errors can occur in your output data set.
3. If you select the OUTDATASET option, you can use the PATCH command to change the unit name, primary allocation, and secondary allocation. If you select the SYSOUT option, you can use the PATCH command to change whether, and how, DFSMShsm limits the lines of SYSOUT output. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* for a description of the PATCH commands available.

## **RESET: Requesting That the Host ID Field Indicate No Serialization**

**Explanation:** RESET is an optional parameter specifying that DFSMShsm reset the host ID field in the records to indicate no serialization by the DFSMShsm host specified on the command. You use this parameter in a multiple-DFSMShsm-host environment. Then, if one of the DFSMShsm hosts becomes inoperative, the serialization done by that DFSMShsm host remains in the control data set records. No other DFSMShsm host can access the serialized resource. DFSMShsm issues message ARC0817I to show whether the record is reset successfully.

**Defaults:** None.

**Note:** The RESET parameter applies only to the HOST parameter. If you do not specify HOST, DFSMShsm ignores the RESET parameter.

## **SUMMARY: Requesting a Summary**

**Explanation:** SUMMARY is an optional parameter specifying a count of data sets, tracks, and bytes of the selected data sets.

**Defaults:** None.

**Notes:**

1. When you specify this parameter, DFSMShsm does not list information about each data set. This parameter applies only to information from the MCDS.
2. The SUMMARY information is issued when you specify the LEVEL parameter or the DATASETNAME parameter (with no data set name specified) and the MCDS information is requested and available. The SUMMARY parameter applies only to the DATASETNAME parameter (with no data set name specified) and the LEVEL parameter.

## **SELECT: Listing Only Those Data Set or Volume Entries that Meet Selection Criteria**

**Explanation:** SELECT, along with its subparameters, is used to specify that only selected entries are listed. SELECT and each of its subparameters is optional. Refer to the syntax diagrams at the beginning of this chapter for the recommended use of SELECT and its subparameters.

The optional subparameters of the SELECT parameter are listed in alphabetical order and can be found at the following locations:

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Subparameter	See Page
AGE	216
ALTERNATEVOLUME   NOALTERNATEVOLUME	217
AVAILABLE	217
CAPACITYMODE	217
CONNECTED   NOTCONNECTED	218
DISASTERALTERNATEVOLUMES	218
DUMPCLASS	219
EMPTY   FULL   NOTFULL   ASSOCIATED   NOTASSOCIATED	219
EXCESSIVEVOLUMES	220
EXPIRED	220
FAILEDCREATE	220
FAILEDRECYCLE	221
LIBRARY   NOLIBRARY	221
MIGRATIONLEVEL1   MIGRATIONLEVEL2   VOLUME   BACKUP   BOTH	221
MULTIPLEVOLUME	222
NORETENTIONLIMIT	222
RECALLTAKEAWAY	223
SMALLDATASETPACKING   NOSMALLDATASETPACKING	223
UNAVAILABLE	223
UNEXPIRED	224
VSAM	224

**Defaults:** None.

**Note:** The subparameters of SELECT follow in alphabetical order.

## SELECT (AGE): Specifying Data Set Use

**Explanation:** AGE is an optional subparameter of SELECT, specifying a list of entries for those data sets in the MCDS that have been referred to within the specified range of days. AGE is also used for those data sets in the BCDS that have been backed up within the specified range of days.

Subparameter	Explanation
<i>mindays</i>	AGE( <i>mindays</i> ) is a required parameter that is used to indicate the minimum number of days since the data sets have been referred to or backed up. For <i>mindays</i> , substitute a decimal number from 0 to 999999.
<i>maxdays</i>	AGE( <i>mindays maxdays</i> ) is an optional parameter and is used to indicate the maximum number of days since the data sets have been referred to or backed up. Specify a <i>maxdays</i> value greater than or equal to the <i>mindays</i> value. For <i>maxdays</i> , substitute a decimal number from 0 to 999999.

**Defaults:** The default for *mindays* is 0. The default for *maxdays* is 999999. The default range causes entries to be listed for all data sets that meet the data set or volume-selection criteria. If *maxdays* is less than *mindays*, *maxdays* defaults to the same value as *mindays*.

**Note:** This subparameter applies to information from the MCDS and BCDS.

## **SELECT (ALTERNATEVOLUME | NOALTERNATEVOLUME): Listing Tape Volumes That Have Alternate Tape Volumes**

**Explanation:** **ALTERNATEVOLUME | NOALTERNATEVOLUME** are mutually exclusive optional subparameters used with LIST TAPE TABLE OF CONTENTS when *volser* is not specified.

**ALTERNATEVOLUME** lists only those tape volumes that are marked full or partially full and that have alternate tape volumes. This list provides you with the capability to identify the full or partially full backup and migration tape volumes that have alternate tapes. In a duplex tape environment, you want to keep those alternate tapes in the library because they can be extended. In a nonduplex tape environment, you may want to EJECT those alternate tapes from the library or initially not put them in the library.

**NOALTERNATEVOLUME** lists only those tape volumes that are marked full or partially full and have neither alternate tape volumes nor DISASTER ALTERNATE VOLUMES.

**Defaults:** None.

## **SELECT (AVAILABLE): Listing Available Dump Volumes for Dump Output**

**Explanation:** **AVAILABLE** is an optional subparameter of SELECT specifying a list of each dump volume that is available for dump output use. An available volume is one that has been added to DFSMShsm's inventory but never used or that has been used but has since been invalidated and remains under DFSMShsm ownership. The following information is listed for each available dump volume:

- Volume serial number
- Unit type
- Dump class

**Defaults:** None.

## **SELECT (CAPACITYMODE): Identifying Tape Volumes by Their Ability to Use Available Tape**

**Explanation:** **CAPACITYMODE** is an optional subparameter of SELECT.

Subparameter	Explanation
COMPATIBILITY	<b>CAPACITYMODE(COMPATIBILITY)</b> lists all nonempty tape volumes that are written by an IBM 3590 in 3490 emulation mode that are not written in <b>CAPACITYMODE(EXTENDED)</b> mode. Data on these tapes is accessible to IBM 3590 drives emulating 3490 drives, regardless of CAPACITYMODE switching support.

Subparameter	Explanation
EXTENDED	CAPACITYMODE(EXTENDED) lists all nonempty tape volumes that are written by an IBM 3590 in 3490 emulation mode that were written in CAPACITYMODE(EXTENDED) mode. Data on these tapes is accessible only to tape units capable of CAPACITYMODE switching. On input, DFSMShsm dynamically switches temporarily to CAPACITYMODE(EXTENDED) to read the tape even if the unit name is in CAPACITYMODE(COMPATIBILITY).

**Defaults:** None.

## SELECT (CONNECTED | NOTCONNECTED): List Volumes That Contain Spanning Data Sets

**Explanation:** CONNECTED | NOTCONNECTED are mutually exclusive optional subparameters of SELECT.

CONNECTED specifies a list of tape volumes that contain spanning data sets. The tapes are grouped based on which volumes are associated with their spanning data sets. CONNECTED lists all connected sets where each set is shown in the connected order. The order of the sets is in collating order of the first tape volser in each set. The collection of sets lists all tapes that contain spanning, valid data sets.

CONNECTED(*volser*) specifies that the tape volume set that is associated with *volser* be listed. All tapes in the connected set associated with this *volser* are listed.

Output from the CONNECTED subparameter identifies which tape volumes should be inserted or ejected from a tape library at the same time.

NOTCONNECTED specifies a list of tape volumes that excludes all that contain spanning data sets. Any tape in this list can be moved into or out of a library without having to find a tape containing another part of a spanning data set. Tapes that are not connected can be full or partially full (empty tapes are not included). The SELECT subparameters FULL or NOTFULL may be used to further restrict the listing. Output from the NOTCONNECTED subparameter identifies those tape volumes that can be individually inserted into or ejected from a tape library.

**Defaults:** None.

**Notes:**

1. Do not use any other subparameters on SELECT when specifying CONNECTED(*volser*).
2. Do not use the EMPTY | FULL | NOTFULL | ALTERNATE | NOALTERNATE | DISASTERALTERNATEVOLUMES subparameters when specifying CONNECTED.

## SELECT (DISASTERALTERNATEVOLUMES): Listing Tape Volumes that have Disaster Alternate Volumes

**Explanation:** DISASTERALTERNATEVOLUMES is an optional subparameter of SELECT to list TAPETABLEOFCONTENTS. DISASTERALTERNATEVOLUMES will list only tape volumes whose TTOCs have been flagged as having a disaster alternate volume.

**Defaults:** None.

## **SELECT (DUMPCLASS): (Used as an Optional Parameter)**

DUMPCLASS can be used as an optional parameter of the LIST command and as a subparameter of SELECT. DUMPCLASS is explained on page “DUMPCLASS: Listing Dump Class Profile” on page 207.

## **SELECT (EMPTY | FULL | NOTFULL | ASSOCIATED | NOTASSOCIATED): Identifying Tape Volume Capacity**

**Explanation:** EMPTY | FULL | NOTFULL | ASSOCIATED | NOTASSOCIATED are mutually exclusive optional subparameters of SELECT. The FULL, NOTFULL, ASSOCIATED, and NOTASSOCIATED subparameters apply only to the LIST TTOC command. The EMPTY subparameter applies to the following commands:

- LIST BACKUPVOLUME
- LIST MIGRATIONLEVEL2(TAPE)
- LIST TTOC

**FULL** specifies a list of tape volumes that are not available for selection (marked full). This subparameter provides a means of identifying the full backup and migration tape volumes.

**NOTFULL** specifies a list of tape volumes that are available for output selection including those that are empty, as well as those that have some data but are not marked full. By using NOTFULL, you have the capability of identifying those tapes that could be the first ones added to a library and made available for backup or migration.

**EMPTY** specifies a list of empty tape backup volumes or empty tape level 2 migration volumes.

**ASSOCIATED** specifies a listing of only those ML2 partial (not empty and not full) tape volumes currently associated for output by specific migration or recycle tasks.

**NOTASSOCIATED** specifies a listing of only those ML2 partial tape volumes available for an initial allocation and not currently associated for output by any migration or recycle task.

**Defaults:** None.

### **Notes:**

1. These subparameters cannot be used when *volser* is part of the command.
2. The FULL and NOTFULL subparameters are ignored when used with the RECALLTAKEAWAY subparameter of SELECT.
3. When EMPTY is specified with the BACKUPVOLUME parameter, DASD backup volumes are not listed. EMPTY is ignored when it is specified with MIGRATIONLEVEL2(DASD). You must use the TAPE parameter for the EMPTY subparameter to work.
4. The ASSOCIATED and NOTASSOCIATED subparameters are ignored when listing TTOCs for backup tape volumes.

## **SELECT (EXCESSIVEVOLUMES): Listing Volumes With Data Sets Spanning 4 or More Volumes**

**Explanation:** EXCESSIVEVOLUMES is an optional parameter used with the LIST TAPETABLEOFC CONTENTS command when no *volser* is specified. The EXCESSIVEVOLUMES parameter lists only the volumes that contain a data set that spans four or more volumes.

**Defaults:** None.

## **SELECT (EXPIRED): Listing Expired Dump Volumes**

**Explanation:** EXPIRED is an optional subparameter of SELECT specifying a list of each dump volume that is part of a valid dump copy and has reached or passed its expiration date. The following information is listed for each dump volume:

- Source volume serial number
- Dump volume serial number
- Unit type
- Expiration date
- Dump class

**Defaults:** None.

**Notes:**

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The EXPIRED subparameter of the SELECT parameter is relevant when *volser* is not specified with the DUMPVOLUME parameter. The EXPIRED subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, NORETENTIONLIMIT, UNAVAILABLE, or UNEXPIRED to get a list of volumes that satisfies all the selection criteria.

## **SELECT (FAILEDCREATE): Listing All Tape Volumes That Have Incomplete Data Set Information Saved in the OCDS TTOC Record**

**Explanation:** FAILEDCREATE is an optional parameter used when you specify LIST TAPETABLEOFC CONTENTS without the *volser*.

FAILEDCREATE lists only the volumes that have not been created.

If DFSMShsm issues message ARC0378I, it indicates the TTOC for a volume is incomplete. Use LIST TAPETABLEOFC CONTENTS SELECT(FAILEDCREATE) to list all volumes that have incomplete data set information saved in the OCDS TTOC record.

**Defaults:** None.

**Notes:**

1. Multihost Consideration: As an example, consider two hosts, 'A' and 'B'. If host 'A' has experienced an outage and has not been restarted, you *cannot* use host 'B' to issue the FAILEDCREATE parameter to list all tape volumes that have incomplete data set information saved in the OCDS TTOC record.
2. If DFSMShsm has issued message ARC0378I, indicating that there is a mismatch between the OCDS TTOC and the tape media, we recommend using the AUDIT MEDIACONTROLS FIX command to resolve the problem. See

"MEDIACONTROLS VOLUMES | MEDIACONTROLS(SDSP) VOLUMES: Requesting an Audit of Control Information" on page 71 for more information. Also see Appendix A, "Using the AUDIT Command," on page 501 for more information on using AUDIT MEDIACONTROLS. An explanation of how to correct the mismatch can be found in "How to Handle Inconsistencies between Tape Media and OCDS TTOC Records", the Media Management chapter, in the *z/OS DFSMShsm Storage Administration Guide*.

## **SELECT (FAILEDRECYCLE): Listing Only Those Volumes That Have Failed Recycle**

**Explanation:** FAILEDRECYCLE is an optional parameter used when you specify LIST TAPETABLEOFCONTENTS without the *volser*.

FAILEDRECYCLE lists only the volumes that have failed recycle and which are not selected for processing by a generic RECYCLE command.

**Note:** Input tapes are marked in error when one of the following occurs: An I/O error on the input tape, or an OPEN failure for the input tape. These errors prevent a successful recycle of the tape.

**Defaults:** None.

## **SELECT (LIBRARY| NOLIBRARY): Listing Tape Volume Library Status**

**Explanation:** LIBRARY | NOLIBRARY are mutually exclusive optional subparameters of SELECT.

**LIBRARY** lists only the tape volumes that are in a tape library.  
**LIBRARY(ALTERNATE)** lists only the tape volumes that have alternate tape volumes.

**NOLIBRARY** lists only the tape volumes that are *not* in a tape library.  
**NOLIBRARY(ALTERNATE)** lists only the tape volumes that have alternate tape volumes not in a library.

When using the ALTERNATE subparameter, the listing is independent of whether the ORIGINAL volume is in a library and applies to both BACKUP and ML2 volumes. The field under the heading, LIB, applies to the alternate volume not the original volume. If you specify SELECT(NOALTERNATEVOLUME), the specification of LIBRARY(ALTERNATE) or NOLIBRARY(ALTERNATE) is ignored.

**Defaults:** None.

**Note:** If you select LIBRARY with no other parameter, all volumes in your library will be listed. To reduce the run time of the LIST command, narrow the scope of the command with other parameters.

## **SELECT (MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME(volser) | BACKUP | BOTH): Requesting Specific Information for Volumes**

**Explanation:** MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME(*volser*) | BACKUP | BOTH are mutually exclusive, optional parameters you specify to request a list of selected information for migration or backup volumes.

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**MIGRATIONLEVEL1** specifies that you want a list of the volume entries for all migration level 1 volumes. This parameter is used only with DATASETNAME and LEVEL.

**MIGRATIONLEVEL2** specifies that you want a list of the volume entries for all migration level 2 volumes.

**VOLUME** specifies that you want a list for a particular volume. For *volser*, substitute the serial number of the specific volume you want listed. When you specify VOLUME(*volser*) to list a backup volume, the output contains a list of the latest backup versions on the volume.

**BACKUP** is used only with the LIST TAPETABLEOFC CONTENTS with no *volser* specified. You specify BACKUP to list all backup volumes.

**BOTH** is specified to list both migration and backup volumes.

**Defaults:** If the SELECT subparameters RECALLTAKEAWAY, ASSOCIATED, or NOTASSOCIATED is specified, the default is MIGRATIONLEVEL2. Otherwise, the default is BOTH.

## SELECT (MULTIPLEVOLUME): Listing Multiple-Volume Non-VSAM Data Sets from Backup or Dump VTOC Copy Data Sets

**Explanation:** MULTIPLEVOLUME is an optional subparameter of SELECT, specifying a list of only multiple-volume non-VSAM data sets. DFSMShsm treats a non-VSAM data set as multiple-volume if the data set VTOC entry indicates that the data resides on more than one volume. DFSMShsm does not use the catalog in determining if a non-VSAM data set resides on multiple volumes.

**Defaults:** None.

**Note:** If both the MULTIPLEVOLUME subparameter and the VSAM subparameter are specified as SELECT options, all VSAM data sets and all multiple-volume non-VSAM data sets are listed.

## SELECT (NORETENTIONLIMIT): Specifying Whether to List Dump Volumes with No Retention Period

**Explanation:** NORETENTIONLIMIT is an optional subparameter of SELECT specifying a list of each dump volume that is part of a valid dump copy and has no retention date. These dump volumes contain dump copies that DFSMShsm invalidates automatically only if the dump copy is the 100th generation and a new dump is performed. The following information is listed for each dump volume:

- Source volume serial number
- Dump volume serial number
- Unit type
- Dump class

**Defaults:** None.

**Notes:**

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.

2. The NORETENTIONLIMIT subparameter of SELECT is relevant only when *volser* is not specified with the DUMPVOLUME parameter. The NORETENTIONLIMIT subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, EXPIRED, UNAVAILABLE, or UNEXPIRED to get a list of volumes that satisfy all the selection criteria.

## **SELECT (RECALLTAKEAWAY): Listing ML2 Volumes Taken Away by Recall or ABACKUP Functions**

**Explanation:** RECALLTAKEAWAY is an optional subparameter of SELECT that specifies a list of all ML2 volumes taken away from use as migration tape output because either RECALL or ABACKUP needed a data set on the volume.

**Defaults:** None.

## **SELECT (SMALLDATASETPACKING | NOSMALLDATASETPACKING): Specifying Whether Data Sets Have Migrated to SDSP**

**Explanation:** SMALLDATASETPACKING | NOSMALLDATASETPACKING are mutually exclusive, optional subparameters of SELECT specifying a list of those data sets that have migrated to small-data-set-packing data sets or a list of those data sets that have not migrated to small-data-set-packing data sets. If you do not specify either subparameter, the list contains entries for all migrated data sets.

**SMALLDATASETPACKING** specifies a list of entries for those data sets that have migrated to small-data-set-packing data sets.

**NOSMALLDATASETPACKING** specifies a list of entries for those data sets that have not migrated to small-data-set-packing data sets.

**Defaults:** None.

### **Notes:**

1. Small-data-set-packing data sets can exist only on migration level 1 volumes. You can specify the MIGRATIONLEVEL1 subparameter of the SELECT parameter and the SMALLDATASETPACKING or NOSMALLDATASETPACKING subparameter of the SELECT parameter in the same LIST command.  
Do not specify MIGRATIONLEVEL2 and SMALLDATASETPACKING in the same LIST command. Also, do not specify a migration level 1 volume (VOLUME) and SMALLDATASETPACKING in the same LIST command.
2. These parameters apply only to information in the MCDS.

## **SELECT (UNAVAILABLE): Listing Dump Volumes with Invalid Contents**

**Explanation:** UNAVAILABLE is an optional subparameter of SELECT specifying a list of each dump volume that has had its contents invalidated, but was not eligible to be automatically reused. The following information is listed for each dump volume:

- Dump volume serial number
- Unit type
- Dump class

**Defaults:** None.

## LIST

### Notes:

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The UNAVAILABLE subparameter of the SELECT parameter is relevant when *volser* is not specified with the DUMPVOLUME parameter. The UNAVAILABLE subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, EXPIRED, NORETENTIONLIMIT, or UNEXPIRED to get a list of volumes that satisfy all the selection criteria.

## SELECT (UNEXPIRED): Listing Dump Volumes That Have Not Reached Their Expiration Dates

**Explanation:** UNEXPIRED is an optional subparameter of SELECT specifying a list of each dump volume that is part of a valid dump copy and has not reached or passed its expiration date. Dump volumes with a retention period of NONE are not included. The following information is listed for each dump volume:

- Source volume serial number for each valid dump copy
- Dump volume serial number
- Unit type
- Expiration date
- Dump class

**Defaults:** None.

### Notes:

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The UNEXPIRED subparameter of the SELECT parameter is relevant only when *volser* is not specified with the DUMPVOLUME parameter. The UNEXPIRED subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, EXPIRED, NORETENTIONLIMIT, or UNAVAILABLE to get a list of volumes that satisfy all the selection criteria.

## SELECT (VSAM): Specifying the Data Set Organization

**Explanation:** VSAM is an optional subparameter of SELECT specifying a list of only migrated VSAM data sets. The list contains standard data set information for the MCDS data set records and any VSAM object names that you can use to automatically recall the data set.

**Defaults:** None.

**Note:** The VSAM subparameter applies only to data set information from the MCDS.

---

## Examples of How to Code Commonly Used List Requests

The examples as presented below show how to use the LIST command to request various types of commonly desired information. Appendix B, “Using the LIST Command,” on page 585 contains examples of output produced by the LIST command.

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

## **Listing Migrated Data Sets Contained in the SDSP**

**Example:** In this example, you issued the DATASETNAME command to list the migrated data sets contained in the SDSP data set on a particular migration level 1 (ML1) volume and the results of the request are written to an output data set.

```
LIST DATASETNAME MIGRATIONCONTROLDATASET SELECT(VOLUME(L1VOLA) SDSP)
OUTDATASET(fully.qualified.dsn)
```

## **Listing Migrated Data Sets Using Abbreviations**

**Example:** In this example, you used the standard abbreviations to list the migrated data sets.

```
LIST DSN MCDS SEL(VOL(L1VOLA) SDSP)
```

## **Listing the Number and Total Space of Migrated Data Sets**

**Example:** This example shows you how to list the number and total space of the migrated data sets contained in the SDSP data set on a particular ML1 volume.

```
LIST DATASETNAME MIGRATIONCONTROLDATASET SELECT(VOLUME(L1VOLA) SDSP) SUMMARY
```

## **Listing Migrated Data Sets, Not Referenced in 180 Days**

**Example:** This example shows you how to list the migrated data sets, not referenced in 180 days, on an ML1 volume and how to write the results of the request to the terminal.

```
LIST DSN MCDS SEL(VOL(L1VOLA) AGE(180)) TERM
```

## **Listing Migrated Data Sets with a High-Level Qualifier**

**Example:** This example shows you how to list on ML1 volumes the migrated data sets having a common high-level qualifier that have not been referenced in 180 days.

```
LIST LEVEL(L364204) MCDS SELECT(ML1 AGE(180))
```

## **Listing Specific Migrated Data Sets**

**Example:** This example shows you how to request a specific ML1 volume and how to write the results of the request to the terminal.

```
LIST LEVEL(L364204) MCDS SELECT(VOLUME(L1VOLB) AGE(180)) TERM
```

## **Listing Migrated Data Sets with a High-Level and a Common Secondary Qualifier**

**Example:** This example shows you how to list on ML1 volume the migrated data sets with a common high-level qualifier and a common secondary qualifier and how to write the results of the request to the terminal.

```
LIST LEVEL(L364204.TEST) MCDS SELECT(VOLUME(L1VOLB)) TERM
```

## **Listing Copy Pool Information for all Copy Pools**

**Example:** In this example, DFSMShsm lists information for all copy pools..

```
LIST COPYPOOL
```

See Figure 22 on page 593 for an example of the output.

## **Listing Copy Pool Information for a Specific Copy Pool**

**Example:** In this example, DFSMShsm lists detailed information for each backup version of the CPDATABASE1 copy pool.

```
LIST COPYPOOL(CPDATABASE1)
```

See Figure 23 on page 594 for an example of the output.

## **Listing Specified Copy Pool Storage Group Information**

**Example:** In this example, DFSMShsm lists information for each volume in the CPBSEGDATABASE4 storage group and the corresponding source volume for each volume in that copy pool backup storage group. This list only returns those volumes that DFSMShsm has selected as target volumes. For those target volumes that are listed, the source volume is also listed.

```
LIST COPYPOOLBACKUPSTORAGEGROUP(CPBSEGDATABASE4)
```

See Figure 24 on page 595 for an example of the output.

## **Listing Summary Information from the MCDS**

**Example:** This example shows you how to list summary information from the MCDS and write the results to an output data set.

```
LIST DSN SUMMARY ODS(LIST)
```

See Figure 27 on page 598 for an example of the output.

## **Listing Specified Volume Information**

**Example:** This example shows you how to list only the volume information for the specific volume specified by the *volser* and how to write the results of the request to the terminal.

```
LIST TTOC(A00800) NODATASETINFORMATION TERM
```

See Figure 48 on page 625 for an example of the output.

## **Listing Specified Volume and Data-Set-Related Information**

**Example:** This example shows you how to list the volume information for the specified volume *volser* and the data-set-related information (the default of DATASETINFORMATION will be used) and how to write the results of the request to an output data set.

```
LIST TTOC(BATP01) OUTPUTDATASET(LIST)
```

See Figure 49 on page 625 for an example of the output.

## **Listing Volume Information for Failed RECYCLE ML2**

**Example:** This example shows you how to list the volume information for the migration level 2 volumes that have previously failed RECYCLE and how to write the results of the request to an output data set.

```
LIST TTOC SELECT(ML2 FAILEDRECYCLE) ODS(LIST)
```

See Figure 52 on page 626 for an example of the output.

## **Listing Tape Volumes with Incomplete Data Set Information**

**Example:** This example shows you how to list all the tape volumes that have incomplete data set information saved in the OCDS TTOC record.

```
LIST TTOC SELECT(FAILEDCREATE)
```

See Figure 53 on page 627 for an example of the output.

## **Listing Volume Information for Data Sets Spanning Four or More Volumes**

**Example:** This example shows how to list the volume information for the ML2 and backup volumes that contain data sets that span four or more volumes and how to write the results of the request to an output data set.

```
LIST TTOC SELECT(BOTH EXCESSIVEVOLUMES) ODS(LIST)
```

See Figure 54 on page 627 for an example of the output.

## **Listing Information for Connected Volumes**

**Example:** This example shows all volumes that are connected to this volume and whether or not these volumes are in the library.

```
LIST TTOC SELECT(CONNECTED(A00800)) ODS(LIST)
```

See Figure 47 on page 625 for an example of the output.

## **Listing Volume Information about Disaster Alternate Volumes**

**Example:** This example shows how to list the volume information about disaster alternate volumes.

```
LIST TTOC SELECT (LIBRARY DISASTERALTERNATEVOLUMES) ODS(LIST)
```

See Figure 51 on page 626 for an example of the output.

## **Listing Volume Information about Alternate Tape Volumes**

**Example:** This example shows you how to list the volume information for the migration level 2 and backup volumes that do *not* have an ALTERNATE tape volume and are in a tape library. The result is printed to an output data set.

```
LIST TTOC SELECT (LIBRARY NOALTERNATEVOLUME) ODS(LIST)
```

See Figure 50 on page 626 for an example of the output.

## **Listing Information about Available Tape Volumes**

**Example:** This example shows you how to list tape volumes that are available for selection (not marked full) and thus identify the empty and partially full backup and migration tape volumes. The results go to the SYSOUT class.

```
LIST TTOC SELECT(NOTFULL) SYSOUT(H)
```

## **Listing Information about Partially Filled ML2 Tape Volumes Not Associated for Output by any Migration or Recycle Task**

**Example:** This example shows you how to list all partially filled ML2 tapes that are not currently associated with an ML2 output task in any host. The results of the request are written to an output data set.

```
LIST TTOC SELECT(NOTASSOCIATED) ODS('JCA.ASSOCNOT.D041798')
```

See Figure 55 on page 627 for an example of the output.

## **Listing Information about Contents of the Dump Volume**

**Example:** This example shows you how to list all data sets that have been dumped to a specified dump volume.

```
LIST DUMPVOLUME(A00359) DUMPCONTENTS(PRIM02) ODS(List)
```

See Figure 37 on page 609 for an example of the output.

## **Listing Information about a Dump Volume**

**Example:** This example shows how to list all data sets that have been dumped to a volume with a specified *volser*. The output includes the dump copy data set name.

```
LIST DUMPVOLUME(A00359) ODS(LIST)
```

See Figure 34 on page 605 for an example of the output.

## **Listing Information about a Specific Dump Class Profile**

**Example:** This example shows how to list all data sets that have been dumped to a specific DUMPCLASS.

```
LIST DUMPCLASS(WEEKLY) ODS(LIST)
```

See Figure 33 on page 603 for an example of the output.

## **Listing Information about Aggregate Data Sets**

**Example:** This example shows how to list the aggregate version record (ABR record) Version 2 to the terminal.

```
LIST AGGREGATE(PAY1) VERSION(0002) TERM
```

See Figure 19 on page 589 for an example of the output.

## **Listing Information about Aggregate Data Sets and Saving the Output to the ODS**

**Example:** This example shows how to list the aggregate version record (ABR record) Version 1 to the ODS.

```
LIST AGGREGATE(PAY1) VERSION(0001) ODS(LIST)
```

See Figure 20 on page 590 for an example of the output.

## **Listing ML2 Volumes Taken Away by Recall or ABACKUP**

**Example:** This example shows how to list the ML2 volumes that were taken away from an output function because RECALL or ABACKUP functions need a data set on the volume.

```
LIST TTOC SELECT(RECALLTAKEAWAY)
```

## **Listing Tape Volumes that Can Use Available Tape**

**Example:** This example shows how to list all tape volumes that are written by an IBM 3590 that is emulating an IBM 3490 in CAPACITYMODE(EXTENDED).

```
LIST TTOC SELECT(CAPACITYMODE(EXTENDED))
```

## LIST

---

## Chapter 25. LOG: Entering Data into the DFSMShsm Log

The LOG command enters information into the DFSMShsm log. This information could be a message or an explanation that the storage administrator or system programmer wants to write into the DFSMShsm log. The information could also be automatically generated DFSMShsm log data.

### Syntax of the LOG Command

►—LOG—*data*—►

---

### Required Parameters of the LOG Command

This section describes the required parameter of the LOG command.

#### **data: Specifying the Data for the Log**

**Explanation:** *data* is a required positional parameter specifying the information to enter into the DFSMShsm log. For *data*, substitute any character string consisting of alphanumeric characters, special characters, and \$, #, or @.

**Defaults:** None.

---

### An Example of How to Code the LOG Command

The following example shows how to code the LOG command to enter data into the DFSMShsm log.

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

#### **Sending a Message to the Log**

**Example:** In this example, a message concerning the DFSMShsm functions is sent to the DFSMShsm log.

LOG ALL MIGRATION FUNCTIONS HELD AT 3:15 AM

## **LOG**

---

## Chapter 26. MIGRATE: Requesting a Space Management Function

The MIGRATE command requests the type of space management you want DFSMShsm to do: migration, data set deletion, or data set retirement. You can issue the MIGRATE command to cause space management for:

- All eligible data sets from a specific level 0 volume. A level 0 volume is an SMS volume in a storage group, a DFSMShsm primary volume, or a nonmanaged user volume.
- All eligible data sets from all primary volumes (PRIMARY).

You can issue the MIGRATE command to cause migration for:

- A specific data set from a level 0 volume to a migration level 1 volume or a migration level 2 volume (DATASETNAME)
- A specific data set from a DASD migration level 2 volume to a tape migration level 2 volume (DATASETNAME and MIGRATIONLEVEL2)
- A specific data set from a migration level 1 volume to a migration level 2 volume (DATASETNAME and MIGRATIONLEVEL2)
- All eligible data sets from all migration level 1 volumes to migration level 2 volumes (MIGRATIONLEVEL1).

**Notes:**

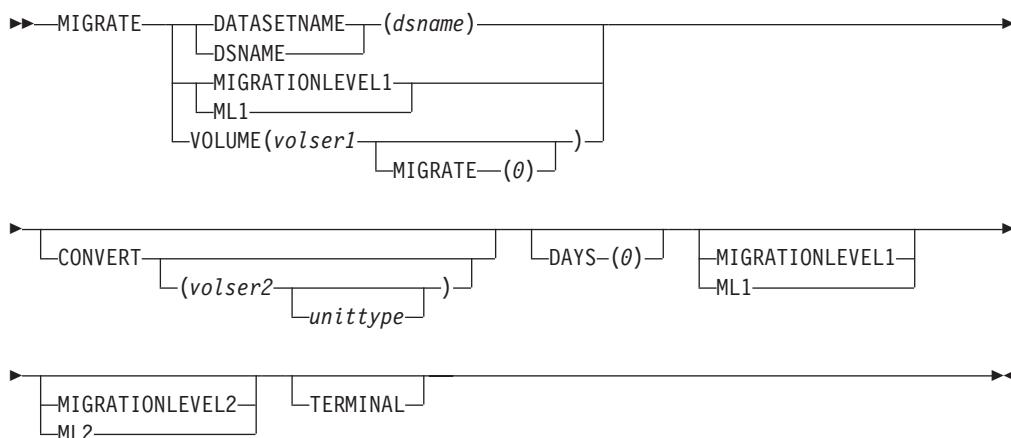
1. If you want to move data sets from one tape migration level 2 volume to another tape migration level 2 volume, you must recycle the tape migration level 2 volume. Chapter 32, “RECYCLE: Consolidating Valid Data to One Tape from Other Tapes,” on page 289 contains information about recycling tape volumes.
2. If you want to move all eligible data sets from a specific migration level 1 volume or a specific migration level 2 DASD volume to other migration level 2 volumes, you must use the FREEVOL command. See Chapter 20, “FREEVOL: Freeing DFSMShsm-Owned Volumes,” on page 171.
3. Fast subsequent migration can take place under both data set and volume MIGRATE commands. For more information on setting up Fast Subsequent Migration, refer to the *z/OS DFSMShsm Storage Administration Guide*.

## Requesting a Space Management Function for SMS-Managed Data Sets

The functions performed for SMS data sets are determined by each data set's management class attributes. COMMAND migration must be allowed by the management class to which the data set belongs.

**Note:** If a management class cannot be obtained for an SMS-managed data set, the data set will not be migrated, and an error message is issued.

## Syntax of the MIGRATE Command for SMS-Managed Data Sets



**Note:** You must specify either DATASETNAME, MIGRATIONLEVEL1, or VOLUME with each MIGRATE command.

## Summary of Parameters

The following table is a summary of the combination of parameters you can specify with the MIGRATE command. Specifying other combinations of parameters results in either an error message or one or more of the parameters being ignored.

Parameter	Related Parameters
CONVERT	VOLUME (MIGRATE)
DATASETNAME	CONVERT MIGRATIONLEVEL1 MIGRATIONLEVEL2
DAYs	MIGRATIONLEVEL1 VOLUME (MIGRATE)
MIGRATIONLEVEL1	DAYs TERMINAL
MIGRATIONLEVEL2	DATASETNAME
VOLUME	CONVERT TERMINAL

## Required Parameters of the MIGRATE Command for SMS-Managed Data Sets

This section describes the required parameters of the MIGRATE command.

### **DATASETNAME: Specifying Migration of a Specific Data Set**

**Explanation:** DATASETNAME(*dsname*) is the required parameter to migrate a specific data set. For *dsname*, substitute the fully qualified name of the data set you want to migrate. You cannot specify an alias for *dsname*. If you do, DFSMSHsm does not migrate the data set. The MIGRATE command overrides the data set's PRIMARY-DAYS-NON-USAGE management class attribute. The data set, however, is not migrated if the data set's management class specifically prevents migration.

**Defaults:** None.

**Notes:**

1. The volume where the data set resides must be mounted before you issue the MIGRATE command.
2. A data set that is eligible for migration with the target device of TAPE, that is also eligible for back up, is not migrated, and an error message issued.
3. If a management class cannot be obtained for a data set, the data set is not migrated, and an error message is issued.
4. DFSMSHsm does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFSMSHsm processes the entire partitioned data set.
5. If *dsname* is a VSAM data set name, specify the base cluster name. The entire VSAM sphere is migrated. If the sphere has more than one AIX, more than one path, or more than one path on the AIX, the data set can only be recalled by the base cluster name.
6. Multiple path names to an alternate index are not supported. Only the last path name listed in the catalog is preserved.

### **MIGRATIONLEVEL1: Specifying Migration of Data Sets from Level 1 to Level 2 Volumes**

**Note:** Required vs. Optional: The following explanation refers to the MIGRATIONLEVEL1 required parameter. For the explanation of the MIGRATIONLEVEL1 optional parameter, see “MIGRATIONLEVEL1: Specifying Migration of a Data Set” on page 237.

**Explanation:** MIGRATIONLEVEL1 is the required parameter to migrate eligible data sets from all migration level 1 volumes to migration level 2 volumes.

Each migrated SMS data set is processed according to its management class attribute value for LEVEL1-DAYS-NON-USAGE.

**Defaults:** None.

**Notes:**

1. If you specify this parameter in a direct-to-tape environment, the command fails.
2. If you specify this parameter when level 1 to level 2 migration of automatic secondary space management is running, the command fails.

## VOLUME: Specifying the Space Management Attribute for the Eligible Data Sets on a Volume

**Explanation:** VOLUME(*volser1*) is the required parameter to specify migration for eligible data sets on one volume. Information for any migration is printed in the migration activity log.

For *volser1*, substitute the serial number of the level 0 volume from which you want to migrate or delete eligible data sets. Eligibility for processing is determined by each data set's management class attributes.

If the MIGRATE command is specified with only the VOLUME parameter, eligibility for migration is determined by the data set's management class attributes and the value for PRIMARY-DAYS-NON-USAGE need not have been met. For SMS-managed volumes, the value specified for the MIGRATE subparameter must be zero, because the zero value removes all data sets for which automatic space management is supported. If a value other than zero is specified, or if no value is specified, the command fails, and a message indicating the error is issued.

When the MIGRATE command is issued for an SMS-managed volume, that volume is considered DFSMSHsm-managed. DFSMSHsm maintains control records for the volume until a DELVOL command is issued against it.

**Defaults:** None.

**Note:** The management class attribute COMMAND-OR-AUTO-MIGRATE=BOTH must be specified for an SMS-managed data set to be eligible for migration by a VOLUME command.

## Optional Parameters of the MIGRATE Command for SMS-Managed Data Sets

This section describes the optional parameters of the MIGRATE command.

### CONVERT: Specifying Movement of Data Sets from One Volume to Another

**Explanation:** CONVERT is an optional parameter that you use to migrate all data sets, or a specific data set, from a level 0 volume to a migration level 1 volume and then immediately recall those data sets to another level 0 volume. You can use this parameter when you want to remove a volume from the system. The automatic class selection routines select the volume to which the data sets should be recalled.

The management class attribute PRIMARY-DAYS-NON-USAGE is not used for a MIGRATE CONVERT request. All eligible SMS-managed data sets are migrated to a migration level 1 volume. Before an SMS-managed data set is migrated, DFSMSHsm determines whether or not the data is eligible to be expired.

**Defaults:** Automatic class-selection routines choose the volume and type of unit to which SMS data sets are recalled.

**Notes:**

1. The management class attribute, LEVEL-1-DAYS-NON-USAGE, are not used when processing a MIGRATE CONVERT request. All eligible data sets are migrated to a migration level 1 volume.

2. If you specify the DAYS(*days*) parameter with the CONVERT parameter, the *days* value must be zero. The default is zero, and the only value allowed is zero.

## **DAYS: Specifying Migration Eligibility of Data Sets**

**Explanation:** **DAYS(0)** is an optional parameter supplied for an SMS volume that allows the movement of all data sets for which automatic space management is supported. The data set's management class attribute value for PRIMARY-DAYS-NON-USAGE need not have been met. For SMS-managed volumes, the value specified for the DAYS subparameter must be zero. If a value other than zero is specified or if no value is specified, the command fails, and a message indicating the error is issued.

**Defaults:** None.

**Note:** The management class attribute COMMAND-OR-AUTO-MIGRATE=BOTH must be specified for an SMS-managed data set to be eligible for migration by a VOLUME command.

## **MIGRATIONLEVEL1: Specifying Migration of a Data Set**

**Note:** Required vs. Optional: The following explanation refers to the MIGRATIONLEVEL1 optional parameter. For the explanation of the MIGRATIONLEVEL1 required parameter, see “MIGRATIONLEVEL1: Specifying Migration of Data Sets from Level 1 to Level 2 Volumes” on page 235.

**Explanation:** **MIGRATIONLEVEL1** is an optional parameter when specifying the DATASETNAME(dsname) parameter. When you specify ML1 with dsname, the data set is migrated to the appropriate hierarchical level, as determined by the data set's management class.

**Defaults:** None.

## **MIGRATIONLEVEL2: Specifying Migration of a Data Set Directly to a Level 2 Volume**

**Explanation:** **MIGRATIONLEVEL2** is an optional parameter specifying that a specific data set migrate from an SMS volume directly to a migration level 2 volume. You must specify the data set name with the DATASETNAME parameter to cause DFSMSHsm to migrate a specific data set directly to a migration level 2 volume.

An SMS-managed data set residing on an SMS volume or a migrated SMS-managed data set residing on a migration volume is migrated to a migration level 2 volume, regardless of the data set's management class attributes.

**Defaults:** None.

### **Notes:**

1. You must specify the MIGRATIONLEVEL2 parameter when you request that DFSMSHsm migrate a data set on a migration level 1 volume. DFSMSHsm migrates the data set to the type of migration level 2 volume that is consistent with your environment. For example, if you are in a tape migration environment, DFSMSHsm migrates the data set to a tape migration level 2

## MIGRATE—SMS

volume rather than a DASD migration level 2 volume. You specify the type of migration environment with the TAPEMIGRATION parameter of the SETSYS command.

2. The MIGRATIONLEVEL2 parameter is not necessary in a direct-to-tape environment.
3. The MIGRATIONLEVEL2 parameter can be used to override the management class attribute LEVEL-1-DAYS-NON-USAGE.

## TERMINAL: Requesting That Volume Space Management Messages Appear at the Terminal

**Explanation:** TERMINAL is an optional parameter specifying that all space management messages associated with the space management of a volume be sent to the system console and to the migration activity log.

**Defaults:** If you do not specify TERMINAL when you specify MIGRATIONLEVEL1 or VOLUME, volume space management messages go only to the migration activity log.

**Note:** TERMINAL does not apply when you specify the DATASETNAME parameter. If you specify TERMINAL when it does not apply, DFSMShsm ignores it.

---

## Examples of How to Code the MIGRATE Command for SMS-Managed Data Sets

The following examples present different ways to code the MIGRATE command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Migration of Eligible Data Sets from a Specified Volume

**Example:** In this example, migration is requested for all eligible data sets on the specified volume. Eligibility is determined by each data set's management class.

```
MIGRATE VOLUME(SMS003)
```

### Removing All Data Sets Eligible to Migrate from an SMS-Managed Level 0 Volume

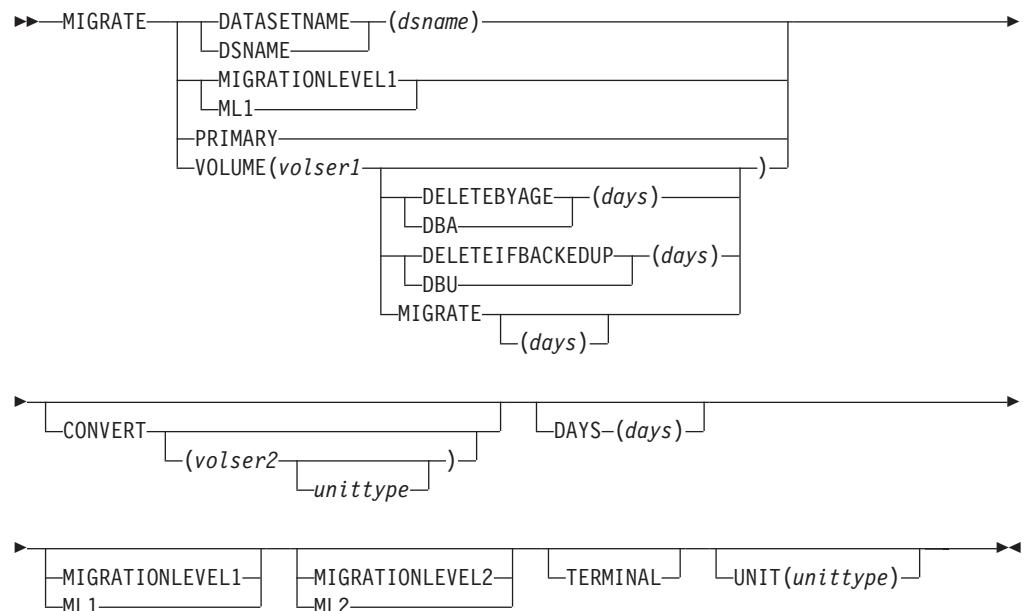
**Example:** The following command migrates all eligible data sets from the specified volume. Those data sets meeting their management class expiration attribute values are expired.

```
MIGRATE VOLUME(SMS003) CONVERT
```

## Requesting a Space Management Function for Non-SMS-Managed Data Sets

Use the MIGRATE command to request that DFSMSHsm migrate eligible non-SMS data sets from ML1 volumes, primary volumes, or a specific volume. You can also use this command to migrate a specific data set.

### Syntax of the MIGRATE Command for Non-SMS-Managed Data Sets



**Note:** You must specify either DATASETNAME, PRIMARY, MIGRATIONLEVEL1, or VOLUME with each MIGRATE command.

## Summary of Parameters

The following table is a summary of the combination of parameters you can specify with the MIGRATE command. Specifying other combinations of parameters results in either an error message or one or more of the parameters being ignored.

Parameter	Related Parameters
CONVERT	UNIT VOLUME (MIGRATE)
DATASETNAME	CONVERT MIGRATIONLEVEL2
DAYS	MIGRATIONLEVEL1 VOLUME MIGRATE
MIGRATIONLEVEL1	DAYS TERMINAL
MIGRATIONLEVEL2	DATASETNAME
PRIMARY	TERMINAL
VOLUME	CONVERT TERMINAL UNIT

---

## Required Parameters of the MIGRATE Command for Non-SMS-Managed Data Sets

This section describes the required parameters of the MIGRATE command.

### DATASETNAME: Specifying Migration of a Specific Data Set

**Explanation:** DATASETNAME(*dsname*) is the required parameter to migrate a specific cataloged data set. When you specify this parameter, DFSMShsm migrates the cataloged data set without checking whether the data set has met the requirements for migration (such as minimum migration age). For *dsname*, substitute the fully qualified name of the data set you want to migrate. You cannot specify an alias for *dsname*. If you do, DFSMShsm does not migrate the data set.

**Defaults:** None.

**Notes:**

1. DFSMShsm does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFSMShsm processes the entire partitioned data set.
2. The volume where the data set resides must be mounted before you issue the MIGRATE command.
3. Multiple path names to an alternate index are not supported. Only the last path name listed in the catalog is preserved.

### MIGRATIONLEVEL1: Specifying Migration of Data Sets from Level 1 to Level 2 Volumes

**Note:** Required vs. Optional: The following explanation refers to the MIGRATIONLEVEL1 required parameter. For the explanation of the

MIGRATIONLEVEL1 optional parameter see “[MIGRATIONLEVEL1: Specifying Migration of a Data Set Directly to Appropriate Level of Hierarchy](#)” on page 244.

**Explanation:** MIGRATIONLEVEL1 is the required parameter to migrate eligible data sets from all migration level 1 volumes to migration level 2 volumes.

When you specify MIGRATIONLEVEL1 for non-SMS-managed data sets, two conditions apply:

- If you also specify DAYS(*days*), DFSMSHsm migrates non-SMS-managed data sets based on the *days* value.
- If you do not specify DAYS(*days*), DFSMSHsm migrates non-SMS-managed data sets based on the current DFSMSHsm value for the MIGRATIONLEVEL1DAYS parameter of the SETSYS command.

**Defaults:** None.

**Notes:**

1. If you specify this parameter in a direct-to-tape environment, the command fails.
2. If you specify this parameter when level 1 to level 2 migration of automatic secondary space management is run, the command fails.

## PRIMARY: Specifying Space Management of Eligible Data Sets on All Primary Volumes

**Explanation:** PRIMARY is the required parameter to migrate or delete eligible data sets on all primary volumes, depending on the space management technique for each volume. You specify the space management technique with the ADDVOL command. When you specify this parameter, DFSMSHsm processes all primary volumes, not just primary volumes with the primary volume attribute of automatic space management. You specify the primary volume attributes with the ADDVOL command.

**Defaults:** None.

## VOLUME: Specifying the Space Management Attribute for the Eligible Data Sets on a Volume

**Explanation:** VOLUME(*volser1*) is the required parameter to specify migration, data set deletion, or data set retirement for eligible data sets on one volume.

Eligible data sets on a volume not managed by DFSMSHsm or SMS can migrate or be scratched if you specify the UNIT parameter. Information for any volume migration or data set deletion is printed in the migration activity log. Eligible data sets on a volume can be scratched after they have been inactive for the number of days you specified.

For *volser1*, substitute the serial number of the level 0 volume from which you want to migrate or delete eligible data sets.

The MIGRATE command fails if the command is specified with a single migration level 1 or migration level 2 volume and the MIGRATE optional parameter is either specified on the command or is the default. This function is allowed only by using the FREEVOL command.

## MIGRATE—NON SMS

Subparameter	Explanation
DELETEBYAGE (days)	The data sets on the volume are scratched if they have been inactive for the number of days you specified. If you specify DELETEBYAGE, the eligible data sets are scratched even if they do not have backup versions; however, if the expiration date of the data set has not been reached, DFSMShsm does not delete the data set. For <i>days</i> , substitute a decimal number from 0 to 999. For example, if you substitute 10 for <i>days</i> , DFSMShsm scratches those data sets that have not been referred to for 10 days.
DELETEIFBACKEDUP (days)	The data sets on the volume are scratched if they have been inactive for the number of days you specified. The data set, however, must have a current backup version before DFSMShsm can scratch it from the volume. A backup version is current if it was created on a date after the data set was last referenced. For <i>days</i> , substitute a decimal number from 1 to 999. For example, if you substitute 25 for <i>days</i> , DFSMShsm scratches those data sets that have not been referred to for at least 25 days and that have current backup versions.
MIGRATE	<p>DFSMShsm can do data set deletion or data set retirement on any primary or migration volume. The migration level 2 volume can be tape or DASD.</p> <p>All eligible data sets migrate from the specified level 0 volume to a migration level 1 volume or tape migration level 2 volume. The migration level used is determined by the SETSYS TAPEMIGRATION command. For <i>days</i>, substitute a decimal number from 0 to 999. For example, if you substitute a 5, DFSMShsm migrates those data sets that have not been referred to for 5 days. This value is called the minimum migration age.</p> <p>When you request migration from a primary volume, the following conditions apply:</p> <ul style="list-style-type: none"> <li>• If you specify the MIGRATE(<i>days</i>) subparameter, DFSMShsm migrates the data sets based on the minimum migration age you specify with <i>days</i>. DFSMShsm ignores any thresholds of occupancy for the volume.</li> <li>• If you do not specify the MIGRATE(<i>days</i>) subparameter, two conditions apply: <ul style="list-style-type: none"> <li>– If you defined thresholds of occupancy with the ADDVOL command, DFSMShsm migrates the data sets (starting with the oldest) until the low threshold of occupancy is reached or until DFSMShsm finds a data set whose inactive age is less than the minimum migration age. You specified this minimum migration age with the ADDVOL or SETSYS command.</li> <li>– If you did not define thresholds of occupancy, DFSMShsm migrates the data sets based on the minimum migration age specified with the MIGRATE(<i>days</i>) parameter of the ADDVOL command. If you did not specify the minimum migration age with the ADDVOL command, DFSMShsm uses the current minimum migration age from the DAYS parameter of the SETSYS command.</li> </ul> </li> </ul>

**Defaults:** If you do not specify one of the MIGRATE, DELETEIFBACKEDUP, or DELETEBYAGE subparameters, DFSMSHsm uses the space management technique you specified in the ADDVOL command.

**Notes:**

1. If you specify a volume that you have not added to DFSMSHsm with the ADDVOL command, you must also specify the UNIT parameter.
2. If you specify a tape migration level 2 volume and the MIGRATE subparameter, the command fails. To move data sets from a tape migration level 2 volume to another tape migration level 2 volume, use the RECYCLE command.
3. If the MIGRATE subparameter of the VOLUME parameter is specified on the MIGRATE command for a DASD migration level 1 volume, the command will fail, and an error message is issued. The migrate space management function for a DFSMSHsm migration level 1 DASD volume is supported only by using the FREEVOL command.

## Optional Parameters of the MIGRATE COMMAND for Non-SMS-Managed Data Sets

This section describes the optional parameters of the MIGRATE command.

### CONVERT: Specifying Movement of Data Sets from One Volume to Another

**Explanation:** CONVERT is an optional parameter that you use to migrate all data sets, only aged data sets, or a specific data set from a level 0 volume to a migration level 1 volume and then immediately recall those data sets to another level 0 volume. You can use this parameter when you want to remove a volume from the system. For example, you can use this parameter to move data sets from a 3380 volume to a 3390 volume.

For *volser2*, specify the volume where DFSMSHsm is to recall the data set. For *unittype2*, specify the type of unit where DFSMSHsm is to mount the target volume. If you do not specify *volser2*, DFSMSHsm selects the target volume the same way it normally selects target volumes during recall. If you use the *volser2* subparameter to specify a volume not managed by DFSMSHsm, you must also specify the *unittype2* subparameter.

In addition, when you specify MIGRATE(0), DFSMSHsm can process types of data sets that it does not normally process during migration. These are:

- Cataloged list and utility data sets that cannot be scratched because they have been referred to too recently.
- Data sets that have temporarily been marked as not able to be migrated because a job in a JES3 system planned to use them.

**Note:** In a JES3 system, two jobs could use the same data set at the same time if you submit one job before the conversion is done and you submit the second job after the conversion. Therefore, ensure that no jobs are waiting to run if those jobs use the data sets on the volume being converted.

**Defaults:** For cataloged data sets, you do not have to specify *volser2* or *unittype2*. If you do not specify these values, DFSMSHsm chooses the volume and type of unit.

## MIGRATE—NON SMS

### Notes:

1. The space management technique must be migration. You can specify the MIGRATE subparameter of the VOLUME parameter, the MIGRATE parameter of the ADDVOL command, or use the default of migration on the ADDVOL command.
2. To prevent the source volume from being selected as the target volume for recall, specify the NOAUTORECALL parameter of the ADDVOL command for the source volume until the migration finishes.
3. If you want DFSMShsm to convert all data sets on a level 0 volume, you must also specify the MIGRATE(0) subparameter of the MIGRATE command. If, however, you used the SETMIG command to specify the DATASETNAME, LEVEL, or VOLUME parameter with the NOMIGRATION parameter, DFSMShsm will not migrate the specified entry when you specify the CONVERT parameter even if you also specified the MIGRATE(0) parameter. For example, if you specified SETMIG LEVEL(USER) NOMIGRATION, those data sets with the first qualifier of USER do not migrate from the primary volume.
4. If you specify the CONVERT parameter in a direct-to-tape environment, the command fails.
5. You can use the CONVERT parameter with the UNIT parameter if you want to convert non-SMS-managed volumes not managed by DFSMShsm to volumes managed by DFSMShsm.
6. VSAM data sets created on the same day that the MIGRATE VOLUME (MIGRATE(0)) CONVERT command was issued are not migrated because of a data integrity exposure.

## DAYS: Specifying Migration Eligibility of Data Sets

**Explanation:** DAYS(*days*) is an optional parameter specifying how many consecutive days that data sets on migration level 1 volumes are to remain inactive before they are eligible for migration. For *days*, substitute a decimal number from 0 to 999.

**Defaults:** If you do not specify DAYS(*days*), DFSMShsm migrates the data sets from the volume based on the current DFSMShsm value for the MIGRATIONLEVEL1DAYS parameter of the SETSYS command.

**Note:** The DAYS(*days*) parameter can be used for non-SMS level 0 volumes and has the same meaning as if it was specified using the VOLUME(*volser* MIGRATE(*days*)) method. See the VOLUME parameter for a description of the parameter. If both DAYS(*days*) and VOLUME(*volser* MIGRATE(*days*)) are specified, the VOLUME(*volser* MIGRATE(*days*)) value is used.

## MIGRATIONLEVEL1: Specifying Migration of a Data Set Directly to Appropriate Level of Hierarchy

**Note:** Required vs. Optional: The following explanation refers to the MIGRATIONLEVEL1 optional parameter. For the explanation of the MIGRATIONLEVEL1 required parameter, see “MIGRATIONLEVEL1: Specifying Migration of Data Sets from Level 1 to Level 2 Volumes” on page 240.

**Explanation:** MIGRATIONLEVEL1 is an optional parameter that can be used with the DATASETNAME(*dsname*) parameter. When you specify ML1 with *dsname*, the

data set will be migrated to the appropriate hierarchical level, as determined by the SETSYS TAPEMIGRATION parameter.

**Defaults:** None.

## MIGRATIONLEVEL2: Specifying Migration of a Data Set Directly to a Level 2 Volume

**Explanation:** MIGRATIONLEVEL2 is an optional parameter specifying that a specific data set migrate from a primary volume directly to a migration level 2 volume. You must specify the data set name with the DATASETNAME parameter to cause DFSMSHsm to migrate a specific data set.

**Defaults:** None.

**Notes:**

1. You must specify the MIGRATIONLEVEL2 parameter when you request that DFSMSHsm migrate a data set on a migration level 1 volume. DFSMSHsm migrates the data set to the type of migration level 2 volume that is consistent with your environment. For example, if you are in a tape migration environment, DFSMSHsm migrates the data set to a tape migration level 2 volume rather than to a DASD migration level 2 volume. You specify the type of migration environment with the TAPEMIGRATION parameter of the SETSYS command.
2. The MIGRATIONLEVEL2 parameter is not necessary in a direct-to-tape environment.

## TERMINAL: Requesting That Volume Space Management Messages Appear at the Terminal

**Explanation:** TERMINAL is an optional parameter specifying that all space management messages associated with the space management of a volume be sent to the system console and to the migration activity log.

**Defaults:** If you do not specify TERMINAL when you specify MIGRATIONLEVEL1, PRIMARY, or VOLUME, volume space management messages go only to the migration activity log.

**Note:** TERMINAL does not apply when you specify the DATASETNAME parameter. If you specify TERMINAL when it does not apply, DFSMSHsm ignores it.

## UNIT: Specifying the Type of Device

**Explanation:** UNIT(*unittype*) is an optional parameter specifying the type of unit where DFSMSHsm can allocate the nonmanaged source volume.

For *unittype*, substitute the type of unit where DFSMSHsm can allocate the volume.

The following are valid types of DASD units:

- 3380
- 3390
- 9345

**Defaults:** None.

## MIGRATE—NON SMS

### Notes:

1. You must specify the UNIT parameter if the volume you specify is not managed by DFSMShsm.
2. DFSMShsm ignores the UNIT parameter if you specify the MIGRATIONLEVEL1 or DATASETNAME parameters.

---

## Examples of How to Code the MIGRATE Command for Non-SMS-Managed Data Sets

The following examples show different ways to code the MIGRATE command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Migration of All the Data Sets from a Volume

**Example:** In this example, migration is requested for all the data sets on the primary volume.

```
MIGRATE VOLUME(PRIM03 MIGRATE(0))
```

The following command also migrates all data sets from a primary volume:

```
MIGRATE VOLUME(PRIM01) DAYS(0)
```

### Migration of Data Sets Based on the Number of Elapsed Days Since the Data Set Was Last Referred To

**Example:** In this example, migration is requested for data sets that reside on the primary volume and have not been referred to for at least five days.

```
MIGRATE VOLUME(PRIM01 MIGRATE(5))
```

### Direct Migration of a Data Set to a Level 2 Volume

**Example:** In this example, the specified data set migrates directly to a migration level 2 volume.

```
MIGRATE DATASETNAME(FET7603.JOB33.LOAD) MIGRATIONLEVEL2
```

### Migration of Data Sets from a Volume Not Managed by DFSMShsm

**Example:** In this example, migration is attempted for all the data sets that meet the DAYS criterion of the SETSYS command and reside on a volume not managed by DFSMShsm.

```
MIGRATE VOLUME(MSS004) UNIT(3390)
```

### Data Set Deletion of Eligible Data Sets on a Volume

**Example:** In this example, all eligible data sets on the primary volume that have not been referred to for at least 20 days and whose expiration dates have been reached are scratched.

```
MIGRATE VOLUME(VOL005 DELETEBYAGE(20))
```

## Moving All Data Sets from a Volume Not Managed by DFSMShsm to Primary Volumes

**Example:** In this example, all DFSMShsm-supported data sets on a volume not managed by DFSMShsm move to primary volumes that allow automatic recall.

```
MIGRATE VOLUME(VOL081 MIG(0)) UNIT(3390) CONVERT
```

## Moving All Data Sets from a Primary Volume

**Example:** In this example, you want to remove all data sets from a primary volume.

```
MIGRATE VOLUME(ONVOL MIG(0)) CONVERT
```

## Moving Data Sets from a Primary Volume to Another Primary Volume

**Example:** In this example, the volume was added to control of DFSMShsm with the space management technique of MIGRATE. The target volume is a volume managed by DFSMShsm. All supported data sets that have not been referred to in the last five days are moved from the 3380 volume (USER80) to the target 3390 volume (NEW90).

```
MIGRATE VOLUME(USER80 MIGRATE(5)) CONVERT(NEW90)
```

## Moving One Data Set from One Primary Volume to Another Primary Volume

**Example:** In this example, one data set is moved from a volume to another primary volume without setting up an IEHMOVE utility job.

```
MIGRATE DATASETNAME(MYDS) CONVERT
```

You could issue this command to cause extent reduction or to move this data set from a full volume to another volume whose free space is in less demand.

## Migration of Data Sets from All Migration Level 1 Volumes

**Example:** In this example, migration is requested for the data sets on all migration level 1 volumes that have not been referred to for at least two days.

```
MIGRATE MIGRATIONLEVEL1 DAYS(2)
```

## Data Set Deletion of a Tape Migration Level 2 Volume

**Example:** In this example, data set deletion is requested for the data sets on a tape migration level 2 volume that have not been referred to for 30 days and whose expiration dates have been reached.

```
MIGRATE VOLUME(M2TP04 DELETEBYAGE(30))
```

## Data Set Retirement of a Migration Level 1 Volume

**Example:** In this example, data set retirement is requested for the data sets on a migration level 1 volume that have not been referred to for 45 days and that have a current backup version.

```
MIGRATE VOLUME(ML1003 DELETEIFBACKEDUP(45))
```

---

## Chapter 27. ONLYIF: Allowing the Single Command Immediately Following It in ARCCMDxx to be Executed Conditionally

The ONLYIF command allows the single command immediately following it to be executed conditionally depending on the host being started. With a multihost system, the ONLYIF command allows you to uniquely define parameters for each host within a single PARMLIB member (ARCCMDxx). The command immediately following the ONLYIF command can have multiple parameters and continuations.

**Note:** Because the ONLYIF command processes the next command, if the line after the ONLYIF command is blank or contains a comment, DFSMShsm considers that line. For example, the comment after the ONLYIF command is considered for processing, not the actual SETSYS command.

```
ONLYIF HSMHOST(A)
/* The following is only done for Host A */
SETSYS ABSTART(0600 0700)
```

To avoid this error, use a continuation character to join the comment to the command, like this:

```
ONLYIF HSMHOST(A)
/* The following is only done for Host A */ +
SETSYS ABSTART(0600 0700)
```

See the *z/OS DFSMShsm Implementation and Customization Guide* for commands you can specify in the DFSMShsm parmlib member ARCCMDxx. You can also refer to the following examples for some of the potential uses.

---

### Syntax of the ONLYIF Command

►►ONLYIF—HSMHOST(*hostid*)—►►

---

### Required Parameters of the ONLYIF Command

This section describes the required parameter of the ONLYIF command.

#### HSMHOST: Specifying the Host ID of a Specific Host

**Explanation:** HSMHOST(*hostid*) is the required parameter to specify the host id for which the command following should be executed. For *hostid*, substitute the single character host ID of the applicable host. This host ID is specified by the HOST keyword in the PROC used to start DFSMShsm.

**Defaults:** None.

## Examples of How to Code the ONLYIF Command

The following examples present how to code the ONLYIF command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Specifying Different Start and Stop Times for Automatic Primary Space Management for 2 Hosts

**Example:** In this example, HOST A's planned start time for automatic primary space management is 4:00 a.m. and the quiesce time is 7:30 a.m. HOST B's planned start time for automatic primary space management is 9:00 a.m. and the quiesce time is 11:00 a.m.

```
ONLYIF HSMHOST(A)
      SETSYS PRIMARYSPMGMTSTART(400 730)
ONLYIF HSMHOST(B)
      SETSYS PRIMARYSPMGMTSTART(900 1100)
```

### Specifying Different Maximum Number of Tasks DFSMShsm can Concurrently Process for Several Hosts

**Example:** In this example, HOST C can have a maximum of 7 automatic volume space management tasks that can run concurrently and a maximum of 5 volume backup tasks to be run concurrently. All other hosts can have a maximum of 3 automatic volume space management tasks that can run concurrently and a maximum of 9 volume backup tasks to be run concurrently.

```
SETSYS MAXMIGRATIONTASKS(3) MAXBACKUPTASKS(9)
ONLYIF HSMHOST(C)
      SETSYS MAXMIGRATIONTASKS(7) MAXBACKUPTASKS(5)
```

### Specifying Continuation Characters for Commands with Several Parameters

**Example:** In this example, all hosts (except HOST M) will have the following attributes:

- a maximum of 1 automatic volume space management task
- when small data sets migrate, they are not packed into predefined VSAM key-sequenced small-data-set-packing data sets on a migration level 1 volume.
- interval migration will not be done
- a maximum of 2 recall tasks can process concurrently
- a maximum of 1 tape recall task that can request tape mounts

HOST M will have these attributes:

- a maximum of 3 automatic volume space management tasks can run concurrently
- when small data sets migrate, they are eligible to be packed into predefined VSAM key-sequenced small-data-set-packing data sets on a migration level 1 volume.
- interval migration will be done
- a maximum of 8 recall tasks can process concurrently
- a maximum of 4 tape recall tasks that can concurrently request tape mounts

```
SETSYS MAXMIGRATIONTASKS(1) NOSMALLDATASETPACKING NOINTERVALMIG +
    MAXRECALLTASKS(2) TAPEMAXRECALL(1)
ONLYIF HSMHOST(M)
SETSYS MAXMIGRATIONTASKS(3) SMALLDATASETPACKING INTERVALMIG +
    MAXRECALLTASKS(8) TAPEMAXRECALL(4)
```

## Specifying Various Commands within ARCCMDxx using ONLYIF

**Example:** In this example, HOST 1 runs automatic backup on weekdays (Monday through Friday) and the cycle is started or reset on January 3,1994 (Monday). HOST 2 runs automatic backup only on Saturdays and the cycle is started or reset on January 3, 1994 (Monday). HOST T prevents all DFSMSHsm functions from running.

```
ONLYIF HSMHOST(1)
DEFINE BACKUP( YYYYYNN -      /* run backup on weekdays only */
    CYCLESTARTDATE(1994/01/03) /* cycle defined on a Monday */
ONLYIF HSMHOST(2)
DEFINE BACKUP( NNNNNYN -      /* run backup only on Saturdays */
    CYCLESTARTDATE(1994/01/03) /* cycle defined on a Monday */
ONLYIF HSMHOST(T)
    HOLD ALL                  /* functions held on test system */
```

**ONLYIF**

---

## **Chapter 28. PATCH: Modifying Storage within DFMSHsm**

The PATCH command is to be used only for maintenance purposes and is explained in the *z/OS DFMSHsm Diagnosis*.



---

## Chapter 29. QUERY: Displaying the Status of DFSMShsm Parameters, Statistics, and Pending Requests

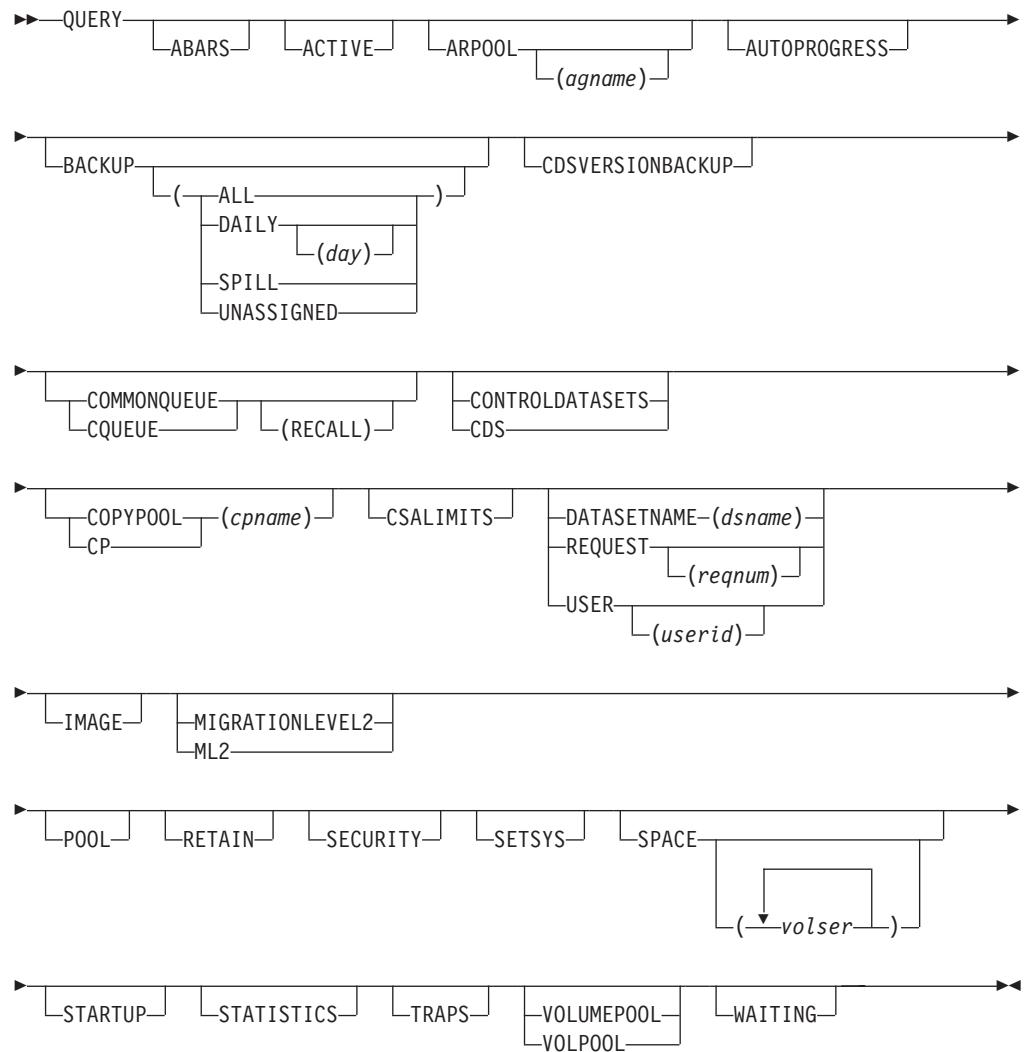
The QUERY command can do the following tasks:

- Determine the DFSMShsm control parameters (SETSYS).
- Determine the DFSMShsm control parameters that apply to aggregate backup and recovery (ABARS).
- Request a list of DFSMShsm statistics (STATISTICS).
- Determine the status of pending DFSMShsm requests (WAITING).
- Request volume space-use information (SPACE).
- Request control data set space-use information (CONTROLDATASETS).
- Determine whether multiple backup data set support is enabled (CDSVERSIONBACKUP).
- Request the common service area storage limits (CSALIMITS).
- Request the status of each DFSMShsm volume and data set subtask, each long-running command, and what each active one is doing (ACTIVE).
- Request a list of recall pools (POOL).
- Request a list of volumes defined to be used during aggregate recovery processing (ARPOOL).
- Request a list of the backup parameters and backup volumes (BACKUP).
- Request a list of the source volume serial numbers for any volumes in a specified copy pool that have an outstanding FlashCopy relationship (COPYPOOL).
- Request a list of selected DFSMShsm requests (DATASETNAME | REQUEST | USER).
- Request a list of the DFSMShsm address spaces that are active on the z/OS image (IMAGE).
- Request a list of key ranges and associated DASD ML2 volumes, and tape ML2 volumes (MIGRATIONLEVEL2).
- Request a list of the first qualifiers of data sets excluded from space management (RETAIN).
- Determine whether access to DFSMShsm commands is controlled using the RACF FACILITY class or the AUTH command (SECURITY).
- Determine the parameters specified when DFSMShsm was started (STARTUP).
- Request a list of trap requests specified with the TRAP command (TRAPS).
- Request a list of current volume pools (VOLUMEPOOL).
- Request a list that indicates the number of volumes that have not been processed and the total volumes eligible to be processed. This list can be used to indicate how much work remains to be done for an automatic function currently in progress (AUTOPROGRESS).
- Request percent full information for the common queue (COMMONQUEUE).
- Request percent full, outstanding recall requests, and recall requests that are currently being processed in the common recall queue (COMMONQUEUE(RECALL)).

## **QUERY**

For more information about the messages associated with the QUERY command, see Appendix C, “Using the QUERY Command,” on page 629.

## Syntax of the QUERY Command



### Notes:

1. You must specify at least one of the optional parameters to have anything displayed.
2. Any QUERY command issued within the startup procedure may not always produce correct data because DFSMSHsm is not yet completely initialized.
3. The SPACE parameter is not supported for SMS-managed volumes.
4. The QUERY command does not support sending the results of the query to an output data set; however, it does support extended consoles. Using TSO/E extended consoles, you can submit programs that can issue a console command, such as a QUERY, and get the results back for interpretation. DFSMSHsm provides a sample REXX program called QUERYSET in SYS1.SAMPLIB(ARCTOOLS). For more details, refer to *z/OS TSO/E REXX Reference*.

---

## Optional Parameters of the QUERY Command

This section describes the optional parameters of the QUERY command.

### ABARS: Displaying Aggregate Backup and Recovery Control Parameters

**Explanation:** ABARS is an optional parameter requesting a list of the DFSMShsm control parameters that apply to aggregate backup and recovery. These control parameters are:

- ABARSACTLOGMSGLEVEL
- ABARSACTLOGTYPE
- ABARSBUFFERS
- ABARSDELETEACTIVITY
- ABARSOPTIMIZE
- ABARSTAPES
- ABARSPROCNAME
- ABARSUNITNAME
- ABARSVOLCOUNT
- ARECOVERML2UNIT
- ARECOVERPERCENTUTILIZED
- ARECOVERTGTGDS
- ARECOVERUNITNAME
- MAXABARSADDRESSSPACE

**Defaults:** None.

### ACTIVE: Displaying All Active Requests

**Explanation:** ACTIVE is an optional parameter requesting the status of each DFSMShsm volume, data set subtask, and long-running command; and what each active one is doing.

To aid in virtual storage constraint relief (VSCR), the active parameter will display the amount of virtual storage (above and below the 16M line) that is unallocated and available to DFSMShsm. The two largest free areas are shown to indicate the level of fragmentation.

**Defaults:** None.

**Note:** In a common recall queue environment, only recall requests from the host that is issuing the QUERY ACTIVE command are returned.

### ARPOOL: Displaying Aggregate Recovery Pools

**Explanation:** ARPOOL is an optional parameter requesting a list of the aggregate recovery pools as specified with the DEFINE ARPOOL command.

If *agname* is specified, the pool for that *agname* and the associated volume serial numbers are listed. If *agname* is not specified, all pools and the volume serial numbers for each pool are listed. If the DEFINE ARPOOL was not previously issued or was issued with the ALL, L0VOLS(\*), or ML1VOLS(\*) parameters, then a message is issued indicating this. A list of the currently ADDVOLed ML1 and primary volumes is also displayed.

**Defaults:** None.

## AUTOPROGRESS: Displaying an Indication of Volumes to Be Processed

**Explanation:** AUTOPROGRESS is an optional parameter you can specify to request information about the number of volumes to be processed. You can get an indication of the number of volumes that have not been processed by an automatic function and the total number of volumes that are eligible for processing by an automatic function. For each automatic function that is processing DFSMShsm-managed volumes on the host where the QUERY AUTOPROGRESS command is issued, the following is reported:

- The number of eligible SMS-managed volumes restricted to this DFSMShsm host that have not been processed. *Restricted to this DFSMShsm host* means that the storage group with which a volume is associated specifies processing for this function only by the host in which the QUERY AUTOPROGRESS command was issued.
- The total number of eligible SMS-managed volumes restricted to this DFSMShsm host. *Restricted to this host* means that the storage group with which a volume is associated specifies processing for this function only by the DFSMShsm host in which the QUERY AUTOPROGRESS command was issued.
- The number of eligible SMS-managed volumes that are not restricted to processing by any DFSMShsm host and have not been processed by this function.
- The total number of eligible SMS-managed volumes that are not restricted to processing by any DFSMShsm host.
- The number of eligible non-SMS-managed volumes that have not been processed by this function.
- The total number of non-SMS-managed volumes that are eligible for processing by this function in this DFSMShsm host.

When QUERY AUTOPROGRESS is used, DFSMShsm displays the information for each automatic function currently processing DFSMShsm-managed volumes. If no automatic functions are processing, DFSMShsm indicates this with message ARC0246I.

### Notes:

1. The count of volumes that remain to be processed may not reflect another processing unit's activity. A volume that is eligible for processing by multiple-DFSMShsm-hosts may have been processed in a DFSMShsm host other than the one where the QUERY AUTOPROGRESS command was issued. If the DFSMShsm host running the QUERY AUTOPROGRESS command has not detected that another DFSMShsm host has processed a volume, that volume is included in the count of volumes that have not been processed.
2. A volume is considered *eligible* if it is defined (via the Storage Group for SMS-managed volumes or the ADDVOL command for non-SMS-managed volumes) as being eligible to be processed by this DFSMShsm host for the active function. For Interval Migration, eligible volumes are only the ones that are above their associated threshold level.
3. A volume is considered *not processed* when both the following conditions are true:
  - The volume is not currently being processed by the active function.
  - The minimum time has elapsed since the last time the associated automatic function processed the volume.

**Defaults:** None.

## BACKUP: Displaying Backup Parameters and Backup Volumes

**Explanation:** BACKUP is an optional parameter for requesting a list of the backup and dump parameters and backup volumes.

Subparameter	Explanation
ALL	A list of all nonfull tape backup volumes and all DASD backup volumes is generated.
DAILY	A list of all nonfull daily tape backup volumes and all daily DASD backup volumes is generated. For <i>day</i> , substitute a decimal number from 1 to 31 to list the daily backup volumes associated with the specified day in the backup cycle.
SPILL	A list of all nonfull tape spill backup volumes and all DASD spill backup volumes is generated.
UNASSIGNED	A list of all nonfull unassigned tape backup volumes and all unassigned DASD backup volumes is generated. There are two types of unassigned volumes: <ul style="list-style-type: none"> <li>• Unassigned backup volumes are those that you specified with the ADDVOL command without using the DAILY or SPILL subparameter (ADDVOL <i>volser</i> BACKUP).</li> <li>• Unassigned daily backup volumes are those that you specified as daily backup volumes with the ADDVOL command, but that you did not associate with any day in the backup cycle (ADDVOL <i>volser</i> BACKUP(DAILY)).</li> </ul>

**Defaults:** If you specify DAILY without *day*, DFSMShsm lists all daily nonfull tape backup volumes and all daily DASD backup volumes.

**Note:** Full backup tapes may appear in the list if you have not issued a FIXCDS REFRESH command.

## CDSVERSIONBACKUP: Displaying the Control Data Set Multiple Backup Support Parameters

**Explanation:** CDSVERSIONBACKUP is an optional parameter requesting a list of the parameters related to the multiple backup copies of the control data sets and journal data set. When you specify this parameter, DFSMShsm lists the values you specified with the CDSVERSIONBACKUP parameter of the SETSYS command.

**Defaults:** None.

## COMMONQUEUE: Displaying Common Queue Information

**Explanation:** COMMONQUEUE is an optional parameter that you can specify without any subparameters to display percent full information for the common queues.

COMMONQUEUE(RECALL) is a subparameter that you can specify to display percent full, outstanding recall requests, and recall requests that are currently being processed in the common recall queue. When you specify this parameter, DFSMShsm provides a snapshot of all recall activity across the CRQplex.

**Defaults:** None.

## CONTROLDATASETS: Displaying Control Data Set Space-Use Information

**Explanation:** CONTROLDATASETS is an optional parameter requesting a list of the space-use information for the MCDS, BCDS, OCDS, and journal data set. The list consists of the following information:

- The serialization technique being used.
- The total space in each data set.
- The percentage of the total occupied space in each data set to the extent that DFSMShsm can determine it.
- The threshold percentage value currently assigned for each data set. When this threshold is exceeded, DFSMShsm sends warning messages to the operator.
- The key boundaries of multicluster data sets.

**Defaults:** None.

**Note:** Information for the JOURNAL data set is based on the last journal update on the host that the QUERY command is entered on. The actual value can be affected by updates made on other hosts.

## COPYPOOL: Displaying Copy Pool Information

**Explanation:** COPYPOOL(*cpname*) is an optional parameter that you specify to list which source volumes in the specified copy pool have an outstanding FlashCopy relationship.

You can use this command to determine if another backup version can be created or if a recover can be performed.

**Defaults:** None.

## CSALIMITS: Displaying the Common Service Area Storage Limits

**Explanation:** CSALIMITS is an optional parameter requesting a list of the common service area (CSA) storage limits. You specify the CSA storage limits with the SETSYS command.

**Defaults:** None.

## DATASETNAME | REQUEST | USER: Displaying Selected Requests

**Explanation:** DATASETNAME(*dsname*) | REQUEST | USER are mutually exclusive, optional parameters requesting a list of selected DFSMShsm requests.

**DATASETNAME(*dsname*)** specifies a list of the requests associated with the specified data set name. For *dsname*, substitute the fully qualified name of the data set for which you want the list of requests.

**REQUEST(*reqnum*)** specifies a list of the specified request number for all requests. For *reqnum*, substitute the DFSMShsm request number.

**USER(*userid*)** specifies a list of the requests associated with a specified user. For *userid*, substitute a 1 to 7 alphanumeric character string for the identification of the particular user.

## QUERY

**Defaults:** If you specify USER without *userid*, DFSMShsm lists requests for all users. If you specify REQUEST without *reqnum*, DFSMShsm lists information for all requests.

**Notes:**

1. DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name, DFSMShsm displays the entire partitioned data set.
2. In a common recall queue environment, only recall requests from the host that is issuing the QUERY DATASETNAME|REQUEST|USER command are returned.

## IMAGE: Displaying Information for the DFSMShsm Address Spaces Active Within A Single z/OS Image

**Explanation:** IMAGE is an optional parameter requesting information on the DFSMShsm address spaces that are active within a single z/OS image. Information displayed includes the host identifier, procedure name used to start the address space, the job identifier, the address space identifier, and the host mode (MAIN or AUX). The information is displayed in message ARC0250I.

**Defaults:** None.

## MIGRATIONLEVEL2: Displaying Key Ranges and Migration Level 2 Volumes

**Explanation:** MIGRATIONLEVEL2 is an optional parameter requesting a list of key ranges and the DASD migration level 2 volume associated with each key range as specified with the DEFINE command. This parameter also displays the tape migration level 2 volumes currently selected for use by the migration functions that output to tape if migration tapes are used in the requesting DFSMShsm host.

**Defaults:** None.

## POOL: Displaying Recall Pools

**Explanation:** POOL is an optional parameter requesting a list of the recall pools as specified with the DEFINE command.

**Defaults:** None.

**Note:** An SMS-managed volume may be displayed on the output listing if the volume was converted from non-SMS-managed to SMS-managed since the last time the pool was defined.

## RETAIN: Displaying Data Set Levels Prevented from Space Management

**Explanation:** RETAIN is an optional parameter requesting a list of the first qualifiers of data sets prevented from space management with the SETMIG command. Data set names and volumes prevented from migrating with the DATASETNAME or VOLUME parameters of the SETMIG command are not listed.

**Defaults:** None.

## **SECURITY: Displaying the Type of Command Authorization in Effect**

**Explanation:** SECURITY is an optional parameter that you specify to request information about the type of command authorization in effect. When you specify this command, DFSMShsm issues a message that indicates whether RACF profiles or the DFSMShsm AUTH command protects DFSMShsm commands.

**Defaults:** None.

## **SETSYS: Displaying Control Parameters**

**Explanation:** SETSYS is an optional parameter requesting a list of the DFSMShsm control parameters. You can change most of these parameters with the SETSYS command; some can only be changed at the startup of DFSMShsm.

**Defaults:** None.

## **SPACE: Displaying Volume Space-Use Information**

**Explanation:** SPACE is an optional parameter requesting a list of information about space used on the specified non-SMS-managed primary volumes and migration level 1 volumes. For *volser* ..., substitute the serial numbers of the volumes whose space-use information you want listed.

**Defaults:** If you specify SPACE without *volser*, DFSMShsm lists space-use information for all primary non-SMS-managed volumes and migration level 1 volumes.

## **STARTUP: Displaying the Startup Information**

**Explanation:** STARTUP is an optional parameter requesting a list of the parameters that were specified when DFSMShsm was started. These parameters were specified on the PROC statement in the DFSMShsm startup procedure.

**Defaults:** None.

## **STATISTICS: Displaying Daily Statistics**

**Explanation:** STATISTICS is an optional parameter requesting a list of selected DFSMShsm daily statistics that have accumulated for the current day.

**Defaults:** None.

## **TRAPS: Displaying Trap Requests**

**Explanation:** TRAPS is an optional parameter requesting a list of trap requests that were specified with the TRAP command.

**Defaults:** None.

## **VOLUMEPOOL: Displaying Current Volume Pools**

**Explanation:** VOLUMEPOOL is an optional parameter requesting a list of the current volume pools that you have specified with the DEFINE command. The current volume pool names and the volumes that make up the volume pools are listed.

**Defaults:** None.

## **WAITING: Displaying the Number of Requests Waiting to Be Processed**

**Explanation:** WAITING is an optional parameter requesting a list of the number of requests on each functional queue waiting for DFSMShsm to process them.

**Defaults:** None.

**Note:** In a common recall queue environment, only recall requests from the host that is issuing the QUERY WAITING command are returned.

---

### **Examples of How to Code the QUERY Command**

For a list of the messages generated by the QUERY command, see Appendix C, “Using the QUERY Command,” on page 629.

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## Chapter 30. RECALL: Recalling a Specific Migrated Data Set

The RECALL command recalls a migrated data set. If you want, you can specify the volume and type of unit where DFSMShsm is to recall the data set.

If you specify the volume and type of unit when recalling an SMS-managed data set, the volume and unit type will be passed to the automatic class selection (ACS) Routines. ACS ultimately determines to which volume the data set is recalled.

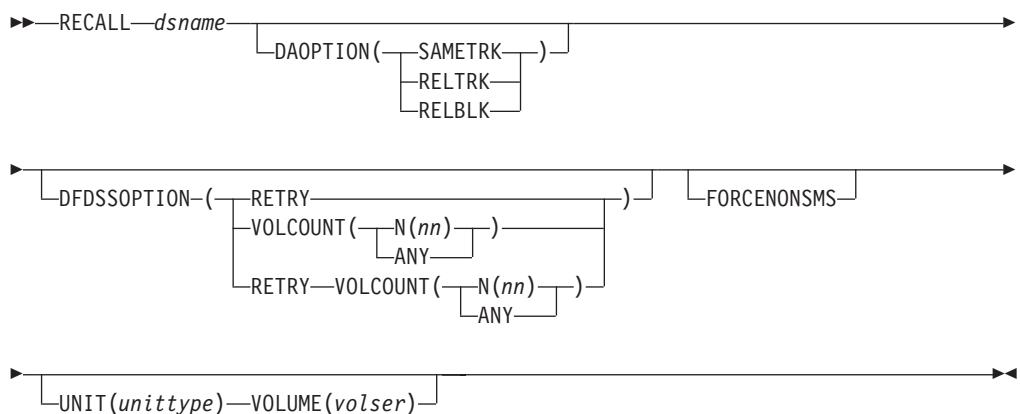
The FORCENONSMS parameter allows the ability to force recall of an SMS-managed data set to a non-SMS-managed volume. It is not possible to convert a data set that is *not* extended format to a data set that is extended format during a recall. However, you can convert an extended format data set to a data set that is *not* extended format during a recall, if you specify the FORCENONSMS optional parameter.

If you do not specify the target volume for a recalled non-SMS-managed data set, and the data set migrated from a primary volume whose primary volume attribute was automatic backup or automatic migration, DFSMShsm automatically tries to recall it to a primary volume having the same set of attributes as the volume it migrated from. If no volume is found and the UNLIKE subparameter was specified with the SETSYS RECALL command, then DFSMShsm can recall to a volume that has unlike attributes.

If a host is connected to a common recall queue (CRQ), recall requests are sent to the CRQ. For information about the common recall queue functions, see the *z/OS DFSMShsm Implementation and Customization Guide*.

---

### Syntax of the RECALL Command



**Note:** You can specify RETRY, VOLCOUNT, or both with the DFDSSOPTION, but you must specify at least one parameter.

---

## Required Parameters of the RECALL Command

This section describes the required parameter of the RECALL command.

### **dsname: Specifying the Name of the Data Set to Be Recalled**

**Explanation:** *dsname* is a required positional parameter specifying the data set that you want to recall. For *dsname*, substitute the fully qualified name of the data set.

**Defaults:** None.

**Notes:**

1. Because *dsname* is a required positional parameter, you must specify it immediately after the command name.
2. You cannot specify an alias for *dsname*. If you do, DFSMShsm does not recall the data set.
3. DFSMShsm does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFSMShsm processes the entire partitioned data set. If *dsname* is a VSAM data set name, specify the base cluster name, any component name, or any path name. If the sphere has more than one AIX, more than one path, or more than one path to the AIX, only the base cluster name can be specified for RECALL. The entire VSAM sphere is recalled.
4. Multiple path names to an alternate index are not supported. Only the last path name listed in the catalog is preserved.

---

## Optional Parameters of the RECALL Command

This section describes the optional parameters of the RECALL command.

### **DAOPTION: Selecting Target Volume Track Length**

**Explanation:** DAOPTION(SAMETRK | RELTRK | RELBLK) are mutually exclusive, optional parameters specifying the type of data set accessing required (relative track or relative block) upon recall of a direct access data set. This, in turn, implies the allowable target volume device types.

Subparameter	Explanation
SAMETRK	If DFSMShsm is not directed to a volume by the VOLUME parameter, it selects a target volume having the same track length as the last L0 volume from which the data set was migrated. If DFSMShsm is directed to a specific volume by the VOLUME parameter, this volume must have the same track length as the last L0 volume from which the data set was migrated. Data will be moved as a track-to-track image, accessible for both relative track and relative block processing.
RELTRK	If DFSMShsm is not directed to a volume by the VOLUME parameter, it attempts to select a target volume having the same track length as the last L0 volume from which the data set was migrated. If no volume of equal track length is available, the target volume selected may have a larger track length than the last L0 volume. If DFSMShsm is directed to a specific volume by the VOLUME parameter, this volume must have the same or greater track length than the last L0 volume from which the data set was migrated. Data is moved as a track-to-track image, accessible by relative track addressing.

Subparameter	Explanation
RELBLK	If DFSMSHsm is not directed to a volume by the VOLUME parameter, it attempts to select a target volume having the same track length as the last L0 volume from which the data set was migrated. If no volume of equal track length is available, the target volume selected may have a larger or smaller track length than the last L0 volume. If DFSMSHsm is directed to a specific volume by the VOLUME parameter, this volume can have any track length. Data will be moved to fill out the track, accessible by relative block addressing.

**Defaults:** If DAOPTION is not specified, the target volume selection is unchanged and data is moved as a track image, allowing for relative track addressing.

**Note:** Only basic direct access method (BDAM) data sets are supported by this option. Using DAOPTION to recall a data set as SMS-managed is not supported. If a data set would be SMS-managed after the recall, the FORCENONSMS parameter of RECALL must be used to force it to be non-SMS-managed.

## DFDSSOPTION: Pass Optional Parameters to DFSMSdss

**Explanation:** DFDSSOPTION(RETRY | VOLCOUNT) is an optional parameter that causes DFSMSHsm to pass optional parameters to DFSMSdss when recalling certain types of data sets or to specify the number of volumes a data set can extend to.

RETRY is applicable to the recalling of the following types of data sets and is ignored by DFSMSHsm if specified for other types of data sets:

- Partitioned data set: When the initial recall of the data set fails and a DFSMSdss message requests the use of the NOPACKING option. RETRY specifies for DFSMSHsm to pass this NOPACKING option to DFSMSdss.
- Keyed VSAM data set: When the initial recall of the data set fails and a DFSMSdss message requests the use of the FREESPACE(0 0) option, to retry the restore to a like device, or both. If the data set is not SMS-managed, also specify VOLUME(volser) UNIT(unittype) parameter on the recall command. RETRY specifies for DFSMSHsm to pass this FREESPACE option to DFSMSdss.

VOLCOUNT(ANY | N(nn)) allows an SMS data set to extend to additional volumes within the same storage group, when space is available. The VOLCOUNT parameter is limited to SMS data set types supported as multivolume data sets. Refer to the *z/OS DFSMSdss Storage Administration Reference* under the topic of the RESTORE command for more information regarding restrictions and limitations of the VOLCOUNT parameter.

VOLCOUNT(ANY) results in the allocation of the target data set on as many volumes as required, to a maximum of 59.

VOLCOUNT(N(nn)) allows users to specify the number of volumes to be used for SMS data set allocation. *nn* can be any value from 0 to 59. When you specify the number of volumes the data set is allocated to, the allocation of the data set will be limited to that number of volumes or will be extended to that number of volumes.

The VOLCOUNT(N(nn)) parameter is ignored if specified with the DFSMSHsm VOLUME parameter. If a volume count VOLCOUNT(N(nn)) is specified and the

## RECALL

VOLUME parameter is also specified, the resulting volume count for the data set will be one (1). If inadequate space exists on the specified volume, the allocation fails.

**Defaults:** None.

**Note:** If you specify the RECALL command with the VOLCOUNT parameter, it overrides any option used on the SETSYS VOLCOUNT command.

## FORCENONSMS: Recalling an SMS-Managed Data Set to a Non-SMS-Managed Volume

**Explanation:** FORCENONSMS is an optional parameter that forces a data set to be recalled to a non-SMS-managed volume. Use this parameter if SMS is not active or if SMS is active and you need to return a data set to non-SMS-managed status.

**Defaults:** None.

**Note:** If SMS is not active, a recall request for an SMS-managed data set will fail unless the FORCENONSMS parameter is specified on the RECALL command.

## UNIT: Specifying the Type of Device

**Explanation:** UNIT(*unittype*) is an optional parameter specifying the type of unit to which DFSMShsm can allocate the target volume. A target volume is the volume that receives the recalled data set. For *unittype*, substitute the type of unit to which DFSMShsm can allocate the target volume.

The following are valid types of DASD units:

- 3380
- 3390
- 9345

**Defaults:** None.

**Notes:**

1. If you specify UNIT, you must also specify the VOLUME parameter.
2. If the block size of the data set is greater than the track capacity of the target volume, track overflow must be supported in both software and hardware. This applies to devices whose track size is less than 32K.
3. When you specify the UNIT parameter, DFSMShsm passes that unit name to the automatic class selection (ACS) routines to determine whether the data set should be recalled to an SMS-managed volume. Refer to *z/OS DFSMShsm Storage Administration Guide* for more information about automatic class selection.

## VOLUME: Specifying the Volume to Receive the Recalled Data Set

**Explanation:** VOLUME(*volser*) is an optional parameter specifying the volume that is to receive the recalled data set. This volume is called the target volume. The volume does not have to be managed by DFSMShsm. For *volser*, substitute the serial number of the target volume.

**Defaults:** If you do not specify the VOLUME parameter, DFSMShsm recalls the non-SMS-managed data set to the eligible primary volume with the most space available, unless the recalled data set is associated with a recall pool.

**Notes:**

1. If you specify VOLUME, you must also specify the UNIT parameter.
2. In a JES3 environment, do not specify the *volser* of a volume because JES3 preselects a set of volumes. If you specify a volume that is not in that preselected list, DFSMShsm fails the recall.
3. When you specify the VOLUME parameter, the target volume must have enough space available for the data set. Otherwise, DFSMShsm fails the recall.
4. When you specify the VOLUME parameter, DFSMShsm passes that volume serial number to the automatic class selection (ACS) routines to determine whether the volume is managed by SMS before recalling the data set. Refer to *z/OS DFSMShsm Storage Administration Guide* for more information about automatic class selection.
5. If both VOLUME and the VOLCOUNT(N(nn)) parameters are specified, the resulting volume count for the data set will be one (1). If space does not exist on the specified volume, the allocation fails.

## Examples of How to Code the RECALL Command

The following examples present different ways to code the RECALL command:

**Note:** Any values specified here are examples only and should not be interpreted as the values to be used for your system.

### Recalling an SMS-Managed Data Set to a Non-SMS-Managed Volume

**Example:** In this example, a data set that was SMS-managed at the time it was migrated is recalled as a non-SMS-managed data set.

```
RECALL JMG4916.PLACE.TEXT FORCENONSMS VOLUME(VOL255) UNIT(3390)
```

### Recalling an SMS-Managed Data Set to a Volume Selected by ACS Services

**Example:** In this example an SMS-managed data set is recalled to a volume selected by automatic class selection routines.

```
RECALL JMG2384.PLACE2.TEXT
```

### Recalling a Non-SMS-Managed Data Set to a Specific Volume

**Example:** In this example, the data set is recalled to a specific volume.

```
RECALL XXX5634.PARTS.ASM VOLUME(VOL123) UNIT(3390)
```

### Recalling a Non-SMS-Managed Data Set to a Volume Selected by DFSMShsm

**Example:** In this example, the data set is recalled to a primary volume selected by DFSMShsm.

## RECALL

```
RECALL LHE1256.REVISION.TEXT
```

### Recalling a DA Data Set for Relative Block Accessing

**Example:** In this example, a data set is directed to a specific volume and the data is moved so that it can be accessed by relative block addressing.

```
RECALL ND5718.PARTS DAOPTION(RELBLK) +
VOLUME(VOL195) UNIT(3390)
```

### Recalling a Data Set That Failed Because of Inadequate Space

**Example:** In this example, a data set was not recalled by DFSMSdss because an inadequate space condition occurred. The RECALL command can be issued again with the VOLCOUNT parameter allowing the data set to be recalled to as many volumes as needed (maximum of 59) for successful allocation. DFSMShsm passes the VOLCOUNT parameter to DFSMSdss.

```
RECALL C253800.ID.PARTS DFDSSOPTION(VOLCOUNT(ANY))
```

---

## Chapter 31. RECOVER: Recovering a Backup Version or Dump Copy of a Data Set or a Volume

The RECOVER command causes DFMSHsm to invoke DFSMSdss to do a physical restore of the requested data set or volume when you specify the FROMDUMP parameter with the command. If you also specify the APPLYINCREMENTAL parameter with the RECOVER command (following the restore), DFMSHsm recovers data sets incrementally backed up by DFMSHsm if backup occurred after the dump. You can tell DFMSHsm to use a particular dump copy as the source of the restore by specifying one of the following parameters with the RECOVER command:

- DATE
- DUMPCLASS
- DUMPGENERATION
- DUMPVOLUME

When the RECOVER command is issued without the FROMDUMP parameter, DFMSHsm recovers a level 0 volume, or an incremental backup version of a data set, or a dump copy of a data set, depending on which copy is more current. If there are no records of the data set in the BCDS, and there is no catalog entry for the data set on the volume from which the dump copy was made, the recovery fails. If a dump copy of the data set exists, a RECOVER command issued with the FROMDUMP parameter could successfully recover the data set. For additional information of SMS-managed data sets, refer to "Restoring a Data Set from a DFMSHsm Dump Copy", the Availability Management of SMS-Managed Storage chapter, in *z/OS DFMSHsm Storage Administration Guide*. For additional information of non-SMS-managed data sets, refer to "Data Set Restore from a DFMSHsm Dump Copy", the Availability Management of Non-SMS-Managed Storage chapter, in *z/OS DFMSHsm Storage Administration Guide*.

When FROMDUMP DUMPVOLUME is not specified, the restore of a multiple striped data set will be from an incremental backup version. If no incremental backup version exists, the restore will fail. To restore an extended format data set from a dump volume, the FROMDUMP DUMPVOLUME parameter must be used for each extended format data set.

You can use the recovered version of the data set to replace an existing data set. You can also rename the recovered version to have two versions of the same data set. If you want to recover backup versions of a migrated data set, use one of the following procedures:

- Recall the migrated data set and recover a backup version of that data set.
- Delete the migrated data set and recover a backup version of the deleted data set.
- Specify the NEWNAME parameter and recover a backup version of that data set. The NEWNAME parameter cannot be the name of a migrated data set.
- If none of the above three procedures works, use the FIXCDS command to delete the MCDS data set (MCD) record for the migrated data set and uncatalog the data set. Then recover the backup version of the data set.

You normally run volume recovery when an entire DASD pack has been lost or damaged or when a significant amount of the data is no longer accessible.

## RECOVER

If a data set being recovered spans to a second or more volumes, and the data set resides on disaster alternate volumes that are in a tape library, DFSMShsm will verify and correct the tape library volume record for the first volume and the original volumes in the volume list only. The message ARC0184I RC=4 is issued for all other volumes that are disaster alternate volumes. The message ARC0184I RC=4 is issued for an MCT record that cannot be found for the disaster alternate volume.

Disaster alternate volumes do not have MCT records. The MCT is for an original volume only. The message ARC0184I RC=4 is not an indication of an error condition for a disaster alternate volume. The disaster alternate volume will be allocated and the recovery process will continue.

This following example shows a volume list for a data set spanning four volumes.

```
TAPEA - DISASTER ALTERNATE VOLUME - TAPE LIBRARY RECORD VERIFIED.  
TAPEB - DISASTER ALTERNATE VOLUME - MESSAGE ARC0184I RC=4.  
TAPEC - ORIGINAL TAPE VOLUME - TAPE LIBRARY RECORD VERIFIED.  
TAPED - DISASTER ALTERNATE VOLUME - MESSAGE ARC184I RC=4.
```

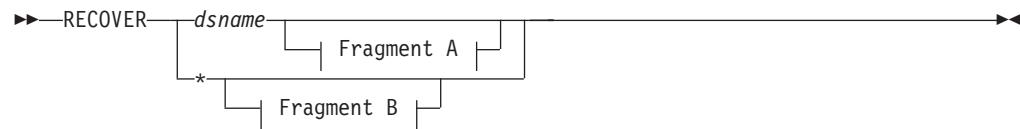
When replacing an existing SMS-managed data set, DFSMShsm normally recovers or restores the data set to the volume on which the data set is currently cataloged; however, for SMS-managed VSAM data sets, VTOC/Data Set Services selects the target volume. In addition, the SMS class names that currently exist in the catalog for the data set are maintained, regardless of what the class names were at the time of backup or dump.

When recreating a deleted data set, DFSMShsm determines a new class name by invoking the ACS routines. The result of invoking ACS determines if the data set is to be SMS-managed, VTOC/Data Set Services chooses the target volume, and the newly determined class name is associated with the data set.

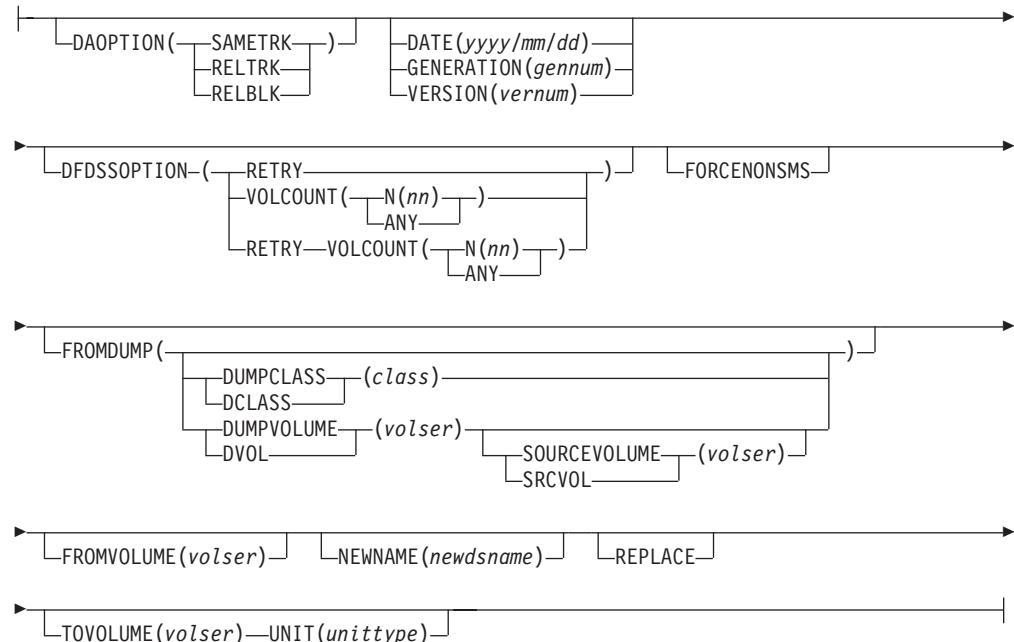
The exception to the above rules for replacing and recreating SMS-managed data sets is when the FORCENONSMS parameter is issued with the RECOVER command. The FORCENONSMS parameter can force recovery of an SMS-managed data set to a non-SMS-managed volume. It is not possible to convert a data set that is *not* extended format to a data set that is extended format during recovery. However, you can convert an extended format data set to a data set that is *not* extended format during a recovery, if you specify the FORCENONSMS optional parameter.

The REPLACE subparameter is required when replacing an existing data set.

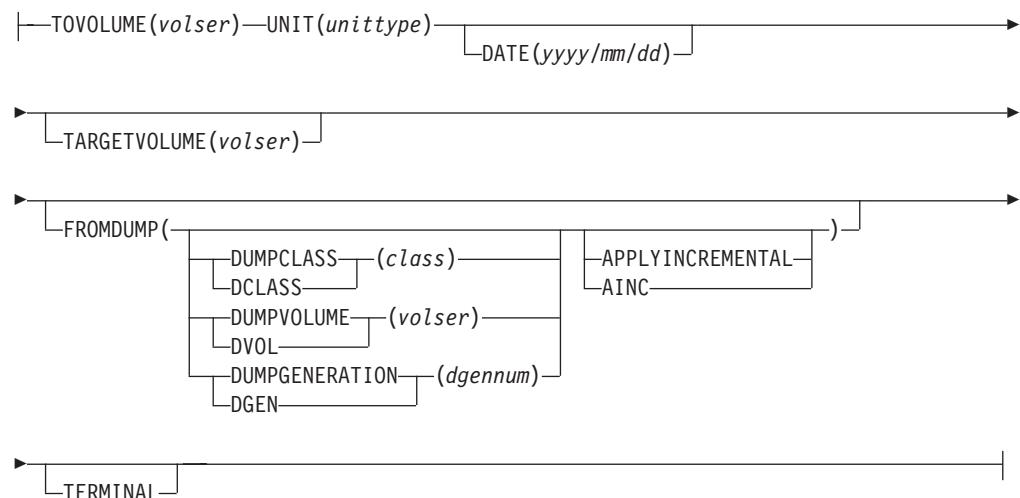
## Syntax of the RECOVER Command



### A: RECOVER Optional Parameters:



### B: RECOVER Optional Parameters:



---

## Required Parameters of the RECOVER Command

This section describes the required parameters of the RECOVER command.

### **dsname | \*: Specifying the Name of the Data Set to Be Recovered**

**Explanation:** *dsname* is a required positional parameter specifying the fully qualified name of the data set you want to recover. For *dsname*, substitute the fully qualified name of the data set you want to recover. You can specify an asterisk (\*) as the *dsname* to request that the volume you identify with the TOVOLUME parameter is recovered. Unless FROMDUMP is specified, the volume must be a level 0 volume. If FROMDUMP is specified, the volume can be a DFSMShsm-owned DASD volume.

During volume recovery, if DFSMShsm created backup versions of both cataloged and uncataloged data sets that have the same data set name and DFSMShsm created them from the volume being recovered, DFSMShsm recovers the backup version that has the latest creation date and the same data set organization.

**Defaults:** None.

**Notes:**

1. Because *dsname* is a required positional parameter, you must specify it immediately after the command name. You cannot specify an alias for *dsname*. If you do, DFSMShsm does not recover the data set.
2. DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name, DFSMShsm recovers the entire partitioned data set.
3. A DUMP VTOC copy data set must exist in order to restore a data set from a DUMP copy, except when the DUMPVOLUME subparameter is specified. By using the DUMPVOLUME subparameter, you are deliberately bypassing this requirement; therefore, no data set verification is performed on the dump tape. If the data set you are trying to restore is not on the dump tape, DFSMShsm still ends with a successful message even though the data set was not restored.
4. DFSMShsm cannot recover an integrated catalog facility catalog data set from a dump copy. An integrated catalog facility catalog that was dumped by DFSMShsm can be recovered from a dump copy without DFSMShsm.

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## Optional Parameters of the RECOVER Command

This section describes the optional parameters of the RECOVER command.

### **DAOPTION: Selecting Target Volume Track Length**

**Explanation:** DAOPTION(SAMETRK | RELTRK | RELBLK) are mutually exclusive, optional parameters specifying the type of data set accessing required (relative track or relative block) upon recovery of a direct access data set. This, in turn, implies the allowable target volume device types.

Subparameter	Explanation
SAMETRK	Data is moved as a track-to-track image and the target volume track size must be the same as the L0 volume from which the data set was backed up. If DFSShsm is directed to a specific volume by the TOVOLUME parameter, this volume must have the same track length as the L0 volume from which the data set was backed up. Data can be accessed for both relative track and relative block processing.
RELTRK	Data is moved as a track-to-track image and the target volume track size must be the same or greater than the L0 volume from which the data set was backed up. If DFSShsm is directed to a specific volume by the TOVOLUME parameter, this volume must have the same or greater track length as the L0 volume from which the data set was backed up. Data can be accessed for relative track processing.
RELBLK	Data is moved to fill out the track and the target volume track size can be the same, greater, or smaller than the L0 volume from which the data set was backed up. Data can be accessed for relative block processing.

**Defaults:** If DAOPTION is not specified, the data is moved as a track image, allowing for relative track accessing.

**Note:** Only basic direct access method (BDAM) data sets are supported by this option. Using DAOPTION to recover a data set as SMS-managed is not supported. If a data set would be SMS-managed after the recover, the FORCENONSMS parameter of RECOVER must be used to force it to be non-SMS-managed.

## DATE | GENERATION | VERSION: Specifying the Particular Backup Version or Dump Copy to Recover

**Explanation:** DATE(yyyy/mm/dd) | GENERATION(gennum) | VERSION(vernum) are mutually exclusive, optional parameters specifying the particular backup version or dump copy of one or more data sets you want to recover.

DATE(yyyy/mm/dd) can be used to specify the particular dump copy to be used for a restore. DATE applies when recovering a backup version or dump copy of a specific data set or an entire volume. For yyyy/mm/dd, substitute the date for the backup version or dump copy of the data set or volume that you want to recover in the following form. A leading zero is not required for a one-digit month or day. If DFSShsm is recovering a data set, it recovers the latest backup version that was created on or before the date you specified. If DFSShsm is recovering a volume, DFSShsm recovers the latest backup version of each data set that was backed up on or after the date you specified. If DFSShsm is recovering a volume from a dump copy, the most recent dump copy made on or before the date is selected. If DFSShsm is recovering a data set from a dump copy and the data set is cataloged, the most recent dump copy made on or before the date is selected. If the data set is not cataloged, there must be an incremental backup version created on or prior to the date for the data set to be recovered from the dump copy.

GENERATION(gennum) specifies that you want to recover a particular incremental backup version of a specific data set. For gennum, substitute the relative generation number of the backup version of the data set to be recovered. A 0 specifies the

## RECOVER

latest version, 1 specifies the next to the latest version, and so on, to the maximum number of versions existing for the data set. The *gennum* can be up to 3 digits long.

**VERSION(vernun)** specifies that you want to recover a particular version of a backed up data set. For *vernun*, substitute a decimal number from 1 to 999 for the particular backup version you want to recover. If DFSMShsm is unable to find the specified backup version, the recover fails and message ARC1128I is issued.

**Defaults:** If you do not specify DATE, GENERATION, or VERSION, DFSMShsm recovers the latest backup version of the data set.

### Notes:

1. The GENERATION and VERSION parameters do not apply to volume recovery. If you specify GENERATION or VERSION when it does not apply, DFSMShsm ignores it.
2. The GENERATION or VERSION parameters should not be specified if FROMDUMP is specified.
3. DATE should not be specified if DUMPVOLUME or DUMPGENERATION is specified.
4. If either the GENERATION or the VERSION parameter is specified, DFSMShsm selects only from incremental backups and will not recover from physical dump copies, even if the physical dump is more recent.

## DFDSSOPTION: Pass Optional Parameters to DFMSMdss

**Explanation:** **DFDSSOPTION(RETRY | VOLCOUNT)** is an optional parameter that causes DFSMShsm to pass optional parameters to DFMSMdss when recovering certain types of data sets or to specify the number of volumes a data set can extend to.

RETRY is applicable to the recovery of the following types of data sets and is ignored by DFSMShsm if specified for other types of data sets:

- Partitioned data set: When the initial recovery of the data set fails and a DFMSMdss message requests the use of the NOPACKING option, RETRY specifies for DFSMShsm to pass this NOPACKING option to DFMSMdss.
- Keyed VSAM data set: When the initial recovery of the data set fails and a DFMSMdss message requests to use the FREESPACE(0 0) option, to retry the restore to a like device, or both. If the data set is not SMS-managed, also specify the TOVOLUME(volser) UNIT(unittype) parameters on the recover command. RETRY specifies for DFSMShsm to pass this FREESPACE option to DFMSMdss.

**VOLCOUNT(ANY | N(nn))** allows an SMS data set to extend to additional volumes within the same storage group, when space is available. The VOLCOUNT parameter is limited to SMS data set types supported as multivolume data sets. Refer to the *z/OS DFMSMdss Storage Administration Reference* under the topic of the RESTORE command for more information regarding restrictions and limitations of the VOLCOUNT parameter.

**VOLCOUNT(ANY)** results in the allocation of the target data set on as many volumes as required, to a maximum of 59.

**VOLCOUNT(N(nn))** allows users to specify the number of volumes to be used for SMS data set allocation. *nn* can be any value from 0 to 59. When you specify the

number of volumes the data set is allocated to, the allocation of the data set will be limited to that number of volumes or will be extended to that number of volumes.

The VOLCOUNT(N(nn)) parameter is ignored if specified with the DFSMShsm TOVOLUME parameter. If a volume count VOLCOUNT(N(nn)) is specified and the TOVOLUME parameter is also specified, the resulting volume count for the data set will be one (1). If inadequate space exists on the specified volume, the allocation fails.

**Defaults:** None.

**Note:** If you specify the RECOVER command with the VOLCOUNT parameter, it overrides any option used on the SETSYS VOLCOUNT command.

## FORCENONSMS: Recovering an SMS-Managed Data Set to a Non-SMS-Managed Volume

**Explanation:** FORCENONSMS is an optional parameter that forces a data set to be recovered to a non-SMS-managed volume. Use this parameter if SMS is not active or if SMS is active and you need to return a data set to non-SMS-managed status.

**Defaults:** None.

**Notes:**

1. If SMS is not active, a recover request for an SMS-managed data set fails unless the FORCENONSMS parameter is specified on the RECOVER command.
2. A non-SMS target volume must be known to DFSMShsm to complete the request. This can be obtained through:
  - The TOVOLUME and UNIT parameters if the data was backed up as SMS.
  - The volume from which the data set was backed up if backed up as non-SMS.
  - The volume from which the data set migrated if migrated as non-SMS.

## FROMDUMP: Specifying Which Dump Copy Is Used for Restoring Data Sets

**Explanation:** FROMDUMP is an optional parameter specifying which dump copy should be used for the restore.

FROMDUMP specifies the recovery should use a dump copy from dump volumes.

DUMPCLASS(class) | DUMPVOLUME(volser) | DUMPGENERATION(dgennum) are mutually exclusive, optional subparameters of FROMDUMP specifying a particular class, volume, or generation from which the restore should be made. Neither DUMPGENERATION nor DUMPVOLUME should be specified if the DATE parameter is specified.

Subparameter	Explanation
DUMPCLASS(class)	The dump copy to be used to restore a data set or volume should come from a particular class. This subparameter is needed only if the source volume was dumped to more than one dump class. For class, substitute from 1 to 8 alphanumeric characters for the class of the volume from which the data set or volume is to be restored.

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Subparameter	Explanation
DUMPVOLUME( <i>volser</i> )	A particular dump volume is used for restoring a data set or a volume. For <i>volser</i> , substitute the volume serial number of one of the dump volumes that contains part of the wanted dump copy of the source volume to be restored. DUMPVOLUME is not valid when GENERATION, VERSION, DATE, DUMPCLASS, or DUMPGENERATION are specified.
SOURCEVOLUME( <i>volser</i> )	The identified dump copy is used when the data set to be recovered from a dump is not cataloged or is migrated, and has no backup copy, and more than one valid dump copy is stacked on the volume specified with DUMPVOLUME.

If a multivolume, cataloged data set is to be recovered, the RECOVER command must be issued with the FROMDUMP parameter and the DUMPVOLUME subparameter to ensure that DFSMShsm directs each part of the data set to the correct volume. In this case, the TOVOLUME parameter is optional but, if used, must be the name of the volume as identified in the catalog entry.

There must be similar device types between the original DASD and the target DASD, with the exception that you may recover data dumped from a 3380 DASD to a 3390 DASD that is in 3380 emulation mode. The following is a scenario example:

- The volume serial number PRIM01 is a 3380 DASD dumped to tape cartridge DUMP05.
- All 3380 DASD devices have been replaced by 3390 DASD.
- The 3390 DASD runs in a 3380 emulation mode and initializes with the volume serial number PRIM01.
- The command to recover PRIM01 is as follows:

```
RECOVER * TOVOLUME(PRIM01) UNIT(3380) FROMDUMP(DUMPVOL(DUMP05))
```

DUMPGENERATION(*dgennum*) specifies that a particular dump generation should be used as a source for restoring a volume. The *dgennum*, can be up to three digits long, but its value must be between zero and 99. Zero is the most-recent generation. Use the LIST command to determine what generation numbers exist. DUMPGENERATION should not be specified if you are restoring a single data set.

APPLYINCREMENTAL specifies that an incremental volume recovery process is to follow immediately after the volume restore and is to be a part of the single request to recover a specific volume. APPLYINCREMENTAL has meaning only when a volume is being restored. The volume does not have to have been processed by the DFSMShsm volume backup function. If the volume was not backed up with the DFSMShsm function, DFSMShsm still tries to find more recent backup versions created from individual data set backup requests after the dump copy was created. It is not applicable if a data set request is entered.

### Notes:

1. The APPLYINCREMENTAL parameter is not honored if DFSMShsm determines that the target volume is owned by a ICF catalog that resides on the target volume. This is to avoid conflicts in the way DFSMShsm supports ICF catalogs and the data sets cataloged in them.
2. If Data Facility Product Version 2 Release 3.0 or higher is not installed, you cannot use the APPLYINCREMENTAL parameter during backup and recovery when the target volume has an Integrated Catalog Facility catalog.

3. The APPLYINCREMENTAL parameter is not allowed when the target volume is a DFSMShsm-owned volume.
4. The SOURCEVOLUME subparameter is only used to identify which dump copy on a dump volume should be used to restore a data set. It does not have all the implications of the FROMVOLUME parameter.
5. If you use DUMPVOLUME to specify a dump tape, and that dump volume has more than one valid dump copy stacked on it, each dump copy is for a different source volume. For DFSMShsm to restore the data set, it must be told which source volume (which dump copy) is needed. It uses information in the following order: FROMVOLUME (if specified); SOURCEVOLUME (if specified); the volser where the data set is cataloged; if not cataloged, the volume from which the data set was last backed up. If none of these is specified or available, the RECOVER command fails.

**Defaults:** None.

## FROMVOLUME: Specifying the Volume from Which the Backup Version of a Data Set Has Been Created

**Explanation:** FROMVOLUME(*volser*) is an optional parameter specifying that the data set was uncataloged and that it resided on the volume specified by *volser* when DFSMShsm created the backup version or dump copy. For *volser*, substitute the serial number of the volume where the data set resided when DFSMShsm created the backup version or dump copy. If FROMVOLUME is used to direct DFSMShsm to restore a data set from a dump copy, the dump copy made from FROMVOLUME specified is used regardless of the catalog status of the data set when the dump copy was first made. The data set is restored to the FROMVOLUME specified and left uncataloged.

**Defaults:** None.

### Notes:

1. The FROMVOLUME parameter applies only to data set recovery; it does not apply to volume recovery. If you specify FROMVOLUME when it does not apply, DFSMShsm ignores it.
2. You must specify the FROMVOLUME parameter if the data set you want to recover was uncataloged when it was backed up.
3. DFSMShsm recovers only cataloged data sets unless you specify FROMVOLUME.
4. DFSMShsm does not catalog the recovered backup version or dump copy when you specify the FROMVOLUME parameter.
5. The FROMVOLUME parameter does not apply to VSAM data sets.
6. If the data set does not exist on the target volume for the recovery, automatic class selection routines are invoked to determine if the data set should be recovered as SMS, if FROMVOLUME is not specified.
7. If FROMVOLUME is specified, DFSMShsm recovers the data set as a non-SMS.

## NEWNAME: Specifying a New Data Set Name for the Recovered Data Set

**Explanation:** NEWNAME(*newdsname*) is an optional parameter specifying a new, fully qualified data set name for the recovered backup version or dump copy. For *newdsname*, substitute a new, fully qualified data set name for the recovered data set.

## RECOVER

If a cataloged data set exists with the same name as the new name you are specifying, you must specify the REPLACE parameter to replace the existing cataloged data set. If an uncataloged data set with the same name as the new name you are specifying exists on the volume, you must specify the REPLACE parameter to replace the existing uncataloged data set.

**Defaults:** None.

**Notes:**

1. The NEWNAME parameter applies only to data set recovery. If you specify NEWNAME when it does not apply, DFSMShsm ignores it.
2. You must specify NEWNAME when a data set exists with the same data set name as the data set that you are recovering and you want to keep both versions of the data set.
3. If a VSAM data set is being recovered and you specify NEWNAME, the new data set name can be cataloged in the same or different catalog as the original data set under the following restrictions:
  - a. If the new data set will be cataloged in a different catalog than the original, only the base cluster will be recovered, even when there were alternate indexes at the time of backup. You may use the access method services (AMS) BLDINDEX facility to rebuild the alternate indexes (AIX).
  - b. If the old data set does not exist, the new data set can be recovered provided the original data set's data and index components follow these standard naming conventions:
    - The old data component was the base cluster name followed by the .DATA qualifier.
    - The old index component was the base cluster name followed by the .INDEX qualifier.

For VSAM data sets not cataloged in the Integrated Catalog Facility catalog, if you specify TOVOLUME with NEWNAME, the volume must be owned by the catalog where the data set being recovered will be cataloged.

4. The following only applies if DFHSM 2.6.0 (or earlier release) was used to move the data during backup. When you specify NEWNAME for VSAM data sets, DFSMShsm will fail the recovery if the original data set exists and has two or more paths defined to the base cluster. In some cases the path defined to the base cluster will not be recovered; use the (AMS) DEFINE PATH command.

Additionally, the data and index object names of the data set being recovered must be the same as the data and index object names that were exported. The object names of the data set being recovered will be passed to AMS IMPORT for renaming the NEWNAME data set. The access method services facility (AMS) then verifies that the data and index object names of the data set being recovered are the same as the ones that were exported.

5. DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name for either the data set name or the new data set name, DFSMShsm fails the command.
6. The NEWNAME parameter is not allowed when FROMDUMP is specified to restore an existing VSAM data set.
7. If a VSAM data set is being recovered and the original data set exists, but no BACKUP COPY exists (only a DUMP COPY exists), and you specify NEWNAME, the RECOVER command will fail. DFSMSdss does not support the NEWNAME option for VSAM data sets, so the restore must use the original data set name.

8. You can recover a backup version of a migrated data set if you specify the NEWNAME parameter. For VSAM data sets, the following is required for recovery to a new name:
  - There is zero or one path defined to the base cluster, and
  - There is zero or one alternate index, and
  - There is zero or one path defined to the alternate index.

The newname parameter cannot be the name of the migrated data set.

## **REPLACE: Specifying That the Recovered Backup Version or Dump Copy Is to Replace Any Existing Data Set of the Same Name**

**Explanation:** REPLACE is an optional parameter specifying that the recovered backup version or a dump copy of the uncataloged data set replaces any existing uncataloged data set with the same data set name on the target volume. If the data set is cataloged, DFSMShsm scratches it and recatalogs the data set with the same data set name. If you specify the NEWNAME parameter and the new name is the same as the name of an existing data set, you must specify the REPLACE parameter. If you do not, DFSMShsm fails the RECOVER command.

**Defaults:** When DFSMShsm recovers a volume, it always replaces data sets with the same name on the target volume.

### **Notes:**

1. If you do not specify the REPLACE or NEWNAME parameter for an existing data set, DFSMShsm does not recover the data set. For cataloged data sets, the old copy remains cataloged. For uncataloged data sets, the data set by the same name remains on the target volume.
2. The data set to be replaced must have the same organization as the data set from which the backup version was created. If the backup version is being recovered and both the backup version and the target data set are cataloged, DFSMShsm fails the RECOVER request when the data set organizations do not match.

## **TARGETVOLUME: Specifying the Volume to Receive the Restored Data Sets**

**Explanation:** TARGETVOLUME(*volser*) is an optional parameter specifying that volume restore should use the volume specified by *volser* and change this *volser* to the volser of the TOVOLUME parameter during the restore operation.

**Defaults:** None

### **Notes:**

1. TARGETVOLUME is only valid when the TOVOLUME and FROMDUMP parameters are specified. If you specify TARGETVOLUME when it does not apply, an error message will be issued.
2. If you do not specify TARGETVOLUME, a volume with the *volser* specified in the TOVOLUME parameter must exist and be online.
3. If you are restoring an SMS-managed volume and specify APPLYINCREMENTAL, either the TARGETVOLUME volume or another SMS-managed volume must be available to be selected as directed by your ACS routines for the APPLYINCREMENTAL portion to recover later backup versions. Even if the TARGETVOLUME volume is SMS and selectable, APPLYINCREMENTAL processing might select another available SMS volume.

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4. If you specify APPLYINCREMENTAL and TARGETVOLUME, the TOVOLUME unit must be varied offline before you enter the RECOVER command. Otherwise, the command fails with message ARC0256I.
5. After the RECOVER command completes, additional steps may be required to complete the volume change and to establish access to the restored volume. Check all DFSMSHsm, DFSMSdss, and system messages issued during the Volume Restore. Since the TARGETVOLUME must be online, if the TOVOLUME is also ONLINE, when APPLYINCREMENTAL is NOT specified, check for DFSMSdss message ADR344I indicating that a duplicate volume will be varied offline. ADR344I includes the unit to be varied offline. Following this, check for messages like IEF281I 0E19 NOW OFFLINE indicating the volume is offline. If this is the unit for TARGETVOLUME, after the command completes, you will need to vary the TOVOLUME unit OFFLINE and then vary the TARGETVOLUME unit ONLINE. IBM recommends that you display the units before issuing the RECOVER command, and note the units and associated volser for both the TOVOLUME and TARGETVOLUME. After the RECOVER command completes, study all messages and again display the units to decide if further action is needed.

## TERMINAL: Requesting That Volume Recovery Messages Appear at the Terminal

**Explanation:** TERMINAL is an optional parameter requesting that volume recovery messages be sent to the system console and to the backup activity log when DFSMSHsm recovers a volume.

**Defaults:** If you do not specify TERMINAL when you want to recover a volume, DFSMSHsm sends the output only to the backup activity log.

**Note:** TERMINAL applies only to volume recovery. In addition, you must issue the TERMINAL parameter of the RECOVER command from the system console. If you specify TERMINAL when it does not apply, DFSMSHsm ignores it.

## TOVOLUME: Specifying the Volume to Receive the Recovered Data Set

**Explanation:** If you are recovering a data set, TOVOLUME(*volser*) is an optional parameter specifying which volume should receive the recovered data set. For *volser*, substitute the serial number of the volume that is to receive one or more recovered data sets.

If you are recovering a volume, TOVOLUME(*volser*) is a required parameter specifying which volume you want to recover. For *volser*, substitute the serial number of the volume that is to be recovered. The volser that is to be recovered must be the same as the source volser of the volume that was backed up or dumped.

If you specify TOVOLUME when recovering an SMS-managed data set, the *volser* will be passed to the automatic class selection (ACS) routines; ACS, however, ultimately determines to which volume the data set is recovered. The TOVOLUME parameter is ignored if an existing SMS data set is recovered as SMS.

**Defaults:** If you are recovering from a backup version of a cataloged data set and do not specify TOVOLUME, DFSMSHsm recovers the backup version to the volume where the catalog entry shows the data set currently exists. If no catalog

entry exists, DFSMShsm recovers the backup version to the volume where the data set resided when it was backed up unless the backup version was created from a data set on a migration volume. If the data set was backed up while residing on a migration volume and you do not specify the TOVOLUME parameter, DFSMShsm recovers the backup version to the volume from which the data set last migrated.

If you are recovering from a backup version of an uncataloged data set and do not specify TOVOLUME, DFSMShsm recovers the backup version to the volume where the data set resided when it was backed up, unless it is recovered as SMS.

**Notes:**

1. If you specify TOVOLUME, you must also specify the UNIT parameter.
2. If DFSMShsm is recovering a VSAM data set not cataloged in an integrated catalog facility catalog, TOVOLUME can only specify a volume owned by the catalog where the data set being recovered is cataloged or will be cataloged.
3. The TOVOLUME parameter is passed to the ACS routines when processing a data set that will be recovered to an SMS-managed volume.
4. If a data set that was SMS-managed when backed up has been deleted, and if ACS determines that data set is now non-SMS, TOVOLUME is required to recover that data set to a non-SMS-managed volume. If TOVOLUME is not specified, the recovery will fail with message ARC1170I and reason code 13.
5. If both TOVOLUME and the VOLCOUNT(N(nn)) parameters are specified, the resulting volume count for the data set will be one (1). If space does not exist on the specified volume, the allocation fails.

**Attention**

If you specify TOVOLUME for a data set that was backed up with DFSMSdss and you direct it to a volume that has an uncataloged data set with the same name, DFSMSdss tries to restore the cataloged data set on top of the uncataloged data set; as a result, your attempt fails. DFSMShsm scratches the uncataloged data set because DFSMSdss fails to restore the cataloged data set.

## UNIT: Specifying the Type of Device

**Explanation:** UNIT(*unittype*) is an optional parameter specifying the type of unit where DFSMShsm can mount the target volume. You use this parameter with the TOVOLUME parameter.

DFSMShsm incremental volume recovery and volume restore with APPLYINCREMENTAL do not support a device change on the volume that is recovered. If the device type is changed after the volume is backed up and the device type in the catalog for all data sets residing on the volume is not changed, all VSAM data sets will not be recovered. All non-VSAM data sets may appear to be recovered successfully, but the first allocation after the recovery will fail due to the inconsistent unit name and device type that was created by the recovery.

If you specify the type of unit when recovering an SMS-managed data set, that unit type will be passed to the automatic class selection (ACS) routines; ACS, however, ultimately determines to which unit type the data set is recovered. For *unittype*, substitute the type of unit where DFSMShsm is to mount the target volume.

The following are valid types of DASD units:

- 3380

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- 3390
- 9345

**Defaults:** None.

**Notes:**

1. If you specify UNIT, you must also specify the TOVOLUME parameter.
2. If the block size of the data set is greater than the track capacity of the target volume, track overflow must be supported in both the software and the hardware. This applies to devices whose track size is less than 32 KB.

## Examples of How to Code the RECOVER Command

The following examples present different ways to code the RECOVER command.

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Recovering a Cataloged Data Set to a Specific Volume

**Example:** In this example, a backup version or dump copy of a cataloged data set is recovered to the TOVOLUME specified.

```
RECOVER PAC3105.PROJECT.LOAD TOVOLUME(VOL005) UNIT(3390)
```

### Recovering an Uncataloged Data Set to a Specific Volume

**Example:** In this example, a data set that was uncataloged when it was backed up or dumped is recovered to the TOVOLUME specified.

```
RECOVER JAB1234.ANALYSIS.TEXT TOVOLUME(VOL001) UNIT(3390) +
    FROMVOLUME(JAB456)
```

### Recovering a Next-to-Latest Backup Generation of a Cataloged Data Set

**Example:** In this example, a next-to-latest backup generation of a cataloged data set is recovered.

```
RECOVER MIL9876.SETUP.ASM GENERATION(1)
```

### Recovering the Oldest Backup Version of a Cataloged Data Set

**Example:** In this example, the oldest backup version of a cataloged data set is recovered.

```
RECOVER C253800.PUBS.ASM VERSION(1)
```

### Recovering a Data Set to Replace an Existing Data Set with the Same Name

**Example:** In this example, a data set is recovered to the volume the data set is currently cataloged on, and it replaces a data set having the same name. DFSMSHsm scratches the original data set.

```
RECOVER PAC5432.REPORT.CNTL REPLACE
```

### Recovering and Renaming a Data Set

**Example:** In this example, the recovered data set is given a different name. The original data set remains unchanged.

```
RECOVER MIL3210.INPUT.LIST NEWNAME(MIL3210.FINAL.LIST)
```

## Recovering an Entire Volume

**Example:** In this example, an entire volume is recovered. It is assumed that the volume is current as of the date specified. For example, the volume has been restored with a DFSMSdss dump tape made on that date. Data sets are recovered to the volume only if a backup version was created on or after the specified date.

```
RECOVER * TOVOLUME(SAR005) UNIT(3390) DATE(1991/01/01)
```

## Recovering the Most Recently Dumped Version of a Data Set of a Specific Dump Class and Renaming the Data Set

**Example:** In this example, the most recently dumped version of a specific data set that was dumped to a specific dump class (EXTRA) is recovered and given a different name.

```
RECOVER B110066.POF.N.F230EP06.DSET3 +
    NEWNAME(B110066.POFNEW.NRECOV.F230EP06.DSET3) +
    FROMDUMP(DUMPCLASS(EXTRA))
```

## Recovering the Second-Most Recently Dumped Version of a Volume

**Example:** In this example, the second-most recently dumped version is used to do a full-volume restore of volume P1. Immediately following the restore, the data sets that were incrementally backed up since the dump occurred are recovered.

```
RECOVER * TOVOLUME(PTU001) +
    FROMDUMP(DUMPGENERATION(1) APPLYINCREMENTAL) +
    UNIT(3390)
```

## Recovering a Data Set and Forcing It to a non-SMS-Managed Volume

**Example:** In this example, a data set that was SMS-managed when it was backed up or dumped is being forced to a non-SMS-managed volume during recovery.

```
RECOVER SMS.REPT.CNTL FORCEONSMS +
    TOVOLUME(VOL006) UNIT(3390)
```

## Recovering a Data Set for Relative Block Accessing

**Example:** In this example, a data set is to be recovered so that it can be accessed for relative block addressing. Even though the data set would have been SMS-managed after the recovery, it is directed to a non-SMS volume.

```
RECOVER TK1789.PARTS.DA3 DAOPTION(RELBLK) +
    TOVOLUME(NONSMS) UNIT(3390) FORCEONSMS
```

## Recovering a Migrated Data Set to Level 0

**Example:** In this example, a non-VSAM, migrated data set is recovered. The NEWNAME parameter identifies a data set that is not migrated.

```
RECOVER TEST.DSET.NO1 NEWNAME(TEST.DSET.NO2)
```

## Recovering a Lost Volume to a DASD Volume with a Different Volser

**Example:** In this example, a lost volume is to be recovered to a DASD volume with a different volser. The TARGETVOLUME parameter saves you the step of “clipping” a volume to the lost volser.

```
RECOVER * TOVOLUME(VOL008) UNIT(3390) TARGETVOLUME(SAR10) +
FROMDUMP(DUMPVOLUME(DUMP05) APPLYINCREMENTAL)
```

## Recovering a Data Set that Failed Because of Inadequate Space

**Example:** In this example, a data set was not recovered by DFSMSdss because an inadequate space condition occurred. The RECOVER command can be issued again with the VOLCOUNT parameter allowing the data set to be recovered to as many volumes as needed (maximum of 59) for successful allocation. DFSMShsm passes the VOLCOUNT parameter to DFSMSdss.

```
RECOVER C253800.ID.PARTS DFDSSOPTION(VOLCOUNT(ANY))
```

## RECOVER

---

## Chapter 32. RECYCLE: Consolidating Valid Data to One Tape from Other Tapes

The RECYCLE command consolidates data from any migration or backup tape volume (except an unassigned backup volume) that contains a small percentage of valid data. This lets you reuse your nearly empty tape volumes. Tape volumes that may have data checks or invalid file block identifiers can also be recycled.

When you issue the generic RECYCLE command, DFSMShsm moves valid backup versions or valid migration copies from several tapes to one tape volume. The specific RECYCLE command moves valid backup versions or valid migration copies from one tape, or a connected set of tapes, to one tape volume. For example, if you specify RECYCLE SPILL, DFSMShsm moves the valid data from all eligible tape spill backup volumes to one tape spill backup volume until that spill backup volume becomes full. DFSMShsm then selects another available tape spill backup volume to receive the valid data sets. If you had specified SETSYS TAPEDELETION(SCRATCHTAPE), the recycled tapes become scratch tapes. If you had specified SETSYS TAPEDELETION(HSMTAPE), the recycled tapes become unassigned tapes.

When you recycle a tape backup volume (daily or spill), DFSMShsm copies the valid data on the tape volume to an available tape spill backup volume. When you recycle a tape migration level 2 volume, DFSMShsm copies the valid data on the tape volume to an available tape migration level 2 volume.

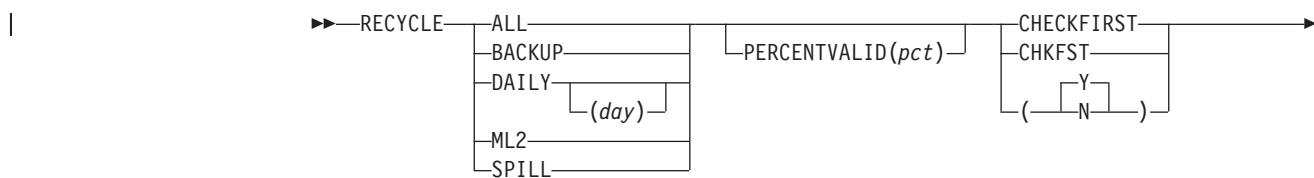
Although an MVS image can process only one RECYCLE request at a time, RECYCLE initiates up to 15 tape processing tasks when you issue a generic RECYCLE command. Each task that moves data requires two tape drives, one for input and one for output. The SETSYS MAXRECYCLETASKS parameter allows you to specify the number of tape processing tasks that can run at a time.

RECYCLE for the same volume type (ML2, DAILY, SPILL) cannot be issued concurrently from two separate hosts. For example, a request to RECYCLE ML2 tapes from a second MVS image fails if the first image is already recycling ML2 tapes.

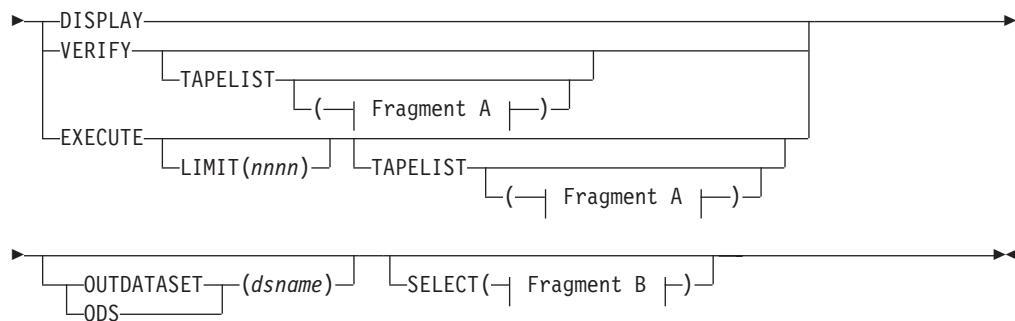
RECYCLE will only process connected sets that span 40 or fewer volumes. If you need to disconnect a longer connected set for RECYCLE, refer to this procedure in *z/OS DFSMShsm Storage Administration Guide*.

---

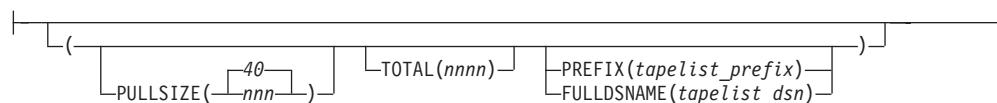
### Syntax of the Generic RECYCLE Command



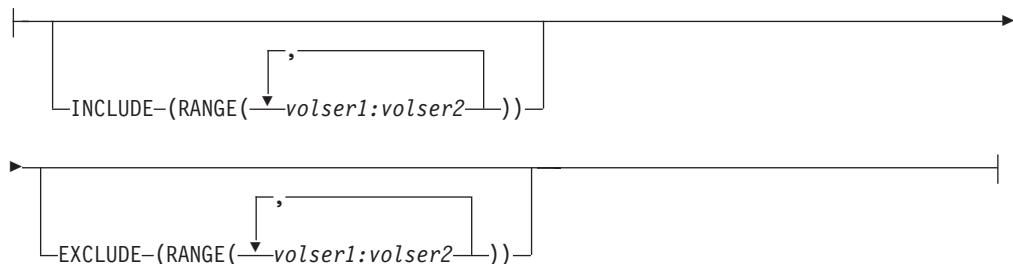
## RECYCLE



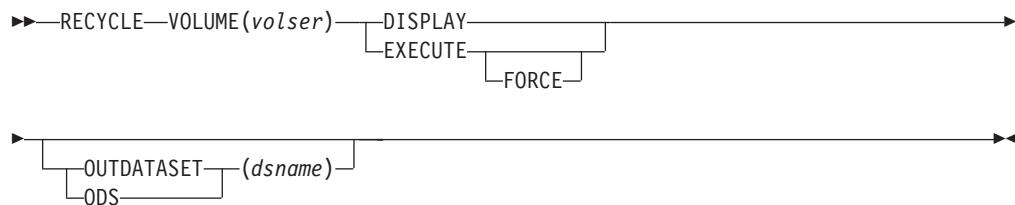
### A: TAPELIST Optional Parameters:



### B: SELECT Optional Parameters:



## Syntax of the Specific RECYCLE Command



---

## Required Parameters of the RECYCLE Command

This section describes the required parameters of the RECYCLE command.

### ALL | BACKUP | DAILY | ML2 | SPILL | VOLUME: Specifying the Tape Volumes to Be Recycled

**Explanation:** ALL | BACKUP | DAILY | ML2 | SPILL | VOLUME(volser) are mutually exclusive, required parameters specifying the types of tape volumes to be recycled.

ALL specifies that DFSMShsm should recycle all eligible daily, ML2, and spill tape volumes.

**BACKUP** specifies that both daily and spill backup tapes are to be used as input in the RECYCLE processing.

**DAILY** specifies that DFSMShsm should recycle all eligible tape daily backup volumes.

Subparameter	Explanation
<i>day</i>	<b>DAILY(<i>day</i>)</b> specifies that DFSMShsm should recycle all eligible tape volumes assigned to that day in the backup cycle. For <i>day</i> , substitute a decimal number to represent the day in the backup cycle assigned to the tape daily backup volume. You use the DEFINE BACKUP command to define the backup cycle.

**ML2** specifies that DFSMShsm should recycle all eligible tape migration level 2 volumes. If the SETSYS ML2PARTIALSNOTASSOCIATEDGOAL(*nnn*) parameter has been specified with a value other than NOLIMIT and the number of ML2 partial tapes not currently associated as output for any migration or recycle task and meeting the recycle criteria is greater than *nnn* then DFSMShsm recycles the excess over *nnn*, that is, those tapes with the least percent of valid data. A partial is a tape that is not full and not empty.

**SPILL** specifies that DFSMShsm should recycle all eligible tape spill backup volumes.

**VOLUME(*volser*)** specifies the volume to be recycled. For *volser*, substitute the serial number of the volume to be recycled. When you specify a volume serial number, DFSMShsm does not check whether the specific tape volume is eligible for recycling. This allows you to recycle tapes that are not full or that were otherwise not selected by generic recycle.

**Defaults:** None.

**Notes:**

1. If you specify a generic request, a connected set is eligible for recycling only if the following conditions are met for all volumes in the set:
  - The tape volume is a migration level 2 tape or a backup tape, but not an unassigned backup tape.
  - The tape volume is either marked full, or a partial ML2 tape that is not connected to any other tape and not currently associated with any migration or recycle output task.
  - The tape volume is marked full.
  - The percentage of valid data is equal to or less than the applicable value. This percentage is specified with the PERCENTVALID parameter, the SETSYS ML2RECYCLEPERCENT parameter, or the SETSYS RECYCLEPERCENT parameter. When these parameters are not specified, the DFSMShsm default is 20%.
  - The volume has not previously failed recycle processing, or if it has failed, now contains no valid data.
  - The TTOC for the volume is complete.
  - The volume does not have a disaster alternate volume.
2. Dump volumes are not recycled.
3. For performance reasons, DFSMShsm does not update the OCDS TTOC every time a data set is migrated or backed up to a tape volume. If DFSMShsm abends, an I/O error occurs, or a system fails, the OCDS TTOC may not be updated. If you specify the RECYCLE command to recycle a tape volume that

## RECYCLE

has missing TTOC entries, message ARC0378I is issued, indicating that the tape media and the OCDS TTOC have a mismatch. Use the AUDIT MEDIACONTROLS FIX command to resolve the problem. For more information, see “MEDIACONTROLS VOLUMES | MEDIACONTROLS(SDSP) VOLUMES: Requesting an Audit of Control Information” on page 71.

### EXECUTE | VERIFY | DISPLAY: Specifying Whether to List or to Recycle Tape Volumes

**Explanation:** EXECUTE | VERIFY | DISPLAY are mutually exclusive, required parameters that specify whether to recycle, print tape lists, or list volumes that meet eligibility criteria (percent valid) for recycling.

**EXECUTE** specifies that DFSMSHsm should recycle a specific tape volume, a category of backup volumes, tape migration level 2 volumes, or a combination of all volumes. Volumes that meet the eligibility criteria are recycled. To recycle volumes that do not meet the eligibility criteria, you must prepare the volumes for recycle by following the specified actions. Refer to the *z/OS DFSMSHsm Storage Administration Guide* for a discussion of recycle eligibility criteria and actions to follow as you prepare volumes for recycle.

**VERIFY** specifies that DFSMSHsm produces one set of tape volume serial numbers that are listed twice: in two different formats and in one output data set.

Customers can use the first list as a **pull list** and the second list as a **mount list**.

- **Pull list:** One or more tape groups of the requested category (ML2, SPILL, and so forth ) to be pulled from tape storage. Each group is ordered by volume serial. The groups are in the order in which RECYCLE will most likely request that tapes be mounted when the RECYCLE EXECUTE command is issued. Volumes in a connected set are not split between groups. Empty tapes are included and identified as such, but are not mounted during RECYCLE processing. Pull lists are used by operators to fetch and transport the required tapes during RECYCLE processing.
- **Mount list:** A list of all tapes to be recycled for a given category, ordered by the reuse capacity. This is the order in which recycle most likely requests the tapes be mounted. However, this projected mount order may differ from the actual mount order due to other factors affecting recycle processing including, but not limited to, running more than 1 recycle task, unrecoverable errors, a mixture of device types within the mount list, or connected sets containing more than 5 volumes. The volumes in a connected set are identified and listed together. Empty tapes are included and identified as such, but are not mounted during RECYCLE processing. Mount lists aid tape operators with the mounting order of tapes that are being recycled.

Both of these lists are dynamically allocated to either a SYSOUT data set or to the data set having the prefix that you specified with the TAPELIST PREFIX(*tapelist\_prefix*) parameter or to the fully qualified data set name that you specified with the TAPELIST FULLDSNAME(*tapelist\_dsn*) parameter. The data set is deallocated when the command completes.

**DISPLAY** gives you a formatted list in volume serial sequence of the tape volumes eligible for recycling that meet the percent valid criteria. The list is dynamically allocated to either a SYSOUT data set or the data set specified by the OUTDATASET parameter. If you request DISPLAY for a specific tape volume, you will get a list of the connected set containing that volume. DFSMSHsm sends a message containing the information to your terminal or optionally directs this information to a data set specified by the OUTDATASET parameter.

When you specify the VERIFY or DISPLAY parameters, the total output includes one or more of the following volumes:

- Eligible tape daily backup volumes assigned to a particular day (or to all days) in the backup cycle
- Eligible tape spill backup volumes
- Eligible tape migration level 2 volumes

When you specify the VERIFY or DISPLAY parameters, DFSMSHsm does not ask for any tapes to be mounted.

**Defaults:** None.

**Notes:**

1. If you are a customer without an ATL but with a relatively *small* number of tapes that you must pull manually from shelf storage, use the DISPLAY parameter.  
However, if you are a customer without an ATL but with a *large* number of tapes that you must pull manually, the VERIFY parameter (or EXECUTE TAPELIST) is a better choice.
2. With the VERIFY parameter, the number of volumes in a pull group (and the total number of volumes to be pulled) can be specified with the optional TAPELIST parameter.
3. If you specify the VERIFY parameter with a single volume, DFSMSHsm treats the command as if you had specified DISPLAY.

## Optional Parameters of the RECYCLE Command

This section describes the optional parameters of the RECYCLE command.

### CHECKFIRST: Allowing Connected Set to be Recycled Sooner

**Explanation:** CHECKFIRST is an optional parameter that allows connected sets to be recycled sooner. In determining whether to recycle a connected set, DFSMSHsm requires the first tape within the connected set to meet the PERCENTVALID specification before continuing on with the calculation for the entire connected set. You can bypass this first volume check by using the CHECKFIRST(N) parameter of the RECYCLE command. If CHECKFIRST(N) is specified, the entire connected set's percentage of valid data is calculated regardless of the percent of valid data on the first volume.

**Notes:**

1. If you enter the RECYCLE command with the VOLSER parameter, the system ignores the CHECKFIRST parameter.
2. Be aware that CHECKFIRST(N) causes recycle processing to always determine the percent valid for the entire connected set, which can slow recycle performance if you have many connected sets.

**Defaults:** If CHECKFIRST is not specified on the RECYCLE command, then recycle performs as if CHECKFIRST(Y) had been specified.

### FORCE: Forcing DFSMSHsm to Permit a Tape Recycle

**Explanation:** FORCE is a parameter specifying whether to permit the specified 3480 single-file tape or equivalent to be recycled even though the tape contains data checks or invalid file block identifiers. The FORCE optional parameter is valid

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only when used with the specific RECYCLE command for a single volume request. The only connected volume set that will be processed, is a connected set containing the specified volume.

When the FORCE parameter is in effect, RECYCLE works the same as when FORCE is not specified, except when a data check or an invalid file block identifier is encountered. DFSMShsm invalidates the data set being processed before continuing with the next data set on the tape. Migrated data sets are deleted, including the catalog entry. In this case, it is the storage administrator's task to recover the data set from another source. For backup copies, the version with the error is invalidated. Because the records necessary to access the data will be lost when using the FORCE parameter, it should be specified only when no alternate volume previously generated via the TAPECOPY command is available.

When processing tape volumes with known errors, use the following steps:

1. If an alternate tape volume exists, use the tape replace function (see Chapter 40, "TAPEREPL: Replacing Cartridge-Type Tape Volumes with Their Alternate Volumes," on page 491) instead of recycling the volume.
2. If you do not have an alternate volume, the following steps are recommended to reduce the exposure of deleting accessible data when an error occurs—such as a hardware malfunction:
  - a. Use the RECYCLE command without the FORCE parameter to move all data without errors to another tape volume.
  - b. Now use the RECYCLE command with the FORCE parameter to effectively remove all references to any data that is still inaccessible. After this process, the tape volume is deleted.

For a full discussion of recovery situations, refer to *z/OS DFSMShsm Storage Administration Guide*.

**Defaults:** None.

**Note:** If you specify RECYCLE VOLUME FORCE and the TTOC for the volume is incomplete, RECYCLE will not process this volume. You will need to use the AUDIT MEDIACONTROLS function to prepare the volume for RECYCLE. For more information on the recovery procedures that have to be performed to be able to recycle these data sets, refer to *z/OS DFSMShsm Storage Administration Guide*.

## LIMIT: Quiescing Recycle Processing When the Desired Number of Tapes Have Been Returned to Scratch

**Explanation:** LIMIT(*nnnn*) is an optional parameter specifying when recycle quiesces. RECYCLE quiesces after the net specified number of tapes have been returned to scratch status. Each task completes the connected set currently being processed and no additional ones are started. You can specify the number of scratch tapes needed (*nnnn*) from 1 to 9999. The LIMIT parameter is subject to the number of tapes allowed by the PERCENTVALID parameter; the LIMIT parameter provides a way to stop processing before all the candidates meeting the PERCENTVALID value are processed.

Net is determined by tapes read in for input minus tapes written to for output. For RECYCLE ALL, the LIMIT is applied to ML2 tapes and BACKUP tapes separately. That is, RECYCLE ALL LIMIT(100) results in 100 net ML2 tapes and 100 net BACKUP tapes, unless you do not have enough tapes that meet the eligibility

criteria, for example, when the values indicated by the SETSYS RECYCLEPERCENT or the SETSYS ML2RECYCLEPERCENT parameter have been met.

**Defaults:** If LIMIT(*nnnn*) is not specified on the RECYCLE command, DFSMShsm processes all tapes eligible for RECYCLE processing.

**Note:** The LIMIT parameter specifies an upper bound on the net number of volumes to be returned to scratch status in a given category. If the TAPELIST(TOTAL) parameter is also specified, the TOTAL parameter specifies an upper bound on the number of volumes to be recycled in a given category. In each case, DFSMShsm treats the upper bounds as approximate, since a connected set is recycled completely or not at all. If the value specified with the TOTAL parameter is too small, the value specified with the LIMIT parameter may not be reached.

## OUTDATASET: Directing Recycle Messages

**Explanation:** OUTDATASET(*dsn*) is an optional parameter specifying where to send the messages generated during RECYCLE processing. For (*dsn*), substitute the fully qualified name of the data set to receive the RECYCLE messages. The recycle command log records all data movement activity that results from processing the RECYCLE command. Any error messages that the RECYCLE command processor issues are also written in this log.

If the data set does not exist, DFSMShsm dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified (*dsname*)
- Record format of fixed-blocked with ANSI control characters (FBA)
- Logical record length of 121
- Data set is system reblockable
- Primary allocation of 20 tracks (see note)
- Secondary allocation of 50 tracks (see note)
- Unit of SYSALLDA. (see note)

If the data set already exists, DFSMShsm will use the data set. The data set must have the following characteristics.

- The data set must be cataloged and on DASD.
- The data set record format must be FBA, and the logical record length must be 121.
- The data set is system reblockable
- The user can choose the primary space allocation.
- If the data set does not contain data, DFSMShsm starts writing output data at the beginning of the data set.
- If the data set contains data, DFSMShsm writes the output data after the existing data.

**Defaults:** If OUTDATASET(*dsn*) is not specified on the RECYCLE command, DFSMShsm sends all messages generated during RECYCLE processing to the SYSOUT specified by the SETSYS parameter.

**Note:** If you select the OUTDATASET option, you can use the PATCH command to change the unit name, primary allocation, and secondary allocation. If you select the SYSOUT option, you can use the PATCH command to change

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whether, and how, DFSMShsm limits the lines of SYSOUT output. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* for a list of the available PATCH commands.

### PERCENTVALID: Specifying the Percent Valid Criteria for Recycle Eligibility

**Explanation:** PERCENTVALID(*pct*) is an optional parameter specifying the maximum percentage of valid data that a volume can have and still be eligible for recycling. DFSMShsm ignores this parameter if you specified the volume to be recycled. For *pct*, substitute a decimal number from 0 to 100. For example, if you specify *pct* as 30, a connected set (including a single volume) whose first volume in the set contains 30% or less valid data AND whose entire set contains 30% or less valid data is eligible for recycling.

**Note:** If 0 (zero) is specified, no tape drives are required. Only tapes that contain no valid data are returned to scratch.

By default, DFSMShsm requires the first volume in the connected set to meet the percent valid criterion before determining the connected set's percentage of valid data. To allow connected sets to be recycled earlier and potentially free up more volumes to scratch or tape pools, you can use the CHECKFIRST(N) parameter to specify that the first volume of a connected set need not meet the PERCENTVALID requirement as long as the entire connected set meets the PERCENTVALID requirement.

#### Example:

```
RECYCLE PERCENTVALID(pct) CHECKFIRST(N)
```

**Defaults:** If PERCENTVALID(*pct*) is not specified on the RECYCLE command, DFSMShsm selects an appropriate value based on the volume type parameter specified. Also, recycle processing always performs the first volume check when evaluating the connected set's recycle eligibility.

RECYCLE ALL is treated functionally as a RECYCLE ML2 followed by a RECYCLE BACKUP.

When processing ML2 volumes, DFSMShsm uses the ML2RECYCLEPERCENT value that has been specified on the SETSYS command. If ML2RECYCLEPERCENT has not been specified, DFSMShsm uses the SETSYS RECYCLEPERCENT value. If RECYCLEPERCENT has not been specified, the DFSMShsm default is 20%.

For all backup volume type parameter specifications (Backup, Daily, or Spill), DFSMShsm uses the RECYCLEPERCENT value.

You can override this default by specifying the RECYCLE PERCENTVALID parameter.

#### Notes:

1. During RECYCLE execution, a DELVOL operation is performed for any volume having 0% valid data.
2. For a discussion of how DFSMShsm calculates percentages based on valid blocks and connected sets, refer to "Managing DFSMShsm Media" in the *z/OS DFSMShsm Storage Administration Guide*.

## SELECT: Specifying Tape Eligibility for Generic Recycle

**Explanation:** SELECT is an optional parameter that is used to specify a selection filter for the eligibility test performed by the RECYCLE function. The SELECT parameter provides increased granularity to filter out tapes that are considered eligible by the percent valid criteria but do not meet the range that is specified with the SELECT parameter.

When the SELECT parameter is specified, you must specify **one or both** of the following SELECT subparameters:

Subparameter	Explanation
INCLUDE	<b>INCLUDE(RANGE (volser1:volser2 ...))</b> specifies that this range of tape volumes is included in the RECYCLE eligibility tests. <b>INCLUDE(RANGE(volser1:volser2 ...))</b> is a required subparameter of the SELECT parameter.
EXCLUDE	<b>EXCLUDE(RANGE (volser1:volser2,...))</b> specifies that this range of tape volumes is not included in the RECYCLE eligibility tests. <b>EXCLUDE(RANGE(volser1:volser2,...))</b> is a required subparameter of the SELECT parameter.
RANGE	<b>RANGE (volser1:volser2,...)</b> specifies a single volser range, a list of volser ranges, a single volume, or a list of volumes. When you specify a volser range, <i>volser1</i> is the beginning of the range, and <i>volser2</i> is the end of the range. When you specify a single volume, use that volume serial number for both <i>volser1</i> and <i>volser2</i> . The only limit on the number of volumes or ranges used for RANGE is the RECYCLE command's limit of 1023 characters for a single command.  All tape volumes within a specified range are included. If you are including a connected set of tapes, all tape volumes in the connected set must be within the specified range of volumes to be considered as eligible. If any tape volume within a connected set is specified in the excluded range, then that whole connected set is excluded. Message ARC0849I is issued when an ending volume serial is specified before a starting volume serial.

**Note:** The SELECT parameter applies only to generic RECYCLE processing. The SELECT parameter is not valid if specified with the RECYCLE VOLUME command.

**Defaults:** If SELECT is not specified on the RECYCLE command, DFSMSHsm uses the percentage specified with the PERCENTVALID parameter to determine RECYCLE eligibility.

## TAPELIST: Listing Volumes for Pulling and Mounting Tapes

**Explanation:** TAPELIST is an optional parameter that can be used with the VERIFY or EXECUTE parameters (it is ignored if used with the DISPLAY parameter). When TAPELIST is used with the VERIFY parameter, it allows you to review the output while other RECYCLE commands can continue processing. When TAPELIST is used with the EXECUTE parameter, DFSMSHsm produces the same lists as those produced by the VERIFY parameter, plus, you are given the option to continue the RECYCLE processing after the lists are produced.

The lists are dynamically allocated to either a SYSOUT data set or to the data set generated or specified by the TAPELIST PREFIX parameter or the TAPELIST FULLDSNAME parameter.

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Subparameter	Explanation
PULLSIZE	<b>PULLSIZE(<i>nnn</i>)</b> allows you to select the number of tape volumes that is feasible to physically transport at one time from shelf storage to your tape drives (for example, on a cart) or the number of tape volumes that can be managed by an operator after they are brought to the vicinity of the tape drives. Specify a value between 1 and 999.
TOTAL	<b>TOTAL(<i>nnnn</i>)</b> allows you to select the total number of volumes (including empty volumes) to be listed in all pull groups for a given category of DFSMShsm tapes. If the EXECUTE parameter is specified, this restricts the total number of volumes that can be recycled for that category. Specify a value between 1 and 9999.
PREFIX	<b>PREFIX(<i>tapelist_prefix</i>)</b> is mutually exclusive with the FULLDSNAME parameter. This optional parameter is used to specify the name of the TAPELIST output.  You can select the data set prefix to be used for that data set name. DFSMShsm generates a fully qualified data set name by appending the following qualifiers to <i>tapelist_prefix</i> : <ul style="list-style-type: none"><li>• .BACKUP, .DAILY, .ML2, or .SPILL, depending on the category of tape volumes specified on the command</li><li>• date stamp .<i>Dyyyddd</i>, where <i>yyyy</i> represents the year and <i>ddd</i> the day of the year</li><li>• time stamp .<i>Thhmmss</i>, where <i>hh</i>, <i>mm</i>, and <i>ss</i> represent the hour, minute, and second</li></ul> Because the maximum length of a data set name is 44 characters, the allowable length of <i>tapelist_prefix</i> is 20 characters, so that the generated data set name will be valid regardless of the volume category specified.  When the PREFIX parameter is specified, DFSMShsm dynamically allocates and catalogs an output data set with the following characteristics: <ul style="list-style-type: none"><li>• Data set name generated from <i>tapelist_prefix</i></li><li>• Record format of FBA</li><li>• Logical record length of 121</li><li>• Data set is system reblockable</li><li>• Primary allocation of 20 tracks</li><li>• Secondary allocation of 50 tracks</li><li>• Unit of SYSALLDA</li></ul>

Subparameter	Explanation
FULLDSNAME	<p>FULLDSNAME(<i>tapelist_dsn</i>) is mutually exclusive with the PREFIX parameter. This optional parameter is used to specify the name of the TAPELIST output.</p> <p>You can select the fully qualified name to be used for the TAPELIST output. If <i>tapelist_dsn</i> data set does not exist, DFSMShsm dynamically allocates and catalogs an output data set with the following characteristics:</p> <ul style="list-style-type: none"> <li>• Data set name of <i>tapelist_dsn</i></li> <li>• Record format of FBA</li> <li>• Logical record length of 121</li> <li>• Data set is system reblockable</li> <li>• Primary allocation of 20 tracks</li> <li>• Secondary allocation of 50 tracks</li> <li>• Unit of SYSALLDA</li> </ul> <p>However, if <i>tapelist_dsn</i> does exist, this output data set must be available so that DFSMShsm can use it for output. This output data set must have the following characteristics:</p> <ul style="list-style-type: none"> <li>• Cataloged and reside on DASD</li> <li>• Record format of FBA</li> <li>• Logical record length of 121</li> <li>• Data set is system reblockable</li> <li>• Primary allocation of the user's choice</li> <li>• If the data set does not contain data, DFSMShsm starts writing output data at the beginning of the data set.</li> <li>• If the data set contains data, DFSMShsm writes the output data after the existing data.</li> </ul>

When DFSMShsm completes writing to the data set, DFSMShsm deallocates the data set allowing you to browse or print it. If you have specified the EXECUTE parameter, then before DFSMShsm allocates any tape drives, it issues a WTOR message to the tape operator:

ARC0825D RECYCLE TAPE LIST CREATED, DSN=*dsname*. DO YOU WISH TO CONTINUE? REPLY 'N' TO STOP RECYCLE OR 'Y' WHEN READY TO MOUNT TAPES.

Replies 'Y' causes recycle processing to select and allocate the first input tapes for as many recycle tasks as are defined. Replies 'N' ends recycle processing for that category of volumes.

#### Defaults:

- If the PULLSIZE parameter is not specified, DFSMShsm uses the value of 40.
- When the TOTAL parameter is not specified, DFSMShsm lists pull groups for all the eligible volumes in the category being recycled and if the EXECUTE parameter is specified, recycles all of them.
- When the PREFIX parameter and the FULLDSNAME parameter are not specified, DFSMShsm writes the TAPELIST output to the SYSOUT class specified by the SETSYS parameter.

#### Notes:

1. If you specify the RECYCLE ALL command and do not specify the FULLDSNAME parameter, DFSMShsm creates two data sets: one for ML2 volumes and one for backup (daily and spill) volumes. If you also specify the

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EXECUTE parameter, DFSMShsm writes the ARC0825D message twice, following the deallocation of each of the two data sets. Your response need not be the same to each message. If the operator's response is to not continue with ML2 volumes, DFSMShsm later writes the ARC0825D message with the second data set name, allowing you to recycle backup volumes.

2. Because the volumes in a connected set are not split across pull groups, some pull groups may have fewer volumes than the PULLSIZE value.
3. Empty tapes are not mixed with nonempty tapes within a pull group.
4. If a connected set contains more volumes than the PULLSIZE value, that connected set is listed in a pull group by itself.
5. The TOTAL parameter specifies an upper bound on the number of volumes to be in the list and therefore recycled in a given category. The LIMIT parameter specifies an upper bound on the net number of volumes that can be returned to scratch status in a given category. In each case, the upper bounds are approximate, since a connected set is recycled completely or not at all. If the TOTAL value is too small, the LIMIT value may not be reached.
6. If you specify the RECYCLE ALL command, the total number of volumes pulled can be as much as twice the TOTAL value, one set of migration level 2 volumes and one set of backup volumes.
7. If you specify the RECYCLE ALL command with the TAPELIST(FULLDSNAME) parameter, DFSMShsm uses this specified data set for the TAPELIST of migration level 2 volumes followed by the lists of backup volumes. You should realize that the backup pass may fail if you have this data set in use after the L2 TAPELIST output is written and do not release it before the backup pass starts. Therefore, you should not use ALL and FULLDSNAME together unless you can be sure that the data set will be freed by the time RECYCLE processing requires it.
8. If you specify the TAPELIST parameter with the DISPLAY parameter or when specifying a single volume, DFSMShsm ignores the TAPELIST parameter.
9. If all of your tape volumes are in automated tape libraries, the output from the TAPELIST or VERIFY parameters will benefit you as a reporting tool.
10. You can use the PATCH command to change the unit name, primary allocation, and secondary allocation. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* for a list of the available PATCH commands.

## Examples of How to Code the RECYCLE Command

The following examples present different ways to code the RECYCLE command.

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Recycling all volumes, do not check the first volume in a connected set for percentvalid criteria

**Recycling all volumes, do not check the first volume in a connected set for percentvalid criteria Example:** In this example, this command recycles all eligible backup and migration volumes. It also requests that DFSMShsm not check that the first volume in a connected set meet the percentvalid criteria as long as the average percent valid for all volumes in the connected set meets the percentvalid criteria.

```
RECYCLE ALL EXECUTE CHECKFIRST(N) PERCENTVALID(25)
RECYCLE PERCENTVALID(25) CHECKFIRST(N)
```

### Displaying a List of All Eligible Tape Daily Backup Volumes

**Example:** In this example, a formatted list is printed of all tape daily backup volumes that contain 5% or less valid data and are eligible for recycling. Volumes that have 0% valid data are not listed because they do not need to be pulled for a subsequent recycle.

```
RECYCLE DISPLAY DAILY PERCENTVALID(5)
```

### Recycling Tape Spill Volumes

**Example:** In this example, DFSMShsm recycles all tape spill backup volumes that contain 25% or less valid data and are eligible for recycling.

```
RECYCLE EXECUTE SPILL PERCENTVALID(25)
```

### Recycling Tape Migration Level 2 Volumes

**Example:** In this example, DFSMShsm recycles all tape migration level 2 volumes that are eligible for recycling. DFSMShsm uses the value specified with the SETSYS ML2RECYCLEPERCENT command to determine the percent valid criteria. If the SETSYS ML2RECYCLEPERCENT is not specified, DFSMShsm uses the value specified with the SETSYS RECYCLEPERCENT command.

```
RECYCLE EXECUTE ML2
```

### Recycling a Specific Tape Volume

**Example:** In this example, a specific tape volume is recycled. DFSMShsm does not check the percentage of valid data on the volume or whether the volume is full before it recycles the volume.

```
RECYCLE EXECUTE VOLUME(BATP01)
```

## Recycling a Tape Volume with Known Errors

**Example:** In this example, a specific tape volume with known errors is recycled.

```
RECYCLE VOLUME(TAP230) FORCE EXECUTE
```

## Displaying a List of Both Daily and Spill Backup Tapes

**Example:** In this example, a list of both daily and spill backup tapes that are already empty but have not yet been returned to scratch is displayed.

```
RECYCLE BACKUP DISPLAY PERCENTVALID(0)
```

## Recycling a Limited Number of Backup Tapes

**Example:** In this example, DFSMShsm recycles both daily and spill backup tapes and it quiesces the RECYCLE process when 150 tapes have been returned to scratch. The messages generated during the RECYCLE processing are written to the requested output data set.

```
RECYCLE BACKUP EXECUTE LIMIT(150) OUTDATASET(C253800.RECYCLE.OUTPUT)
```

## Producing a List of Tape Volume Serials Before Recycling Those Volumes

**Example:** In this example, DFSMShsm produces a list of tape volume serials in a pull list format and a mount list format. An operator can transport 100 tapes on each cart and a total of 500 tapes is requested. The list of tape volume serials is written to the output data set prefixed by the requested data set name. After the tapes have been collected, the tape operator can reply 'Y' to the ARC0825D message. Then RECYCLE begins to process those tape volumes.

```
RECYCLE BACKUP EXECUTE TAPELIST(PULLSIZE(100) TOTAL(500) PREFIX(REMOTE))
```

## Another Example of Producing A List of Tape Volume Serials Before Recycling Those Volumes

**Example:** In this example, DFSMShsm produces a list of tape volume serials in both pull list format and mount list format. The PULLSIZE default of 40 is used. All connected sets whose percent valid is not greater than 75% are listed. The list is written to the output data set with a prefix of 'A'.

**Note:** This example is used to illustrate outputs. We would not expect you to use this command with a PERCENTVALID percentage of 75%.

```
RECYCLE ALL EXECUTE TAPELIST(PREFIX(A)) PERCENTVALID(75)
```

The following is a sample listing of the output data set. For this example, the pull list and the mount list for only ML2 volumes are shown.

```

OUTPUT LIST DATASET: A.ML2.D1996109.T093226
LEGEND:
'*' INDICATES EMPTY TAPE, '-' INDICATES CONTINUATION FROM OR TO
DFSMSHSM RECYCLE PULL LIST FROM 0.0% TO 0.0%
*555060 *555075 *555100 *555222 *555990 *555995

DFSMSHSM RECYCLE PULL LIST FROM 0.8% TO 49.9%
 555001 555003 555004 555005 555006 555007 555008 555009
 555011 555012 555013 555014 555015 555016 555017 555018
 555019 555022 555026 555027 555028 555029 555031 555032
 555034 555035 555036 555037 555038 555040 555041 555042
 555043 555044 555045 555046 555047 555048 555049 555050

DFSMSHSM RECYCLE PULL LIST FROM 51.4% TO 57.3%
 555021 555023 555024 555039 555115 555116 555117 555118
 555119 555120
END OF DFSMSHSM RECYCLE PULL LIST

```

**Notes:**

1. The volumes listed in the 0.0% to 0.0% section are empty and will not be mounted
2. The volumes listed in the 0.8% to 49.9% section represent the pull default size of 40 volumes. The volumes are listed in collating sequence to simplify locating them in tape storage.

```

DFSMSHSM RECYCLE MOUNT LIST FROM 0.0% TO 57.3%
*555060 *555075 *555100 *555222 *555990 *555995 555011 555007
 555004 555032 555012 555035 555048 555015 555001 555044
 555042 555045 555008 555034- -555029 555009 555028 555038
 555040 555018 555006 555049 555005 555041 555046 555037
 555026 555036 555047 555016 555022 555017 555013 555050
 555031 555019 555003 555027 555014 555043 555024 555039
 555119- -555120- -555118- -555117- -555116- -555115 555023 555021
END OF DFSMSHSM RECYCLE MOUNT LIST

```

**Notes:**

1. The volume 555015 needs a different device type than the other volumes. It will not be requested after volume 555048, instead volume 555015 will be requested at a later time, when a new drive allocation is performed.
2. When attempting to recycle connected set 555034—555029, an open error occurred on 555034 causing the connected set to fail recycle processing. A mount for 555029 will not be attempted.
3. The connected set 555119—555120—555118—555117—555116—555115 consisted of more than 5 volumes. This connected set will not be mounted on an already mounted drive, independent of the SETSYS RECYCLEINPUTDEALLOCFREQUENCY setting, but will be skipped until a new drive allocation is performed.

## Converting Current Media Tapes to a Newer Tape Media

**Example:** In this example, the SELECT parameter is used to specify a selection filter for RECYCLE processing. For this example, assume the current media to be 3490 tapes and the newer media to be 3590 tapes. Also assume that the 3490 tapes all have volser numbers in the range of A00000 through A39999 and 3590 tapes all have volser numbers in the range of B00000 through B39999.

You can use the INCLUDE subparameter to specify a range of tapes to RECYCLE that are 3490 tape media by entering the following command:

## RECYCLE

```
RECYCLE ALL EXECUTE SELECT(INCLUDE(RANGE(A00000:A39999))) PERCENTVALID(100)
```

Or, you can use the EXCLUDE subparameter to specify a range of tapes to exclude from RECYCLE processing that are 3590 tape media by entering the following command:

```
RECYCLE ALL EXECUTE SELECT(EXCLUDE(RANGE(B00000:B39999))) PERCENTVALID(100)
```

## Selecting Connected Tapes for RECYCLE Using the SELECT Parameter

**Example:** In this example, three ways to use the SELECT parameter when selecting connected sets for RECYCLE processing are shown. For this example, assume that there are only three connected sets:

- Set A consists of TAPE01 and TAPE09
- Set B consists of TAPE02 and TAPE04
- Set C consists of TAPE03, TAPE05, and TAPE10

In this example, you want to recycle only sets A and C. To recycle connected sets A and C using the SELECT INCLUDE parameters, enter the following command:

```
RECYCLE ALL EXECUTE SELECT(INCLUDE(RANGE(TAPE01:TAPE03,TAPE05:TAPE10)))
```

Although TAPE02 from set B is included in the range, TAPE04 is not included in the range and this makes set B ineligible for RECYCLE processing.

To recycle connected sets A and C using the SELECT EXCLUDE parameters, enter the following command:

```
RECYCLE ALL EXECUTE SELECT(EXCLUDE(RANGE(TAPE02:TAPE02)))
```

Because TAPE02 is specified as the range to exclude and because TAPE02 is part of the connected set B, set B is excluded from RECYCLE processing.

To recycle connected sets A and C using both the SELECT INCLUDE and EXCLUDE parameters, enter the following command:

```
RECYCLE ALL EXECUTE SELECT(INCLUDE(RANGE(TAPE01:TAPE10)) +  
EXCLUDE(RANGE(TAPE04:TAPE04)))
```

Connected set B is not eligible for RECYCLE processing because TAPE04 is specifically excluded.

## Selecting Single Tapes for RECYCLE Using the SELECT Parameter

**Example:** In this example, the SELECT parameter is used to select a list of single volumes for RECYCLE processing. To recycle volumes A, J, and Q, enter the following command:

```
RECYCLE ALL EXECUTE SELECT(INCLUDE(RANGE(A:A,J:J,Q:Q)))
```

---

## Chapter 33. RELEASE: Releasing All or Some DFSMShsm Functions for Processing

The RELEASE command releases for processing all or part of the DFSMShsm functions that have been held. You cannot release the processing of a subfunction while the processing of its main function is being held. For example, you cannot release the subfunction BACKUP(AUTO) if the main function BACKUP is held. When you release a main function, the held main function processing and its associated subfunctions processing are released. DFSMShsm does not restart any commands that it failed after you issued the HOLD command.

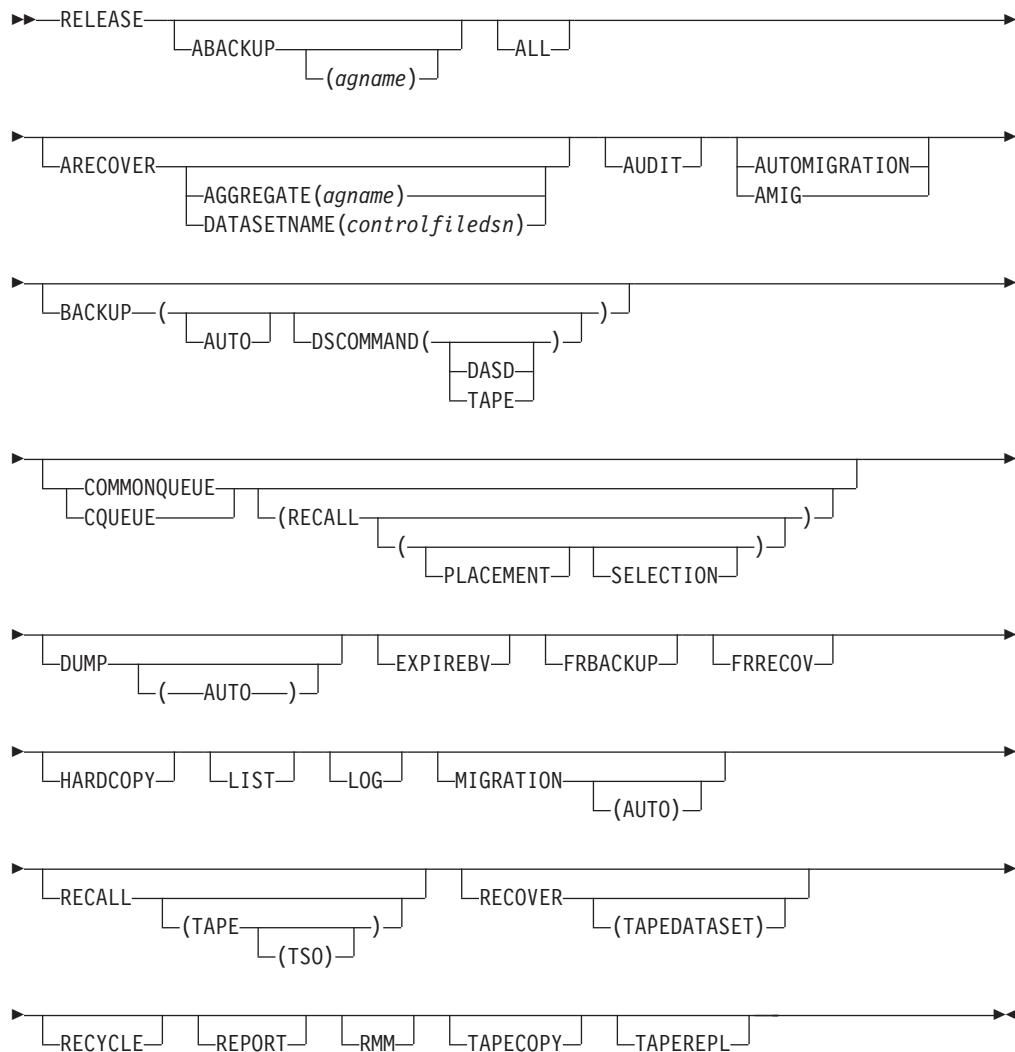
If a journal becomes full, processing is held for all migration, backup, and dump functions. To resume journaling and other DFSMShsm functions, enter the BACKVOL CDS command to null the journal. If multiple systems share the journal, enter the BACKVOL CDS command on one of the systems, and then enter the RELEASE ALL command on all of the systems that share the journal.

If DFSMShsm functions are held because of a full journal, the RELEASE command will not appear to be effective until the control data sets are backed up. Refer to *z/OS DFSMShsm Storage Administration Guide* for further explanation.

The RELEASE command allows migration target levels (ML1 or ML2 tape) that have become unavailable as targets because of some error condition to become available for retry. For further explanation, refer to *z/OS DFSMShsm Storage Administration Guide*.

In addition, you can also decide to print the activity logs or you can enable the EDGTVEXT interface again after it was disabled because of an ABEND in DFSMSrmm<sup>TM</sup>.

## Syntax of the RELEASE Command



### Notes:

1. Although the RELEASE command has no required parameters, you must specify at least one parameter to release a DFSMSHsm function for processing.
2. In a multiple address space for DFSMSHsm environment, ABARS commands, like RELEASE ABACKUP or RELEASE ARECOVER, can only be issued by the host identified as the main host. DFSMSHsm ignores the ABARS commands if directed to a host identified as HOSTMODE=AUX.

---

## Optional Parameters of the RELEASE Command

This section describes the optional parameters of the RELEASE command.

### ABACKUP: Releasing Aggregate Backup

**Explanation:** ABACKUP is an optional parameter specifying that DFSMSHsm release for processing any ABACKUP commands currently held in queues and allow new ABACKUP commands to be received.

**A**BACKUP(*agname*) is an optional parameter that allows you to release any ABACKUP commands held for a particular aggregate group.

**Defaults:** None.

## ALL: Releasing All DFSMShsm Functions

**Explanation:** ALL is an optional parameter specifying that DFSMShsm release all functions controlled by this command, except writing in the DFSMShsm log and printing the activity logs.

**Defaults:** None.

**Notes:**

1. If you want DFSMShsm to begin recording in the DFSMShsm log, you must specify the LOG parameter. If you want DFSMShsm to print the activity logs, you must specify the HARDCOPY parameter.
2. RELEASE ALL does not release holds on the common recall queue (CRQ). To release a hold on the CRQ, specify RELEASE COMMONQUEUE. To release a hold on only specific CRQ functions, specify the appropriate optional subparameters.

## ARECOVER: Releasing Aggregate Recovery

**Explanation:** ARECOVER is an optional parameter specifying that DFSMShsm release for processing any ARECOVER commands currently held in queues and allow new ARECOVER commands to be received.

Subparameter	Explanation
AGGREGATE ( <i>agname</i> )	Any ARECOVER commands held for a particular aggregate group are released.
DATASETNAME ( <i>controlfiledsn</i> )	Any ARECOVER commands held for a particular control file are released.

**Defaults:** None.

## AUDIT: Releasing the Audit Function

**Explanation:** AUDIT is an optional parameter specifying that the audit function is released. DFSMShsm starts processing any queued AUDIT commands. Any AUDIT command that was interrupted by a HOLD command does not restart.

**Defaults:** None.

## AUTOMIGRATION: Releasing Only Automatic Volume and Automatic Secondary Space Management

**Explanation:** AUTOMIGRATION is an optional parameter specifying that DFSMShsm release automatic volume and automatic secondary space management.

If tape migration has ended while DASD migration continues, or if DASD migration has ended while tape migration continues, this parameter allows both DASD and tape to resume their acceptability as migration targets.

**Defaults:** None.

## RELEASE

**Note:** You cannot release the AUTOMIGRATION if MIGRATION is held.

### BACKUP: Releasing Backup

**Explanation:** BACKUP is an optional parameter specifying whether DFSMShsm should release all backup processing or release only:

- All data set backup requests
- All data set backup requests to either DASD or tape
- Data set backups to DASD
- Data set backups to tape
- All automatic backups.

BACKUP by itself specifies that DFSMShsm releases all backup processing.

Subparameter	Explanation
AUTO	DFSMShsm releases only automatic backup processing.
DSCOMMAND	DFSMShsm releases data set backups for both tape and ML1 DASD requests. If you specify DS COMMAND(DASD), DFSMShsm releases data set backups directed to ML1 DASD. If you specify DS COMMAND(TAPE), DFSMShsm releases data set backups directed to tape.

**Defaults:** None.

**Notes:**

1. You cannot release a subfunction if the initial HOLD was done at a higher level. For example, you cannot release the subfunction BACKUP(AUTO) if the main function BACKUP is held.  
For another example: If you issue HOLD BACKUP(DS COMMAND(TAPE)), DFSMShsm holds only the data set backup by command to tape subfunction. Then, if you issue RELEASE BACKUP(DS COMMAND), DFSMShsm releases data set backup by command to tape because TAPE is a subfunction of DS COMMAND. However, if you issue HOLD BACKUP, DFSMShsm holds all backup processing. Then, if you issue RELEASE BACKUP(DS COMMAND(TAPE)), DFSMShsm *still* holds data set backup by command to tape because all backup to tape was held at the BACKUP level.
2. Releasing a particular function releases the hold on that function's subfunctions, as well.
3. If the time is still within the backup start window, automatic backup starts processing any functions that have not already been processed. Any volumes that were not already fully processed are candidates for processing if less than 24 hours has passed since automatic backup was last started from the beginning and if the time is still within the backup window.
4. If automatic backup is not scheduled to run on a particular day, you can use the BACKUP parameter of the RELEASE command to move backup versions (and backup migrated data sets). Automatic backup is scheduled not to run if you specified SETSYS AUTOBACKUPSTART(0) or specified N for this day in the backup cycle.

## COMMONQUEUE: Releasing Holds on the Common Queue

**Explanation:** COMMONQUEUE is an optional parameter that specifies that DFSMShsm release all holds at the COMMONQUEUE, RECALL, PLACEMENT, and SELECTION levels. All unselected recall requests in the local queue move to the common recall queue (CRQ).

**RECALL:** If there is no hold at the COMMONQUEUE level, specify COMMONQUEUE(RECALL) to release holds at the RECALL, PLACEMENT, and SELECTION levels. All unselected recall requests in the local queue move to the common recall queue (CRQ).

**PLACEMENT:** If there is no hold at the COMMONQUEUE level or COMMONQUEUE(RECALL) level, specify COMMONQUEUE(RECALL(PLACEMENT)) to release a hold at the PLACEMENT level. All unselected recall requests in the local queue move to the common recall queue (CRQ).

**SELECTION:** If there is no hold at the COMMONQUEUE level or COMMONQUEUE(RECALL) level, specify COMMONQUEUE(RECALL(SELECTION)) to release a hold at the SELECTION level.

For an overview of how the CRQ operates after a HOLD or RELEASE command is issued, see the *z/OS DFSMShsm Storage Administration Guide*.

**Defaults:** None.

## DUMP: Releasing Dump

**Explanation:** DUMP is an optional parameter specifying whether DFSMShsm should release both automatic dump and command dump or only automatic dump.

The DUMP parameter, without any subparameters, specifies that DFSMShsm release both automatic dump processing and command dump processing.

Subparameter	Explanation
AUTO	DUMP(AUTO) specifies that DFSMShsm release only the automatic dump processing.

**Defaults:** None.

**Notes:**

1. You cannot release the subfunction DUMP(AUTO) if the main function DUMP is held.
2. If the time is still within the dump window, automatic dump starts to process any functions that had not been completed when the dump function was held.

## EXPIREBV: Releasing the Expire Backup Versions Function

**Explanation:** EXPIREBV is an optional parameter specifying that DFSMShsm release the expire backup versions function. DFSMShsm starts processing any queued EXPIREBV commands.

Entering a RELEASE EXPIREBV command does not restart an EXPIREBV command that was in process at the time a HOLD EXPIREBV command was

## RELEASE

issued. To continue processing, you must reenter the EXPIREBV command. If the function is held when the command is reentered, the command will be saved by DFSMShsm and processed once the function is released.

**Defaults:** None.

## FRBACKUP: Releasing the Fast Replication Backup Function

**Explanation:** FRBACKUP is an optional parameter that you specify to release the fast replication backup function. When you issue this command, DFSMShsm starts processing any queued FRBACKUP command.

**Defaults:** None.

## FRRECOV: Releasing the Fast Replication Recover Function

**Explanation:** FRRECOV is an optional parameter that you specify to release the fast replication recovery function. When you issue this command, DFSMShsm starts processing any queued FRRECOV commands.

**Defaults:** None.

## HARDCOPY: Releasing the Activity Logs

**Explanation:** HARDCOPY is an optional parameter specifying that DFSMShsm print four activity logs that have data. Printing occurs when ACTLOGTYPE is specified as SYSOUT on the SETSYS command.

If the activity logs are allocated to DASD, printing does not occur, but the current logs are closed and new copies of the logs are allocated for use. Allocating the activity logs to DASD allows you to view or browse the currently allocated activity logs for messages that may have passed too quickly from your screens.

The following activity logs can be printed with the RELEASE HARDCOPY command:

- Backup
- Dump
- Migration
- Command

After printing (or closing) these logs, DFSMShsm allocates new activity logs.

**Note:** The activity log for Aggregate Backup and Recovery cannot be printed with the RELEASE HARDCOPY command. This activity log is written to either a SYSOUT or DASD data set as determined by the ABARSACTLOGTYPE parameter of the SETSYS command.

**Defaults:** None.

## LIST: Releasing the List Function

**Explanation:** LIST is an optional parameter specifying that DFSMShsm release the list function. DFSMShsm starts processing any queued LIST commands. Any list operation that was in process when list was held is not restarted.

**Defaults:** None.

## LOG: Releasing Logging

**Explanation:** LOG is an optional parameter specifying that DFSMShsm begin recording in the DFSMShsm log.

**Defaults:** None.

## MIGRATION: Releasing Space Management

**Explanation:** MIGRATION(AUTO) is an optional parameter specifying whether DFSMShsm should release automatic volume and automatic secondary space management plus command space management or only automatic volume and automatic secondary space management.

The MIGRATION parameter, without any subparameters, specifies that DFSMShsm release command space management plus automatic volume and automatic secondary space management.

MIGRATION(AUTO) is a subparameter specifying that DFSMShsm release only automatic volume and automatic secondary space management.

If tape migration has ended while DASD migration continues or if DASD migration has ended while tape migration continues, this parameter allows both DASD and tape to resume their acceptability as migration targets (for both MIGRATION alone and with AUTO).

**Defaults:** None.

**Notes:**

1. You cannot release the subfunction MIGRATION(AUTO) if the main function MIGRATION is held.
2. If the time is still within the automatic primary space management or automatic secondary space management processing window, any automatic primary space management or automatic secondary space management functions that were not completed when migration was held begin processing.

## RECALL: Releasing Recall and Deletion

**Explanation:** RECALL is an optional parameter specifying whether DFSMShsm should release automatic recall, recall by command, and deletion of a migrated data set from all volumes, from all tape volumes, or recalls that need tapes and were submitted by a TSO user.

The RECALL parameter, without any subparameters, specifies that DFSMShsm release all recall and data set deletion tasks from all volumes.

Subparameter	Explanation
TAPE	DFSMShsm releases all recalls from tape volumes.
TAPE(TSO)	DFSMShsm releases recalls that need tapes that were submitted by a TSO user.

**Defaults:** None.

**Notes:**

1. You cannot release the subfunction RECALL(TAPE(TSO)) if either the subfunction RECALL(TAPE) or the main function RECALL is held.

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2. You cannot release the subfunction RECALL(TAPE) if the main function RECALL is held.

### RECOVER: Releasing Recovery and Restore

**Explanation:** RECOVER is an optional parameter specifying whether DFSMShsm should release all recovery processing or only tape data set recovery and restore processing.

RECOVER(TAPEDATASET) specifies that DFSMShsm release only tape data set recover and restore processing tasks.

RECOVER by itself specifies that DFSMShsm release all recover and restore processing tasks.

**Defaults:** None.

**Note:** You cannot release the subfunction RECOVER(TAPEDATASET) if the main function RECOVER is held.

### RECYCLE: Releasing the Recycle Function

**Explanation:** RECYCLE is an optional parameter specifying that DFSMShsm release the recycle function. DFSMShsm starts processing any queued recycle request. Any volumes that were being recycled when recycle was held are not restarted.

**Defaults:** None.

### REPORT: Releasing the Report Function

**Explanation:** REPORT is an optional parameter specifying that DFSMShsm release the report function. DFSMShsm starts processing any queued report request. Any report that was in process when reporting was held is not restarted.

**Defaults:** None.

### RMM: Releasing the DFSMSrmm Function

**Explanation:** RMM is an optional parameter that enables the EDGTVEXT interface again after it was disabled because of an ABEND in DFSMSrmm.

**Defaults:** None.

### TAPECOPY: Releasing the Tape Copy Function

**Explanation:** TAPECOPY is an optional parameter specifying that the tape copy function is released. DFSMShsm starts processing any queued TAPECOPY commands.

If the HOLD command has been issued while the TAPECOPY command is processing more than one volume, either from a volume list from the command or an input data set, processing stops after the current volume. TAPECOPY *does not* resume volume processing when the RELEASE command is issued. Therefore, you must reissue the TAPECOPY command to complete the processing of the remaining volumes in the list.

**Defaults:** None.

## TAPEREPL: Releasing the Tape Replace Function

**Explanation:** TAPEREPL is an optional parameter specifying that the tape replace function is released. DFSMShsm starts processing any queued TAPEREPL commands.

If the HOLD command has been issued while the TAPEREPL command is processing more than one volume, either from a volume list from the command or an input data set, processing stops after the current volume. TAPEREPL *does not* resume volume processing when the RELEASE command is issued. Therefore, you must reissue the TAPEREPL command to complete the processing of the remaining volumes in the list.

**Defaults:** None.

## Examples of How to Code the RELEASE Command

The following examples present different ways to code the RELEASE command:

### Printing the Activity Logs

**Example:** In this example, DFSMShsm prints activity logs that have data and allocates new activity logs.

RELEASE HARDCOPY

### Releasing the Aggregate Backup Function

**Example:** In this example, DFSMShsm releases the backup of aggregated data sets for processing.

RELEASE ABACKUP

### Releasing the Aggregate Recovery Function

**Example:** In this example, DFSMShsm releases the recovery of aggregated data sets for processing.

RELEASE ARECOVER

### Releasing Common Queue Functions

**Example:** In this example, DFSMShsm releases the common queue functions for processing.

RELEASE COMMONQUEUE

### Releasing Placement of Recall Requests in the CRQ

**Example:** In this example, DFSMShsm releases the CRQ placement function for processing.

RELEASE COMMONQUEUE(RECALL(PLACEMENT))

## Releasing Selection of Recall Requests in the CRQ

**Example:** In this example, DFSMShsm releases the CRQ selection function for processing.

```
RELEASE COMMONQUEUE(RECALL(SELECTION))
```

## Releasing Automatic Volume and Automatic Secondary Space Management Functions

**Example:** In this example, DFSMShsm releases the recall and deletion of a migrated data set and automatic volume and automatic secondary space management functions for processing. The MIGRATION parameter of the HOLD command was not specified previously.

```
RELEASE RECALL AUTOMIGRATION
```

## Releasing the Backup Functions

**Example:** In this example, DFSMShsm releases the backup functions for processing.

```
RELEASE BACKUP
```

## Releasing the Expiration of Backup Versions

**Example:** In this example, DFSMShsm releases the expiration of backup versions for processing.

```
RELEASE EXPIREBV
```

## Releasing the Fast Replication Backup Function

**Example:** In this example, DFSMShsm releases the fast replication backup for processing.

```
RELEASE FRBACKUP
```

## Releasing the Fast Replication Recover Function

**Example:** In this example, DFSMShsm releases the fast replication recovery function for processing.

```
RELEASE FRRECOV
```

## Releasing the List Function

**Example:** In this example, DFSMShsm releases the list function for processing.

```
RELEASE LIST
```

## Releasing All Requests for Tape Recalls in the Queue

**Example:** In this example, DFSMShsm releases all requests for tape recalls in the queue for processing.

```
RELEASE RECALL(TAPE)
```

## Releasing All Requests for Tape Recalls Submitted by an Interactive TSO User

**Example:** In this example, DFSMShsm releases all requests for tape recalls submitted by an interactive TSO user for processing.

```
RELEASE RECALL(TAPE(TSO))
```

## Releasing the Tape Copy Function

**Example:** In this example, DFSMShsm releases the tape copy function for processing.

```
RELEASE TAPECOPY
```

## Releasing the Tape Replace Function

**Example:** In this example, DFSMShsm releases the tape replace function for processing.

```
RELEASE TAPEREPL
```

## Releasing Automatic Backup and Command Data Set Backups to Tape

**Example:** In this example, DFSMShsm releases automatic backups and command data set backups directed to tape for processing.

```
RELEASE BACKUP(AUTO DSCOMMAND(TAPE))
```

**RELEASE**

---

## Chapter 34. REPORT: Requesting Reports Based on DFSMShsm Statistics Records

The REPORT command generates reports based on DFSMShsm statistics records in the MCDS. You can get daily statistics reports and volume statistics reports for one function or for all DFSMShsm functions, for one volume or for all volumes that have statistics records in the MCDS, and for statistics that have been created on a specific date or between two specific dates.

You can restrict the report to the functions DFSMShsm performs, such as migration and backup, and you can restrict the report to specific dates.

You can request the following kinds of reports by using the REPORT command:

- Daily statistics report (DAILY)
- Volume statistics report (VOLUMES)

You can restrict the scope and format of the statistics reported as follows:

- Backup statistics report (FUNCTION BACKUP)
- Delete statistics report (FUNCTION DELETE)
- Migration statistics report (FUNCTION MIGRATION)
- Recall statistics report (FUNCTION RECALL)
- Recovery statistics report (FUNCTION RECOVER)
- Recycle statistics report (FUNCTION RECYCLE)
- Spill statistics report (FUNCTION SPILL)
- Statistics other than function statistics (NOFUNCTION)

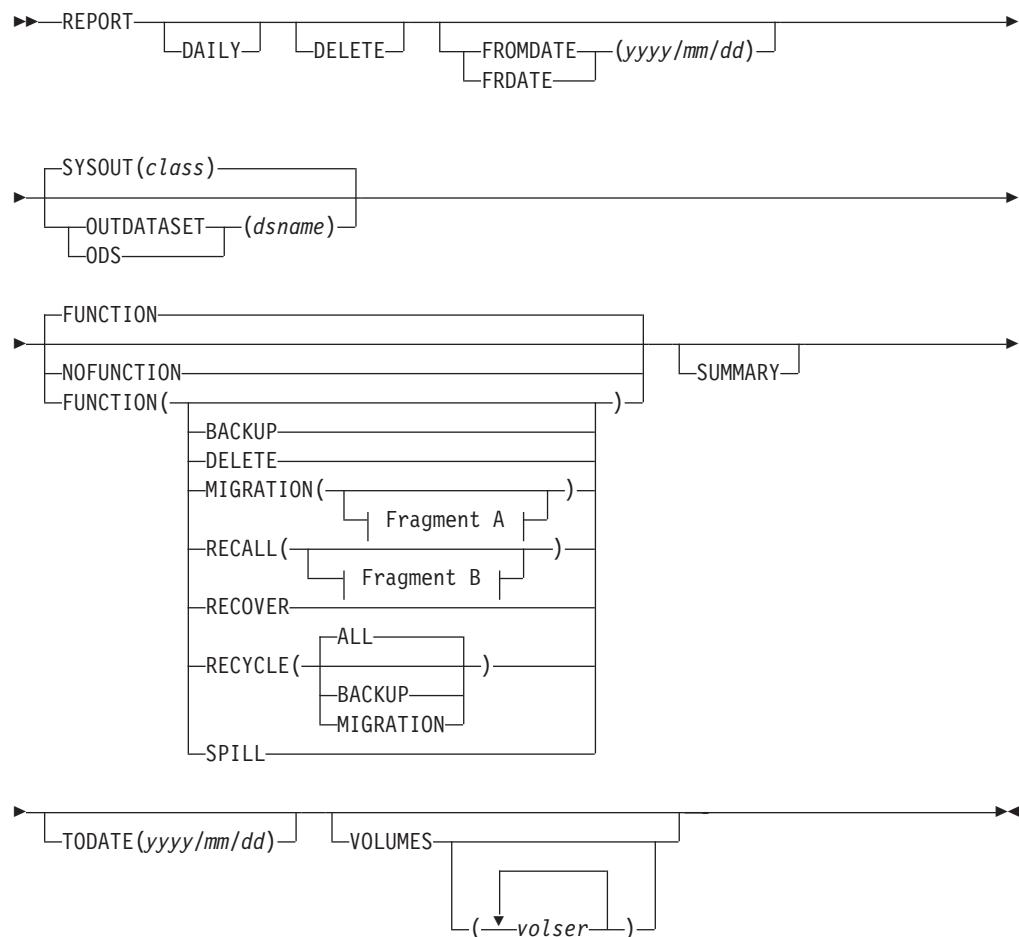
You can further restrict the scope of the statistics reports as follows:

- Statistics for dates on or after a specified date (FROMDATE)
- Statistics between two specified dates (FROMDATE and TODATE)
- Summary totals for the statistics reports (SUMMARY)

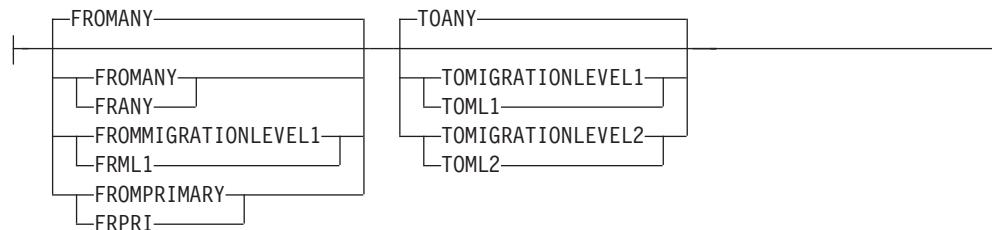
DFSMShsm allows only one REPORT command to run at a time. Appendix D, “Using the REPORT Command,” on page 637 contains sample reports of daily statistics and volume statistics.

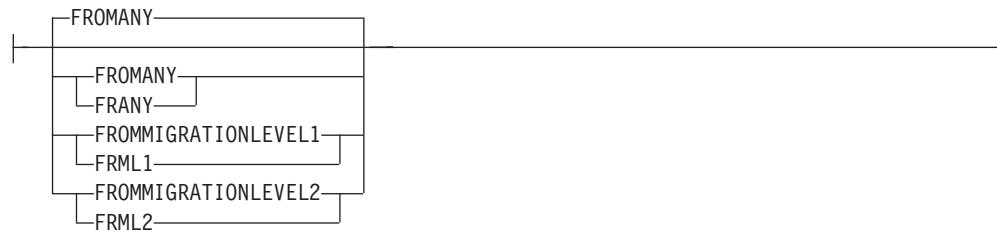
## REPORT

### Syntax of the REPORT Command



#### A: MIGRATION Optional Parameters:



**B: RECALL Optional Parameters:****Summary of Parameters**

The following table is a summary of the combination of parameters you can specify with the REPORT command:

Parameter	Related Parameters
DAILY	All parameters except VOLUMES
DELETE	DAILY or VOLUMES
FROMDATE	DAILY, SUMMARY, TODATE, or VOLUMES
FUNCTION (and all subparameters of FUNCTION)	DAILY or VOLUMES
NOFUNCTION	DAILY or VOLUMES
OUTDATASET	DAILY or VOLUMES
SUMMARY	DAILY, FROMDATE, FUNCTION, TODATE, or VOLUMES
SYSOUT	DAILY or VOLUMES
TODATE	DAILY, FROMDATE, or VOLUMES
VOLUMES	All parameters except DAILY

---

**Optional Parameters of the REPORT Command**

This section describes the optional parameters of the REPORT command.

**DAILY: Requesting Daily Statistics**

**Explanation:** DAILY is an optional parameter requesting a daily statistics report for all functions. See Figure 57 on page 642 for an example of the REPORT DAILY output.

**Defaults:** If you do not specify DAILY or VOLUMES, DFSMSHsm prints a daily statistics report.

**Notes:**

1. If you want a report of daily statistics for all DFSMSHsm functions, specify REPORT DAILY FUNCTION. DFSMSHsm then reports statistics for the current date unless you also specify the FROMDATE and TODATE parameters.
2. For a daily report, the numbers printed on the report indicate the number of attempted DFSMSHsm functional processing requests. Functional processing is not attempted for the following invalid requests:

## REPORT

- HMIGRATE requests for uncataloged data sets. The command function verifies that the data sets are cataloged before sending an MWE to DFSMShsm.
  - HRECALL requests for uncataloged data sets. The command function verifies that the data sets are cataloged before sending an MWE to DFSMShsm.
  - Any request that attempts to migrate a volume that is not added to DFSMShsm without specifying the UNIT parameter.
- REPORT DAILY causes DFSMShsm to update the daily statistics record (DSR) in the MCDS with information from the copy in storage where the command was processed. The report for today does not include any information about functions that were attempted in the last hour from any other DFSMShsm host in the environment.
3. You can specify either DAILY or VOLUMES. If you specify both parameters, DFSMShsm prints a volume statistics report.
  4. MIGRATION and RECALL statistics do not include amounts for extent reductions.

## DELETE: Deleting Statistics Records Used as Input to the Report

**Explanation:** DELETE is an optional parameter specifying that DFSMShsm delete the statistics records used as input to the report after DFSMShsm finishes processing the REPORT command.

**Defaults:** If you do not specify DELETE with REPORT, DFSMShsm does not delete the statistics records used as input to the report.

**Note:** This parameter is not related to the DELETE subparameter of the FUNCTION parameter.

## FROMDATE: Requesting Statistics of Activity on or after the Specified Date

**Explanation:** FROMDATE(yyyy/mm/dd) is an optional parameter limiting the statistics report to activity that occurred on or after the date you specify. For yyyy/mm/dd, substitute the first date you want DFSMShsm to report statistics. For example, if you specify FROMDATE(2001/02/01), DFSMShsm reports statistics for Feb. 1, 2001 through the current date.

A leading zero is not required for a one-digit month or day.

**Defaults:** If you do not specify FROMDATE, the starting date defaults to the current date.

If you specify a FROMDATE that is later than TODATE, DFSMShsm sets FROMDATE to the same date as TODATE.

### Notes:

1. You must specify yyyy/mm/dd if you specify FROMDATE.
2. If you specify that DFSMShsm report the statistics for the current day, DFSMShsm does not give you the latest statistics. The statistics records are kept in storage and accumulated with a control data set copy of the record only once an hour. Also, each DFSMShsm host uses the same control data set record. New

records are created each day for the DFSMShsm activities that have occurred today. Therefore, use today's statistics report as an indication of trends of DFSMShsm activity.

3. If FROMDATE is specified, it must not be after TODATE (specified or defaulted).
4. For REPORT VOLUMES, DFSMShsm does not allow requesting a range of dates spanning the century. In other words, both FROMDATE and TODATE (whether specified or defaulted) must be before 1 January 2000, or both FROMDATE and TODATE (whether specified or defaulted) must be after 31 December 1999.

## **FUNCTION | NOFUNCTION: Requesting Statistics by Function**

**Explanation:** FUNCTION | NOFUNCTION are mutually exclusive optional parameters specifying whether to report the statistics by function.

**FUNCTION** specifies that statistics for each specified function are reported.

**NOFUNCTION** specifies that function statistics are not reported.

**Note:** Because of the number of subparameters of the FUNCTION parameter, each subparameter is described separately.

**Defaults:** The default is FUNCTION. If you specify FUNCTION without any subparameters, DFSMShsm reports the statistics for all functions.

## **FUNCTION(BACKUP): Requesting Statistics of the Backup Function**

**Explanation:** BACKUP is an optional subparameter of the FUNCTION parameter to request a statistics report of data sets that have been backed up to daily backup volumes. You can also use it to request a statistics report of EXPIREBV requests.

**Defaults:** None.

## **FUNCTION(DELETE): Requesting Statistics of the Delete Function**

**Explanation:** DELETE is an optional subparameter of the FUNCTION parameter to request a statistics report of the migrated data sets that have been deleted or data sets that have been scratched during data set deletion or data set retirement. Deletion of primary data sets includes only those deleted by the DELETEBYAGE (DBA) or DELETEIFBACKEDUP (DBU) functions. The DBA and DBU functions apply only to non-SMS-managed data sets.

**Defaults:** None.

## **FUNCTION(MIGRATION): Requesting Statistics of the Migration Function**

**Explanation:** MIGRATION is an optional subparameter of the FUNCTION parameter to request a statistics report about migration.

Use the subparameters of the MIGRATION parameter to select statistics reports about data sets migrated between specified levels of DFSMShsm storage. For example, when you specify MIGRATION and the FROMPRIMARY and

## REPORT

TOMIGRATIONLEVEL1 subparameters, you get a statistics report about only those data sets that DFSMShsm migrated from primary volumes to migration level 1 volumes.

The following table shows the type of statistics report you get for migration:

Source Volume Subparameter	Target Volume Subparameter	Type of Migration on Statistics Report
FROMANY	TOANY	Primary to Level 1 Primary to Level 2 SUBSEQUENT MIGS
FROMANY	TOMIGRATIONLEVEL1	Primary to Level 1
FROMANY	TOMIGRATIONLEVEL2	Primary to Level 2 SUBSEQUENT MIGS
FROMMIGRATIONLEVEL1	TOANY	SUBSEQUENT MIGS
FROMMIGRATIONLEVEL1	TOMIGRATIONLEVEL1	
FROMMIGRATIONLEVEL1	TOMIGRATIONLEVEL2	SUBSEQUENT MIGS
FROMPRIMARY	TOANY	Primary to Level 1 Primary to Level 2
FROMPRIMARY	TOMIGRATIONLEVEL1	Primary to Level 1
FROMPRIMARY	TOMIGRATIONLEVEL2	Primary to Level 2

### Notes:

1. When you specify FROMANY and TOMIGRATIONLEVEL2, DFSMShsm includes data sets that migrate from migration level 2 volumes to different migration level 2 volumes in the statistics of data sets that migrate from migration level 1 volumes to migration level 2 volumes.
2. If you want information about movement from one tape migration level 2 volume to another tape migration level 2 volume, use the RECYCLE parameter.
3. SUBSEQUENT MIGS reflects all movements of data sets from migration level 1 to migration level 1, migration level 1 to migration level 2, and migration level 2 to migration level 2. This includes FREEVOL moves but does not include RECYCLE moves.

**Defaults:** When you specify MIGRATION without specifying subparameters, the defaults are FROMANY and TOANY.

## FUNCTION(RECALL): Requesting Statistics of the Recall Function

**Explanation:** RECALL is an optional subparameter of the FUNCTION parameter to request a statistics report for the recall function.

Subparameter	Explanation
FROMANY	DFSMShsm creates a statistics report of the data sets recalled from migration level 1 and migration level 2 volumes.
FROMMIGRATIONLEVEL1	DFSMShsm creates a statistics report of the data sets recalled from migration level 1 volumes.
FROMMIGRATIONLEVEL2	DFSMShsm creates a statistics report of the data sets recalled from migration level 2 volumes.

**Defaults:** When you specify RECALL without specifying subparameters, the default is FROMANY.

## FUNCTION(RECYCLE): Requesting Statistics of the Recycle Function

**Explanation:** RECYCLE is an optional subparameter of the FUNCTION parameter to request a statistics report of the data sets that have been recycled.

Subparameter	Explanation
BACKUP	DFSMShsm creates a statistics report about the data sets that DFSMShsm moved from tape backup volumes to tape spill backup volumes during recycle processing.
MIGRATION	DFSMShsm creates a statistics report about the data sets that DFSMShsm moved from the tape migration level 2 volumes to other tape migration level 2 volumes during recycle processing.
ALL	DFSMShsm creates a statistics report about tape migration level 2 volumes and tape backup volumes.

**Defaults:** If you specify RECYCLE and do not specify a subparameter, the default is ALL.

## FUNCTION(RECOVER): Requesting Statistics of the Recovery Function

**Explanation:** RECOVER is an optional subparameter of the FUNCTION parameter to request a statistics report of the data sets that have been recovered from backup volumes.

**Defaults:** None.

## FUNCTION(SPILL): Requesting Statistics of the Spill Function

**Explanation:** SPILL is an optional subparameter of the FUNCTION parameter to request a statistics report of subsequent movement of backup versions.

**Note:** These statistics include data sets spilled from daily BACKUP volumes, data sets moved as a result of the FREEVOL BACKUPVOLUME command, and data sets moved from ML1 volumes to BACKUP volumes.

**Defaults:** None.

## OUTDATASET | SYSOUT: Specifying the Output Location

**Explanation:** OUTDATASET(*dsname*) | SYSOUT(*class*) are mutually exclusive, optional parameters specifying the output location for the statistics report.

**OUTDATASET(*dsname*)** specifies the name of the data set where DFSMShsm is to write the output data. For *dsname*, substitute the fully qualified name of the data set to receive the statistics report.

If the data set does not exist, DFSMShsm dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified (*dsname*)
- Record format of fixed-blocked with ANSI control characters (FBA)

## REPORT

- Logical record length of 121
- Data set is system reblockable
- Primary allocation of 20 tracks (see second note)
- Secondary allocation of 50 tracks (see second note)
- Unit of SYSALLDA (see second note)

If the data set already exists, DFSMShsm will use the data set. The data set must have the following characteristics:

- The data set must be cataloged and on DASD.
- The data set record format must be FBA, and the logical record length must be 121.
- The data set is system reblockable.
- The user can choose the primary space allocation.
- If DFSMShsm needs additional extents after the primary space allocation, DFSMShsm uses a secondary space allocation of 50 tracks. (see second note)
- If the data set does not contain data, DFSMShsm starts writing output data at the beginning of the data set.
- If the data set contains data, DFSMShsm writes the output data after the existing data.

**SYSOUT(class)** specifies that the statistics report is to be sent to the specified system output class. For *class*, substitute the alphanumeric character for the system output class.

**Defaults:** The default is SYSOUT, and *class* defaults to the current DFSMShsm value for the SYSOUT parameter. You specify the current DFSMShsm value with the SETSYS command. If you do not specify SYSOUT with the SETSYS command, the default is class A.

**Notes:**

1. DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name as the output data set, the statistics report could be written over existing data. If you do not allocate an output data set with the required characteristics, I/O errors could occur on the output data set.
2. If you select the OUTDATASET option, you can use the PATCH command to change the unit name, primary allocation, and secondary allocation. If you select the SYSOUT option, you can use the PATCH command to change whether, and how, DFSMShsm limits the lines of SYSOUT output. Refer to the *z/OS DFSMShsm Implementation and Customization Guide*, SC35-0418 for the PATCH command.

## SUMMARY: Requesting Only the Totals of the Statistics

**Explanation:** SUMMARY is an optional parameter requesting that DFSMShsm print a summary of statistics for the days you specified with the FROMDATE and TODATE parameters.

**Defaults:** None.

**Notes:**

1. You specify REPORT DAILY FUNCTION SUMMARY to get the summary totals for the daily statistics for all functions. You specify REPORT VOLUME FUNCTION SUMMARY to get the summary totals for the volume statistics for all volumes and for all functions. You specify the VOLUMES parameter with a

volume serial number to get summary statistics for only one volume. If you request a summary of specified functions, the summary contains the statistics totals for only the specified functions.

2. When you specify SUMMARY, you get only the summary report. If you do not specify SUMMARY, you get the statistics report you requested, and a summary at the end of the report if DFSMShsm reported the statistics for more than one day.

## TODATE: Requesting Statistics of Activity on or before the Specified Date

**Explanation:** TODATE(yyyy/mm/dd) is an optional parameter you use with FROMDATE to limit statistics reports to activity that occurred during that range of time. For yyyy/mm/dd, substitute the last date you want statistics reported.

A leading zero is not required for a one-digit month or day.

**Defaults:** If you do not specify TODATE, the ending date defaults to the current date.

### Notes:

1. You must specify yyyy/mm/dd if you specify TODATE.
2. If you specify that DFSMShsm report the statistics for the current day, DFSMShsm does not give you the latest statistics. The statistics records are kept in storage and accumulated with a control data set copy of the record only once an hour. Also, each DFSMShsm host uses the same control data set record. New records are created each day for the DFSMShsm activities that occurred today. Therefore, use today's statistics report as an indication of trends of DFSMShsm activity.
3. If TODATE is specified, it must not be before FROMDATE (specified or defaulted).
4. For REPORT VOLUMES, DFSMShsm does not allow requesting a range of dates spanning the century. In other words, both FROMDATE and TODATE (whether specified or defaulted) must be before 1 January 2000, or both FROMDATE and TODATE (whether specified or defaulted) must be after 31 December 1999.

For REPORT VOLUMES, DFSMShsm will not report volume statistics for the current date unless that date is within the range of dates requested.

## VOLUMES: Requesting Volume Statistics

**Explanation:** VOLUMES(volser ...) is an optional parameter requesting a volume statistics report for specified volumes or for all volumes with statistics records in the MCDS. For volser, substitute the serial number of the volume or a list of serial numbers of the volumes whose statistics you want reported.

You specify REPORT VOLUMES FUNCTION to get a list of the volume statistics for all functions for all volumes managed by DFSMShsm. You specify VOLUMES with a volume serial number to get a statistics report for a specific volume. If you do not specify the FROMDATE and TODATE parameters, you receive a statistics report only for the current date.

See Figure 58 on page 648 for an example of the REPORT VOLUMES output.

**Defaults:** If you specify VOLUMES without volser, DFSMShsm reports statistics for all volumes that have statistics records.

## REPORT

**Note:** Any data sets that existed on a volume before you used the ADDVOL command to add the volume to DFSMShsm control are not included in the report unless DFSMShsm audited the volume just before the report and no other data sets have been allocated to the volume since the audit.

The volume report information is obtained from the volume statistics record (VSR) in the MCDS. These records are written to the MCDS each hour. Any activity that has occurred since the last update of the VSR will not be reported.

---

### Examples of How to Code the REPORT Command

For examples of the REPORT command, see Appendix D, “Using the REPORT Command,” on page 637.

---

## Chapter 35. SETMIG: Changing the Space Management Status of Non-SMS-Managed Data Sets or Volumes

The SETMIG command changes the space management status of a specific data set or group of data sets on level 0 volumes. It can also change the space management status of a specific primary volume. You use this command to temporarily change the type of space management for specific cases.

You can change the space management status in three ways:

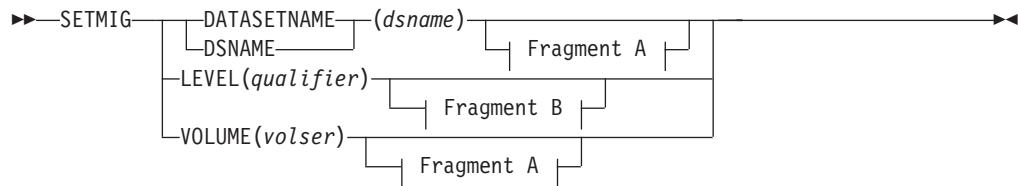
- Data set migration only by command
- Command and automatic space management
- No command or automatic space management

If you specify a value for DATASETNAME(*dsname*), you do not have to repeat the SETMIG command each time you start DFSMShsm. But if you specify a value for LEVEL(*qualifier*) or VOLUME(*volser*), you must repeat the SETMIG command each time you start DFSMShsm.

SETMIG is not supported for SMS-managed volumes or data sets except to remove or restore the SYS1 and HSM data set qualifier restriction when using the LEVEL parameter. If an SMS-managed volume is specified, an error message is issued and no function is performed. The SETMIG command is processed for an SMS-managed data set, but it has no effect on the processing of the data set, because the space management status is determined by a data set's management class attribute.

---

## Syntax of the SETMIG Command



### A: DATASETNAME | VOLUME Optional Parameters:



### B: LEVEL Optional Parameters:



**Note:** You can specify an optional parameter to change space management status.

---

## Required Parameters of the SETMIG Command

This section describes the required parameters of the SETMIG command.

### DATASETNAME | LEVEL | VOLUME: Changing the Space Management Status

**Explanation:** DATASETNAME(*dsname*) | LEVEL(*qualifier*) | VOLUME(*volser*) are mutually exclusive, required parameters to change the space management status of a data set, group of data sets, or volume.

**DATASETNAME(*dsname*)** is the parameter to change the space management status of a data set on a level 0 volume. For *dsname*, substitute the fully qualified name of the data set whose space management status is changing.

**LEVEL(*qualifier*)** is the parameter to change the space management status of a group of data sets that have the same set of initial characters of the data set name. The data sets are on level 0 volumes. For *qualifier*, substitute the first qualifier of the data set name or any number of contiguous characters, beginning with the first character of the data set name for a group of data sets whose space management status is changing. In other words, any number of leading characters of a data set name can be specified, and the last set of characters can be a partial qualifier.

**VOLUME(*volser*)** is the parameter to change the space management status of the primary volume. For *volser*, substitute the serial number of the volume. If you specified the AUTOMIGRATION parameter of the ADDVOL command for this volume, you can use the VOLUME parameter of the SETMIG command to temporarily exclude the volume from automatic primary space management. Even

if you temporarily exclude the volume from automatic primary space management, you can still issue commands to migrate a specific data set on the volume.

**Defaults:** None.

**Note:** DFSMShsm does not handle partitioned data set members individually. If you specify a partitioned data set with a member name, DFSMShsm changes the status of the entire partitioned data set.

---

## Optional Parameters of the SETMIG Command

This section describes the optional parameters of the SETMIG command.

### COMMANDMIGRATION | MIGRATION | NOMIGRATION: Specifying the Way Space Management Is Controlled

**Explanation:** COMMANDMIGRATION | MIGRATION | NOMIGRATION are mutually exclusive, optional parameters specifying how space management is controlled for a data set, a group of data sets, or all data sets on a volume.

**COMMANDMIGRATION**, valid only with the LEVEL parameter, specifies that DFSMShsm allows space management by data set command for any of a group of data sets you identified with the LEVEL parameter. DFSMShsm does not manage these data sets when it processes a volume.

**MIGRATION** specifies that DFSMShsm will do space management automatically or by command for a data set, a group of data sets, or all data sets on a volume. You specify the MIGRATION parameter only if you previously specified the COMMANDMIGRATION or NOMIGRATION parameter with the SETMIG command.

**NOMIGRATION** specifies that DFSMShsm will not do space management for the data set, group of data sets, or the volume; however, DFSMShsm will do space management by data set command for data sets when this parameter is specified with the VOLUME parameter. If NOMIGRATION is specified with the data set name or LEVEL parameter, DFSMShsm will not do space management by data set command.

**Defaults:** None.

**Notes:**

1. The COMMANDMIGRATION parameter applies only when you specify the LEVEL parameter. If you specify COMMANDMIGRATION when it does not apply, DFSMShsm ignores it.
2. If a data set is specified in more than one LEVEL parameter, that data set is given the space management status that is specified in the first issued command. For example, if LEVEL(A) COMMANDMIGRATION is specified, then LEVEL(A.B) MIGRATION is specified; because LEVEL(A) covers all A.B data sets, the second command is ignored.

## Examples of How to Code the SETMIG Command

The following examples present different ways to code the SETMIG command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Changing the Space Management Status of a Specific Data Set

**Example:** In this example, the space management status of a particular data set is changed to prevent space management by volume processing or data set command.

```
SETMIG DATASETNAME(FST1234.COMPARE.REPORT) NOMIGRATION
```

### Changing the Space Management Status of a Group of Data Sets

**Example:** In this example, the space management status of a group of data sets with the same first qualifier of the data set name is changed to prevent space management by volume processing or by command.

```
SETMIG LEVEL(JJT2143) NOMIGRATION
```

### Changing the Space Management Status of a Volume

**Example:** In this example, the space management status of a DFSMSHsm-managed volume is changed to allow automatic and command space management, which was previously restricted, to occur from the volume.

```
SETMIG VOLUME(VOL123) MIGRATION
```

### Changing the Space Management Status of a Group of Data Sets to Allow Space Management Only by Command

**Example:** In this example, the space management status of a group of data sets is changed to allow space management of a data set only when requested by a command.

```
SETMIG LEVEL(MIL3691.REV3) COMMANDMIGRATION
```

This command would apply to all the data sets listed here:

- MIL3691.REV3
- MIL3691.REV3VER2.LISTING
- MIL3691.REV3456.TEST
- MIL3691.REV3TST.EXAM.LIST

---

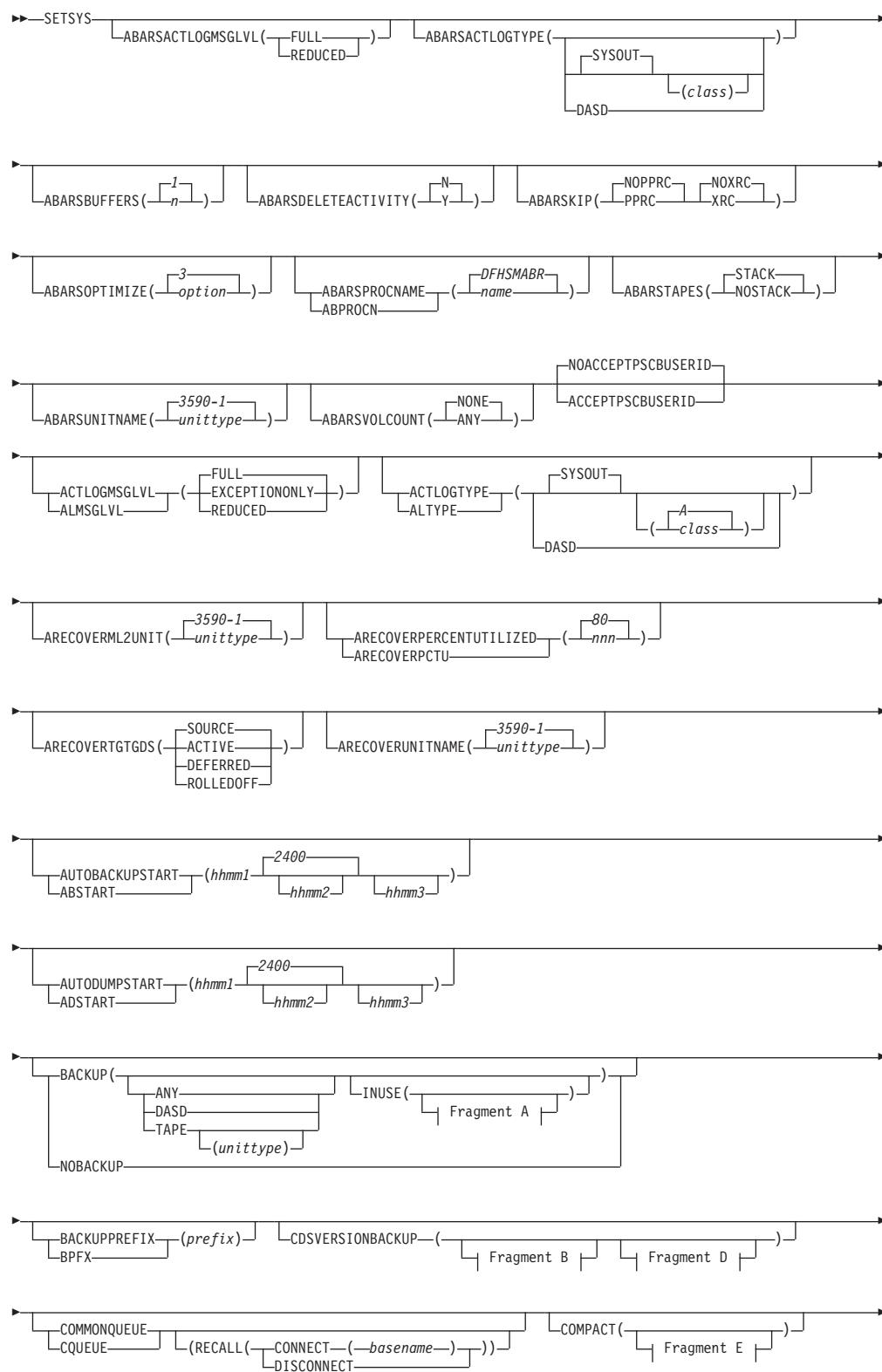
## **Chapter 36. SETSYS: Establishing or Changing the Values of DFSMShsm Control Parameters**

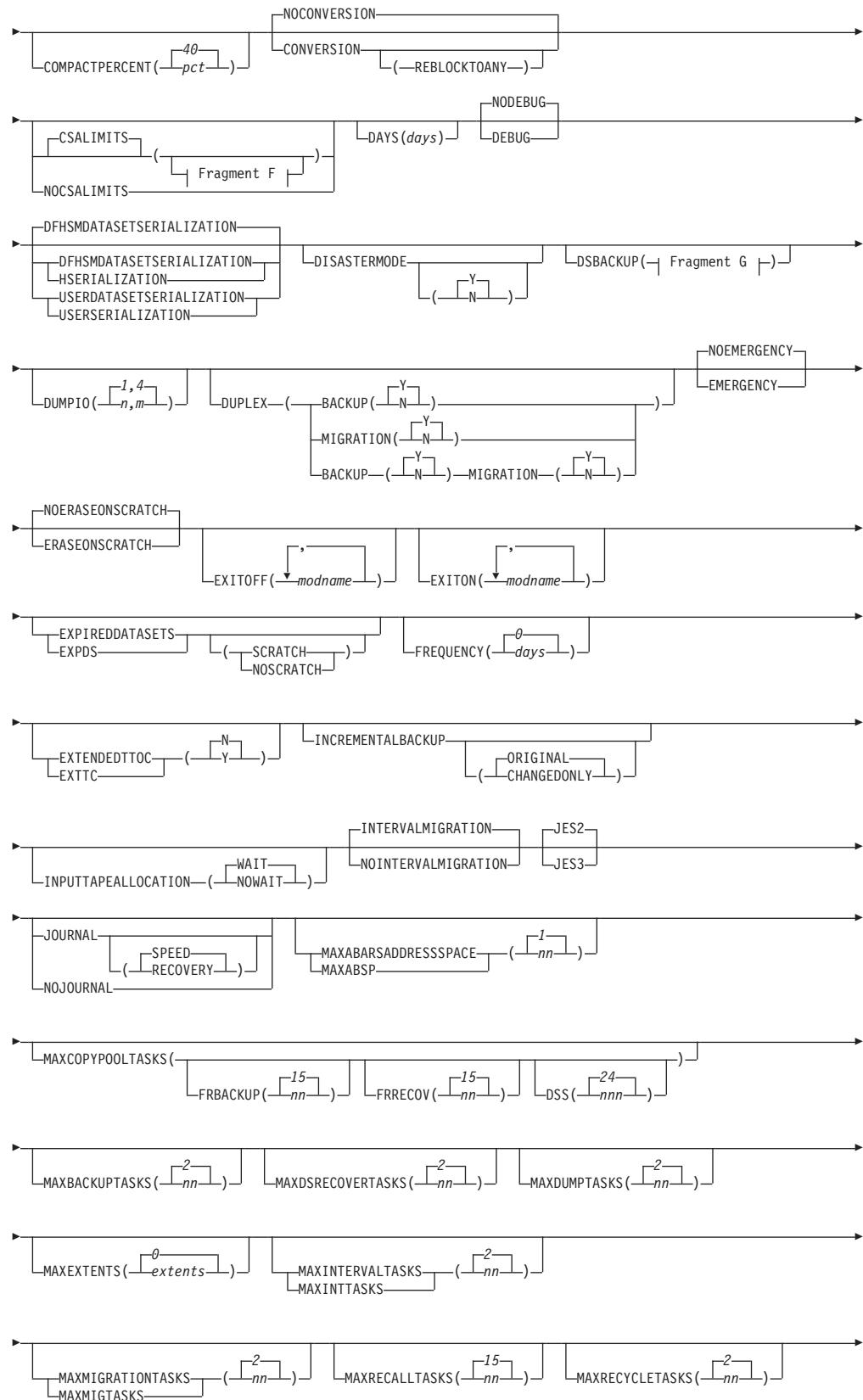
When you start DFSMShsm, a subset of DFSMShsm control parameters is established by default. You can override DFSMShsm defaults by specifying one or more SETSYS commands in the ARCCMDxx PARMLIB member used when you start DFSMShsm. You can issue the SETSYS command with specific parameter values after DFSMShsm is started to change the current defaults. The changed values remain in effect until you restart DFSMShsm. Refer to the DFSMShsm Installation Verification Procedure in the *z/OS DFSMShsm Implementation and Customization Guide* for an example of how to set up the ARCCMDxx PARMLIB member.

If you do not specify the SETSYS command, DFSMShsm does not do any automatic space management, backup, or dump. Therefore, if you want to take advantage of the automatic functions of DFSMShsm, use the SETSYS command.

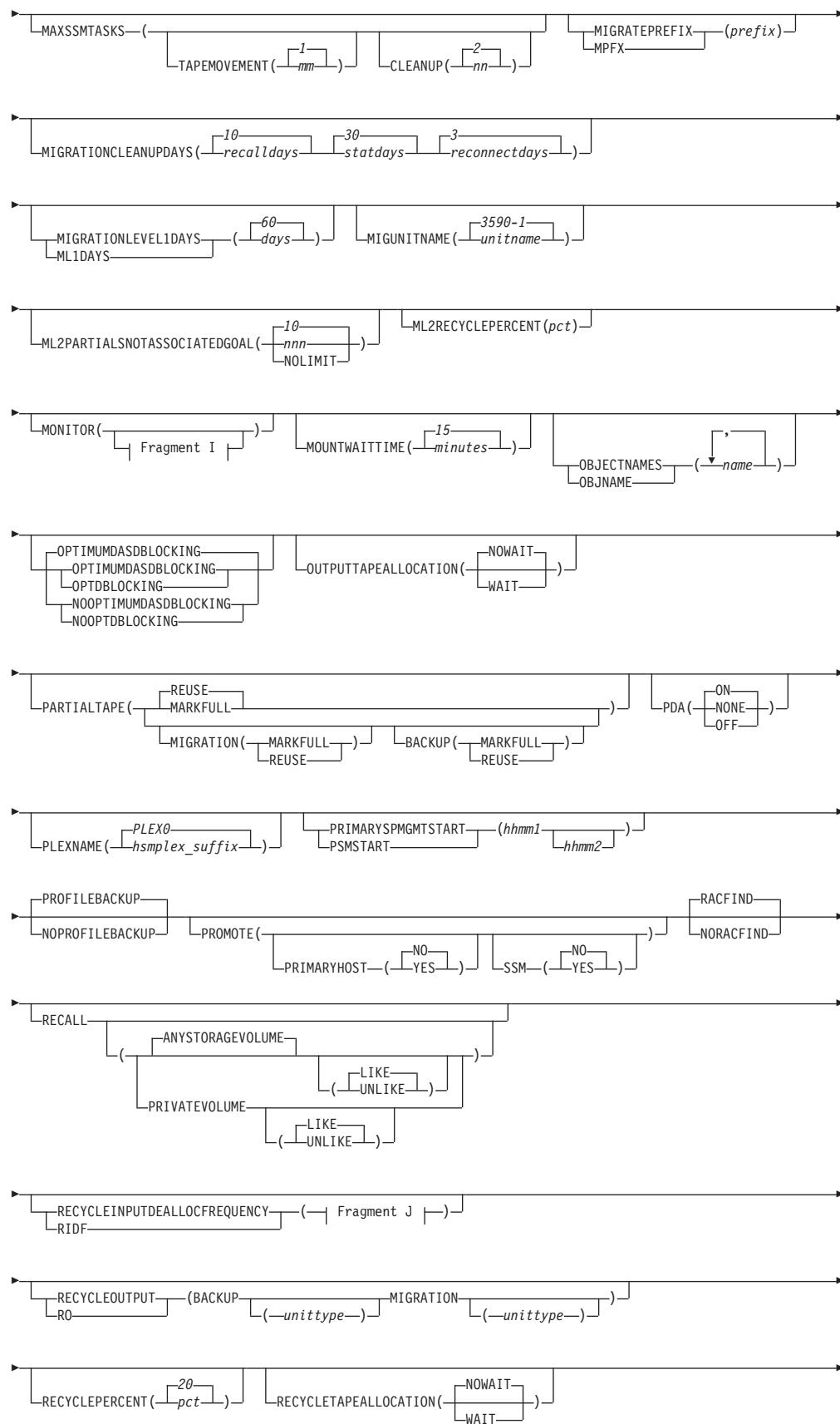
Do not confuse DFSMShsm defaults with the SETSYS command defaults. Except for certain values, there are no SETSYS command defaults. A SETSYS command does not have required parameters, so unless you indicate a specific parameter value for the SETSYS command, the DFSMShsm control parameter is the default. An exception to this is the CDSVERSIONBACKUP parameter.

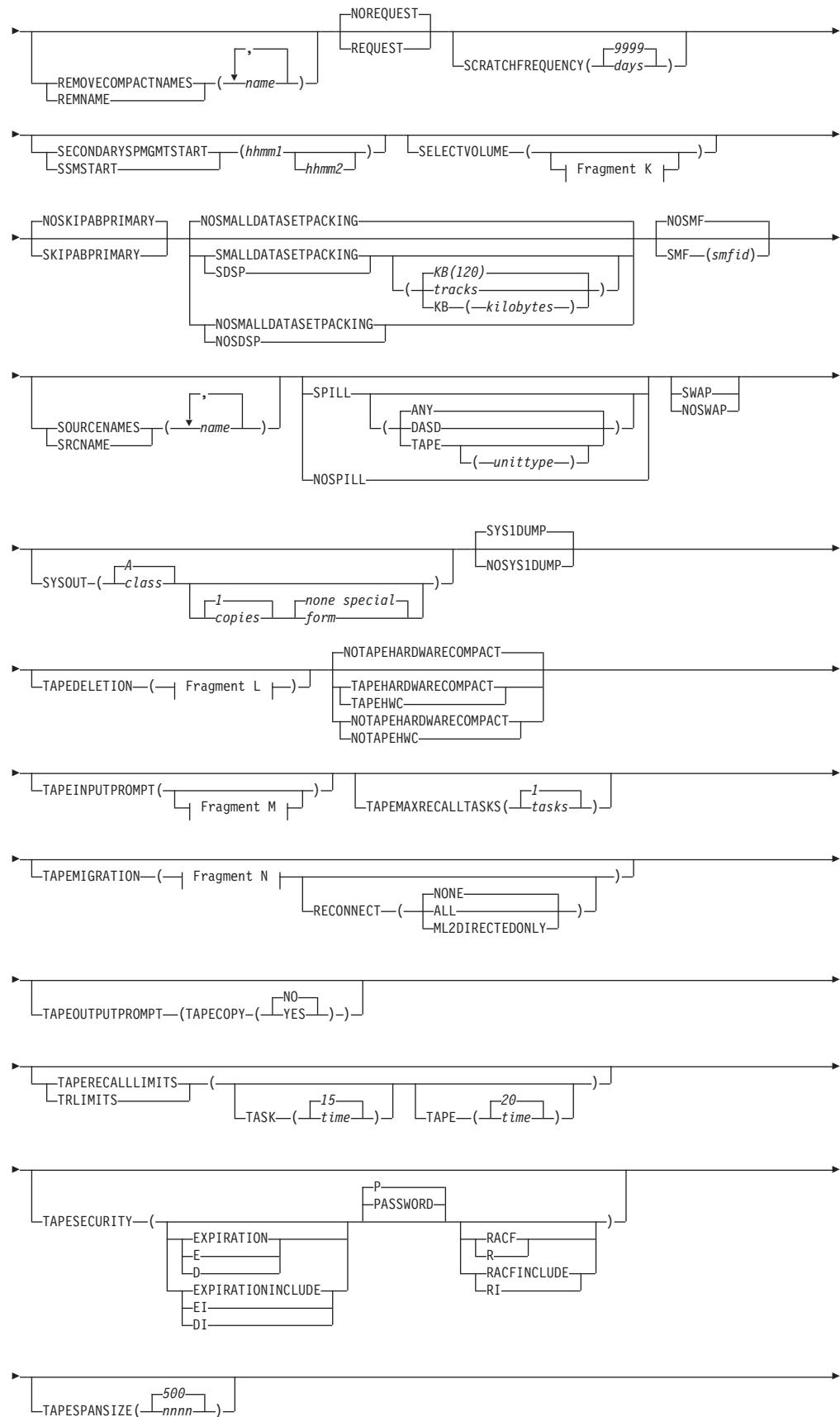
## Syntax of the SETSYS Command



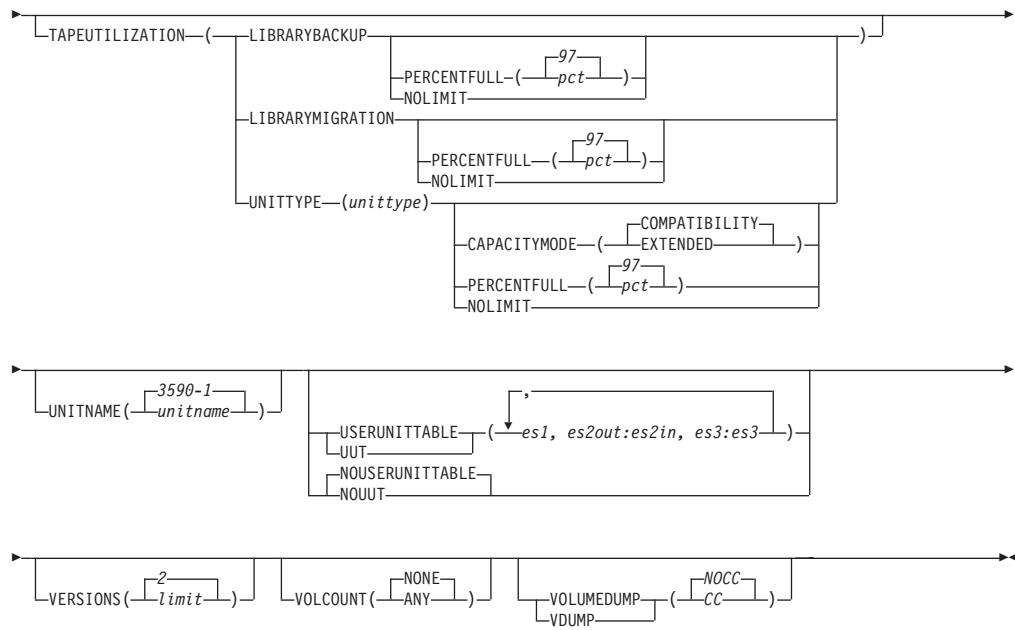


## SETSYS

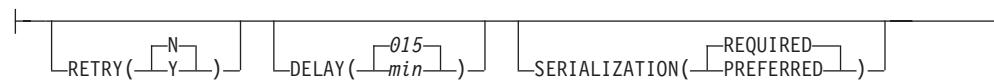




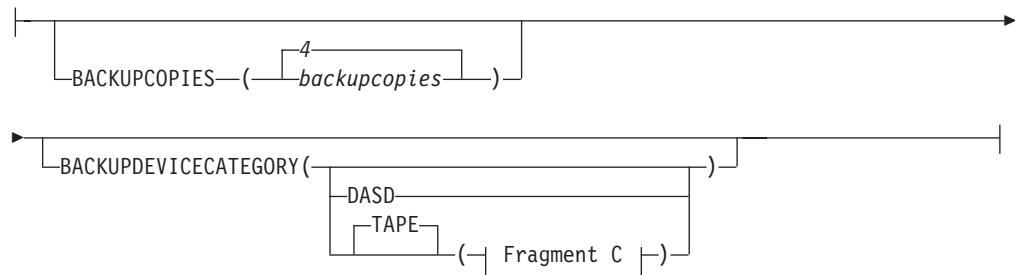
## SETSYS



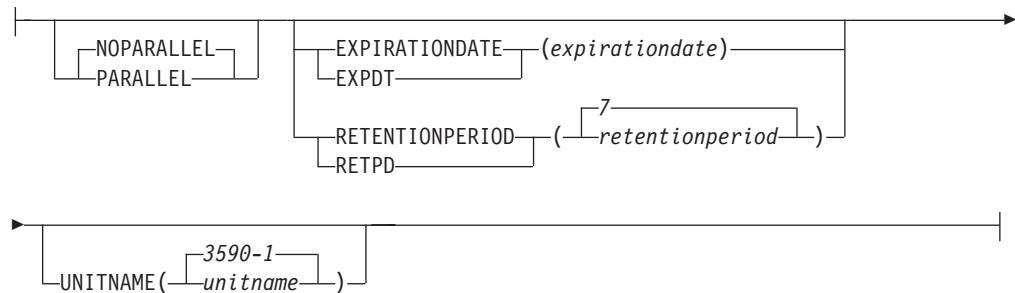
### A: INUSE Optional Parameters:

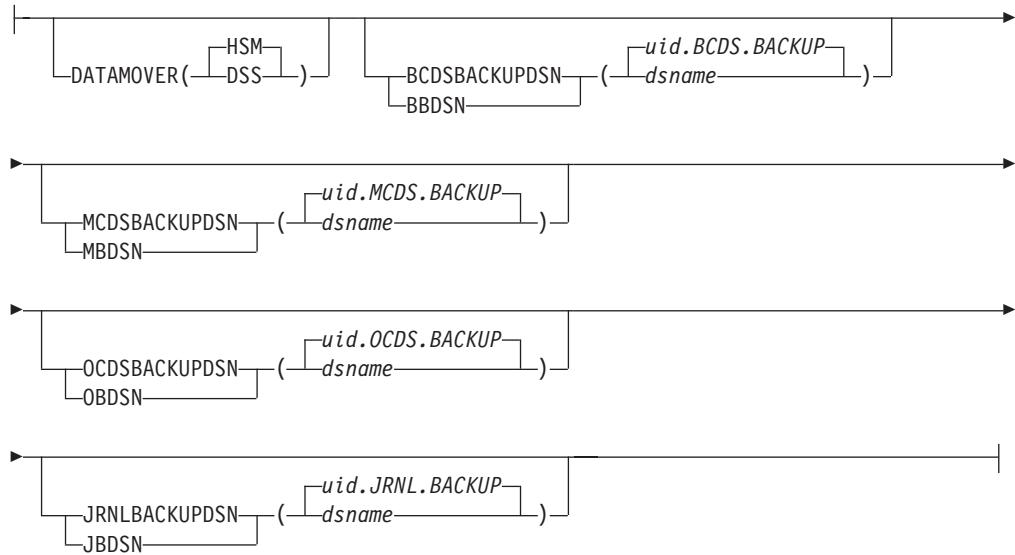
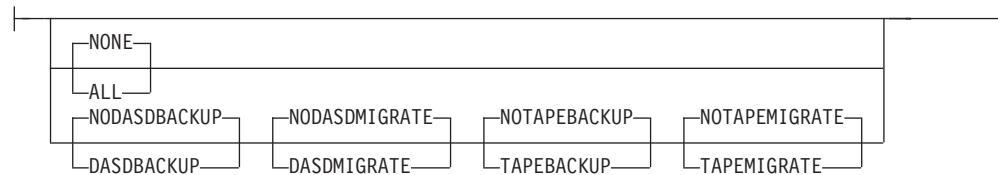
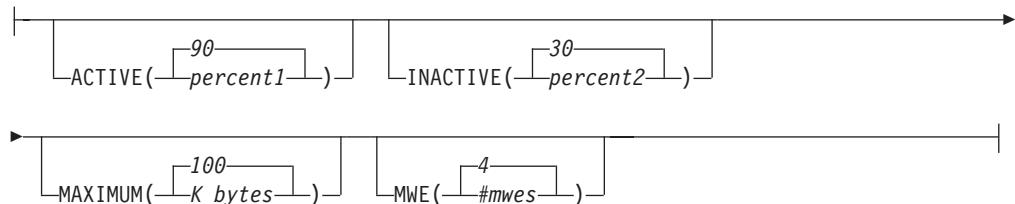
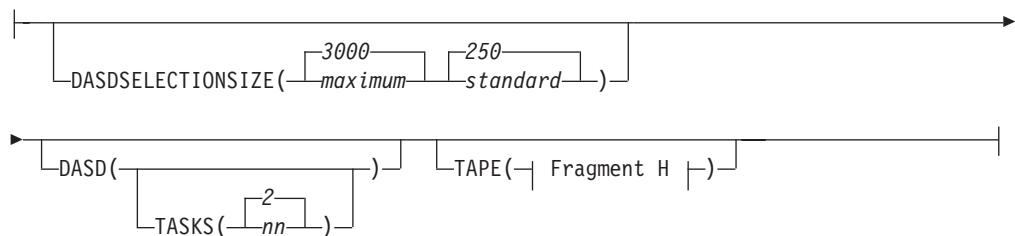


### B: CDSVERSIONBACKUP Optional Parameters:

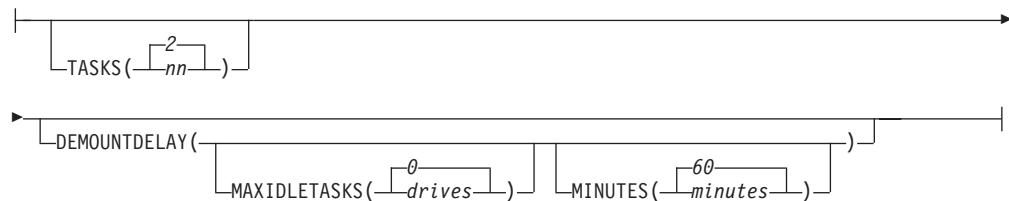


### C: TAPE Optional Parameters:

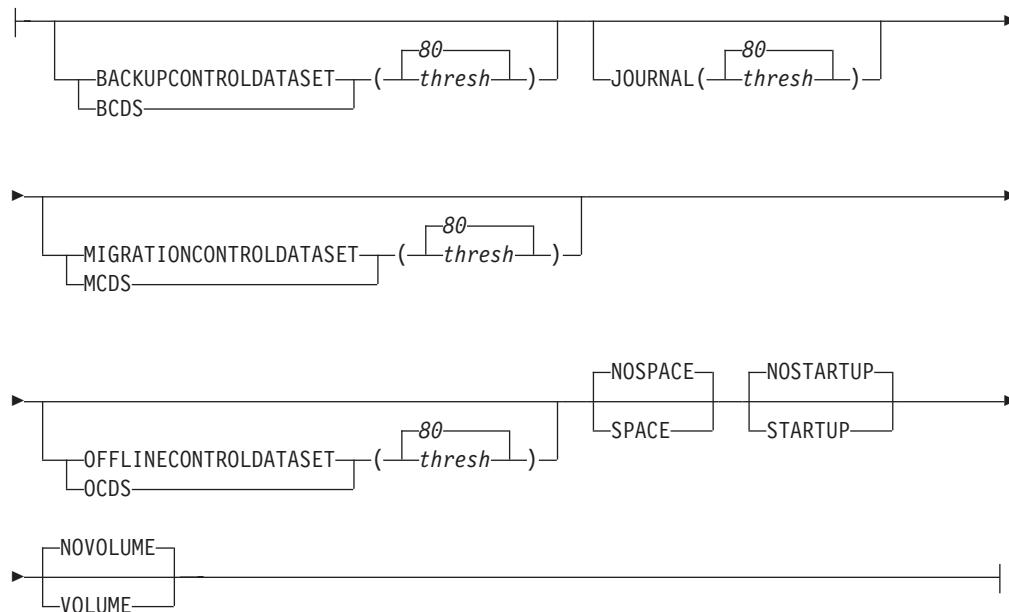


**D: Additional CDSVERSIONBACKUP Optional Parameters:****E: COMPACT Optional Parameters:****F: CSALIMITS Optional Parameters:****G: DSBACKUP Optional Parameters:****H: Tape Optional Parameters:**

## SETSYS



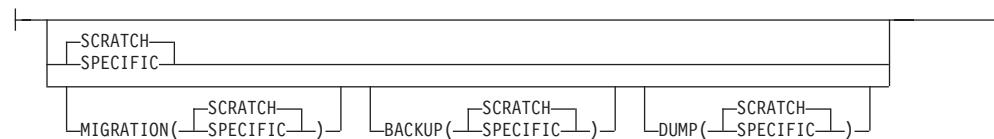
### I: MONITOR Optional Parameters:

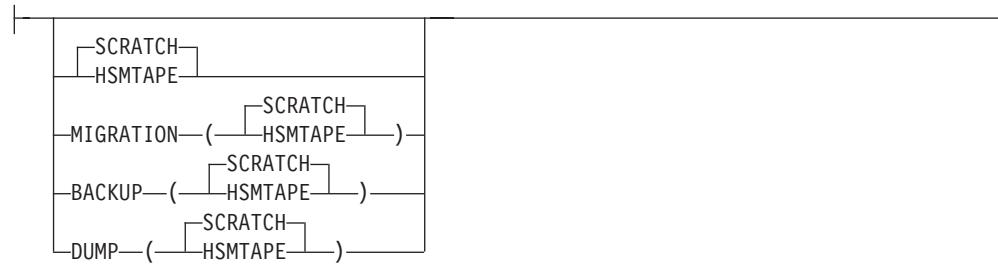
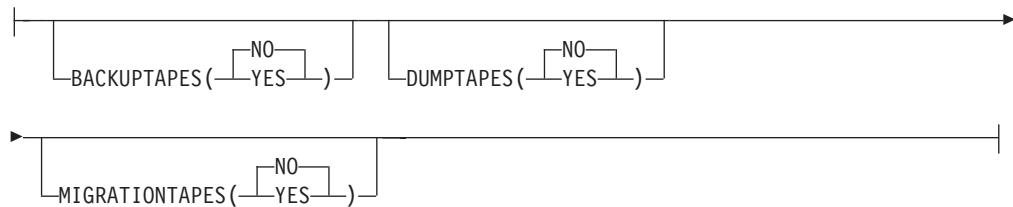
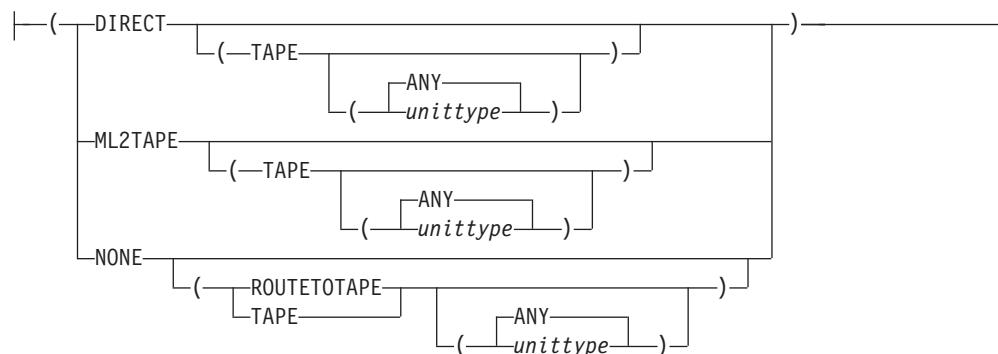


### J: RECYCLEINPUTDEALLOCFREQUENCY Optional Parameters:



### K: SELECTVOLUME Optional Parameters:



**L: TAPEDELETION Optional Parameters:****M: TAPEINPUTPROMPT Optional Parameters:****N: TAPEMIGRATION Optional Parameters:**

**Note:** In a multiple address space for DFSMShsm environment, SETSYS commands with ABARS parameters, like ABARSxxx, ARECOVERxxx, or MAXABARSADDRESSSPACE, or the SETSYS CSALIMITS command can be directed only to the host identified as the main host. DFSMShsm ignores these commands if directed to a host identified as HOSTMODE=AUX.

## SETSYS Fast-Path for DFSMShsm Functions

DFSMShsm performs two main functions: Availability Management and Space Management. Availability Management is used to make data available by automatically copying new and changed data sets to backup volumes and DASD volumes to dump tapes. Space Management is used to manage DASD space by enabling inactive data sets to be moved off fast-access storage devices thus creating free space for new allocations. DFSMShsm also provides other supporting functions that are essential to your installation's DFSMShsm environment.

The following table illustrates the functions performed by DFSMShsm for Availability Management, Space Management and these supporting functions.

Main Functions	Supporting Functions
Availability Management: ABARS Backup Dump Fast Replication Recover  Space Management: Expiration Extent Reduction Interval Migration Migration Recall Recycle Secondary Space Management	CDS (Backup, Journaling, and Monitoring) Logging and Diagnosis MVS Environment Security Tape Environment

The SETSYS command and its parameters are used to establish a DFSMShsm environment. When DFSMShsm is installed, a default set of SETSYS parameters is used. You can specify one or more SETSYS commands in the ARCCMDxx PARMLIB member that is used during the startup of DFSMShsm or you can issue SETSYS commands with specific parameter values after DFSMShsm is started.

The following table lists both the main and supporting functions performed by DFSMShsm and the SETSYS parameters that affect them. The left column lists the functions and the right column lists the SETSYS parameters that affect these functions. This table emphasizes SMS-managed user data and it excludes parameters that relate to non-SMS user data and backup to DASD. Refer to the SETSYS examples at the end of this SETSYS chapter for common user scenarios that you can use for your installation.

Availability Management Functions	SETSYS Parameter
ABARS Environment	ABARSACTLOGMSGLEVEL ABARSACTLOGTYPE ABARSBUFFERS ABARSDELETEACTIVITY ABARSKIP ABARSPROCNAME ABARSTAPES ABARSUNITNAME EXITON(ED TV)   EXITOFF(ED TV) MAXABARSADDRESSSPACE
ABACKUP	ABARSOPTIMIZE EXITON(BE M2)   EXITOFF(BE M2)
ARECOVER	ABARSVOLCOUNT ARECOVERML2UNIT ARECOVERPERCENTUTILIZED ARECOVERTGDS ARECOVERUNITNAME EXITON(CR SK)   EXITOFF(CR SK)
Backup	AUTOBACKUPSTART BACKUP BACKUPPREFIX COMPACT COMPACTPERCENT DSBACKUP DUMPIO DUPLEX EXITON(BD SA)   EXITOFF(BD SA) INCREMENTALBACKUP MAXBACKUPTASKS See also the DEFINE command and the EXPIREBV command.
Dump	AUTODUMPSTART BACKUP BACKUPPREFIX DUMPIO MAXDUMPTASKS VOLUMEDUMP See also the DEFINE command.
Fast Replication	MAXCOPYPOOLTASKS

## SETSYS

Availability Management Functions	SETSYS Parameter
Recover	CONVERSION
	EXITON(CD RP)   EXITOFF(CD RP)
	MAXDSRECOVERTASKS
	VOLCOUNT
Space Management Functions	SETSYS Parameter
Expiration	EXPIREDATASETS
Extent Reduction	MAXEXTENTS
Interval Migration	EXITON(MD SA)   EXITOFF(MD SA)
	INTERVALMIGRATION
	MAXINTERVALTASKS
	See also the SETSYS parameters for the Migration function with the exception of the following parameters: EXPIREDATASETS and PRIMARYSPMGMTSTART.
Migration	COMPACT
	COMPACTPERCENT
	DUMPIO
	DUPLEX
	EXITON(MD MV SA)   EXITOFF(MD MV SA)
	EXPIREDATASETS
	MAXMIGRATIONTASKS
	MIGRATEPREFIX
	PRIMARYSPMGMTSTART
	SMALLDATASETPACKING   NOSMALLDATASETPACKING
Recall	TAPEMIGRATION
	COMMONQUEUE
	CONVERSION
	EXITON(CD RP)   EXITOFF(CD RP)
	MAXRECALLTASKS
	TAPEMAXRECALLTASKS
	TAPERECALLLIMITS
Recycle	VOLCOUNT
	MAXRECYCLETASKS
	ML2PARTIALSNOTASSOCIATEDGOAL
	ML2RECYCLEPERCENT
	RECYCLEINPUTDEALLOCFREQUENCY
	RECYCLEOUTPUT
	RECYCLEPERCENT
	RECYCLETAPEALLOCATION

Space Management Functions	SETSYS Parameter
Secondary Space Management	EXITON(MM)   EXITOFF(MM)
	MAXSSMTASKS
	MIGRATIONCLEANUPDAYS
	SECONDARYSPMGMTSTART

Supporting Functions	SETSYS Parameter
CDS (Backup, Journaling, and Monitoring)	CDSVERSIONBACKUP
	EXITON(CB)   EXITOFF(CB)
	JOURNAL   NOJOURNAL
	MONITOR
Logging and Diagnosis	ACTLOGMSGlvl
	ACTLOGTYPE
	DEBUG   NODEBUG
	EMERGENCY   NOEMERGENCY
	MONITOR
	PDA
	SMF
	SYSOUT
	SYS1DUMP
MVS Environment	CSALIMITS
	EXITON(IN SD)   EXITOFF(IN SD)
	JES2   JES3
	NOSWAP
	PLEXNAME
	PROMOTE
	USERDATASETSERIALIZATION   DFHSM DATASETSERIALIZATION
Security	ACCEPTPSCBUSERID   NOACCEPTPSCBUSERID
	ERASEONSCRATCH   NOERASEONSCRATCH
	PROFILEBACKUP   NOPROFILEBACKUP
	RACFIND   NORACFIND
	TAPESECURITY

## SETSYS

Supporting Functions	SETSYS Parameter
Tape Environment	COMPACT
	DISASTERMODE
	EXITON(TD TE TV)   EXITOFF(TD TE TV)
	EXTENDEDTTOC(Y   N)
	INPUTTAPEALLOCATION
	MOUNTWAITTIME
	OUTPUTTAPEALLOCATION
	PARTIALTAPE
	SELECTVOLUME
	TAPEDELETION
	TAPEHARDWARECOMPACT
	TAPEINPUTPROMPT
	TAPEMIGRATION
	TAPEOUTPUTPROMPT
	TAPESPANSIZE
	TAPEUTILIZATION
	UNITNAME
	USERUNITTABLE   NOUSERUNITTABLE

## Relationship of SMS to SETSYS Parameters

The following table indicates the relationship of the SETSYS parameters to SMS-managed DASD volumes and SMS-managed DASD data sets. Parameters that apply equally to both SMS-managed and non-SMS-managed DASD volumes and DASD data sets are not included in this table.

The following abbreviations and their meanings are used in this table:

Abbreviations	Meaning	Description
APP	Applicable	Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.
CAPP	Conditionally Applicable	Parameter applies in some instances to SMS-managed DASD volumes or data sets.
NAPP	Not Applicable	Parameter does not apply to SMS-managed DASD volumes or data sets.

All SETSYS parameters that affect tape data set names, tape volumes, and tape unit types are applicable to SMS-managed tape environments, and may have different meanings from non-SMS-managed tape environments, depending on the SMS implementation.

**Note:** Although the SETSYS command has no required parameters, you must specify at least one of the optional parameters to change any system parameters or default values.

SMS Relationship	SETSYS Optional Parameters
CAPP	ABARSVOLCOUNT
NAPP	ARECOVERPERCENTUTILIZED
APP	BACKUP   NOBACKUP
APP	COMPACT
APP	COMPACTPERCENT
CAPP	CONVERSION   NOCONVERSION
NAPP	DAYS
APP	DEBUG   NODEBUG
APP	DFHSMDATASETSERIALIZATION   USERDATASETSERIALIZATION
APP	EMERGENCY   NOEMERGENCY
APP	ERASEONSCRATCH   NOERASEONSCRATCH
APP	EXITOFF
APP	EXITON
CAPP	EXPIREDATASETS
NAPP	FREQUENCY
APP	INCREMENTALBACKUP
APP	INTERVALMIGRATION   NOINTERVALMIGRATION
APP	MAXCOPYPOOLTASKS
APP	MAXEXTENTS

## SETSYS

SMS Relationship	SETSYS Optional Parameters
APP	MIGRATIONCLEANUPDAYS
NAPP	MIGRATIONLEVEL1DAYS
APP	OBJECTNAMES
APP	PROFILEBACKUP   NOPROFILEBACKUP
APP	RACFIND   NORACFIND
NAPP	RECALL
APP	REMOVECOMPACTNAMES
NAPP	SCRATCHFREQUENCY
APP	SKIPABPRIMARY   NOSKIPABPRIMARY
APP	SMF   NOSMF
CAPP	TAPEMIGRATION
NAPP	TAPEOUTPUTPROMPT
APP	USERUNITTABLE   NOUSERUNITTABLE
NAPP	VERSIONS
CAPP	VOLCOUNT

---

## Parameter Description Location Table

The following table shows the optional SETSYS parameter names and where a complete description of each parameter is found.

Optional SETSYS Parameter	Described on Page
ABARSACTLOGMSG_LVL	350
ABARSACTLOGTYPE	350
ABARSBUFFERS	351
ABARSDELETEACTIVITY	351
ABARSKIP	352
ABARSOPTIMIZE	352
ABARSPROCNAME	352
ABARSTAPES	353
ABARSUNITNAME	353
ABARSVOLCOUNT	354
ACCEPT_PSCBUSERID	354
ACTLOGMSG_LVL	355
ACTLOGTYPE	356
ARECOVERML2UNIT	357
ARECOVERPERCENTUTILIZED	357
ARECOVERTGTGDS	
ARECOVERUNITNAME	358
AUTOBACKUPSTART	358
AUTODUMPSTART	360
AUTOMIGRATIONSTART	361
BACKUP   NOBACKUP	361
BACKUPPREFIX	365
CDSVERSIONBACKUP	366
COMMONQUEUE	373
COMPACT	375
COMPACTPERCENT	378
CONVERSION   NOCONVERSION	378
CSALIMITS   NOCSALIMITS	379
DAYS	381
DEBUG   NODEBUG	382
DEFER_MOUNT	383
DENSITY	383
DFHSMDATASETSERIALIZATION	383
DISASTERMODE	384
DSBACKUP	384
DUMPIO	388
DUPLEX	389
EMERGENCY   NOEMERGENCY	389
ERASEONSCRATCH	390
EXTOFF	390
EXITON	392
EXPIREDDATASETS	393
EXTENDEDTTOC	393
FREQUENCY	394
INCREMENTALBACKUP	394
INPUTTAPEALLOCATION	395
INTERVALMIGRATION	396
JES2   JES3	397
JOURNAL   NOJOURNAL	397
MAXABARSADDRESSSPACE	399

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Optional SETSYS Parameter	Described on Page
MAXBACKUPTASKS	399
MAXCOPYPOOLTASKS	399
MAXDSRECOVERTASKS	400
MAXDUMPTASKS	401
MAXEXTENTS	401
MAXINTERVALTASKS	402
MAXMIGRATIONTASKS	402
MAXRECALLTASKS	403
MAXRECYCLETASKS	403
MAXSSMTASKS	404
MIGDENSITY	405
MIGRATEPREFIX	405
MIGRATIONCLEANUPDAYS	406
MIGRATIONLEVEL1DAYS	407
MIGUNITNAME	407
ML2PARTIALSNOTASSOCIATEDGOAL	408
ML2RECYCLEPERCENT	408
MONITOR	409
MOUNTWAITTIME	412
NOACCEPTPSCBUSERID	354
NOERASEONSCRATCH	390
NOINTERVALMIGRATION	396
NOOPTIMUMDASDBLOCKING	413
NOSMALLDATASETPACKING	431
NOTAPEHARDWARECOMPACT	437
OBJECTNAMES	413
OPTIMUMDASDBLOCKING	413
OUTPUTTAPEALOCATION	414
PARTIALTAPE	415
PDA	416
PLEXNAME	417
PRIMARYSPMGMTSTART	417
PROFILEBACKUP   NOPROFILEBACKUP	419
PROMOTE	419
RACFIND   NORACFIND	420
RECALL	421
RECYCLEINPUTDEALLOCFREQUENCY	422
RECYCLEOUTPUT	423
RECYCLEPERCENT	424
RECYCLETAPEALOCATION	425
REMOVECOMPACTNAMES	426
REQUEST   NOREQUEST	426
SCRATCHFREQUENCY	426
SECONDARYSPMGMTSTART	427
SELECTVOLUME	428
SKIPABPRIMARY   NOSKIPABPRIMARY	430
SMALLDATASETPACKING	431
SMF   NOSMF	432
SOURCENAMES	433
SPILL   NOSPILL	433
SWAP   NOSWAP	435
SYSOUT	435
SYS1DUMP   NOSYS1DUMP	435
TAPEDELETION	436

<b>Optional SETSYS Parameter</b>	<b>Described on Page</b>
TAPEHARDWARECOMPACT	437
TAPEINPUTPROMPT	438
TAPEMAXRECALLTASKS	439
TAPEMIGRATION	440
TAPEOUTPUTPROMPT	443
TAPERECALLLIMITS	444
TAPESECURITY	445
TAPESPANSIZE	447
TAPEUTILIZATION	448
UNITNAME	451
UNLOAD   NOUNLOAD	451
USERDATASETSERIALIZATION	383
USERUNITTABLE   NOUSERUNITTABLE	452
VERSIONS	455
VOLCOUNT	456
VOLUMEDUMP	456

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## Optional Parameters of the SETSYS Command

References to “all” data sets in the descriptions of the SETSYS parameters mean *both* SMS-managed and non-SMS-managed data sets for those parameters that are applicable to SMS.

### ABARSACTLOGMSGLEVEL: Specifying Which DFSMSdss Messages Are Written to the Log

**Explanation:** ABARSACTLOGMSGLEVEL(FULL | REDUCED) is used to specify which DFSMSdss messages are written to the respective ABARS activity log.

Subparameter	Explanation
FULL	All DFSMSdss messages are intercepted and written to the ABARS activity log.
REDUCED	Only DFSMSdss warning or error messages are displayed in the ABARS activity log. No informational messages will be written.

---

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

### ABARSACTLOGTYPE: Specifying the ABARS Activity Log Output Data Set Type

**Explanation:** ABARSACTLOGTYPE is used to specify the ABARS activity log output data set type.

Subparameter	Explanation
SYSOUT( <i>class</i> )	Messages are written out to a spool data set. For <i>class</i> , substitute an alphanumeric character for the class ABARS is to use for output.
DASD	DFSMShsm dynamically allocates DASD data sets with a unit name of SYSALLDA and a size of 20 tracks for primary allocation and 50 tracks for secondary allocation. Activity logs have names in the following form:  mcvtactn.Hmcvthost.function.agname.Dyyddd.Thhhmmss  where: <ul style="list-style-type: none"> <li>• mcvtactn = Activity log high-level qualifier, the default is HSMACT</li> <li>• Hmcvthost = DFSMShsm host ID from the PROC statement, preceded by H</li> <li>• function = Either ABACKUP or ARECOVER</li> <li>• agname = The name of the aggregate group being backed up</li> <li>• Dyyddd = Year and day of allocation, preceded by D</li> <li>• Thhhmmss = Hour, minute, and second of allocation, preceded by T</li> </ul>

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**Note:** SYSOUT has the advantage of not utilizing DASD space, whereas DASD has the advantage of being machine readable and readily available. Outputting to DASD will allow the ABACKUP activity log to be backed up as part of the aggregate backup output.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** SYSOUT is the initial default setting. If class is not specified, the default will be the SETSYS ACTLOGTYPE SYSOUT class. If ACTLOGTYPE has been set to DASD, the ABARSACTLOGTYPE class defaults to the SETSYS SYSOUT class, which in turn defaults to "A".

If SETSYS ABARSACTLOGTYPE has not been issued, each time SETSYS ACTLOGTYPE is issued, it makes the corresponding change to the setting of ABARSACTLOGTYPE.

**Note:** Once SETSYS ABARSACTLOGTYPE is issued, any subsequent SETSYS ACTLOGTYPE command does not affect the ABARSACTLOGTYPE.

## ABARSBUFFERS: Specifying the Number of I/O Buffers for ABARS

**Explanation:** ABARSBUFFERS(*n*) is used to specify the number of I/O buffers to be used by ABARS when DFSMShsm is used to read or write data sets during aggregate backup and recovery processing. This parameter does not affect the number of buffers used when DFSMSdss is invoked to DUMP or RESTORE data sets.

*n* specifies a number in the range of 1 to 9 indicating the number of buffers used for I/O processing. This number is internally multiplied by two (a buffer for input and a buffer for output).

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If the number of buffers is not specified by the SETSYS ABARSBUFFERS(*n*) command, the default is one.

## ABARSDELETEACTIVITY: Allowing DFSMShsm to Automatically Delete the ABARS Activity Log

**Explanation:** ABARSDELETEACTIVITY(Y | N) is used to select whether or not DFSMShsm deletes the ABARS activity log during ABARS roll-off processing or EXPIREBV ABARSVERSIONS processing.

Y specifies that DFSMShsm is to delete the ABARS activity log during ABARS processing. N specifies that no automatic deletion is performed by DFSMShsm.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** The ABARS activity log is not automatically deleted during ABARS processing.

## ABARSKIP: Specifying Which Types of Data Sets ABACKUP Should Skip

**Explanation:** ABARSKIP is used to specify which types of data sets that ABACKUP processing should skip. If a data set in an aggregate group is on a volume or volumes that are protected by peer-to-peer remote copy, specifying ABARSKIP(PPRC) causes ABACKUP processing to skip the data set and not back it up. If a data set is on a volume or volumes protected by extended remote copy, specifying ABARSKIP(XRC) causes ABACKUP processing to skip the data set and not back it up.

Specifying ABARSKIP(NOPPRC) or ABARSKIP(NOXRC) causes ABACKUP processing to not skip the corresponding data set and it is backed up.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** The DFSMShsm default is NOPPRC and NOXRC.

## ABARSOPTIMIZE: Adjusting Performance When Backing Up Level 0 DASD Specified in INCLUDE List

**Explanation:** ABARSOPTIMIZE(*option*) is used to control the value that the ABACKUP function specifies in the OPTIMIZE parameter when invoking DFSMSdss to backup level 0 DASD data sets.

The valid specifications for the *option* value are:

- If value is 1, then DFSMSdss reads one track at a time
- If value is 2, then DFSMSdss reads two tracks at a time
- If value is 3, then DFSMSdss reads five tracks at a time
- If value is 4, then DFSMSdss reads one cylinder at a time

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** The default value for *option* is 3.

## ABARSPROCNAME: Specifying the Base Procedure Name to Start the ABARS Secondary Address Space

**Explanation:** ABARSPROCNAME(*name*) is used to specify the JCL procedure name used on the START command issued by DFMSHsm to start the ABARS secondary address space. For *name*, specify a procedure name that conforms to standard MVS JCL naming conventions.

DFSMShsm appends ABARS*nnst* as an identifier to this procedure name when starting ABARS secondary address spaces. The value *nn* changes each time a new address space is started. The value will range from 1 to 64, so that each address space is started with a unique procedure name. The value *st* is derived from the current clock time when the procedure is started.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify a procedure name on any SETSYS command, the DFSMShsm default is DFHSMABR.

## ABARSTAPES: Allowing DFSMShsm to Stack the ABACKUP Output Files

**Explanation:** ABARSTAPES(STACK | NOSTACK) is used to indicate to DFSMShsm to stack the ABACKUP output files onto a minimum number of tape volumes during ABACKUP processing.

Subparameter	Explanation
STACK	DFSMShsm stacks the ABACKUP output files onto a minimum number of tape volumes. STACK also indicates to the ARECOVER function that the ABACKUP output files are stacked and if ARECOVER determines that the ABACKUP output files are not stacked, ARECOVER attempts to recover the output files as if NOSTACK was specified.
NOSTACK	DFSMShsm does not stack the ABACKUP output files. The ABACKUP function operates as it did in prior releases. NOSTACK also indicates to the ARECOVER function that the ABACKUP output files are not stacked and if ARECOVER determines that the ABACKUP output files are stacked, ARECOVER attempts to recover the output files as if STACK was specified.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** The default is STACK.

## ABARSUNITNAME: Specifying a Unit Name for ABARS

**Explanation:** ABARSUNITNAME(*unittype*) is used to specify the unit to be used when invoking aggregate backup or aggregate recovery.

**Tape Library Relationship:** A UNITNAME can be used for filtering in the ACS routines. If you specify the *unittype* for this command, it will be sent to the ACS routines in SMS for the ABARS function.

*unittype* specifies the tape unit to be allocated for the control file, instruction/activity log, and data file. The valid types of tape units are:

- 3400-3, 3400-4, 3400-5, 3400-6, 3400-9
- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the USERUNITTABLE parameter of the SETSYS command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. Specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

## SETSYS

**SETSYS Defaults:** If unitname is not specified by the SETSYS ABARSUNITNAME(*unitname*) or the UNIT parameter on the ABACKUP or ARECOVER command, it defaults to 3590-1.

## ABARSVOLCOUNT: Specifying the Method for Determining Volume Count for SMS Target Data Set Allocations Done by DFSMSdss

**Explanation:** ABARSVOLCOUNT(ANY | NONE) is an optional parameter that affects how DFMSHsm will invoke DFSMSdss during the ARECOVER of data sets that were dumped by DFSMSdss. This parameter affects only the ARECOVER of data sets dumped from primary volumes (L0 data sets). Refer to the *z/OS DFSMSdss Storage Administration Reference* under the topic of the RESTORE command for more specific information about the restrictions and limitations of the DFSMSdss VOLCOUNT parameter.

Subparameter	Explanation
ANY	DFMSHsm passes the VOLCOUNT(ANY) parameter to DFSMSdss during the ARECOVER of data dumped by DFSMSdss (L0 data sets). This results in the allocation of the target data set on as many volumes as required, to a maximum of 59.
NONE	The VOLCOUNT parameter is not passed to DFSMSdss and DFMSHsm operates as it did prior to the VOLCOUNT support being added where the source volume count must be maintained (for example, no single volume data sets can be extended to multiple volumes). If, for example, ABARSVOLCOUNT(ANY) had been previously specified, issuing SETSYS ABARSVOLCOUNT(NONE) resets the associated DFMSHsm indicators.

The ABARSVOLCOUNT parameters of ANY or NONE are ignored if specified for data types to which they do not apply. Refer to the *z/OS DFMSHsm Implementation and Customization Guide* to determine data set types moved by DFSMSdss for DFMSHsm.

**SMS Relationship:** Parameter applies in some instances to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** There is no SETSYS default.

**DFMSHsm Defaults:** If you do not specify SETSYS ABARSVOLCOUNT, the default is NONE.

## ACCEPTPSCBUSERID | NOACCEPTPSCBUSERID: Allowing Non-RACF Installations to Issue Authorized Commands in a TMP Environment

**Explanation:** ACCEPTPSCBUSERID | NOACCEPTPSCBUSERID are mutually exclusive, optional parameters you use to specify whether DFMSHsm should have a way of issuing authorized DFMSHsm commands in a TSO batch environment in installations not having RACF. When RACF is not installed, authorized DFMSHsm commands issued in a pure batch environment fail because of a lack of authorization.

**ACCEPTPSCBUSERID** specifies that an installation not having RACF will have DFSMShsm retrieve the user ID for TSO batch requests from the protected step control block (PSCB) and associate the user ID with the request. Thus, the current authorization checking for commands can be used to determine if the user ID is an authorized DFSMShsm user ID. If no user ID is present in the PSCB, \*\*BATCH\* will be used. An installation must ensure that the user ID is placed in the PSCB if ACCEPTPSCBUSERID is specified. If an installation does not issue the SETSYS ACCEPTPSCBUSERID command and RACF is not installed, DFSMShsm will not attempt to retrieve the user ID for TSO batch requests and all DFSMShsm authorized-user commands will fail.

**NOACCEPTPSCBUSERID** specifies that DFSMShsm will not attempt to retrieve the user ID for TSO batch requests when RACF is not installed.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is NOACCEPTPSCBUSERID.

**Notes:**

1. The SETSYS ACCEPTPSCBUSERID command applies only to TSO batch requests on systems where RACF is not installed.
2. When SETSYS SYS1DUMP is entered in the DFSMShsm startup command member in a PARMLIB, there is a possibility of an ABEND occurring during DFSMShsm initialization prior to this command being processed. If an ABEND occurs in this window and a dump listing is desired, include a SYSUDUMP DD card in the DFSMShsm startup procedure.

## ACTLOGMSG\_LVL: Specifying Message Level for Recording Data Sets

**Explanation:** ACTLOGMSG\_LVL(FULL | EXCEPTIONONLY | REDUCED) is an optional parameter specifying the message log level for the activity log required for recording data sets processed by volume and level functions. Specifically, this parameter determines which ARC0734I data set movement messages will be written to the activity log. Only the issuance of the ARC0734I message is affected.

Subparameter	Explanation
FULL	Messages are generated and logged for all activities.
EXCEPTIONONLY	Messages are generated and logged for activities with a nonzero return code.
REDUCED	The original space management message or backup message is generated, but messages for subsequent movement and cleanup are suppressed.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify any of the subparameters with the ACTLOGMSG\_LVL parameter, the DFSMShsm default is FULL.

**Notes:**

1. ACTLOGMSG\_LVL is not supported for secondary address spaces.
2. Any messages excluded from the activity logs by the use of ACTLOGMSG\_LVL will also be excluded from the HSMLOGX/Y.

## ACTLOGTYPE: Specifying the Type of Output Data Set to Receive Messages

**Explanation:** ACTLOGTYPE(SYSOUT(*class*) | DASD) is an optional parameter specifying the activity logs as either a SYSOUT data set or a DASD data set. The content of the log is free-form and can be scanned to produce a desired output.

Subparameter	Explanation
SYSOUT( <i>class</i> )	Messages are written out to a spool data set. For <i>class</i> , substitute an alphanumeric character for the class DFSMShsm is to use for output.
DASD	DFSMShsm dynamically allocates DASD data sets with a unit name of SYSALLDA and a size of 20 tracks for primary allocation and 50 tracks for secondary allocation. Activity logs have names in the following form:  mcvtactn.Hmcvthost.function.Dyyddd.Thhmmss  where: <ul style="list-style-type: none"> <li>• mcvtactn = Activity log high-level qualifier, the default is HSMACT</li> <li>• Hmcvthost = DFSMShsm host ID from the PROC statement, preceded by H</li> <li>• function = Either CMDLOG, BAKLOG, DMPLOG, or MIGLOG</li> <li>• Dyyddd = Year and day of allocation, preceded by D</li> <li>• Thhmmss = Hour, minute, and second of allocation, preceded by T</li> </ul>

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** The SYSOUT class established by the SETSYS SYSOUT command.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is SYSOUT. If you do not specify *class* for SYSOUT, the DFSMShsm default is A, one copy, and no special forms.

**Notes:**

1. If the SYSOUT class is modified with the SETSYS ACTLOGTYPE command, existing open SYSOUT activity logs are closed and new SYSOUT activity logs are opened using the output class specified with the command. For the DFSMShsm secondary address space, the new output class is used for subsequent secondary address spaces as they are started.
2. ACTLOGTYPE is supported for secondary address spaces.
3. If you need to replace HSMACT as the activity log high-level qualifier, refer to “Tuning DFSMShsm” in the *z/OS DFSMShsm Implementation and Customization Guide*.

## **ARECOVERML2UNIT: Specifying the Unit When Recovering Migrated Data Sets to Nonspecific Volumes**

**Explanation:** **ARECOVERML2UNIT(*unittype*)** specifies the type of tape unit to use in a nonspecific volume request when recovering migrated data sets to ML2 tape volumes. For *unittype*, substitute a valid unit type or a valid esoteric unit name. The following are valid types of tape units: 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, 3480, 3480X, 3490, and 3590-1. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**DFSMShsm Defaults:** If you do not specify this parameter, the DFSMShsm default is 3590-1.

## **ARECOVERPERCENTUTILIZED: Specifying the Percentage of DASD Space for Non-SMS-Managed Volumes**

**Explanation:** **ARECOVERPERCENTUTILIZED(*nnn*)** is an optional parameter that allows you to change the percentage to which DFSMShsm allows DFSMSdss to fill non-SMS-managed DASD recovery volumes. For *nnn*, substitute an integer number between 1 and 100.

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 80% (080).

## **ARECOVERTGTGDS: Passing the TGTGDS Parameter to DFSMSdss During Restore Processing**

**Explanation:** **ARECOVERTGTGDS(*option*)** is used to pass to DFSMSdss the TGTGDS parameter. This parameter provides greater flexibility managing SMS-managed generation data sets that are being restored to level 0 DASD.

The valid values for *option* are as follows:

- **DEFERRED** specifies that the target data set is to be assigned the DEFERRED status.
- **ACTIVE** specifies that the target data set is to be assigned the ACTIVE status, for example, rolled into the GDG base.
- **ROLLEDOFF** specifies that the target data set is to be assigned the ROLLEDOFF status.
- **SOURCE** specifies that the target data set is to be assigned the same status as that of the source data set.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** The default is SOURCE.

## **ARECOVERUNITNAME: Specifying Tape Unit Type for Aggregate Recovery**

**Explanation:** **ARECOVERUNITNAME(*unittype*)** is an optional parameter specifying the tape unit type for data sets being recovered to user tape volumes during an aggregate recovery.

For *unittype*, substitute the type of tape unit. The following are valid types of tape units:

- 3400-3, 3400-4, 3400-5, 3400-6, 3400-9
- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:

- 3400-9, your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives.
- 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.
- 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.
- 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.

You specify 3480 or 3480X when you use all the functions of the 3480 or 3480X Magnetic Tape Subsystem.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify *unittype* the default is 3590-1.

## **AUTOBACKUPSTART: Specifying When Automatic Backup Is to Start**

**Explanation:** **AUTOBACKUPSTART((*hhmm1 hhmm2 hhmm3*)** is an optional parameter specifying the time when automatic backup can start. The first time you specify (*hhmm1*) is the time you plan for DFSMShsm to start automatic backup. The second time you specify (*hhmm2*) is the latest time DFSMShsm can start automatic backup. The third time you specify (*hhmm3*) is the time after which DFSMShsm will not start automatic backup on additional volumes.

If DFSMShsm does not start automatic backup between the planned start time and the latest start time, no automatic backup is run that day.

For *hhmm1*, substitute the planned time for DFSMShsm to start automatic backup. If you specify *hhmm1* as zero, DFSMShsm cannot start automatic backup.

**Note:** Time is based on the 24-hour clock and is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and the minutes by *mm*. For example, 1:15 p.m. is 1315 and midnight is 2400. The maximum value you can specify for *hh* is 24, the maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm* is 2400.

For *hhmm2*, substitute the latest time DFSMShsm can start automatic backup. If *hhmm2* is set to zero, this is the same as not including the *hhmm2* parameter and DFSMShsm runs automatic backup processing until all volumes have been backed up. If you want automatic backup to begin after midnight, the value for the latest start time can be smaller than the planned start time. For example, you can specify 2330 for *hhmm1* and 0100 for *hhmm2*.

For *hhmm3*, substitute the time after which DFSMShsm can no longer start automatic backup of additional volumes. If *hhmm3* is set to zero, this is the same as not including the *hhmm3* parameter. If you do not specify *hhmm3*, DFSMShsm runs automatic backup processing until all volumes have been backed up.

If you want automatic backup to begin after midnight, *hhmm2*, the latest start time, can be smaller than *hhmm1*, the planned start time. As an example, you can specify 2330 for *hhmm1*, 0100 for *hhmm2*, and 0330 for *hhmm3*. DFSMShsm assumes that *hhmm2* is a later time than *hhmm1* and *hhmm3* is a later time than *hhmm2*.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you do not specify a value for *hhmm2*, the SETSYS default is 2400.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is no automatic backup.

**Notes:**

1. If you do not specify a nonzero value for *hhmm1* during this start up of DFSMShsm, DFSMShsm does not do automatic backup.
2. The maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm1*, *hhmm2*, or *hhmm3* is 2400.
3. You use the BACKUP parameter of the DEFINE command to specify on which days DFSMShsm is to run automatic backup. The AUTOBACKUPSTART parameter specifies the time when automatic backup can start. If automatic backup does not start before the latest start time, DFSMShsm does not start automatic backup until the next day in the cycle that automatic backup is scheduled to run. If automatic backup did not start today, you can use AUTOBACKUPSTART to change the planned and latest start times.
4. DFSMShsm serializes access to your data sets and volumes for a short period of time while it runs automatic backup. Therefore, choose a time for automatic backup when the computing system is not very active and there is not much interactive user activity.
5. If you want the operator to decide whether DFSMShsm should start automatic backup, specify the REQUEST parameter and the AUTOBACKUPSTART parameter.
6. If you specify *hhmm3* as zero, automatic backup will process all eligible primary volumes.
7. The SETSYS command fails if *hhmm1* and *hhmm2* are equal or if *hhmm2* and *hhmm3* are equal.
8. DFSMShsm does not honor the value for *hhmm3* until the volume phase of the AUTOBACKUP function.

## AUTODUMPSTART: Specifying When Automatic Dump Is to Start

**Explanation:** AUTODUMPSTART(*hhmm1 hhmm2 hhmm3*) is an optional parameter specifying the time when automatic dump can start. The first time you specify (*hhmm1*) is the time you plan for DFSMSHsm to start automatic dump. The second time you specify (*hhmm2*) is the latest time DFSMSHsm can start automatic dump. The third time you specify (*hhmm3*) is the time after which DFSMSHsm will not start automatic dump on additional volumes.

If DFSMSHsm does not start automatic dump on volumes by the *hhmm2* time, no automatic dumping is performed that day. Volumes being processed when the *hhmm3* time is reached are not affected.

For *hhmm1*, substitute the planned time for DFSMSHsm to start automatic dump. If you specify *hhmm1* as zero, DFSMSHsm does not start automatic dump.

**Note:** Time is based on the 24-hour clock and is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and the minutes by *mm*. For example, 1:15 p.m. is 1315 and midnight is 2400. The maximum value you can specify for *hh* is 24, the maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm* is 2400.

For *hhmm2*, substitute the latest time DFSMSHsm can start automatic dump. If *hhmm2* is set to zero, this is the same as not including the *hhmm2* parameter and DFSMSHsm runs automatic dump processing until all volumes have been dumped. If you want automatic dump to begin after midnight, the value for the latest start time can be smaller than the planned start time. For example, you can specify 2330 for *hhmm1* and 0100 for *hhmm2*.

For *hhmm3*, substitute the time after which DFSMSHsm can no longer start the automatic dumping of additional volumes. If *hhmm3* is set to zero, this is the same as not including the *hhmm3* parameter. If you do not specify *hhmm3*, DFSMSHsm runs automatic dump processing until all volumes have been dumped.

If you want automatic dumping to begin after midnight, *hhmm2*, the latest start time, can be smaller than *hhmm1*, the planned start time. As an example, you can specify 2330 for *hhmm1*, 0100 for *hhmm2*, and 0330 for *hhmm3*. DFSMSHsm assumes that *hhmm2* is a later time than *hhmm1* and *hhmm3* is a later time than *hhmm2*.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you do not specify a value for *hhmm2*, the SETSYS default is 2400.

**DFSMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, the default is no automatic dump.

### Notes:

1. If you do not specify a nonzero value for *hhmm1* during this start up of DFSMSHsm, DFSMSHsm does not do automatic dumping.
2. The maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm1*, *hhmm2*, or *hhmm3* is 2400.
3. You use the DUMPCYCLE parameter of the DEFINE command to specify on which days DFSMSHsm is to run automatic dump. The AUTODUMPSTART

parameter specifies the time when automatic dump can start. If automatic dump does not start before the latest start time, DFSMShsm does not start automatic dump until the next day in the cycle that automatic dump is scheduled to run. If automatic dump did not start today, you can use AUTODUMPSTART to change the planned and latest start times.

4. AUTODUMPSTART has no meaning unless the BACKUP parameter is specified on a SETSYS command during this DFSMShsm startup.
5. An explicit command must be issued to halt the automatic dump process before normal completion.
6. If you want the operator to decide whether DFSMShsm should start automatic dump, specify the REQUEST parameter and the AUTODUMPSTART parameter.
7. As with automatic backup, DFSMShsm serializes access to data sets and volumes for a short period of time. Therefore, select a time for automatic dump when the computing system is not very active and there is not much interactive user activity (usually at night).
8. Automatic dump usually starts at the planned start time. Assume, however, that DFSMShsm is not running at the planned start time or the operating system is lost while automatic dump is running. When DFSMShsm restarts, it checks whether the latest start time has passed. If it has not passed, DFSMShsm restarts automatic dump. If the time has passed and you want automatic dump to run today, you can use this parameter to respecify the time when automatic dump can start.
9. If you specify *hhmm3* as zero, automatic dump processes all eligible primary volumes.
10. The SETSYS command will fail if *hhmm1* and *hhmm2* are equal.
11. DFSMShsm can run automatic dump multiple times a day in a test environment. If automatic dump runs to completion and you want to start automatic dump again, use the following procedure:
  - a. Issue the SETSYS AUTODUMPSTART command to define a new start window.
  - b. Specify a start window that has a planned start time after the time that automatic dump last ended.
  - c. Do not confuse the time that automatic dump last ended with the specified latest start time.

Automatic dump starts immediately if the current time is in the new start window. If the current time is not in the new start window, automatic dump starts automatically when the planned start time occurs.

## AUTOMIGRATIONSTART: Specifying the Start Time for Automatic Primary Space Management

The use of the SETSYS AUTOMIGRATIONSTART parameter is nonfunctional and its use has been replaced by other functions. The AUTOMIGRATIONSTART parameter is still supported but is no longer documented.

## BACKUP | NOBACKUP: Specifying Whether You Intend to Use DFSMShsm Backup, Recovery, and Dump

**Explanation:** BACKUP | NOBACKUP are mutually exclusive, optional parameters specifying whether you intend to use any of the following DFSMShsm functions: backup, dump, recovery, and expiring backup versions. The BACKUP parameter allows you to specify restrictions as to what kind of volumes are allowed to be used for daily backup.

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The target device type used for volume backups can come from multiple sources. There are the BACKUPDEVICECATEGORY options on the BACKVOL and ADDVOL commands and there are the SETSYS BACKUP options of ANY | DASD | TAPE. The target device type can apply to the backup from SMS DASD when specified on a BACKVOL command or with the SETSYS BACKUP command. For non-SMS DASD, the target device type can be specified by any BACKVOL, ADDVOL, or SETSYS BACKUP command.

**Tape Library Relationship:** A UNITNAME can be used for filtering in the ACS routines. If you specify the unittype for this command, it will be sent to the ACS routines in SMS for the BACKUP function.

BACKUP specifies that you intend to use some or all of the following DFSShsm functions: backup (automatic or command), dump (automatic or command), recovery, and expire backup versions.

To do the following functions	Use this DFSShsm command
Backup	HBACKDS, BACKDS, or BACKVOL
Automatic backup	SETSYS AUTOBACKUPSTART and DEFINE BACKUP
Dump	BACKVOL and DEFINE DUMPCLASS
Automatic dump	SETSYS AUTODUMPSTART, DEFINE DUMPCLASS, and DEFINE DUMPCYCLE
Recovery	HRECOVER or RECOVER
Expire backup versions	EXPIREBV

The SETSYS BACKUP options ANY | DASD | TAPE(*unittype*) are there to control the target of the backup output. The SETSYS BACKUP options apply only if the BACKUPDEVICECATEGORY option is not specified on the BACKVOL command (SMS or non-SMS) or on an ADDVOL command (non-SMS only).

Subparameter	Explanation
ANY	During volume backup processing, unless overridden by a BACKVOL command or by an ADDVOL of a non-SMS volume command, any type of daily backup volume can be used for output.
DASD	During volume backup processing, unless overridden by a BACKVOL command or by an ADDVOL of a non-SMS volume command, only DASD daily backup volumes can be used for output.
TAPE	During volume backup processing, unless overridden by a BACKVOL command or by an ADDVOL of a non-SMS volume command, only tape daily backup volumes can be used for output.

Subparameter	Explanation
TAPE( <i>unittype</i> )	<p>For volume backup processing to non-SMS tape, only tape daily backup volumes that can be mounted and written on the specified type <i>unittype</i> can be used for output. For SMS tape, the specified type <i>unittype</i> will be passed to the ACS routines. A corresponding <i>unittype</i> restriction for dump output can be specified with the DEFINE DUMPCLASS command.</p> <p>For <i>unittype</i>, a generic or esoteric unit name can be specified. The following generic unit names are acceptable: 3480, 3480X, 3490 and 3590-1. If an esoteric unit name is specified, it must have been previously defined to DFSMShsm using the USERUNITTABLE parameter of the SETSYS command. You specify 3480 or 3480X when you use all the functions of the 3480 or 3480X Magnetic Tape Subsystem.</p>

INUSE, with its subparameters, specifies how DFSMShsm should handle backing up a data set that is found to be in use (open for update) during volume backup processing. The following subparameters can be used with the INUSE parameter:

Subparameter	Explanation
RETRY(Y)	DFSMShsm will retry once to back up a data set if the first attempt fails because (1) the data set is in use, or (2) a BWO candidate suffers a CA/CI split and the backup is discarded.
RETRY(N)	DFSMShsm does not retry a backup if the first attempt fails because the data set is in use.
DELAY( <i>min</i> )	DFSMShsm delays for <i>min</i> minutes before retrying a backup attempt which failed because a data set was in use. For <i>min</i> , specify a value from 0 to 999.
SERIALIZATION(PREFERRED)	If DFSMShsm retries backing up a data set (after some delay) and finds the data set still (or again) in use, it should back up the data set anyway.
SERIALIZATION(REQUIRED)	If DFSMShsm retries backing up a data set (after some delay) and finds the data set still (or again) in use, it should fail the backup.

NOBACKUP specifies that you do not intend to use DFSMShsm backup, dump, recovery, or expire backup versions. When you specify this parameter, automatic backup and automatic dump are not run, and DFSMShsm fails any backup, dump, recovery, or expire backup versions commands.

If you specify the NOBACKUP parameter while DFSMShsm functions are running, the following will occur:

If . . .	Then . . .
Volume backup is running	The volume backup operation ends after the data set currently being processed has been backed up.
Volume dump is running	The volume dump operation ends after the volume currently being processed has been dumped.
Automatic backup is running	Automatic backup prematurely ends after all volume backup operations in process have ended.
Automatic dump is running	Automatic dump prematurely ends after all volume dump operations in process have ended.

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If ...	Then ...
EXPIREBV is running	EXPIREBV prematurely ends after all expire backup versions operations in process have ended.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

### SETSYS Defaults:

If ...	Then ...
You specify BACKUP without any subparameters	Any previous backup output specification and specifications for handling data sets in use are retained.
You specify RETRY without a value	The SETSYS default is N.
You specify DELAY without a value	The SETSYS default is 15.
You specify SERIALIZATION without a value	The SETSYS default is REQUIRED.

### DFSMShsm Defaults:

If ...	Then ...
You do not specify either BACKUP or NOBACKUP on any SETSYS command	The DFSMShsm default is NOBACKUP. If BACKUP has been specified but never (within this start-up of DFSMShsm) with any of the ANY   DASD   TAPE options specified, then the default option of ANY is used.  If an option of BACKUP (either ANY   DASD   TAPE) has been specified already but <i>not</i> on this issuance of the BACKUP command, then the command is treated as if the option ANY was specified. This means that the ANY option is the default option for BACKUP.
You do not specify INUSE on any SETSYS BACKUP command	DFSMShsm does not retry any data set backup if the first attempt finds that the data set is currently in use (that is, the backup fails).
You do not specify the RETRY subparameter on any SETSYS BACKUP command	DFSMShsm does not retry any data set backup if the first attempt finds that the data set is currently in use (that is, the backup fails).
You do not specify the DELAY subparameter but you specify RETRY(Y)	DFSMShsm delays for 15 minutes before doing a retry.
You do not specify the SERIALIZATION subparameter on any SETSYS command	If DFSMShsm attempts a retry of a backup and finds the data set still in use, it will fail the backup.

### Notes:

1. If DFSMShsm has scheduled a retry of a backup, and you then change the value of the DELAY subparameter, DFSMShsm will use the most recent DELAY value to determine the time for attempting the retry.

2. Installation exit ARCBDEXT, if enabled, can override the RETRY and SERIALIZATION options for a given data set.
3. BWO data sets with CA/CI split will not be retried if SERIALIZATION(PREFERRED) has been specified.
4. When a backup retry is internally scheduled for a data set, it is the equivalent of a BACKDS command being issued. The settings used on the SETSYS DSBACKUP command affect where the backup is directed. Requests will be directed to tape or DASD based on the settings used in the DASDSELECTIONSIZE parameter.
5. If you specified BACKUP(ANY) on the SETSYS command, DFSMShsm selects the first nonfull, unallocated, daily backup volume assigned to the current day in the backup cycle. If you want DFSMShsm to use tape as a daily backup volume and you have not specified restrictions limiting the selection to tape, you must define at least one tape for each of the appropriate days in the backup cycle by using the ADDVOL command. However, if you have restricted daily backup volumes to tape by specifying BACKUP(TAPE) on a SETSYS command, you do not have to define tapes as daily backup volumes with the ADDVOL command.

## **BACKUPPREFIX: Specifying the Prefix for the Backup Version Name or the Dump Copy Data Set Name**

**Explanation:** BACKUPPREFIX(*prefix*) is an optional parameter specifying the prefix (high-level qualifier) of the data set name DFSMShsm generates when it backs up a data set or dumps a volume. *prefix* must be defined as 1 to 7 alphanumeric characters; the first character must be alphabetic only.

### **Attention**

Changing this parameter after the DFSMShsm environment is set could result in failures during the recall and recovery of data sets from tape and SDSPs.

The **backup version** name has the following format:

*prefix.BACK.Tssmmhh.user1.user2..Xyddd*

where:

- *prefix* is replaced with the prefix you specify with this command.
- BACK indicates that this is a backup version.
- *Tssmmhh* is the time when DFSMShsm backed up the data set; *ss* is the second, *mm* is the minute, and *hh* is the hour. If a duplicate exists after this name is generated, DFSMShsm changes the first character of the time stamp.
- *user1* and *user2* are replaced with the first two qualifiers of the data set name. The data set name can be 44 characters long.
- *Xyddd* is the date when DFSMShsm backed up the data set. DFSMShsm replaces the X with a letter that represents the decade. A-J have the following numeric values:

A-1, B-2, C-3, D-4, E-5  
F-6, G-7, H-8, I-9, J-0

For example, you specify BACKUPREFIX(HSMBAK). Your data set name is TERRY.CLIST.TEXT. DFSMShsm backs up the data set on 30 December 1991 at 9:15 a.m. The backup version name is:

HSMBAK.BACK.T001509.TERRY.CLIST.I0364

The **dump copy** data set name has the following format:

*prefix.DMP.dclass.Vvolser.Dyyddd.Tssmmhh*

where:

- *prefix* is replaced with the prefix you specify with this command
- DMP indicates that this is a dump version
- *dclass* is the dump class name
- *Vvolser* is the source volume serial number
- *Dyyddd* is the date when DFSMShsm dumped the data set. *yy* is the last two digits of the year of the dump date stamp. *ddd* is the Julian day of the dump date stamp.
- *Tssmmhh* is the time when DFSMShsm dumped the data set; *ss* is the second, *mm* is the minute, and *hh* is the hour.

If you request it, DFSMShsm makes a dump VTOC copy data set for each dump generation that is made for a volume.

The **dump VTOC copy** data set name has the following format:

*prefix.DUMPVTOC.Tssmmhh.Vvolser.Dyyddd*

where:

- *prefix* is replaced with the prefix you specify with this command
- DUMPVTOC indicates that this is a dump VTOC version
- *Tssmmhh* is the time when DFSMShsm dumped the data set; *ss* is the second, *mm* is the minute, and *hh* is the hour.
- *Vvolser* is the source volume serial number
- *Dyyddd* is the date when DFSMShsm dumped the data set. *yy* is the last two digits of the year of the dump date stamp. *ddd* is the Julian day of the dump date stamp.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is the UID parameter you specified in the DFSMShsm startup procedure. This UID is used as the first qualifier for data set names generated by DFSMShsm during the BACKUP or MIGRATION functions. Changing this UID after the DFSMShsm environment is set could result in failures during the recall and recovery of data sets from tape and SDSPs. *z/OS DFSMShsm Implementation and Customization Guide* explains the UID and the DFSMShsm startup procedure.

## CDSVERSIONBACKUP: Specifying Whether the Control Data Sets Should Be Backed Up to Multiple Data Sets

**Explanation:** CDSVERSIONBACKUP is an optional parameter that you use to specify whether or not DFSMShsm should back up the control data sets to multiple

data sets. The multiple backup copies give you a history of the control data sets and the journal data set. The number of backup copies kept is determined by the BACKUPCOPIES subparameter.

In a multiple-DFSMShsm-host environment, all hosts sharing DFMSHsm control data sets must specify the same options for the SETSYS CDSVERSIONBACKUP command, as the information is stored in the MCDS. The last DFMSHsm host to issue the SETSYS CDSVERSIONBACKUP command controls how all the hosts back up the CDSs. An alternative to having all DFMSHsm hosts specify the same options for the command is to have only one host (usually the primary host) specify the command. If you use the same ARCCMDxx PARMLIB member for all hosts, you can use the ONLYIF command in that member to restrict the SETSYS parameter to one host.

If you specify CDSVERSIONBACKUP while DFMSHsm is backing up the control data sets and journal data set, the parameter does not take effect until after DFMSHsm has finished backing up the control data sets and journal data set.

The subparameters of the CDSVERSIONBACKUP parameter follow this discussion in alphabetical order. The following are optional subparameters:

- BACKUPCOPIES
- BACKUPDEVICECATEGORY
- DATAMOVER
- BCDSBACKUPDSN
- MCDSBACKUPDSN
- OCDSBACKUPDSN
- JRNLBACKUPDSN

**Note:** The use of the NOCDSVERSIONBACKUP parameter has been disabled.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

#### **DFSMShsm Defaults:**

If any of these parameters or subparameters are not specified, the default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist or the parameter (or subparameter) has never been specified, the DFMSHsm defaults are as follows:

- BACKUPCOPIES is 4
- BACKUPDEVICECATEGORY is TAPE
- DATAMOVER is HSM
- NOPARALLEL
- UNITNAME specified on the SETSYS UNITNAME command
- RETENTIONPERIOD (7)
- BCDSBACKUPDSN is *uid*.BCDS.BACKUP. The *uid* is the UID parameter you specified in the DFMSHsm startup procedure.
- MCDSBACKUPDSN is *uid*.MCDS.BACKUP. The *uid* is the UID parameter you specified in the DFMSHsm startup procedure.
- OCDSBACKUPDSN is *uid*.OCDS.BACKUP. The *uid* is the UID parameter you specified in the DFMSHsm startup procedure.

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- JRNLBACKUPDSN is *uid*.JRNL.BACKUP. The *uid* is the UID parameter you specified in the DFSMShsm startup procedure.

### CDSVERSIONBACKUP (BACKUPCOPIES): Specifying the Number of Backup Copies to Keep for Each Control Data Set and Journal Data Set

**Explanation:** BACKUPCOPIES(*backupcopies*) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the number of backup copies to be cataloged and inventoried by DFSMShsm for each of the control data sets and the journal data set. For *backupcopies*, specify a decimal number from 1 to 9999 indicating the number of backup copies to be maintained. When the number of copies exceeds this limit, DFSMShsm removes the oldest from the catalog and if on tape, invokes the ARCTVEXT installation exit when it has been activated by the SETSYS EXITON command.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** See the DFSMShsm defaults listed for CDSVERSIONBACKUP on page 367.

### CDSVERSIONBACKUP (BACKUPDEVICECATEGORY): Specifying the Backup Device to Which the Control Data Sets and Journal Will Be Backed Up

**Explanation:** BACKUPDEVICECATEGORY is an optional subparameter of the CDSVERSIONBACKUP parameter that specifies the type of device that receives the backup copies of the DFSMShsm control data sets and the journal data set when DFSMShsm backs them up.

Subparameter	Explanation
DASD	DFSMShsm places the backup copies on DASD.
TAPE	DFSMShsm places the backup copies on scratch tapes.

Subparameter	Explanation
PARALLEL   NOPARALLEL	<p>Control data set backups to tape are done in parallel (PARALLEL) or one at a time (NOPARALLEL). Backup of the CDSs is always performed in parallel if the output device is DASD. If the output is to tape, DFSMShsm can be directed to backup the data sets in parallel by using the PARALLEL subparameter. If you prefer to use only a single tape drive at a time, use the NOPARALLEL subparameter.</p>
	<p>PARALLEL is the subparameter indicating that all control data sets and the journal should be backed up in parallel. By specifying this subparameter, you can cause a separate tape drive to be allocated for each control data set and the journal. Note that if DSS is the datamover, PARALLEL must be used.</p>
	<p>NOPARALLEL is the subparameter indicating that the control data sets and the journal should be backed up serially. When NOPARALLEL is specified, the control data sets are backed up one at a time followed by the backup of the journal. By specifying this parameter, you can cause only one tape drive to be allocated at a time for all the data set backups.</p>
	<p>NOPARALLEL is the default.</p>
DENSITY( <i>density</i> )	<p>You select the density of the scratch tape that DFSMShsm is to mount when it backs up the control data sets and the journal data set. For <i>density</i>, specify a value of 2, 3, or 4. The decimal number 2 indicates a tape density of 32 bytes/mm (800 bpi); 3 represents a density of 63 bytes/mm (1600 bpi), and 4 represents a density of 246 bytes/mm (6250 bpi). The DENSITY subparameter applies only to reel-to-reel technology and if specified for cartridge technology, DFSMShsm ignores it. DENSITY must be specified if the unit name specified with the UNITNAME subparameter is a reel-type tape.</p>
EXPIRATIONDATE ( <i>expirationdate</i> )   RETENTIONPERIOD ( <i>retentionperiod</i> )	<p>You select when the backup copies are no longer to be managed by your tape management product. They result in an expiration date being placed in the tape volume label.</p> <p>For <i>yyyyddd</i>, <i>yyyy</i> and <i>ddd</i> are the year and day of the year for the expiration date of the dump copies. For <i>yyyy</i>, specify a year between the current year and 2155. For <i>ddd</i>, specify a day between 001 and 366.</p> <p>For <i>yy</i>, specify a year between the current year and 99; the <i>yy</i> value is added to 1900 to get the year. For <i>ddd</i>, specify a day between 001 and 366.</p> <p>For <i>retentionperiod</i>, specify a 1- to 4-digit number representing the number of days DFSMShsm must keep the backup copy before DFSMShsm can delete it.</p>
UNITNAME ( <i>unitname</i> )	<p>You select the type of unit where DFSMShsm is to allocate the scratch tape when DFSMShsm backs up the control data sets and the journal data set. For <i>unitname</i>, the types of units you can request for allocating the scratch tape are 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, 3480, 3480X, 3490, 3590-1, or an esoteric name you specify in the USERUNITTABLE parameter of the SETSYS command.</p>

The SETSYS UNITNAME command must be issued prior to issuing the SETSYS CDSVERSIONBACKUP command to identify the type of tape unit used during

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backup or dump processing. If an esoteric tape unit name is used, the SETSYS USERUNITTABLE command must be issued prior to the SETSYS CDSVERSIONBACKUP command.

If you specify ...	Then ...
3400-9	Your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives.
3480 or 3480X	You use all the functions of the 3480 Magnetic Tape Subsystem.
3490	You use all the functions of the 3490 Magnetic Tape Subsystem.
3590-1	You use all the functions of the 3590 Magnetic Tape Subsystem.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** See the DFSMShsm defaults listed for CDSVERSIONBACKUP on page 367.

**Notes:**

1. Past dates are not recognized for *expirationdate*.
2. Values for *expirationdate* of 1999365 and 1999366 are recognized as “never expire” dates. Values of 1998000 and 1999000 are recognized as meaningful to certain tape management systems.

## CDSVERSIONBACKUP (DATAMOVER): Specifying the Type of Data Movement Used When Performing CDSVERSIONBACKUP

**Explanation:** DATAMOVER(HSM | DSS) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the type of data movement to be used when performing CDSVERSIONBACKUP of the DFSMShsm control data sets. DFSMSdss must be specified as the datamover for CDS backup when you are using RLS mode.

Subparameter	Explanation
HSM	The DFSMShsm control data sets are backed up using the AMS EXPORT function. The journal data set is backed up using sequential I/O.
DSS	The DFSMShsm control data sets are backed up by invoking the DFSMSdss logical dump function for each data set. The journal is backed up using sequential I/O. Using DFSMSdss as the datamover allows you to exploit the concurrent copy function. Control data sets and the journal are always backed up in parallel.

When you use DFSMSdss rather than DFSMShsm as the data mover, concurrent copy can be used and the CDSs will be validated as they are backed up. Concurrent copy allows the CDS backup to complete as soon as the journal has been backed up so that DFSMShsm can begin processing requests before the CDS backups are completed.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** See the DFSMShsm defaults listed for CDSVERSIONBACKUP on page 367.

**Notes:**

1. If DATAMOVER is specified, either HSM or DSS must be specified.
2. The CDSVERSIONBACKUP subparameters DATAMOVER(DSS) and BACKUPDEVICECATEGORY(TAPE(NOPARALLEL)) may not be used together. If you specify BACKUPDEVICECATEGORY(TAPE(NOPARALLEL)) and DATAMOVER(DSS), the SETSYS CDSVERSIONBACKUP command will be ignored. If you specify DATAMOVER(DSS) without specifying BACKUPDEVICECATEGORY, and the DFSMShsm environment already specifies BACKUPDEVICECATEGORY(TAPE(NOPARALLEL)) in a previous SETSYS command, DFSMShsm generates a warning message and changes the DFSMShsm environment to BACKUPDEVICECATEGORY(TAPE(PARALLEL)).
3. Each control data set and the journal are backed up to separate data sets whose names are generated using the values specified in the SETSYS CDSVERSIONBACKUP command subparameters of MCDSBACKUPDSN, BCDSBACKUPDSN, OCDSBACKUPDSN, and JRNLBACKUPDSN. These names are appended with a DFSMShsm-defined final qualifier of '.Vnnnnnnn' if the datamover is DFSMShsm, or '.Dnnnnnnn' if the datamover is DFSMSdss. If the backup fails, independent of the datamover specified, the data set name field of the failed backup will be given a final qualifier of '.Xnnnnnnn'.
4. When performing CDSVERSIONBACKUP with DATAMOVER(DSS), DFSMShsm checks the SMS management class parameters to determine if concurrent copy should be used to back up the CDS data sets.
5. If the journal is defined as a large format data set, the datamover for the journal must be DFSMShsm. For information about defining the DFSMShsm journal, see *z/OS DFSMShsm Implementation and Customization Guide*.

## CDSVERSIONBACKUP (BCDSBACKUPDSN): Specifying the Initial Characters of the Backup Data Set Name for the Backup Control Data Set

**Explanation:** BCDSBACKUPDSN(*dsname*) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name to be used when allocating the backup data set for the BCDS. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters including the periods (.); however, the 35 initial characters cannot end with a period. If the BCDS is defined as a multicluster, then only 31 characters can be used. DFSMShsm appends a final qualifier of .Dnnnnnnn or .Vnnnnnnn to the backup name you choose. DFSMShsm uses the total name to allocate the backup data set for the BCDS.

**Note:** With the multicluster CDS support, up to four names for the BCDS may be required, depending on how you have split the BCDS. DFSMShsm generates these names using the user-supplied name (or default) and appending .DSx before the final qualifier. *x* will be a number 1–4 representing each cluster. For example, if the backup data set name for the BCDS is:

DFHSM.BCDS.BACKUP

and you have split the BCDS into 4 clusters, then the generated data set names will be:

DFHSM.BCDS.BACKUP.DS1.D0000000  
DFHSM.BCDS.BACKUP.DS2.D0000000  
DFHSM.BCDS.BACKUP.DS3.D0000000  
DFHSM.BCDS.BACKUP.DS4.D0000000

If the BCDS is not defined as a multicluster, the user-defined name is used as is.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** See the DFSMShsm defaults listed for CDSVERSIONBACKUP on page 367.

## CDSVERSIONBACKUP (MCDSBACKUPDSN): Specifying the Initial Characters of the Backup Data Set Name for the Migration Control Data Set

**Explanation:** MCDSBACKUPDSN(*dsname*) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name when allocating the backup data set for the MCDS. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters, including the periods (.); however, the 35 initial characters cannot end with a period. If the MCDS is defined as a multicluster, then only 31 characters can be used. DFSMShsm appends a final qualifier of .Dnnnnnnn or .Vnnnnnnn to the backup name you choose. DFSMShsm uses the total name to allocate the backup data set for the MCDS.

**Note:** With the multicluster CDS support, up to four names for the MCDS may be required, depending on how you have split the MCDS. DFSMShsm generates these names using the user-supplied name (or default) and appending .DSx before the final qualifier. *x* will be a number 1–4 representing each cluster. For example, if the backup data set name for the MCDS is:

DFHSM.MCDS.BACKUP

and you have split the MCDS into 2 clusters, then the generated data set names will be:

DFHSM.MCDS.BACKUP.DS1.D0000000  
DFHSM.MCDS.BACKUP.DS2.D0000000

If the MCDS is not defined as a multicluster, the user-defined name is used as is.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** See the DFSMShsm defaults listed for CDSVERSIONBACKUP on page 367.

## CDSVERSIONBACKUP (OCDSBACKUPDSN): Specifying the Initial Characters of the Backup Data Set Name for the Offline Control Data Set

**Explanation:** OCDSBACKUPDSN(*dsname*) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name when allocating the backup data set for the OCDS. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters, including the periods (.); however, the 35 initial characters cannot end with a period. DFSMShsm appends a final qualifier of .Dnnnnnnn or .Vnnnnnnn to the backup name you choose. DFSMShsm uses the total name to allocate the backup data set for the OCDS.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** See the DFSMShsm defaults listed for CDSVERSIONBACKUP on page 367.

## CDSVERSIONBACKUP (JRNLBACKUPDSN): Specifying the Initial Characters of the Backup Data Set Name for the Journal Data Set

**Explanation:** JRNLBACKUPDSN(*dsname*) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name when allocating the backup data set for the journal data set. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters, including the periods (.); however, the 35 initial characters cannot end with a period. DFSMShsm appends a final qualifier of .Dnnnnnnn or .Vnnnnnnn to the backup name you choose. DFSMShsm uses the total name to allocate the backup data set for the journal data set.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** See the DFSMShsm defaults listed for CDSVERSIONBACKUP on page 367.

## COMMONQUEUE: Specifying Settings for the Common Queues

**Explanation:** COMMONQUEUE is an optional parameter that specifies settings for the DFSMShsm common queues.

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The subparameters of the COMMONQUEUE parameter follow this discussion.

**SMS Relationship:** Not applicable.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** None.

### **COMMONQUEUE (RECALL(CONNECT(*basename*))): Specifying the Base Name of the List Structure for CRQ Host Connection**

**Explanation:** RECALL(CONNECT(*basename*)) is an optional subparameter of the COMMONQUEUE parameter. This subparameter specifies the base name of the list structure that a host connects to for common recall queue (CRQ) activities. The list structure name must be defined in the active CFRM policy. For *basename*, substitute five characters. The five characters can be numeric, uppercase alphabetic, and national characters. The list structure name is SYSARC\_*basename*\_RCL. For example, if you specify PLEX1 for *basename*, the resulting list structure is SYSARC\_PLEX1\_RCL.

**SMS Relationship:** Not applicable.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** None.

**Note:** A host must disassociate itself from one list structure before it attempts to connect to another structure. To disassociate, a host must disconnect from the list structure, and then you must define the new structure in the active CFRM policy. DFSMShsm will attempt to connect to the new structure when it is defined in the active CFRM policy.

### **COMMONQUEUE (RECALL(DISCONNECT)): Specifying Disconnection from the CRQ**

**Explanation:** RECALL(DISCONNECT) is an optional subparameter of the COMMONQUEUE parameter which specifies that a host disconnects from the common recall queue (CRQ). When you specify the RECALL(DISCONNECT) subparameter, the host performs the following functions:

- Directs all new recall requests to the local recall queue
- Moves all recall requests that originated on that host from the CRQ to the local queue
- Completes any remote requests that were previously selected from the CRQ
- Stops selecting requests from the CRQ

The host disconnects from the CRQ when the following conditions are met:

- The host has finished processing all the remote requests that were previously selected from the CRQ
- All requests originating on that host have moved from the CRQ to the local queue
- Processing is complete for all requests that originate on that host that have been selected for remote processing

The disconnection must be complete before the host can connect to another CRQ.

**SMS Relationship:** Not applicable.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** None.

**Note:** This command does not need to be issued before a DFMSHsm shutdown. Disconnection from the CRQ is part of the normal shutdown process.

## COMPACT: Specifying When Compaction Should Be Done

**Explanation:** COMPACT is an optional parameter set that you use to specify the type of compaction during migration or backup for all data sets.

The subparameters of the COMPACT parameter follow this discussion in alphabetical order. The following are optional subparameters:

- ALL | NONE
- DASDBACKUP
- DASDMIGRATE
- TAPEBACKUP
- TAPEMIGRATE

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify the COMPACT parameter without specifying any subparameters, the SETSYS default is no compaction.

**DFSMShsm Defaults:** If you do not specify a subparameter with this parameter on any SETSYS command, the DFMSHsm default is no compaction.

## COMPACT (ALL | NONE): Specifying Whether to Compact Data Sets

**Explanation:** ALL | NONE are mutually exclusive, optional subparameters of the COMPACT parameter specifying whether or not to compact a data set during migration or backup.

Subparameter	Explanation
ALL	DFMSHsm can compact a data set during migration to DASD, migration to tape, backup to tape, and backup to DASD.
NONE	DFMSHsm does not compact a data set during migration or backup.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify any subparameter of the COMPACT parameter on any SETSYS command, the DFMSHsm default is NONE.

### Notes:

1. When you specify the ALL or NONE subparameter with the COMPACT parameter, DFMSHsm ignores all other subparameters.
2. DFMSHsm compacts cataloged and uncataloged data sets.

## COMPACT (DASDBACKUP | NODASDBACKUP): Specifying Whether to Compact Data Sets during Backup to DASD

**Explanation:** DASDBACKUP | NODASDBACKUP are mutually exclusive, optional subparameters of the COMPACT parameter specifying whether or not to compact a data set when DFSMShsm backs it up to DASD.

Subparameter	Explanation
DASDBACKUP	DFSMShsm can compact a data set when DFSMShsm backs it up to DASD.
NODASDBACKUP	DFSMShsm does not compact a data set when DFSMShsm backs it up to DASD.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NODASDBACKUP.

**Notes:**

1. If you do not want a specific data set to be compacted during volume backup, use the data set backup exit (ARCBDEXT) to prevent compaction.
2. Since compressed format data sets are already compressed, they will not be compacted during backup to DASD.

## COMPACT (DASDMIGRATE | NODASDMIGRATE): Specifying Whether to Compact Data Sets during Migration to DASD

**Explanation:** DASDMIGRATE | NODASDMIGRATE are mutually exclusive, optional subparameters of the COMPACT parameter specifying whether or not to compact a data set during migration to DASD.

Subparameter	Explanation
DASDMIGRATE	DFSMShsm can compact a data set during migration to DASD.
NODASDMIGRATE	DFSMShsm does not compact a data set during migration to DASD.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NODASDMIGRATE.

**Notes:**

1. If you do not want a specific data set compacted during volume migration to DASD, use the data set migration exit (ARCMDEXT) to prevent compaction.
2. If you specified the TAPEMIGRATION(DIRECT) parameter of the SETSYS command, DFSMShsm ignores the DASDMIGRATE or NODASDMIGRATE subparameter if you specify one of them.

3. Although the MIGRATE and NOMIGRATE subparameters no longer exist, DFSMShsm does not fail the command if you specify them. Instead, MIGRATE and NOMIGRATE have the same meaning as DASDMIGRATE and NODASDMIGRATE.
4. Since compressed format data sets are already compressed, they will not be compacted during migration to DASD.

## **COMPACT (TAPEBACKUP | NOTAPEBACKUP): Specifying Whether to Compact Data Sets during Backup to Tape**

**Explanation:** TAPEBACKUP | NOTAPEBACKUP are mutually exclusive, optional subparameters of the COMPACT parameter specifying whether or not to compact a data set when DFSMShsm is backing it up to tape.

Subparameter	Explanation
TAPEBACKUP	DFSMShsm can compact a data set when DFSMShsm backs it up to tape.
NOTAPEBACKUP	DFSMShsm does not compact a data set when DFSMShsm backs it up to tape.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOTAPEBACKUP.

**Notes:**

1. If you do not want a specific data set to be compacted during volume backup, use the data set backup exit (ARCBDEXT) to prevent compaction.
2. Since compressed format data sets are already compressed, they will not be compacted during backup to tape.

## **COMPACT (TAPEMIGRATE | NOTAPEMIGRATE): Specifying Whether or Not to Compact Data Sets during Migration to Tape**

**Explanation:** TAPEMIGRATE | NOTAPEMIGRATE are mutually exclusive, optional subparameters of the COMPACT parameter specifying whether or not to compact a data set when DFSMShsm is migrating it to a tape migration level 2 volume.

Subparameter	Explanation
TAPEMIGRATE	DFSMShsm can compact a data set when DFSMShsm migrates it to a tape migration level 2 volume.
NOTAPEMIGRATE	DFSMShsm does not compact a data set when DFSMShsm migrates it to a tape migration level 2 volume.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

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**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOTAPEMIGRATE.

**Notes:**

1. If you do not want a specific data set to be compacted during volume migration, use the data set migration exit (ARCMDEXT) to prevent compaction.
2. Since compressed format data sets are already compressed, they will not be compacted during migration to tape.

## COMPACTPERCENT: Specifying the Percentage of Space Saved for Compaction

**Explanation:** COMPACTPERCENT(*pct*) is an optional parameter specifying the percentage of space saved if DFSMShsm compacts all data sets. For *pct*, substitute a decimal number from 0 to 99 to specify the least amount of space you want saved if DFSMShsm compacts a data set.

If you request compaction, DFSMShsm compacts a data set when it migrates or backs up the data set for the first time. DFSMShsm then compares the number of bytes written to the total bytes of the original data set and computes the percentage of bytes saved. If the percentage saved is not greater than or equal to *pct*, DFSMShsm does not compact the data set during subsequent migrations or backups. DFSMShsm does not check whether or not the data set was compacted during migration if DFSMShsm is currently backing up the data set. Similarly, DFSMShsm does not check whether or not the data set was compacted during backup if DFSMShsm is currently migrating the data set.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 40.

**Notes:**

1. DFSMShsm makes this comparison only for cataloged data sets.
2. DFSMShsm compacts a data set only if it can save at least one track on DASD or the data set migrated to an SDSP data set.
3. Compaction always occurs during backup processing if SETSYS COMPACTPERCENT(0) is specified and DFSMShsm is to compact the data set.

## CONVERSION | NOCONVERSION: Specifying Whether Reblocking Is to Occur

**Explanation:** CONVERSION | NOCONVERSION are mutually exclusive, optional parameters specifying whether DFSMShsm reblocks eligible data sets during recall or recovery. This parameter is not applicable to system-reblockable data sets, whether they are SMS or non-SMS.

**CONVERSION** specifies that DFSMShsm can reblock the data sets during recall or recovery.

REBLOCKTOANY is an optional subparameter of the CONVERSION parameter specifying the type of reblocking during recall or recovery of data sets that use DFSMShsm as the data mover and also specifies reblocking to any DASD device type supported by DFSMShsm.

**NOCONVERSION** specifies that DFSMShsm cannot reblock the data sets even if you specified the data set reblock exit.

**SMS Relationship:** Parameter applies in some instances to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is NOCONVERSION.

**Notes:**

1. DFSMShsm reblocks only nonkeyed, physical sequential data sets with the following record organizations: fixed-blocked, fixed-blocked-standard, variable-blocked, or variable-blocked-spanned. If a data set specified LRECL=X, DFSMShsm does not support reblocking.  
DFSMSdss reblocks only physical sequential and partitioned data sets with the following record organizations: fixed-blocked, fixed-block-standard, and variable-blocked.
2. You must specify the CONVERSION parameter if you want to use the data set reblock exit (ARCCDEXT). You can prevent DFSMShsm from reblocking user-selected data sets by using the data set reblock exit.

## CSALIMITS | NOCSALIMITS: Specifying Whether to Use CSA Limiting for MWE Allocation

**Explanation:** CSALIMITS | NOCSALIMITS are mutually exclusive, optional parameters that you use to specify whether common service area (CSA) limiting of management work element (MWE) storage allocation is to be used during DFSMShsm processing. The MWE describes a requested function to be performed by DFSMShsm.

**Note:** DFSMShsm acquires storage in extended CSA (ECSA) for MWE's. Since DFSMShsm is using ECSA, more CSA storage is available for other applications

**CSALIMITS** specifies the values for CSA storage allocation used during DFSMShsm processing.

The subparameters of the CSALIMITS parameter follow this discussion in alphabetical order. These optional subparameters are:

- ACTIVE
- INACTIVE
- MAXIMUM
- MWE

**NOCSALIMITS** specifies that CSA limiting should not be done during DFSMShsm processing.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is CSALIMITS.

## **CSALIMITS (ACTIVE): Specifying the Percentage of the Maximum Limit to Be Allocated to Any Type of MWE**

**Explanation:** ACTIVE(*percent1*) is an optional subparameter of the CSALIMITS parameter that you use to specify the percentage of CSA storage that DFSMShsm can allocate to all types of MWEs when DFSMShsm is active. After the percentage is reached, only batch WAIT MWEs are added to the CSA queue. All other requests are failed until CSA storage usage drops below the limit or you change the limit. For *percent1*, specify a 1-to 3-character number indicating the percentage of CSA storage to be allocated to all types of MWEs. The number can range from 0 to 100.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this subparameter on any SETSYS command, the DFSMShsm default is 90.

## **CSALIMITS (INACTIVE): Specifying the Percentage of the Maximum Limit to Be Allocated to NOWAIT MWEs**

**Explanation:** INACTIVE(*percent2*) is an optional subparameter of the CSALIMITS parameter specifying the percentage of CSA storage that DFSMShsm can allocate to NOWAIT MWEs while DFSMShsm is inactive. After the percentage is reached, all requests are failed until DFSMShsm is started or until you change the limit. For *percent2*, specify a 1-to 3-character number indicating the percentage of CSA storage to be allocated to NOWAIT MWEs while DFSMShsm is inactive. The number can range from 0 to 100.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this subparameter on any SETSYS command, the DFSMShsm default is 30.

## **CSALIMITS (MAXIMUM): Specifying the Maximum Number of CSA Bytes Allocated to All Types of MWEs**

**Explanation:** MAXIMUM(*Kbytes*) is an optional subparameter of the CSALIMITS parameter specifying the maximum number of KBs of CSA storage to be allocated to MWEs. For *Kbytes*, specify a 2- to 5-character decimal number indicating the number of bytes of CSA storage to be allocated to MWEs. You can specify a value from 10 to 16383. If you specify 16384 or higher, no limiting of the number of bytes allocated in CSA is done. If the value for MAXIMUM is exceeded, DFSMShsm fails all new requests until CSA usage drops below the maximum limit or you change the value for MAXIMUM.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this subparameter on any SETSYS command, the DFSMShsm default is 100.

## CSALIMITS (MWE): Specifying Maximum Number of NOWAIT MWEs Per Address Space

**Explanation:** MWE(#mves) is an optional subparameter of the CSALIMITS parameter specifying the maximum number of NOWAIT MWEs submitted by a single address space that is to be kept on the CSA queue until completed. NOWAIT MWEs in excess of the maximum number will be removed from the CSA queue as soon as they are copied into the DFSMShsm address space. For #mves, specify a 1-to 4-character decimal number indicating how many NOWAIT MWEs per address space are kept on the CSA queue until completed. To limit the number of NOWAIT MWEs kept on the CSA queue, specify a number between 0 and 8191. If you specify 0, all NOWAIT MWEs are removed from the CSA queue as soon as they are copied into the address space of DFSMShsm. If you specify 8192 or higher, the number of MWEs to keep on the CSA queue per address space is limited only by the amount of CSA available, as specified in the MAXIMUM subparameter.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this subparameter on any SETSYS command, the DFSMShsm default is 4.

**Note:** If DFSMShsm is inactive, the NOWAIT MWEs will not be removed from the CSA queue. In that case, the number of NOWAIT MWEs submitted by all address spaces that will be added to the CSA queue is controlled by the INACTIVE subparameter.

## DAYS: Specifying the Minimum Migration Age of a Data Set

**Explanation:** DAYS(days) is an optional parameter specifying the number of contiguous days a data set must remain unreferenced before the data set is eligible for migration. DFSMShsm uses this parameter to migrate data sets from primary volumes to migration level 1 volumes under the following conditions:

- The primary volume does not already have a minimum migration age.
  - For automatic migration, DFSMShsm checks the minimum migration age you specified with the ADDVOL command. If you did not specify the MIGRATE(days) parameter of the ADDVOL command, or if you specified MIGRATE(0) with the ADDVOL command, or if you specified MIGRATE(1) with the ADDVOL command in a multiple-DFSMShsm-host environment and did not specify USERDATASETSERIALIZATION, then DFSMShsm uses the minimum migration age you specify with the SETSYS DAYS parameter.
  - For command migration, DFSMShsm checks the minimum migration age you specified with the MIGRATE command. If you did not specify a value for days with the MIGRATE command, DFSMShsm checks whether you specified the minimum migration age with the ADDVOL command. If you also did not specify the MIGRATE(days) parameter of the ADDVOL command, or you specified MIGRATE(0) with the ADDVOL command, or you specified MIGRATE(1) with the ADDVOL command in a multiple-DFSMShsm-host environment and did not specify USERDATASETSERIALIZATION, then DFSMShsm uses the minimum migration age you specify with the SETSYS DAYS parameter.

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- For nonmanaged volumes, DFSMShsm checks whether you used the MIGRATE command to specify the minimum migration age. If you did not, DFSMShsm uses the age you specify with this parameter.

The value you specify for *days* depends on your environment. If USERDATASETSERIALIZATION has been specified, DAYS can be set between 0 and 999. If not, DAYS can be set between 1 and 999 in a single-DFSMShsm-host environment, and between 2 and 999 in a multiple-DFSMShsm-host environment.

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is one day if DFSMShsm is running in a single-DFSMShsm-host environment or two days if DFSMShsm is running in a multiple-DFSMShsm-host environment.

**Note:** DFSMShsm uses the DAYS value when you have not defined thresholds of occupancy for a volume. If you have defined thresholds of occupancy for the volume, the DAYS parameter is another way to set a lower limit for migration.

## DEBUG | NODEBUG: Specifying Debug Mode

**Explanation:** DEBUG | NODEBUG are mutually exclusive, optional parameters specifying whether DFSMShsm is to operate in debug mode.

**DEBUG** specifies that DFSMShsm is to operate in debug mode. A command to process only one data set is not affected by the DEBUG parameter. You use DEBUG to monitor the effect of DFSMShsm on your computing system. DFSMShsm does all automatic and command volume space management, backup, dump, and command expiration of backup versions functions without moving or deleting any data sets. DEBUG specifies that DFSMShsm is not to move any data. Because you can monitor the data sets and volumes that DFSMShsm would have managed, you can decide which data sets you do not want DFSMShsm to process.

Debug mode can be entered at any time during DFSMShsm processing. During automatic volume space management, command volume space management, or backup functions, DFSMShsm checks for debug mode before processing each data set. During automatic dump, command dump, or volume recovery functions, DFSMShsm checks for debug mode before processing each volume. During the expiration of backup versions function, DFSMShsm checks for debug mode at the start of each command. If a SETSYS DEBUG command is issued before the start of the next data set during space management or backup, or before the start of the next volume during dump or recovery, the next data set or volume to be processed will be processed in debug mode, and no data will be moved or deleted. Any processing accomplished before entering debug mode is not affected. DEBUG causes all ABACKUP and ARECOVER commands to be processed with the VERIFY option at the time the command is selected to be started.

**NODEBUG** specifies that DFSMShsm is not to operate in debug mode.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is NODEBUG.

**Note:** To use the debug mode, decide which volumes you want DFSMShsm to manage. Then, run DFSMShsm in debug mode. When you are satisfied that the volumes are being managed as you want, specify NODEBUG. DFSMShsm will then process the data sets. You can use this gradual conversion procedure when you add more volumes to DFSMShsm control.

## DEFEROUNT: Specifying Defer Mounting of Tapes

The use of the SETSYS DEFEROUNT parameter is considered to be nonfunctional and its use is ignored by DFSMShsm.

## DENSITY: Specifying the Tape Density

The use of the DENSITY parameter is considered to be nonfunctional and its use will result in an ARC1605I parse error.

## DFHSMDATASETSERIALIZATION | USERDATASETSERIALIZATION: Specifying Data Set Serialization

**Explanation:** DFHSMDATASETSERIALIZATION | USERDATASETSERIALIZATION are mutually exclusive, optional parameters that apply to volume migration and volume backup in a multiple-DFSMShsm-host environment. These parameters specify whether data set serialization of system resources is provided for all data sets by system facilities.

**DFHSMDATASETSERIALIZATION** specifies that data set serialization of system resources during volume migration and volume backup in a multiple-image environment is not provided by system facilities, and that DFSMShsm should implement its requirements for resource serialization.

**USERDATASETSERIALIZATION** specifies that data set serialization of system resources during volume migration and volume backup in a multiple-DFSMShsm-host environment is provided by system facilities. Examples of such system facilities are Global Resource Serialization and JES3 data set reservation. In a single DFSMShsm host, data set enqueue is provided. DFSMShsm should optimize its requirements for resource serialization with those facilities.

### Notes:

1. The setting of this parameter affects the value of the DFSMShsm integrity age. Refer to the *z/OS DFSMShsm Storage Administration Guide* for more information on the relationship between integrity age and DFHSMDATASETSERIALIZATION | USERDATASETSERIALIZATION.
2. In DFSMShsm Version 1 Release 5, the incremental backup function was restructured in order to improve the performance of that function. This improvement is only effective when USERDATASETSERIALIZATION is specified. Only use the SETSYS DFHSMDATASETSERIALIZATION command if it is required by your environment. Otherwise, it is recommended that you use the SETSYS USERDATASETSERIALIZATION command.
3. The fast subsequent migration function supports reconnection only in a USERDATASETSERIALIZATION environment.

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4. Some data sets, such as multivolume physical sequential data sets, are processed only with SETSYS USERDATASETSERIALIZATION.

**Attention**

In a multiple-DFSMShsm-host environment, do not specify USERDATASETSERIALIZATION unless you have a data set serialization facility installed and enabled on your system. Otherwise, serious data-integrity problems can occur.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is DFHSMDATASETSERIALIZATION.

## DISASTERMODE: Specifying the Tape Operation Mode for DFSMShsm in Disaster Mode

**Explanation:** DISASTERMODE is an optional parameter that specifies whether DFSMShsm establishes a tape substitution mode. This command plays an important part during an actual disaster recovery or when you are running a disaster recovery test.

While DFSMShsm is running in disaster mode, recalls and recovers from tape volumes that are flagged as having disaster alternate volumes dynamically substitute the alternate tape for the original tape. For more information on the use of disaster alternate volumes, refer to the “Disaster Backup” chapter in the *z/OS DFSMShsm Storage Administration Guide*.

If you specify Y for this parameter on the SETSYS command, DFSMShsm checks the TTOC record of the original tape volume to see if a disaster alternate volume exists and if so, requests the use of it to return the data. If you specify N for this parameter on the SETSYS command or no disaster alternate volume exists, DFSMShsm will request the original tape volume and makes no substitution.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify DISASTERMODE without specifying any subparameter, the default is Y.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is N.

## DSBACKUP: Controlling the Command Data Set Backup Environment

**Explanation:** DSBACKUP is an optional parameter that allows you to control the command data set backup environment. You can balance the backup workload between DASD and tape tasks and you can tailor DFSMShsm tape mounting and demounting for command data set backups. DFSMShsm can run up to 64 concurrent command data set backup tasks.

DASDSELECTIONSIZE (*maximum standard*) helps you balance the workload between DASD and tape tasks for all WAIT-type requests that do not target tape. DASDSELECTIONSIZE is only applicable if both tape and ML1 DASD are allowed for command data set backups. *maximum* is the size, in kilobytes, of the largest data set, (a WAIT-type request) that is directed to ML1 DASD. *standard* is the largest size, in kilobytes, that is considered to be a small data set. DFSMShsm directs small data sets (a WAIT-type request) to DASD if a tape task is not immediately available to process the request. DFSMShsm directs NOWAIT requests to tape, if tape tasks are allowed. The values that you can specify for *maximum* and *standard* range from 0 to 999999.

A data set is considered small if it is less than or equal to *standard*. A data set is considered large if it is greater than *maximum*. A data set with a value between *maximum* and *standard* is a medium data set.

To determine whether a data set uses tape or disk, refer to Table 2.

**Note:** The default is DASDSELECTIONSIZE(3000 250), where 3000 is the *maximum* in kilobytes, and 250 is the *standard* in kilobytes. The categories in the table are based on these default values. If you change the DASDSELECTIONSIZE(*maximum standard*) settings, then these categories change.

Table 2. Determining Data Set Task Targets

Default Criteria	Large	Medium	Small
Data set size	3001 KB and up	251–3000 KB	0–250 KB
WAIT-type requests	Favor tape	First available	Favor disk
NOWAIT-type requests	Favor tape	Favor tape	Favor tape

The following list describes the task targets that are used in Table 2.

This task target . . .	Means . . .
Favor disk	Small data sets that are processed by WAIT-type requests will select ML1 DASD as target. However, if you specify DASD(TASKS(0)), the data set will use tape.
Favor tape	Data set backups will be directed to tape unless you specify TAPE(TASKS(0)).
First available	Data sets will favor the first available task, regardless of disk or tape. If both tasks are available, it will favor the tape task.

#### Notes:

1. If you want command data set backups to go to DASD only if targeted to do so, and all nontargeted command data set backups to go to tape, you can specify DASDSELECTIONSIZE(0 0). This forces all nontargeted command data set backups to go to tape.
2. If only one value is specified for DASDSELECTIONSIZE, it will be interpreted as the maximum size.

DASD specifies that you want to use ML1 DASD for command data set backups.

TAPE specifies that you want to use tape for command data set backups.

You can also specify both DASD and tape for command data set backup tasks. TASKS(*nn*) specifies the maximum number of concurrent command data set

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backup tasks that DFSMShsm directs to ML1 DASD or to tape. *nn* is a value between 0 and 64. If the number of DASD or tape tasks specified is 0, all command data set backup requests targeting the backup to DASD or tape fail. The sum of DASD(TASKS(*nn*)) and TAPE(TASKS(*nn*)) cannot exceed 64. If the sum is zero, any request fails.

DEMOUNTDELAY allows you to tailor the DFSMShsm tape mounting and demounting for command data set backup. MINUTES(*minutes*) is the number of minutes that you want DFSMShsm to wait before it deallocates the tape associated with continuously inactive (idle) command data set backup tasks. *minutes* is a value from 0 to 1440. A value of 1440 indicates that DFSMShsm will not demount the tape until command data set backup tasks are held, a SWITCHTAPES event occurs, or DFSMShsm shuts down, so this value extends across 24 hours.

If you specify DEMOUNTDELAY(MINUTES(0)), a tape that is mounted for command data set backup remains mounted long enough to support a continuous stream of WAIT-type backup requests to tape from a single job stream even if the queue of work momentarily becomes empty.

A change to the DEMOUNTDELAY(MINUTES) value results in a new delay time being set. This new time is calculated from the current time of day. In other words, the new delay does not take into account any time the tape has been idle up to the issuance of this change.

MAXIDLETASKS(*drives*) is the maximum number of tape drives that DEMOUNTDELAY can accommodate. *drives* is a value from 0 to 64. You can specify a maximum of 64 drives for MAXIDLETASKS, regardless of the number of TAPE tasks specified. However, the effective number of tasks for MAXIDLETASKS is bound by the number of TAPE tasks. So, if you specify MAXIDLETASKS(64) and TAPE(TASKS(5)), the effective MAXIDLETASKS is 5. If at a later time you respecify TAPE(TASKS(7)), the effective MAXIDLETASKS becomes 7.

When you issue the QUERY SETSYS command, DFSMShsm displays the number of MAXIDLETASKS specified. The QUERY ACTIVE command displays both the effective number of MAXIDLETASKS and the number of current idle tape tasks (that is, drives that are allocated but have no work).

When a command data set backup task writing to tape completes, DFSMShsm does not deallocate tape units until all queued command data set backup requests have been processed. This enables all consecutive WAIT-type requests by the same batch job to be performed without going through a demount/mount sequence.

### DEMOUNTDELAY Notes:

1. DEMOUNTDELAY(MINUTES(0)) specifies that DFSMShsm deallocated tapes when there are no requests on the queue that the tape task could select. The tape task can select any requests except those that are restricted to DASD.
2. If a tape drive is idle (waiting for additional backup requests) and is then used to satisfy a command data set backup request, DFSMShsm resets the DEMOUNTDELAY time specified for that drive. In other words, the DEMOUNTDELAY is per instance, not an accumulation of idle time.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify the DASDSELECTIONSIZE parameter on any SETSYS command, the DFSMShsm default for *maximum* is 3000 KB, and *standard* is 250 KB. If you do not specify the DASD(TASKS) or TAPE(TASKS) parameters on any SETSYS command, the DFSMShsm default for *nn* is 2. If you do not specify DEMOUNTDELAY parameter on any SETSYS command, the DFSMShsm default for MAXIDLETASKS is 0. If idle tape tasks exist and the MINUTES parameter was not specified, then the default for MINUTES is 60 minutes.

**Notes:**

1. You can prevent DFSMShsm from directing command data set backups to ML1 DASD by specifying DASD(TASKS(0)).
2. You can prevent DFSMShsm from directing command data set backups to tape by specifying TAPE(TASKS(0)). You should do this if daily backup targets DASD in your installation.
3. You can prevent nontargeted command data set backups from going to ML1 DASD by specifying DASDSELECTIONSIZE(0).
4. A change in TAPE(TASKS(*nn*)) requires DFSMShsm to start additional tape tasks or stop existing tape tasks (at the end of processing the current command data set).
5. If the sum of tape and DASD tasks exceed the high limit of 64, the command fails.
6. Use care in making a change in the DEMOUNTDELAY parameter. For instance, if a backup to tape task completes its work, the value for MAXIDLETASKS is greater than zero, and DEMOUNTDELAY(10) is in effect, DFSMShsm sets an internal timer for 10 minutes.
  - If after 10 minutes, no additional work is received, the task begins to deallocate the drive and ends.
  - If during this 10 minute idle time the task is selected to perform a backup, the timer is cancelled. Once the task is complete DFSMShsm again sets a timer value of 10 minutes.
  - If during this 10 minute delay, the time is decreased to 5 minutes by using DEMOUNTDELAY(MINUTES(5)), DFSMShsm cancels the current timer and a new timer is established for 5 minutes (not taking into consideration any previous time).
  - If DEMOUNTDELAY(MINUTES(3)) is in effect and you issue an increase such as DEMOUNTDELAY(MINUTES(10)), DFSMShsm cancels the current timer value and uses the new value. This resets the countdown to 10 minutes from the time the command is received.
7. If a parsing error occurs, DFSMShsm fails the SETSYS command with the ARC1605I message. For nonparsing errors but contextual errors, DFSMShsm fails the parameter in error but continues to process all other parameters in the SETSYS DSBACKUP command. DFSMShsm treats the TAPE(TASKS) and DASD(TASKS) parameters as a single entity. For example, SETSYS DSBACKUP(DASDSELECTIONSIZE(5000 300) DASD(TASKS(45)) TAPE(TASKS(20))) results in DASDSELECTIONSIZE being set, but DASD(TASKS) and TAPE(TASKS) fail because the sum of both tasks exceeds 64.

## DUMPIO: Specifying the DFSMSdss DASD I/O Buffering Technique

**Explanation:** DUMPIO(*n,m*) is an optional parameter identifying which DFSMSdss DASD I/O buffering technique to use and the number of tracks to read for each EXCP.

The *n* indicates the DFSMSdss DASD I/O buffering technique for reading tracks. This value applies to DFSMSdss physical volume dump, when using the BACKVOL command with the DUMP subparameter.

The *m* indicates the value used for DFSMSdss logical dump. If *m* is not specified, the value will be the same as *n*.

The values to be used for *n* and *m* and their meanings are:

**Value      Meaning**

- |          |                                     |
|----------|-------------------------------------|
| <b>1</b> | DFSMSdss reads 1 track at a time    |
| <b>2</b> | DFSMSdss reads 2 tracks at a time   |
| <b>3</b> | DFSMSdss reads 5 tracks at a time   |
| <b>4</b> | DFSMSdss reads 1 cylinder at a time |

**Notes:**

1. Exercise caution when using the DUMPIO parameter because it can have a severe impact on virtual and real storage requirements in a z/OS system. The higher the level of optimization used, the more real storage required for I/O buffers, which are page-fixed. This could result in a limit to the number of concurrent DFMSHsm tasks, could require that DFMSHsm address space be expanded, or could cause overall system degradation. In an MVS/XA™ or MVS/ESA™ environment, the default places the necessary I/O buffers above the 16 MB. Refer to *z/OS DFMSHsm Implementation and Customization Guide* for information on how to calculate storage requirements.
2. DFMSdss uses three I/O buffers for each active dump task. The size of each of these buffers is determined by the DASD device type and by how many tracks or cylinders are specified in the DUMPIO parameter. For example, if you specify SETSYS DUMPIO(4) and SETSYS MAXDUMPTASKS(15), DFMSdss gets buffers for 3 cylinders of data for each dump task that is running. The total storage required, if you are using a 3380 DASD device, is 33MB of 31-bit storage. This means that the operating system region size must be larger than the default of 32MB, or an ABEND878 occurs.
3. One other performance consideration is that each page of buffer storage will be page-fixed, requiring time and machine cycles.
4. DUMPIO does not apply during aggregate backup and recovery, use the SETSYS ABARSOPTIMIZE parameter instead.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify DUMPIO without a value for *m*, then *m* defaults to *n*.

**DFMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFMSHsm default for *n* is one and the default for *m* is four.

## DUPLEX: Allowing DFSMShsm to Create Two Tapes Concurrently

**Explanation:** DUPLEX allows DFSMShsm to create two tapes concurrently, the original tape intended to be kept onsite and the alternate tape taken offsite or written to a remote tape library.

Subparameter	Explanation
BACKUP(Y   N)	Duplex alternates will or will not be made for backup volumes. If this subparameter is not specified, no change will be made to the current setting for backup. Y specifies that duplexing will occur for backup tape volumes. N specifies that duplexing will not occur for backup tape volumes.
MIGRATION(Y   N)	Duplex alternates will or will not be made for migration volumes. If this subparameter is not specified, no change will be made to the current setting for migration. Y specifies that duplexing will occur for migration tape volumes. N specifies that duplexing will not occur for migration tape volumes.>

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** When either BACKUP or MIGRATION is specified with no subparameter, the default is Y.

**DFSMShsm Defaults:** If you do not specify DUPLEX and either of its subparameters, DUPLEXING does not occur.

**Note:** The SETSYS DUPLEX command is not saved across DFSMShsm startups, therefore, it is recommended that you specify the SETSYS DUPLEX command in your DFSMShsm startup member so that duplexing will be your normal environment. Although the SETSYS DUPLEX values can be changed while DFSMShsm is up and running, the values will not take effect until after any currently running function has completed.

## EMERGENCY | NOEMERGENCY: Specifying No Data Set Movement

**Explanation:** EMERGENCY | NOEMERGENCY are mutually exclusive, optional parameters specifying whether emergency mode is in effect. Emergency mode stops all DFSMShsm automatic and command data set processing in both SMS and non-SMS environments and in both primary and secondary address spaces, including functions like aggregate backup, aggregate recovery, audit, migration, backup, recall, recovery and recycle.

**EMERGENCY** specifies that emergency mode is in effect, and no new DFSMShsm data set processing can be performed. DFSMShsm allows any operation in process to finish the currently selected data set and it allows any currently running ABACKUP and ARECOVER commands to continue until completion. However, DFSMShsm also allows commands that correct or set up options to run. For example, you can issue FIXCDS, QUERY, or SETSYS commands while running in EMERGENCY mode.

**NOEMERGENCY** specifies that emergency mode is not in effect.

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### Notes:

1. If DFSMShsm does not resume processing for all functions after you specify SETSYS EMERGENCY and then SETSYS NOEMERGENCY, you may need to issue a RELEASE command, assuming a HOLD command was issued previously.
2. You can start DFSMShsm in emergency mode by specifying EMERG=YES on the START command.
3. Emergency mode does not prevent a host from placing recall requests in the common recall queue (CRQ), where those requests are then processed by other active hosts. To prevent a host from placing requests in the CRQ, specify HOLD COMMONQUEUE(RECALL(PLACEMENT)).

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is NOEMERGENCY.

## ERASEONSCRATCH | NOERASEONSCRATCH: Specifying to Check for Erasure of DFSMShsm-Owned Data Sets

**Explanation:** ERASEONSCRATCH | NOERASEONSCRATCH are mutually exclusive, optional parameters specifying whether DFSMShsm should check for erasure of DFSMShsm-owned data sets that have migrated or been backed up to DFSMShsm-owned volumes.

**ERASEONSCRATCH** specifies that DFSMShsm asks RACF for the erase status of the user's data set when backup versions and migration copies are scratched from DFSMShsm-owned DASD volumes. The data set is deleted, and if RACF indicates erase-on-scratch, the DASD residual data is overwritten by data management.

**NOERASEONSCRATCH** specifies that DFSMShsm does not ask RACF for the erase status of the user's data set when backup versions and migration copies are scratched from DFSMShsm-owned DASD volumes. The data set is deleted but the DASD residual data is not overwritten by data management.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is NOERASEONSCRATCH.

### Notes:

1. DFSMShsm always allows data management to perform erase-on-scratch functions for user-owned data sets.
2. ERASEONSCRATCH and NOERASEONSCRATCH affect only backup versions and migration copies of data sets.

## EXITOFF: Specifying Inactive Installation Exits

**Explanation:** EXITOFF(*modname, modname, ...*) is an optional parameter specifying installation exits inactive in DFSMShsm primary address space. EXITOFF now applies to ABARS exits. For *modname*, substitute the module name of the

installation exit you want to be inactive. Refer to the *z/OS DFSMS Installation Exits* manual for additional information about installation exits.

Valid installation exit module names and their meanings are as follows:

Module Name	Abbreviation	Meaning
ARCADEXT	AD	Data set deletion exit
ARCBDEXT	BD	Data set backup exit
ARCBEEXT	BE	Aggregate Backup error exit
ARCCBEXT	CB	Control data set backup exit
ARCCDEXT	CD	Data set reblock exit
ARCCREXT	CR	Aggregate Recovery conflict resolution exit
ARCEDEXT	ED	ABARS expiration date setting exit
ARCINEXT	IN	Initialization exit
ARCMDEXT	MD	Data set migration exit
ARCMMEXT	MM	Second level migration data set exit
ARCMVEXT	MV	Space management volume exit
ARCM2EXT	M2	Aggregate Backup ML2 bypass exit
ARCRDEXT	RD	Data set recall exit
ARCRPEXT	RP	Return-priority exit
ARCSAEXT	SA	Space management and backup exit
ARCSDEXT	SD	Shutdown exit
ARCSKEXT	SK	Aggregate Recovery bypass exit
ARCTDEXT	TD	Tape data set exit
ARCTEEEXT	TE	Tape ejected exit
ARCTVEXT	TV	Tape volume exit

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify an installation exit *modname* on any SETSYS command, the DFSMShsm default is that installation exits will remain in their current state from a previous SETSYS command.

#### Notes:

1. You can delete installation exits while DFSMShsm is running. If you want to delete installation exits, you must use the EXITOFF parameter to specify them.
2. All existing installation exits are supported on the EXITOFF parameter.
3. The *modnames* are not positional. Installation exits not specified remain in their current state.
4. If the EXITS parameter and either the EXITOFF or the EXITON parameter both specify the same installation exit on a SETSYS command, the status specified with the EXITOFF or EXITON parameter has precedence over the status specified with the EXITS parameter.
5. If the same installation exit is specified in both the EXITOFF and the EXITON parameters on a SETSYS command, DFSMShsm leaves that installation exit inactive.

6. The recall exit (ARCRDEXT) and data set deletion exit (ARCADEXT) will not be invoked for SMS-managed data sets.

## EXITON: Specifying Active Installation Exits

**Explanation:** EXITON(*modname,modname, ...*) is an optional parameter specifying active installation exits in DFSMShsm primary address space. EXITON now applies to ABARS exits. For *modname*, substitute the module name of the installation exit you want to be active.

The ARCINEXT exit is passed parameters having 31-bit addresses. This exit may require modification to accept and use the 31-bit addresses. Refer to the *z/OS DFSMS Installation Exits* manual for additional information about installation exits.

Valid installation exit module names and their meanings are as follows:

Module Name	Abbreviation	Meaning
ARCADEXT	AD	Data set deletion exit
ARCBDEXT	BD	Data set backup exit
ARCBEEXT	BE	Aggregate Backup error exit
ARCCBEXT	CB	Control data set backup exit
ARCCDEXT	CD	Data set reblock exit
ARCCREXT	CR	Aggregate Recovery conflict resolution exit
ARCEDEXT	ED	ABARS expiration date setting exit
ARCINEXT	IN	Initialization exit
ARCMDEXT	MD	Data set migration exit
ARCMMEXT	MM	Second level migration data set exit
ARCMVEXT	MV	Space management volume exit
ARCM2EXT	M2	Aggregate Backup ML2 bypass exit
ARCRDEXT	RD	Data set recall exit
ARCRPEXT	RP	Return-priority exit
ARCSAEXT	SA	Space management and backup exit
ARCSDEXT	SD	Shutdown exit
ARCSKEXT	SK	Aggregate Recovery bypass exit
ARCTDEXT	TD	Tape data set exit
ARCTEEEXT	TE	Tape ejected exit
ARCTVEXT	TV	Tape volume exit

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify an installation exit *modname* on any SETSYS command, the DFSMShsm default is that no installation exits are active.

### Notes:

1. You can dynamically load installation exits while DFSMShsm is running. If you want to load installation exits, you must specify the exits to be loaded with the EXITON parameter.

2. All existing installation exits are supported on the EXITON parameter.
3. The *modnames* are not positional. Installation exits not specified remain in their current state.
4. If the EXITS parameter and either the EXITOFF or the EXITON parameter both specify the same installation exits on the same SETSYS command, the status specified with the EXITOFF or EXITON parameter has precedence over the status specified with the EXITS parameter.
5. If the same installation exit is specified in both the EXITOFF and the EXITON parameters on a SETSYS command, DFSMShsm leaves that installation exit inactive.
6. If an installation exit is specified with EXITON and that exit is already active, DFSMShsm does not load a new copy of the exit.
7. The recall exit (ARCRDEXT) and data set deletion exit (ARCADEXT) are not invoked for SMS-managed data sets.

## **EXITS: Specifying the Installation Exits to Be Taken**

The use of the SETSYS EXITS parameter has been replaced by the SETSYS EXITON and SETSYS EXITOFF parameters. The EXITS parameter is still supported but is no longer documented.

## **EXPIREDATASETS: Specifying Whether or Not to Scratch Data Sets with Expired Expiration Dates**

**Explanation:** EXPIREDATASETS(SCRATCH | NOSCRATCH) is an optional parameter specifying whether or not DFSMShsm should scratch data sets having explicit expiration dates when the date has passed (data set has expired). SMS-managed data sets not having explicit expiration dates are expired when they have met their management class expiration criteria.

**Note:** Explicit expiration dates can be set by JCL, utility parameters, Data Class Expiration parameters, or Data Class Retention parameters. The explicit expiration date for a data set can be found in the data set's VTOC entry.

**SCRATCH** specifies that DFSMShsm scratch data sets that have an expired expiration date when it performs space management and migration cleanup.

**NOSCRATCH** specifies that DFSMShsm ignore the expiration date. DFSMShsm processes the data set as if the expiration date has not been reached.

**SMS Relationship:** Parameter applies in some instances to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is not to scratch the expired data sets.

## **EXTENDEDTTOC: Specifying Whether to Use Extended Tape Table of Contents (TTOC)**

**Explanation:** EXTENDEDTTOC(Y | N) is an optional parameter specifying whether DFSMShsm should use extended tape table of contents (TTOCs) in order to better utilize tapes with higher capacity volumes in your installation. Extended TTOCs allow DFSMShsm to write slightly more than one million data sets (potentially) to a migration tape or backup tape.

## SETSYS

To use extended TTOCs in your installation, you must define your offline control data set(OCDS) with a maximum record size of 6144 bytes, as described in *z/OS DFSMShsm Implementation and Customization Guide*. Then enable the support by entering the SETSYS command with optional parameter EXTENDEDTTOC(Y) or its shortened form, EXTTC(Y).

**Note:** If there is an attempt to specify SETSYS EXTENDEDTTOC(Y) and the OCDS has not been defined with a record size of 6144, DFSMShsm will issue an error message and force the value of EXTENDEDTTOC to "N".

To return to using non-extended TTOCs, enter the SETSYS command with EXTENDEDTTOC(N) or its shortened form, EXTTC(N).

**Note:** Users should not specify the SETSYS EXTENDEDTTOC(Y) command on any one host in an HSMplex until the OCDS has been redefined with a record length of 6144 bytes and all hosts in an HSMplex are at DFSMShsm V1R7.0 and are prepared to issue the SETSYS EXTENDEDTTOC(Y) command.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is not to use extended TTOCs.

## FREQUENCY: Specifying the Number of Days between Backup Versions of a Data Set

**Explanation:** FREQUENCY(*days*) is an optional parameter specifying the number of days that must have elapsed since the last time DFSMShsm backed up a data set before DFSMShsm will back up the data set again. For *days*, substitute a decimal number from 0 to 999. A value of 0 allows DFSMShsm to back up data sets every time volume backup runs unless you use the FREQUENCY parameter of the ALTERDS or BACKVOL command to change the frequency.

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is zero.

**Note:** The FREQUENCY parameter only applies to data sets that have been backed up.

## INCREMENTALBACKUP: Specifying Whether to Back Up Only Changed Data Sets during Incremental Volume Backup

**Explanation:** INCREMENTALBACKUP is an optional parameter specifying whether DFSMShsm should back up only changed data sets during incremental volume backup.

Subparameter	Explanation
CHANGEDONLY	<b>INCREMENTALBACKUP(CHANGEDONLY)</b> specifies that DFSMShsm backs up the following data sets only if their change bit is on in the data set VTOC entry: <ul style="list-style-type: none"> <li>• Non-VSAM data sets</li> <li>• VSAM data sets cataloged in an integrated catalog facility catalog.</li> </ul>
ORIGINAL	<b>INCREMENTALBACKUP(ORIGINAL)</b> specifies that DFSMShsm creates an initial backup version (if one does not exist) for all non-VSAM and integrated catalog facility VSAM data sets on a primary volume when incremental backup takes place, regardless of the setting of the change bit in the data set VTOC entry.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you do not specify either subparameter on any SETSYS command, the SETSYS default is ORIGINAL.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is ORIGINAL.

**Notes:**

1. VSAM data sets not cataloged in an integrated catalog facility Catalog are backed up during incremental backup by comparing the date of the last update from the catalog record to the date of the last backup from the BCDS.
2. It is suggested that you consider running the INCREMENTALBACKUP command with the ORIGINAL parameter once a month, once a quarter, or when some of the following scenarios are suspected because a backup version might not always exist for all data sets that do not have the change flag on. The scenarios are:
  - DFSMSdss or a similar product backed up the volume and reset the change flags before DFSMShsm was able to back up the data sets.
  - Users may have deleted the backup versions that DFSMShsm created and, the data sets had not been changed again.
3. The INCREMENTALBACKUP parameter affects only data sets residing on a primary volume when incremental backup is performed. Even if you have specified ORIGINAL, no backup copy will be created for a migrated data set for which the change bit in the data set VTOC entry is off. These data sets have to be backed up individually using the BACKDS command.

## INPUTTAPEALLOCATION: Specifying Whether or Not to Wait for the Input Tape to Be Allocated

**Explanation:** INPUTTAPEALLOCATION(WAIT | NOWAIT) is an optional parameter specifying whether DFSMShsm should wait until the tape unit is allocated for the input tape for recall, recovery, or restore.

Subparameter	Explanation
WAIT	<p><b>INPUTTAPEALLOCATION(WAIT)</b> specifies that DFSMShsm waits until the input tape unit is allocated. All DFSMShsm functions stop until this allocation request is satisfied.</p> <p>When using the WAIT option, caution must be exercised to limit the number of DFSMShsm tasks that require tape. If more tasks run than there are available tape devices, a deadlock condition will occur because of the exclusive enqueue that MVS allocation will put on the task input/output table (SYSZTIOT) while awaiting the tape device. This condition can be resolved only if another job (not DFSMShsm) releases a tape device, or if you cancel DFSMShsm.</p>
NOWAIT	<p><b>INPUTTAPEALLOCATION(NOWAIT)</b> specifies that DFSMShsm does not wait until the input tape unit is allocated. Instead, DFSMShsm reissues the request every 10 seconds up to six times. If the input tape unit is still not allocated after seven tries, DFSMShsm asks the operator whether DFSMShsm should cancel the request or repeat the allocation sequence. With the NOWAIT option, dynamic allocation issues message IEF238D. Once answered, other DFSMShsm tasks can proceed with allocations.</p>

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOWAIT.

## INTERVALMIGRATION | NOINTERVALMIGRATION: Specifying Whether or Not Interval Migration Is to Be Done

**Explanation:** INTERVALMIGRATION | NOINTERVALMIGRATION are mutually exclusive, optional parameters specifying whether DFSMShsm should do interval migration. The purpose of interval migration is to prevent the DFSMShsm-managed volumes from running out of space during the day. DFSMShsm normally does a space check every hour. Therefore, if you request interval migration, DFSMShsm uses this hourly space check to determine on which volumes interval migration is done.

INTERVALMIGRATION specifies that interval migration is done.

NOINTERVALMIGRATION specifies that interval migration is not done.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is INTERVALMIGRATION.

**Notes:**

1. If you want the operator to decide whether interval migration should be allowed after DFSMShsm decides it is necessary, specify the INTERVALMIGRATION parameter and the REQUEST parameter. Interval migration does not occur during the DFSMShsm startup process.
2. With Tape Mount Management (TMM), interval migration can still be performed on SMS volumes in a storage group having the attribute of AUTO MIGRATE=I, regardless of the setting for the SETSYS INTERVALMIGRATION parameter or the SETSYS NOINTERVALMIGRATION parameter.
3. Only primary space management will be performed on SMS volumes in a storage group having the attribute of AM=P. When this attribute is specified, interval migration is not performed even if the SETSYS INTERVALMIGRATION parameter is specified.

**JES2 | JES3: Specifying the Job Entry Subsystem**

**Explanation:** JES2 | JES3 are mutually exclusive, optional parameters specifying the job entry subsystem that is used with DFSMShsm.

If you want to use JES3, you must specify the JES3 parameter before you specify the first ADDVOL command. If you do not, DFSMShsm defaults to JES2. When DFSMShsm is started in an operating system that has JES3 and when you do not specify JES3 during DFSMShsm initialization, an error message is written when DFSMShsm receives the first super locate request from JES3 converter/interpreter. If you specify JES3, but the operating system uses JES2, DFSMShsm is not notified of the error. DFSMShsm, however, uses the rules that govern pool configuration for JES3 and one or both of the following situations can occur:

- Some ADDVOL, SETSYS, and DEFINE commands fail if they are issued when it is unacceptable in a JES3 system.
- Volumes eligible for recall in a JES2 system might not qualify for the DFSMShsm general pool and, in some cases, are not available for recall in the JES3 system.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is JES2.

**JOURNAL | NOJOURNAL: Specifying Whether or Not to Write Updated Control Data Set Records in the Journal Data Set**

**Explanation:** JOURNAL | NOJOURNAL are mutually exclusive, optional parameters specifying whether MCDS data set records, BCDS data set records, and OCDS data set records are written in the journal data set when DFSMShsm updates the control data sets. If the MCDS, BCDS, or OCDS is lost or damaged, you can use the journal data set with a backup copy of the control data set to recreate the affected control data set.

JOURNAL specifies that DFSMShsm write the BCDS, MCDS, and OCDS data set records in the journal data set when DFSMShsm updates them.

Subparameter	Explanation
SPEED	<p><b>JOURNAL(SPEED)</b> specifies that the module making the change should wait only until the journaling request has been added to the journaling queue. When you use SPEED, DFSMShsm does not wait long, because of the following reasons:</p> <ul style="list-style-type: none"> <li>• The journal task has the highest dispatching priority among all DFSMShsm tasks.</li> <li>• The journal entries are not blocked.</li> <li>• In each DFSMShsm host, the journal entries are written in the order they are created.</li> </ul> <p>The task probably does not lose more than one entry if the system fails, unless you allocate the journal data set on a volume that is used often.</p>
RECOVERY	<p><b>JOURNAL(RECOVERY)</b> specifies that the module making the change should wait until the journal entry has been written in the journal data set. DFSMShsm writes each record as it receives the record. Therefore, not more than one entry can be lost if DFSMShsm abnormally ends. After DFSMShsm has updated the affected control data set and has written each journal data set entry, DFSMShsm continues processing.</p>

NOJOURNAL specifies that DFSMShsm is not to write the updated BCDS, MCDS, and OCDS records in the journal data set.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify JOURNAL without a subparameter, the SETSYS default is SPEED.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is JOURNAL(SPEED).

**Notes:**

1. The SPEED option queues the journal updates to be written as soon as possible, but the requesting task does not wait for the journal entry to be written. This can cause ABEND878, ABEND80A, or ABEND106-C during heavy journaling activity, if the logging task cannot keep up with the journaling load. This can happen if the ARCILOG task gets tied up during I/O to the DASD data set. If DFSMShsm should be abnormally terminated while running this option, all journal updates not yet written will be lost.
2. If JOURNAL(RECOVERY) is specified and DFSMShsm senses it is waiting too long for the journal entry to be written, DFSMShsm stops its wait and leaves the request on the journaling queue. This temporary return to SPEED mode helps prevent lockouts caused by resource contention.
3. DFSMShsm does not write updated entries from the BCDS, MCDS, and OCDS unless you include a JCL DD statement for the journal data set in the DFSMShsm startup procedure.
4. DFSMShsm nulls the journal data set every time DFSMShsm successfully backs up the control data sets.
5. When defined as a large format data set, the DFSMShsm journal can exceed 65,535 tracks per volume. For information about defining the DFSMShsm journal, see *z/OS DFSMShsm Implementation and Customization Guide*.

## **MAXABARSADDRESSSPACE: Specifying the Maximum Number of Concurrent Secondary Address Spaces Supported**

**Explanation:** **MAXABARSADDRESSSPACE(*nn*)** is an optional parameter specifying the maximum number of concurrent aggregate backup and recovery address spaces that DFSMShsm supports. For *nn*, substitute a decimal number from 1 to 64 to represent the number of secondary address spaces that can run concurrently for aggregate backup and recovery.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is one.

## **MAXBACKUPTASKS: Specifying the Maximum Number of Concurrent Volume Backup Tasks**

**Explanation:** **MAXBACKUPTASKS(*nn*)** is an optional parameter specifying the maximum number of volume backup tasks DFSMShsm can concurrently process. For *nn*, substitute a decimal number from 1 to 15 to represent the number of volume backup tasks to be run concurrently.

To decide how many concurrent volume backup tasks DFSMShsm should run, consider how many tape units are available if you use tape backup volumes and if you are utilizing duplex tape. Also, consider the system work load and how many backup volumes you have available when volume backup is running. Because each volume backup task chooses a unique daily backup volume, it is impractical to specify more volume backup tasks than available daily backup volumes, because a volume backup task waits until a daily backup volume is available.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is two tasks.

## **MAXCOPYPOOLTASKS: Specifying the Maximum Number of Concurrent DFSMSdss Invocations for Each Fast Replication Command**

**Explanation:** **MAXCOPYPOOLTASKS** is an optional parameter that you use to define the maximum number of DFSMSdss invocations for each fast replication command that DFSMShsm can concurrently process. **FRBACKUP tasks:** The maximum number of concurrent fast replication backup volume tasks is the product of the FRBACKUP and DSS parameters. **FRRECOV tasks:** The maximum number of concurrent fast replication recover volume tasks is the product of the FRRECOV and DSS parameters.

Subparameter	Explanation
FRBACKUP	<b>MAXCOPYPOOLTASKS (FRBACKUP(<i>nn</i>))</b> is an optional parameter that you specify to define the maximum number of DFSMSdss invocations for each FRBACKUP command that DFSMShsm can concurrently process. For <i>nn</i> , substitute a decimal number from 1 to 64 to represent the number of DFSMSdss invocations for each FRBACKUP command that runs concurrently.
FRRECOV	<b>MAXCOPYPOOLTASKS (FRRECOV(<i>nn</i>))</b> is an optional parameter that you specify to define the maximum number of DFSMSdss invocations for each FRRECOV command that DFSMShsm can concurrently process. For <i>nn</i> , substitute a decimal number from 1 to 64 to represent the number of DFSMSdss invocations for each FRRECOV command that runs concurrently.
DSS	<b>MAXCOPYPOOLTASKS (DSS(<i>nnn</i>))</b> is an optional parameter that you specify to define the maximum number of volume pairs that DFSMShsm passes to each DFSMSdss invocation for backup and recover functions. For <i>nnn</i> , substitute a decimal number from 1 to 254 to represent the number volume pairs that DFSMShsm passes to each DFSMSdss invocation.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default for the FRBACKUP parameter is 15 tasks, the FRRECOV parameter is 15 tasks, and the DSS parameter is 24 tasks.

#### Attention

The default values recommended for these parameters are based on performance tests that determined the values that would provide the optimal throughput. You should realize that increasing the value of the DSS(*nnn*) parameter above the recommended default may have a negative impact on throughput.

## MAXDSRECOVERTASKS: Specifying the Maximum Number of Data Set Recovery Tasks

**Explanation:** **MAXDSRECOVERTASKS(*nn*)** is an optional parameter specifying the maximum number of data set recovery tasks DFSMShsm can concurrently process. This parameter allows an installation to determine the appropriate tasking level to recover individual data sets, based on the number of tape drive resources available. The actual number of effective tasks may be limited if the number of backup tape cartridges are fewer than the total tasks specified. For *nn*, substitute a decimal number from 1 to 64 to represent the number of data set recovery tasks to be run concurrently.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is two tasks.

## MAXDUMPTASKS: Specifying the Maximum Number of Concurrent Volume Dump Tasks

**Explanation:** MAXDUMPTASKS(*nn*) is an optional parameter specifying the maximum number of volume dump tasks DFSMShsm can concurrently process. For *nn*, substitute a decimal number from 1 to 32 to represent the number of dump tasks to be run concurrently.

Because multiple classes can be requested for each input volume, MAXDUMPTASKS does not explicitly limit the number of output copies. To decide how many concurrent volume dump tasks DFSMShsm should run, consider how many tape units are available. Multiple dump classes for an input volume require a separate tape drive for a tape in each class. To determine the required number of tape drives for the volume dump process, multiply the number of classes per volume by the number of dump tasks (*nn*). This number should not exceed the number of tape drives expected to be available during the volume dump process.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is two tasks.

## MAXEXTENTS: Specifying the Number of Extents to Cause Extent Reduction

**Explanation:** MAXEXTENTS(*extents*) is an optional parameter specifying the number of extents that, if equaled or exceeded, causes DFSMShsm to reallocate all non-VSAM data sets. For *extents*, substitute a decimal number from 0 to 16 specifying the number of extents to allow before DFSMShsm does extent reduction. If you specify 0, DFSMShsm does not do extent reduction.

When volume migration occurs for volumes containing a non-VSAM data set that cannot migrate either because the data set was referred to recently or has reached or exceeded its maximum extents, DFSMShsm migrates and then immediately recalls the data set.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify a value larger than 16, the SETSYS default for *extents* is 16.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 0.

### Notes:

1. The MAXEXTENTS parameter does not apply to VSAM data sets or to data set organizations not supported by DFSMShsm.

2. You use this parameter for active, non-VSAM data sets. This parameter only applies to those non-VSAM data sets that are architecturally limited to 16 extents. It does not apply to multivolume data sets, striped data sets, extended format data sets, PDSE or HFS data sets.
3. DFSMShsm will not do extent reduction unless the data set is more than one day old in a single-DFSMShsm-host environment or two days old in a multiple-DFSMShsm-host environment.
4. Using a low MAXEXTENTS value might cause extent reduction to occur more frequently than you want. If you specify a MAXEXTENTS value, try using a value of 5 or more.

## **MAXINTERVALTASKS: Specifying the Maximum Number of Automatic Interval Migration Tasks That Can Run Concurrently**

**Explanation:** **MAXINTERVALTASKS(*nn*)** is an optional parameter specifying the maximum number of automatic interval migration tasks that can run concurrently. It applies to the processing of primary volumes and SMS-managed volumes.

For *nn*, substitute a decimal number from 0 to 15, specifying the maximum number of concurrent tasks. A zero value allows you to restrict the interval migration task from running on any host that has MAXINTERVALTASKS set to zero. Once MAXINTERVALTASKS is set to a nonzero value, interval migration processing will resume on the host.

Tape units must be available to support the maximum number of migration tasks. In a direct-to-tape environment, the number of tape units available must be at least equal to *nn*. The number of SDSP data sets available should be greater than *nn*. In addition, in a duplex tape environment, the number of tape units must be at least 2 times *nn*.

In an environment where data sets can be routed to either DASD or tape, a tape unit is required for each migration task that encounters a data set that is migrated directly to tape. Make sure that you have *nn* tape units available. Once DFSMShsm has selected a tape unit, that unit will not be released until the automatic volume space management function has completed, or until recall needs the tape. In a duplex tape environment, DFSMShsm selects two tape units for each migration task and these tape units will not be released until the automatic volume space management function is complete.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the default value for the maximum number of concurrent interval migration tasks (*nn*) is equal to the value defined for MAXMIGRATIONTASKS. The default value for MAXMIGRATIONTASKS is 2.

## **MAXMIGRATIONTASKS: Specifying the Maximum Number of Automatic Volume Space Management Tasks That Can Run Concurrently**

**Explanation:** **MAXMIGRATIONTASKS(*nn*)** is an optional parameter specifying the maximum number of automatic volume space management (primary space management and interval migration) tasks that can run concurrently. It applies to

the processing of primary volumes and SMS-managed volumes. You can specify the maximum number of concurrent tasks (*nn*) from 1 to 15.

**MAXMIGRATIONTASKS** applies only to automatic functions. You can run only one command migration task at a time. Individual commands for data set or volume migrations do not run concurrently.

Tape units must be available to support the maximum number of migration tasks. In a direct-to-tape environment, the number of tape units available must be at least equal to *nn*. The number of SDSP data sets available should be greater than *nn*. In addition, in a duplex tape environment, the number of tape units must be at least 2 times *nn*.

In the environment where data sets can be routed to either DASD or tape, a tape unit is required for each migration task that encounters a data set to be migrated directly to tape. Make sure that you have *nn* tape units available. Once DFSMSHsm has selected a tape unit, it will not be released until the automatic volume space management function has completed. In a duplex tape environment, DFSMSHsm selects two tape units for each migration task and these tape units will not be released until the automatic volume space management function is complete. This does not apply to DASD volumes.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, the default value for the maximum number of concurrent migration tasks (*nn*) is 2.

## MAXRECALLTASKS: Specifying the Maximum Number of Active Recall Tasks

**Explanation:** **MAXRECALLTASKS(*nn*)** is an optional parameter specifying the number of active recall tasks DFSMSHsm can concurrently process. For *nn*, substitute a decimal number from 1 to 15 for the number of concurrent recall tasks DFSMSHsm can process.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify a value larger than 15, the SETSYS default for *nn* is 15.

**DFSMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMSHsm default for *nn* is 15.

**Note:** The MAXRECALLTASKS parameter is utilized in the processing of deletes initiated by secondary space management.

## MAXRECYCLETASKS: Specifying the Maximum Number of Active Recycle Tasks

**Explanation:** **MAXRECYCLETASKS(*nn*)** is an optional parameter specifying the maximum number of tape processing tasks initiated by a single RECYCLE request.

## SETSYS

For *nn*, substitute a decimal number from 1 to 15 for the number of tasks to initiate. The number of tape processing tasks can be changed dynamically, even while DFSMShsm is processing a RECYCLE request. This allows you to free tape drives for uses other than recycle processing, should the need arise. Each task that moves data requires two tape drives, one for input and one for output. In a duplex tape environment, each task moving data requires three tape drives, one for input and two for output.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default for *nn* is 2.

**Note:** Only one RECYCLE command is processed at a time when you use the VOLUME parameter of the specific RECYCLE command. An MVS image can process only one RECYCLE command at a time. If you issue a generic RECYCLE command, and multiple volumes are eligible, then MAXRECYCLETASKS is used.

## MAXSSMTASKS: Specifying the Maximum Number of Concurrent Automatic Secondary Space Management Tasks

**Explanation:** MAXSSMTASKS(CLEANUP(*nn*) | TAPEMOVEMENT(*mm*)) is used to define the maximum number of secondary space management tasks that can run concurrently.

Subparameter	Explanation
CLEANUP( <i>nn</i> )	MAXSSMTASKS(CLEANUP( <i>nn</i> )) specifies the maximum number of secondary space management migration cleanup tasks that can run concurrently. For <i>nn</i> , substitute a decimal number from 0 to 15 for the maximum number of concurrent migration cleanup tasks. A value of 0 indicates that there are no cleanup tasks, and therefore the secondary space management window includes no cleanup processing.
TAPEMOVEMENT( <i>mm</i> )	MAXSSMTASKS(TAPEMOVEMENT( <i>mm</i> )) specifies the maximum number of automatic secondary space management tape migration tasks that can run concurrently. This parameter applies to the migration of data sets from level 1 volumes to level 2 tape volumes. Note that if you are duplexing migration tapes, each TAPEMOVEMENT task you define will require two tape drives. For <i>mm</i> , substitute a decimal number from 0 to 15 for the maximum number of concurrent tape migration tasks. A value of 0 indicates that there are no tape movement tasks, and therefore DFSMShsm performs no ML1-to-ML2 data movement. This setting is useful when no tape drives are available.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify the CLEANUP parameter on any SETSYS command, the DFSMShsm default for *nn* is 2. If you do not specify the TAPEMOVEMENT parameter on any SETSYS command, the DFSMShsm default for *mm* is 1.

## MIGDENSITY: Specifying the Tape Density When Allocating Scratch Tapes for Migration

The use of the MIGDENSITY parameter is considered to be nonfunctional, and its use results in an ARC1605I parse error.

## MIGRATEPREFIX: Specifying the Prefix for the Migration Copy Name

**Explanation:** MIGRATEPREFIX(*prefix*) is an optional parameter specifying the prefix (high-level qualifier) of the data set name that DFSMShsm generates when it migrates the data set. *prefix* must be defined as 1 to 7 alphanumeric characters; the first character must be alphabetic only.

### Attention

Changing this parameter after the DFSMShsm environment is set could result in failures during the recall and recovery of data sets from tape and SDSPs.

The migration copy name has the following format:

*prefix.HMIG.Tssmmhh.user1.user2.Xyddd*

*prefix* is replaced with the prefix you specify with this command. HMIG indicates that this is a migrated data set. *Tssmmhh* is the time when DFSMShsm migrated the data set; *ss* is the second, *mm* is the minute, and *hh* is the hour. If a duplicate exists after this name is generated, DFSMShsm changes the first character of the time stamp. *user1* and *user2* are replaced with the first two qualifiers of the data set name. The data set name can be 44 characters long. *Xyddd* is the date when DFSMShsm migrated the data set. DFSMShsm replaces the X with a letter that represents the decade. A–J have the following meaning:

A–1, B–2, C–3, D–4, E–5  
F–6, G–7, H–8, I–9, J–0

For example, you specify MIGRATEPREFIX(HSMMIG). Your data set name is TERRY.CLIST.TEXT. DFSMShsm migrates the data set on 15 July 1990 at 5:33 p.m. The migration copy name is:

HSMMIG.HMIG.T003317.TERRY.CLIST.I0198

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is the UID you specified in the DFSMShsm startup procedure. This UID is used as the first qualifier for data set names generated by DFSMShsm during the BACKUP or MIGRATION functions.

Changing this UID after the DFSMShsm environment is set could result in failures during the recall and recovery of data sets from tape and SDSPs. *z/OS DFSMShsm Storage Administration Guide* explains the UID and the DFSMShsm startup procedure.

## **MIGRATIONCLEANUPDAYS: Specifying the Number of Days to Keep MCDS Data Set Records and Statistics Records**

**Explanation:** *MIGRATIONCLEANUPDAYS(recalldays statdays reconnectdays)* is an optional parameter specifying the number of days that DFSMShsm keeps MCDS records for recalled data sets or keeps daily and volume statistics records before it deletes them during migration cleanup. The REPORT command uses the daily and volume statistics records. The IDCAMS DCOLLECT function gathers them when the CAPPLANDATA keyword is specified.

For *recalldays*, substitute a decimal number from 0 to 999 for the number of days since the date of recall that DFSMShsm keeps MCDS data set records for recalled data sets.

For *statdays*, substitute a decimal number from 1 to 999 for the number of days DFSMShsm keeps the daily and volume statistics records.

For *reconnectdays*, substitute a decimal number from 0 to 999 for the number of days that DFSMShsm uses to calculate how long to keep the MCDS data set records for recalled data sets that are candidates for reconnection.

This algorithm shows the calculation. The predicted remigration date is the date of recall plus the number of days of nonuse when the data set last migrated. For example:

- Date last referenced at time of migration: 99.100
- Date of migration: 99.110
- Date of recall: 99.125

This equals a predicted remigration date of 99.135. The 10 days the data set went unreferenced prior to the migration is added to the recall date to calculate the predicted remigration date. To this predicted remigration date, add the value specified for the *reconnectdays* parameter (in our example, we are using a value of 5). The MCDS data set record is retained through 99.140.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm defaults for *recalldays* is 10, for *statdays* is 30, and for *reconnectdays* is 3.

**Notes:**

1. The MCDS record for a reconnectable data set is not deleted until both the *recalldays* and *reconnectdays* criteria are met.
2. The *recalldays* value specifies to DFSMShsm how long to keep MCDS data set records for recalled data sets that were not compacted or were compacted and met or exceeded the current value of SETSYS COMPACTPERCENT. For data sets that were compacted but did not meet the current value of SETSYS COMPACTPERCENT, the MCDS data set records are retained for 90 days.

## MIGRATIONLEVEL1DAYS: Specifying the Inactive Age for Data Sets Migrating from Level 1 Volumes

**Explanation:** **MIGRATIONLEVEL1DAYS**(*days*) is an optional parameter specifying the number of contiguous days a data set must remain unreferenced before the data set is eligible for migration from a level 1 volume to a level 2 volume. For *days*, substitute a decimal number from 0 to 999. This value includes the time the unreferenced data set was on a primary volume. For example, if you specified MIGRATIONLEVEL1DAYS(15) and the minimum migration age is 5, the unreferenced data set remains on the primary volume for 5 days and on the migration level 1 volume for 10 days before DFSMShsm migrates it to a migration level 2 volume.

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter with any SETSYS command, the DFSMShsm default is 60 calendar days.

**Note:** MIGRATIONLEVEL1DAYS applies only to migration from level 1 volumes to level 2 volumes.

## MIGUNITNAME: Specifying the Type of Unit for Allocating a Scratch Tape during Migration

**Explanation:** **MIGUNITNAME**(*unitname*) is an optional parameter identifying the type of unit that should be specified the first time DFSMShsm requests to allocate a scratch tape during migration. You can request several unit names for allocating the scratch tape. For *unitname* specify either 3480, 3480X, 3490, 3590-1, or an esoteric name which you specify in the USERUNITTABLE parameter of the SETSYS command. If an esoteric tape unit name is used, the SETSYS USERUNITTABLE command must be issued prior to the SETSYS MIGUNITNAME command.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 3590-1.

### Notes:

1. You cannot specify an esoteric unit name that represents DASD; it must represent tape.
2. DFSMShsm does not use MIGUNITNAME when it requests that a scratch volume be allocated while continuing from another volume. Instead, DFSMShsm uses the same unit the volume was allocated on.
3. If you specify MIGDENSITY and MIGUNITNAME, the density must match the density capabilities for that type of unit. If you specify MIGUNITNAME and do not specify MIGDENSITY, DFSMShsm uses the highest density for the specified unit.

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4. If you specify an esoteric unit name with the MIGUNITNAME parameter, you must also have identified the esoteric unit name to DFSMShsm with the USERUNITTABLE parameter.
5. You can specify the USERUNITTABLE parameter when you specify the MIGUNITNAME parameter or you could have specified USERUNITTABLE with a previous SETSYS command during this startup.

## ML2PARTIALSNOTASSOCIATEDGOAL: Specifying the Maximum Number of Allowed Partial ML2 Tapes

**Explanation:** ML2PARTIALSNOTASSOCIATEDGOAL(*nnn* | NOLIMIT) is an optional parameter specifying the maximum number of partial ML2 tapes not associated with any migration or recycle task to remain after the generic RECYCLE command is invoked to recycle ML2 tape volumes. A partial tape is one that is not full and not empty. For *nnn*, substitute a decimal number from 0 to 999.

If the number of unassociated ML2 partial tapes is less than or equal to *nnn* when recycle is invoked, no partial tapes are recycled. To recycle all unassociated ML2 partial tapes, use the value of zero (0) for *nnn*. To prevent recycling of all ML2 partial tapes, specify the NOLIMIT subparameter.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, DFSMShsm will use the value of 10.

### Notes:

1. This parameter is effective only during recycle processing
2. The allowed number of partial tape volumes applies to your complex of hosts which share the MCDS and OCDS and which define those volumes to DFSMShsm.

## ML2RECYCLEPERCENT: Specifying the Maximum Percentage of Valid Data on a Migration Tape

**Explanation:** ML2RECYCLEPERCENT(*pct*) is an optional parameter specifying the percent-valid criterion DFSMShsm uses to recycle tape migration level 2 volumes, if you do not specify the PERCENTVALID parameter of the RECYCLE command. For *pct*, substitute a decimal number from 0 to 100. When DFSMShsm invalidates a data set entry for a full volume and the percentage of valid data on the migration level 2 tape volume becomes less than or equal to *pct*, DFSMShsm writes the informational message, ARC0365I, in the command activity log.

For a discussion of how DFSMShsm calculates percentages based on valid blocks, refer to “Managing DFSMShsm Media”, the “Consolidating Valid Data on Tape Volumes” topic in the *z/OS DFSMShsm Storage Administration Guide*.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, DFSMShsm will use the value specified with the SETSYS RECYCLEPERCENT parameter.

**Note:** DFSMShsm ignores the ML2RECYCLEPERCENT parameter of this command and the PERCENTVALID parameter of the RECYCLE command when you use the RECYCLE command to recycle specific tape migration level 2 volumes.

## MONITOR: Specifying Which Informational Messages to Print at the System Console

**Explanation:** MONITOR is an optional parameter that specifies which informational messages DFSMShsm is to print at the system console, and the values DFSMShsm is to use for monitoring space in the journal and control data sets.

The subparameters of the MONITOR parameter are listed in alphabetical order and can be found at the following locations:

Subparameter	See Page
BACKUPCONTROLDATASET	409
JOURNAL	410
MIGRATIONCONTROLDATASET	410
OFFLINECONTROLDATASET	411
SPACE	411
STARTUP	411
VOLUME	412

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 80%. No messages are printed to the console about space used during volume processing. No messages are printed to the console from DFSMShsm commands read from the ARCCMDxx parmlib member during DFSMShsm initialization.

**Note:** If you specify MONITOR, the specified level of activity logging controls which messages are written to the system console. For example, if you specify ACTLOGMSGLEVEL(EXCEPTIONONLY), DFSMShsm does not write the successful execution messages to the system console.

## MONITOR (BACKUPCONTROLDATASET): Monitoring the Space Used in the BCDS

**Explanation:** BACKUPCONTROLDATASET(*thresh*) is an optional subparameter of the MONITOR parameter that specifies when DFSMShsm issues warning messages about the amount of space used in the BCDS.

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For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the BCDS exceeds this percentage value, DFSMShsm warns the system operator that the data set is getting full.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify a threshold on any SETSYS command, the DFSMShsm default is 80%.

## MONITOR (JOURNAL): Monitoring the Space Used in the Journal Data Set

**Explanation:** JOURNAL(*thresh*) is an optional subparameter of the MONITOR parameter that specifies when DFSMShsm issues warning messages about the amount of space used in the journal data set.

For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the journal data set exceeds this percentage value, DFSMShsm warns the system operator that the data set is getting full.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this subparameter on any SETSYS command, the DFSMShsm default is 80%.

**Note:**

When defined as a large format data set, the DFSMShsm journal can exceed 65,535 tracks per volume. For information about defining the DFSMShsm journal, see *z/OS DFSMShsm Implementation and Customization Guide*.

## MONITOR (MIGRATIONCONTROLDATASET): Monitoring the Space Used in the MCDS

**Explanation:** MIGRATIONCONTROLDATASET(*thresh*) is an optional subparameter of the MONITOR parameter that specifies when DFSMShsm issues warning messages about the amount of space used in the MCDS.

For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the MCDS exceeds this percentage value, DFSMShsm warns the system operator that the data set is getting full.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify a threshold on any SETSYS command, the DFSMShsm default is 80%.

## MONITOR (OFFLINECONTROLDATASET): Monitoring the Space Used in the OCDS

**Explanation:** OFFLINECONTROLDATASET(*thresh*) is an optional subparameter of the MONITOR parameter that specifies when DFSMShsm issues warning messages about the amount of space used in the OCDS.

For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the OCDS exceeds this percentage value, DFSMShsm warns the system operator that the data set is getting full.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify a threshold on any SETSYS command, the DFSMShsm default is 80%.

## MONITOR (SPACE | NOSPACE): Printing Volume Space-Use Messages

**Explanation:** SPACE | NOSPACE are mutually exclusive, optional subparameters of the MONITOR parameter that specify whether or not to print volume space-use messages at the system console when DFSMShsm periodically checks space for interval migration or when you issue a QUERY SPACE command. The three messages printed are ARC0400I, ARC0401I, and ARC0402I.

Subparameter	Explanation
SPACE	MONITOR(SPACE) specifies that volume space-use messages print at the system console, the DFSMShsm log, and the appropriate activity log.
NOSPACE	MONITOR(NOSPACE) specifies that volume space-use messages print only in the DFSMShsm log and the appropriate activity log.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOSPACE.

## MONITOR (STARTUP | NOSTARTUP): Printing DFSMShsm Startup Informational Messages

**Explanation:** STARTUP | NOSTARTUP are mutually exclusive, optional subparameters of the MONITOR parameter that specify whether or not to print DFSMShsm startup informational messages at the system console. The messages result from DFSMShsm commands that are read from the PARMLIB member during DFSMShsm initialization. You could also specify the STARTUP option on the EXEC PARM options of the DFSMShsm startup procedure to direct the startup informational messages to the system console.

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Subparameters	Explanation
STARTUP	<b>MONITOR(STARTUP)</b> specifies that DFSMShsm startup informational messages print at the system console and in the DFSMShsm log.
NOSTARTUP	<b>MONITOR(NOSTARTUP)</b> specifies that DFSMShsm startup informational messages print only in the DFSMShsm log, with the exception of messages from the PATCH command, which is printed at the system console.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOSTARTUP.

## MONITOR (VOLUME | NOVOLUME): Printing Data Set Messages during Volume Processing

**Explanation:** VOLUME | NOVOLUME are mutually exclusive, optional subparameters of the MONITOR parameter that specify whether or not to print data set (ARC0734I) messages at the system console.

Subparameter	Explanation
VOLUME	<b>MONITOR(VOLUME)</b> specifies that messages print at the system console, DFSMShsm log, and appropriate activity log. DFSMShsm prints messages about data sets on volumes processed by space management, backup, and recovery.
NOVOLUME	<b>MONITOR(NOVOLUME)</b> specifies that messages relating to the data sets on the volumes processed by space management, backup, and recovery print only in the DFSMShsm log and the appropriate activity log.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOVOLUME.

## MOUNTWAITTIME: Specifying the Time DFSMShsm Waits for a Tape Mount and Open

**Explanation:** MOUNTWAITTIME(*minutes*) is an optional parameter specifying the time, in minutes, that DFSMShsm waits for the tape volume to be mounted and opened. For *minutes*, substitute a decimal number from 1 to 120 to represent how long DFSMShsm waits for a tape to be mounted and opened. If the first time period expires, DFSMShsm sends message ARC0310A to the operator asking whether to mount the tape volume. If the operator answers Y to message ARC0310A, DFSMShsm resets the timer to *minutes*. If the input volume has not been mounted and opened when the second time period expires, DFSMShsm automatically ends the task. If the output volume has not been mounted and

opened when the second time period expires, DFSMShsm marks this volume as unavailable and selects another tape volume.

If you have not mounted an output tape dump volume when the second time period expires, DFSMShsm automatically ends the dump task.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 15 minutes.

**Notes:**

1. This parameter does not apply to tape mounts performed during aggregate backup and recovery processing.
2. DFSMShsm sets a mount wait timer for both manual and automatic tape libraries. Appropriate consideration should be given based on which kind of mount DFSMShsm will be involved with. Unique considerations may exist when using a virtual tape system (VTS).

## OBJECTNAMES: Specifying the Compaction-Control Qualifier of the Object Data Set

**Explanation:** OBJECTNAMES(*name1,name2,...*) is an optional parameter specifying the compaction-control qualifier of all data sets that should be compacted with the compaction table for object data sets. For generation data group data sets, this compaction-control qualifier is the next-to-the-last qualifier of the data set name. For all other data sets, this compaction-control qualifier is the last qualifier of the data set name.

For *name1,name2,...*, specify the compaction-control qualifiers of the data set names of those data sets you want to compact with the compaction table for data sets that contain object code. For example, you could specify LINKLIB as a compaction-control qualifier.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is that the general compaction table is used to compact the object data sets.

## OPTIMUMDASDBLOCKING | NOOPTIMUMDASDBLOCKING: Specifying Whether DFSMShsm Should Use Its Defined Optimum Block Size

**Explanation:** OPTIMUMDASDBLOCKING | NOOPTIMUMDASDBLOCKING are mutually exclusive, optional parameters indicating whether DFSMShsm should use its defined optimum block size when outputting or recovering to DFSMShsm-owned DASD. Optimum blocking refers to DFSMShsm writing its output or input in blocks that are multiples of 2 KB and is determined by the device's track size for data being written to DFSMShsm-owned DASD. For

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example, all models of 3390 DASD have the same track length and an optimum block size of 18 KB (1 KB equals 1024 bytes). This permits better use of space on DFSMShsm-owned DASD devices.

OPTIMUMDASDBLOCKING indicates to DFSMShsm to use its defined optimum block size when writing to DFSMShsm-owned DASD.

NOOPTIMUMDASDBLOCKING indicates to DFSMShsm to not use its defined optimum block size when writing to DFSMShsm-owned DASD. DFSMShsm writes to DFSMShsm-owned DASD in 2 KB blocks.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify the NOOPTIMUMDASDBLOCKING parameter on any SETSYS command, DFSMShsm uses its defined optimum block size when writing to DFSMShsm-owned DASD as the default.

**Notes:**

1. OPTIMUMDASDBLOCKING does not pertain to small-data-set-packing data sets, dump VTOC copy data sets, or backup VTOC copy data sets.
2. You can change this parameter while DFSMShsm is running. The change takes effect when the next data set destined for DFSMShsm-owned DASD is opened for output.

## OUTPUTTAPEALLOCATION: Specifying Whether to Wait for the Output Tape to Be Allocated

**Explanation:** OUTPUTTAPEALLOCATION (WAIT | NOWAIT) is an optional parameter specifying whether DFSMShsm should wait until the tape unit is allocated for the output tape for migration or backup.

Subparameter	Explanation
WAIT	DFSMShsm waits until the output tape unit is allocated. Any DFSMShsm function requiring dynamic allocation services will be unable to proceed until this tape unit is allocated.  When using the WAIT option, caution must be exercised to limit the number of DFSMShsm tasks that require tape. If more tasks run than there are available tape devices, a deadlock condition occurs because of the exclusive enqueue that MVS allocation puts on the task input/output table (SYSZTIOT) while awaiting the tape device. This condition can be resolved only if another job (not DFSMShsm) releases a tape device, or if you cancel DFSMShsm.
NOWAIT	DFSMShsm does not wait until the output tape unit is allocated. Instead, DFSMShsm reissues the request every 10 seconds up to six times. If the output tape unit still is not allocated after seven tries, DFSMShsm asks the operator whether DFSMShsm should cancel the request or repeat the allocation sequence. With the NOWAIT option, dynamic allocation issues message IEF238D. Once answered, other DFSMShsm tasks can proceed with allocations.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOWAIT.

## PARTIALTAPE: Specifying Whether to Reuse Partially Full Tapes

**Explanation:** PARTIALTAPE is an optional parameter specifying that you want DFSMShsm to mark a cartridge-type single-file formatted tape volume full when the volume has been demounted.

MARKFULL | REUSE are mutually exclusive subparameters of the PARTIALTAPE parameter. One or the other subparameter must be specified if the PARTIALTAPE parameter is specified. If not, an error message is issued.

Subparameter	Explanation
MARKFULL	<p>DFSMShsm automatically marks a single-file-formatted tape volume full (except after data set migration or data set backup) independent of the block count when it demounts the tape. These volumes can be marked as full even though the volume is only partially used. DFSMShsm excludes data set migration or backup to avoid marking a tape volume full after a command migration or after a command backup of a single data set to migration level 2.</p> <p>When running in a PARTIALTAPE(MARKFULL) environment, a generic TAPECOPY command will select, copy, and mark full nonduplicated original tapes that are <i>not</i> marked as full, even if an alternate tape volume serial number is already recorded in the DFSMShsm inventory (TTOC record). In this case the older alternate is removed from DFSMShsm's inventory but <i>not</i> explicitly communicated to tape management products as with the ARCTVEXT exit method. DFSMShsm creates the new alternate because the partial original may have been extended after the old alternate was created by an explicit TAPECOPY. The older alternate is not communicated to tape management products so that the customer can retain alternates in addition to the one DFSMShsm maintains. DFSMShsm issues an ARC0436I message to the console and identifies the old alternate, the original, and the new alternate. Customers can update their tape management product if they do not want to retain the old alternates.</p>
REUSE	DFSMShsm uses the normal process of marking a single-file formatted tape full only when the percent full (specified with the SETSYS TAPEUTILIZATION parameter) is reached.

If you specify the global PARTIALTAPE(MARKFULL | REUSE) parameter, the parameter applies to both migration and backup. If you specify a specific function, the parameter applies only to that function. If you specify a global value and a specific function in a single command, the command will fail.

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If you specify the MIGRATION(MARKFULL | REUSE) parameter, the parameter applies to migration only. If you specify the BACKUP(MARKFULL | REUSE) parameter, the parameter applies to backup only.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** The default is REUSE, meaning that DFSMShsm marks the tape volume full only when the volume reaches the maximum block count specified with the SETSYS TAPEUTILIZATION parameter.

**Note:** If you are using a VTS subsystem for migration or backup output, the MARKFULL parameter can improve performance by reducing the need to remount yesterday's partial volume in order to extend it today. Additionally, this usage can somewhat reduce the reclamation process of the VTS subsystem because the physical tape containing the initial partial tape, that was extended, was not invalidated on a true tape.

## PDA: Specifying Whether the Problem Determination Aid Is Initiated

**Explanation:** PDA(NONE | ON | OFF) is an optional subparameter that specifies whether the problem determination aid (PDA) is enabled. The PDA facility gathers diagnostic information and records the information in a storage buffer and in DASD data sets.

You can specify PDA tracing in the DFSMShsm startup procedure. Specifying the PDA=YES parameter allows the PDA facility to collect trace data prior to the processing of the SETSYS PDA(ON) command.

Subparameter	Explanation
NONE	The PDA facility does not start at DFSMShsm startup. No space for the storage buffer is requested, and the trace output data sets are not opened. <b>Note:</b> This keyword is effective only at DFSMShsm startup. If issued after DFSMShsm startup, NONE has the same results as issuing the OFF keyword.
ON	Storage is requested for the trace buffer and the trace output data sets open. If the trace data sets are not allocated, the problem determination aid function continues to trace in internal storage.
OFF	The trace facilities are suspended but the primary module is left active. The trace buffer storage area remains allocated and the output data sets remain open, but the bit to allow tracing is turned off.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you do not specify either the ON or OFF keyword, the default is ON.

**DFSMShsm Defaults:** If you do not specify either the ON or OFF keywords, the default is ON.

## PLEXNAME: Specifying a Name for an HSMplex

**Explanation:** PLEXNAME(hsmplex\_suffix) is an optional parameter that allows you to name multiple HSMplexes within a sysplex. This parameter is used during startup of DFSMShsm and must be specified in an ARCCMDxx member. This parameter must be specified if there are multiple HSMplexes in a sysplex because this HSMplex name is used to distinguish between the separate HSMplexes.

The prefix of ARC is used by DFSMShsm and you can specify a maximum of five characters as the suffix for the HSMplex name. The default suffix used by DFSMShsm is PLEX0.

**Note:** If an HSMplex name other than the default is specified on one host in an HSMplex, then that name must be specified on all other DFSMShsm hosts in the HSMplex.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** By default, SETSYS uses PLEXNAME(PLEX0), which causes DFSMShsm to use an HSMplex name of ARCPLEX0.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the default HSMplex name is ARCPLEX0.

## PRIMARYSPMGMTSTART: Specifying the Start and Stop Times for Automatic Primary Space Management

**Explanation:** PRIMARYSPMGMTSTART (*hhmm1 hhmm2*) is an optional parameter specifying the times when automatic primary space management should start. Use this parameter instead of AUTOMIGRATIONSTART to set the start and stop times for automatic primary space management.

Using PRIMARYSPMGMTSTART(*hhmm1 hhmm2*), you can specify a planned start time and a planned end time. If DFSMShsm does not start automatic primary space management between the start and stop times, automatic primary space management is not performed for that day.

For *hhmm1*, substitute the planned start time for automatic primary space management. If you specify *hhmm1* as zero, DFSMShsm does not start automatic primary space management.

For *hhmm2*, substitute the planned stop time when DFSMShsm no longer starts automatic primary space management on a new volume. If *hhmm2* is set to zero, this is the same as not including the *hhmm2* parameter.

The *hhmm* format expresses time as a four-digit decimal number that is based on the 24-hour clock. *hh* specifies the hour and *mm* specifies the minutes. For example, you can specify 1:15 p.m. as 1315, and you can specify midnight as 2400. The maximum value you can specify for *hh* is 24, the maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm* is 2400.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If only one time is specified in PRIMARYSPMGMSTART, DFSMShsm starts the automatic primary space management functions between the time specified and midnight. Automatic primary space management runs until completion.

**DFSMShsm Defaults:** If PRIMARYSPMGMSTART is not specified, the default is no automatic primary space management (unless AUTOMIGRATIONSTART was specified).

**Notes:**

1. If you do not specify a nonzero value for *hhmm1* during start up of DFSMShsm, DFSMShsm does not perform automatic primary space management.
2. The type of automatic primary space management DFSMShsm does on a particular volume (data set deletion, data set retirement, or migration) depends on the parameter you have specified with the ADDVOL command.
3. If you want the operator to decide whether to start automatic primary space management, specify the REQUEST parameter with the PRIMARYSPMGMSTART parameter.
4. As with automatic backup, DFSMShsm serializes access to data sets and volumes for a short period of time. Therefore, select a time for automatic primary space management when the computing system is not very active and there is not much interactive user activity (usually at night).
5. Automatic primary space management usually starts at the planned start time. Assume, however, that DFSMShsm is not running at the planned start time or the operating system is lost while automatic primary space management is running. When DFSMShsm restarts, it checks the start (*hhmm1*) and stop (*hhmm2*) times. These start and stop times form a window. If DFSMShsm restarts during the window, DFSMShsm also restarts automatic primary space management.
6. PRIMARYSPMGMSTART fails if *hhmm1* and *hhmm2* are equal.
7. In a test environment, DFSMShsm can run automatic primary space management multiple times a day. However, this procedure requires certain DFSMShsm supported patches. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* for more information about running primary space management multiple times a day. If automatic primary space management runs to completion and you want to start automatic primary space management again, use the following procedure:
  - Issue the SETSYS PRIMARYSPMGMSTART command to define a new start window.
  - Specify a start window that has a planned start time (*hhmm1*) that is after the time that automatic primary space management last ended.

Automatic primary space management starts immediately if the current time is between the start and stop times you specified. If the current time is not between the start and stop times you specified, automatic primary space management starts automatically when the planned start time is reached.

8. If PRIMARYSPMGMSTART is issued dynamically with a zero value for *hhmm1* to convert to no longer running the function and automatic primary space management is currently running, it runs to completion with the originally established planned stop time. This is true regardless of the *hhmm2* value specified in the newly issued command. DFSMShsm does not start automatic primary space management again unless another command is issued establishing a new start time. A QUERY SETSYS will show zero for the planned start time and the originally established stop time.

## PROFILEBACKUP | NOPROFILEBACKUP: Specifying Whether to Create Backup RACF Discrete Profiles for Cataloged Data Sets

**Explanation:** PROFILEBACKUP | NOPROFILEBACKUP are mutually exclusive, optional parameters that you use to specify whether DFSMShsm creates a backup RACF discrete profile for all cataloged RACF-indicated data sets during backup.

PROFILEBACKUP specifies that DFSMShsm creates a backup RACF discrete profile for the cataloged RACF-indicated data set when it backs up the data set. This backup profile applies to all backup versions of the cataloged RACF-indicated data set.

NOPROFILEBACKUP specifies that DFSMShsm does not create a backup RACF discrete profile when it backs up a cataloged RACF-indicated data set.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the default is PROFILEBACKUP.

### Notes:

1. If a RACF naming conversion table (NCT) is used, the recover function is not able to re-establish the discrete profile protection.
2. Failure to use PROFILEBACKUP allows unauthorized users to have access to data sets. Refer to “RACF Considerations” in the *z/OS DFSMShsm Storage Administration Guide* for more information about backing up RACF discrete profiles for cataloged data sets.

## PROMOTE: Specifying Whether a Host is Eligible for Promotion

**Explanation:** PROMOTE is an optional parameter that allows users to specify which host in an HSMplex may be promoted and which should not be. Currently, one host in an HSMplex is designated as the Primary host and all other hosts are considered secondary. You should specify the PROMOTE parameter on only those hosts that are actually eligible for promotion.

Subparameter	Explanation
PRIMARYHOST (YES   NO)	Allows you to designate if a host is eligible to take over the unique functions from a failed primary host. PRIMARYHOST(YES) specifies that this specific host in an HSMplex is eligible to take over the unique functions from a failed primary host. If PRIMARYHOST(YES) is issued from a primary host, it is ignored. PRIMARYHOST(NO) specifies that this specific host in an HSMplex is disabled from being eligible for promotion. For example, this can be done if a host is assigned specific work that would conflict with promotion or the host resides on a slow z/OS image.

Subparameter	Explanation
SSM(YES   NO)	Allows you to designate a host's eligibility to take over Secondary Space Management (SSM) functions from a failed host. Secondary Space Management generally runs on a single host. This can be the primary host or a specific secondary host. SSM hosts are not eligible for promotion for other SSM hosts because each SSM host may have different or identical SSM windows and cycles defined. SSM(YES) specifies that this specific non-SSM host in an HSMplex is eligible to take over Secondary Space Management functions from a failed host. If SSM(YES) is issued from a SSM host, the message ARC1521I is issued. SSM(NO) specifies that this specific host in an HSMplex is disabled from being eligible for promotion.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, no hosts in an HSMplex are eligible to take over the Primary or Secondary Space Management functions of a failed host.

**Note:** The SETSYS PROMOTE parameter only makes the host eligible to be promoted for Primary or SSM hosts that become disabled after the command was issued. If you want to make the host take over for a host that is already disabled, you can issue the SETSYS NOEMERGENCY command on this host, which will cause the host to go and look for hosts that are already disabled and in need of being promoted.

## RACFIND | NORACFIND: Specifying Whether to Put RACF-Indication on Migration Copies and Backup Versions

**Explanation:** RACFIND | NORACFIND are mutually exclusive, optional parameters that you use to specify whether DFSMSHsm puts RACF-indication on all migration copies and backup versions.

RACFIND specifies that DFSMSHsm puts RACF-indication on migration copies and backup versions.

NORACFIND specifies that migration copies and backup versions are not RACF-indicated, including those data sets that are password-protected. Specify this parameter only if generic profile checking is activated and generic profiles are defined for migration and backup qualifiers in all DFSMSHsm hosts.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMSHsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMSHsm default is RACFIND.

## RECALL: Specifying the Target Volume to Receive Recalled Data Sets

**Explanation:** RECALL is an optional parameter specifying where DFSMShsm puts the non-SMS-managed recalled data sets.

Subparameter	Explanation
ANYSTORAGEVOLUME	DFSMShsm recalls a data set to an online primary volume with the use attribute of storage and the primary volume attribute of automatic recall. You specify the primary volume attribute with the ADDVOL command.
PRIVATEVOLUME	DFSMShsm recalls a data set to any online primary volume with the use attribute of public, storage, or private and the primary volume attribute of automatic recall. You specify the primary volume attribute with the ADDVOL command.

LIKE | UNLIKE are mutually exclusive, optional subparameters of the ANYSTORAGEVOLUME or PRIVATEVOLUME subparameters.

Subparameter	Explanation
LIKE	During undirected recall, only primary volumes whose primary volume attributes match the attributes of the primary volume that the data set migrated from are considered as possible target volumes for the recall.
UNLIKE	During undirected recall, volumes whose currently specified primary volume attributes do not match those of the source primary volume are eligible for selection. DFSMShsm selects the volume for recall from one of three groups of volumes. The following are groups of volumes and how they are ordered: <ul style="list-style-type: none"> <li>• Volumes with like recall attributes</li> <li>• Volumes with unlike recall attributes in automatic backup and backup device category</li> <li>• Volumes with unlike recall attributes in automatic migration</li> </ul>

The volumes in each group are ordered according to most-available free space. For more information on defining pools of volumes, refer to “Defining Pools of Volumes” in *z/OS DFSMShsm Storage Administration Guide*.

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify RECALL without a subparameter, the SETSYS default is ANYSTORAGEVOLUME. If you do not specify the LIKE or UNLIKE subparameter with the ANYSTORAGEVOLUME or PRIVATEVOLUME subparameter, the SETSYS default is LIKE.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default for data sets is RECALL(ANYSTORAGEVOLUME).

### Notes:

1. The LIKE/UNLIKE subparameter does not apply if a data set is SMS-managed when migrated and later is recalled as a non-SMS-managed data set.

2. For BDAM data sets, DFSMShsm selects only devices that are the same device type as the one the data sets migrated from. The DAOPTION of the RECALL and RECOVER commands can be used to specify how BDAM data sets can be moved to a target volume using relative track or relative block accessing. In addition, target volumes with track sizes different from the last level 0 volume from which the BDAM data set came can be selected.
3. In a JES3 environment, specify the same subparameter for DFSMShsm hosts that set up jobs and for DFSMShsm hosts that run the jobs.

## RECYCLEINPUTDEALLOCFREQUENCY: Allowing Periodic Deallocation of Input Unit during Recycle Processing

**Explanation:** **RECYCLEINPUTDEALLOCFREQUENCY(BACKUP(*bfreq*) or MIGRATION(*mfreq*))** is an optional parameter that you use to periodically deallocate an input unit during recycle processing. This dynamically changeable parameter prevents DFSMShsm from possibly keeping an input unit allocated for hours.

**Tape Library Relationship:** In a tape environment where contention for tape drives may be a consideration, the following table shows BACKUP(*bfreq*) or MIGRATION(*mfreq*) values that are recommended when you recycle single-file-format cartridges:

Type of Environment	Value	Resulting Allocation
A single IBM 3494/3495 Tape Library Dataserver environment having all compatible drives	0	The input unit is allocated for the duration of recycle processing.
An SMS-managed tape environment that has multiple IBM 3494/3495 machines where inputs can come from different ATLs	0	A unique allocation is allowed for each input connected set.
A BTLS-managed environment that has multiple IBM 3494/3495 machines where inputs can come from different ATLs	1	RECYCLE allocates tape drives for each connected set in the correct library.
A multiple non-SMS-managed tape library where not all backup or migration tapes are in a single library (for example, an STK® ACS cluster where you want to prevent pass-through processing)	1	RECYCLE allocates tape drives for each connected set in the correct library.
An environment that has incompatible tapes even though they may appear the same, including when one has a mix of real and emulated devices, such as 3490s and emulators of 3490s	1	RECYCLE allocates tape drives for each connected set.
A tape environment with manual tape operators, but no incompatible mix of real and emulated devices that appear as the same device	5 or 10	New allocations are allowed every 5 to 10 input connected sets.

Subparameter	Explanation
BACKUP( <i>bfreq</i> )	During recycle processing of backup volumes, deallocation of an input unit will occur after the specified number of input connected sets representing single-file-format cartridges have been processed. For <i>bfreq</i> , substitute a decimal number from 1 to 255 for the number of connected sets to process before deallocation of the input unit. Specifying 0 will retain the input unit until recycle processing has completed.
MIGRATION( <i>mfreq</i> )	During recycle processing of migration volumes, deallocation of an input unit will occur after the specified number of input connected sets representing single-file-format cartridges have been processed. For <i>mfreq</i> , substitute a decimal number from 1 to 255 for the number of connected sets to process before deallocation of the input unit. Specifying 0 will retain the input unit until recycle processing has completed.

**Notes:**

1. For example, specifying SETSYS  
RECYCLEINPUTDEALLOCFREQUENCY(BACKUP(20)) will deallocate the input unit every 20 input backup connected sets. Using SETSYS  
RECYCLEINPUTDEALLOCFREQUENCY(MIGRATION(1)) will deallocate the input unit after each input migration connected set has been processed.
2. The input unit will always be deallocated between connected sets when the tape volume is not a single-file-format cartridge.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter (or either subparameter) on any SETSYS command, the DFSMShsm default is that recycle processing will keep the input unit allocated until the processing of that type of volume (backup or migration) is complete.

## RECYCLEOUTPUT: Limiting the Selection and Allocation of an Output Volume During Recycle Processing

**Explanation:** RECYCLEOUTPUT(BACKUP MIGRATION) is an optional parameter that you use to limit the selection and allocation of an output volume during recycle processing.

**Tape Library Relationship:** A UNITNAME can be used for filtering in the ACS routines. If you specify the unittype for this command, it will be sent to the ACS routines in SMS for the RECYCLEOUTPUT function.

Subparameter	Explanation
BACKUP( <i>unittype</i> )	During recycle processing of a tape backup volume, only tape spill backup volumes that can be mounted and written on the specified type of unit are used for output. In addition, when the tape spill backup volume is allocated for output during recycle processing, the volume is allocated using the unit name specified with the BACKUP subparameter of the RECYCLEOUTPUT parameter, overriding the unit name specified on the ADDVOL command for the tape spill backup volume.
MIGRATION( <i>unittype</i> )	During recycle processing of a tape level 2 migration volume, only tape level 2 migration volumes that can be mounted and written on the specified type of unit will be used for output. In addition, when the tape level 2 migration volume is allocated for output during recycle processing, the volume is allocated using the unit name specified with the MIGRATION subparameter of the RECYCLEOUTPUT parameter, overriding the unit name specified on the ADDVOL command for the tape level 2 migration volume.

For *unittype*, specify a generic or esoteric unit name. The following generic unit names are acceptable: 3480, 3480X, 3490, and 3590-1. If an esoteric unit name is specified, it must have been previously defined to DFSMShsm using the USERUNITTABLE parameter of the SETSYS command.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If *unittype* is not specified with the BACKUP parameter, there is no restriction on the type of tape spill backup volume that can be selected for output during the recycle processing of a tape backup volume. If *unittype* is not specified here and a scratch tape is required, the value specified for SETSYS UNITNAME is used when an output tape is allocated for a backup volume.

If *unittype* is not specified with the MIGRATION parameter, there is no restriction on the type of tape level 2 migration volume that can be selected for output during the recycle processing of a tape level 2 migration volume. If *unittype* is not specified here and a scratch tape is required, the value specified for SETSYS MIGUNITNAME is used when an output tape is allocated for a migration volume.

If the RECYCLEOUTPUT parameter is specified without any subparameters, no changes are made to the current DFSMShsm values.

**DFSMShsm Defaults:** None.

## RECYCLEPERCENT: Specifying the Maximum Percentage of Valid Data on a Backup Tape

**Explanation:** RECYCLEPERCENT(*pct*) is an optional parameter specifying the percent-valid criterion DFSMShsm uses to recycle tape backup volumes if you do not specify the PERCENTVALID parameter of the RECYCLE command. For *pct*, substitute a decimal number from 0 to 100.

When DFSMShsm invalidates a data set entry for a full backup volume and the percentage of valid data on the tape backup volume becomes less than or equal to

*pct*, DFSMShsm writes the informational message, ARC0365I, in the command activity log. You then use the RECYCLE command to recycle all eligible tape backup volumes.

For a discussion of how DFSMShsm calculates percentages based on valid blocks, refer to “Managing DFSMShsm Media” in the *z/OS DFSMShsm Storage Administration Guide*.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 20%.

**Notes:**

1. DFSMShsm ignores the RECYCLEPERCENT parameter of this command and the PERCENTVALID parameter of the RECYCLE command when you use the RECYCLE command to recycle specific backup volumes.
2. DFSMShsm also uses this value for migration level 2 tape volumes when the ML2RECYCLEPERCENT parameter of the SETSYS command has not been specified.

## RECYCLETAPEALLOCATION: Specifying Whether to Wait for the Recycle Tape to Be Allocated

**Explanation:** RECYCLETAPEALLOCATION (WAIT | NOWAIT) is an optional parameter specifying whether DFSMShsm should wait until the tape unit is allocated for the source and target tape volumes.

Subparameter	Explanation
WAIT	DFSMShsm waits until the recycle tape unit is allocated. All DFSMShsm functions requesting allocations stop until this allocation request is satisfied.  When using the WAIT option, you must exercise caution to limit the number of DFSMShsm tasks that require tape. If more tasks run than there are available tape devices, a deadlock condition occurs because of the exclusive enqueue that MVS allocation will put on the task input/output table (SYSZTIOT) while awaiting the tape device. This condition can be resolved only if another job (not DFSMShsm) releases a tape device, or if you cancel DFSMShsm.
NOWAIT	DFSMShsm does not wait until the recycle tape unit is allocated. Instead, DFSMShsm reissues the request every 10 seconds up to six times. If the recycle tape unit is still not allocated after seven tries, DFSMShsm asks the operator whether to have DFSMShsm cancel the request or repeat the allocation sequence. With the NOWAIT option, dynamic allocation issues message IEF238D. Once answered, other DFSMShsm tasks can proceed with allocations.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

## SETSYS

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either subparameter on any SETSYS command, the DFSMShsm default is NOWAIT.

## REMOVECOMPACTNAMES: Removing the Compaction-Control Qualifier for Source or Object Data Sets

**Explanation:** REMOVECOMPACTNAMES(*name1, name2, ...*) is an optional parameter specifying the compaction-control qualifier of all data sets to be removed from the SOURCENAMES or OBJECTNAMES table. For *name1, name2, ...*, specify the compaction-control qualifiers of those data sets you no longer want to have compacted by the source or object compaction table.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, there is no DFSMShsm default.

## REQUEST | NORQUEST: Specifying Whether the Operators Permission Is Required

**Explanation:** REQUEST | NORQUEST are mutually exclusive, optional parameters specifying whether the operator's permission is required before DFSMShsm starts automatic primary space management, automatic secondary space management, automatic backup, or automatic dump.

REQUEST specifies that the operator's permission is required before DFSMShsm starts automatic primary space management, automatic secondary space management, automatic backup, or automatic dump.

NORQUEST specifies that the operator's permission is not required before DFSMShsm starts automatic primary space management, automatic secondary space management, automatic backup, or automatic dump.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is NORQUEST.

## SCRATCHFREQUENCY: Specifying How Long to Retain List Data Sets

**Explanation:** SCRATCHFREQUENCY(*days*) is an optional parameter specifying the number of days DFSMShsm should keep list data sets. For *days*, substitute a decimal number from 0 to 9999 specifying how long DFSMShsm should keep an unused list data set. If you specify 0, DFSMShsm scratches list data sets during the next space management of the volume. If the last qualifier in a data set name is .LIST, .OUTLIST, or .LINKLIST, the data set is a list data set. DFSMShsm scratches

list data sets during volume space management after the specified number of days have passed since anyone used the data sets.

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 9999 days.

## SECONDARYSPMGMTSTART: Specifying the Start and Stop Time for Automatic Secondary Space Management

**Explanation:** SECONDARYSPMGMTSTART(*hhmm1 hhmm2*) is an optional parameter you use to specify when automatic secondary space management functions are to start and stop. If DFSMShsm does not start automatic secondary space management between the specified start and stop times, automatic secondary space management functions are not done for that day.

For *hhmm1*, substitute the planned start time for automatic secondary space management. If you specify it as 0000, secondary space management will not start.

For *hhmm2*, substitute the planned stop time for automatic secondary space management. If *hhmm2* is set to zero, this is the same as not including the *hhmm2* parameter.

**Note:** Time is based on the 24-hour clock and is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and the minutes by *mm*. For example, 1:15 p.m. is 1315 and midnight is 2400. The maximum value you can specify for *hh* is 24, the maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm* is 2400.

The SETSYS SECONDARYSPMGMTSTART command will fail if the start and stop times are the same.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If only one time is specified in SECONDARYSPMGMTSTART, DFSMShsm starts the automatic secondary space management functions between the time specified and midnight. Automatic secondary space management runs until completion.

**DFSMShsm Defaults:** If you do not specify this parameter, no automatic secondary space management functions are done. ML1 volumes will eventually run out of space.

### Notes:

1. Any outstanding MWEs for data set deletion that were built by secondary space management up to the stop time, continue to be processed. After the stop time, secondary space management generates no new MWEs. When many MWEs are waiting for processing, their processing may continue well after secondary space management itself has stopped processing. However, recalls and user-requested deletes have a higher priority than those deletes that are performed from secondary space management.

2. If SECONDARYSPMGMTSTART is issued dynamically with a zero value for *hhmm1* to convert to no longer running the function and automatic secondary space management is currently running, it runs to completion with the originally established planned stop time. This is true regardless of the *hhmm2* value specified in the newly issued command. DFSMShsm does not start automatic secondary space management again unless another command is issued establishing a new start time. A QUERY SETSYS will show zero for the planned start time and the originally established stop time.

## **SELECTVOLUME: Specifying Whether DFSMShsm Should Select a Scratch Tape Volume or a DFSMShsm Tape Volume**

**Explanation:** SELECTVOLUME is an optional parameter specifying whether DFSMShsm chooses a tape volume owned by DFSMShsm or a scratch tape volume when an end-of-volume (EOV) condition occurs while DFSMShsm is writing on a tape volume. SELECTVOLUME(SCRATCH | SPECIFIC) applies to the initial selection for dump tape volumes as well as to the EOV condition.

If you specify the global SELECTVOLUME(SCRATCH | SPECIFIC) parameter, the parameter applies to all functions (migration, backup, and dump). If you specify a specific volume type with the SELECTVOLUME(MIGRATION | BACKUP | DUMP) parameter, the parameter applies only to that type of function. If you specify a global value and a specific volume type in a single command, the command fails.

Subparameter	Explanation
SCRATCH	A PRIVAT mount request is always sent to the operator when an EOV condition occurs on a tape backup volume, tape migration level 2 volume, or dump tape volume. The operator should mount a private scratch tape volume.
SPECIFIC	DFSMShsm chooses another tape volume when an EOV condition occurs on a tape backup volume, tape migration level 2 volume, or dump tape volume. DFSMShsm chooses a tape volume you have already defined to DFSMShsm with the ADDVOL command. If the EOV condition occurs on a tape backup volume, DFSMShsm chooses another tape backup volume. If the EOV condition occurs on a tape migration level 2 volume, DFSMShsm chooses another tape migration level 2 volume. If the EOV condition occurs on a dump tape volume, DFSMShsm chooses another dump tape volume. DFSMShsm first attempts to select a dump tape volume that is assigned to the same class as is currently being dumped to. If a dump tape volume with the same class cannot be found, then DFSMShsm looks for a dump tape volume that is not assigned to any class. When DFSMShsm chooses the tape volume, the operator receives a message specifying which tape to mount. If DFSMShsm cannot find an acceptable tape volume, the operator receives a PRIVAT mount request.

DFSMShsm distinguishes between devices that have the same logical device type but which have different physical devices. There are four types of 3490's:

- Emulated on a 128 track device
- Emulated on a 256 track device
- Emulated on a virtual tape server (VTS) subsystem as a virtual tape volume
- All others

There are three types of 3590's:

- Native 128 track devices
- Native 256 track devices
- Native 384 track devices

DFSMShsm examines the technology of the restricting output unit name and prefers selecting a partially filled cartridge having that recording format, at initial selection for backup to tape or migration to tape. If no cartridge matching the recording technology is found, then a nonspecific mount is requested.

**Note:** If a specific volume is specified for output during initial or subsequent (end-of-volume) processing the following requirements apply:

- If a library device is allocated:
  - The tape volume must be in the library for it to be considered eligible for selection. If the tape volume is outside the library, it is marked unavailable in the DFSMShsm inventory.
  - If a data class is assigned to the DFSMShsm tape data set name and the ACS COMPACTION attribute is specified (Y or N), the following considerations apply:
    - A partial tape is eligible for initial tape selection when the compaction status is consistent with the ACS data class COMPACTION attribute, and its device type is consistent with the allocated device type.
    - If a tape volume is empty, the existing selection rules related to device type eligibility still apply.
  - If a data class is not assigned or a data class is assigned to the DFSMShsm tape data set name and the ACS COMPACTION attribute is *not* specified (blank), the following considerations apply:
    - A partial tape is eligible for initial tape selection when its device type is consistent with the allocated device type (the compaction status assigned to a partially full tape does not influence initial tape selection).
    - If a tape volume is empty, the existing selection rules related to device type eligibility still apply.
- If a non library device is allocated, the tape volume must *not* be in a library for it to be considered eligible for selection. If the tape volume is in a library, it is marked unavailable in the DFSMShsm inventory.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is SCRATCH.

#### Notes:

1. Use the SCRATCH subparameter if you have the cartridge loader of the 3480 Magnetic Tape Subsystem. The cartridge loader provides the operator with the capability to preload multiple tapes used as migration, backup, or dump tapes. The system then writes migration data sets, backup data sets, or dump copies to these tapes without operator intervention.
2. The volume verification exit can reinitialize a tape volume if the tape remains under control of DFSMShsm. Therefore, to use the volume verification exit effectively, specify SPECIFIC and TAPEDELETION(HSMTAPE).

## SETSYS

3. This parameter has no effect when aggregate recovery is recovering data sets to ML2 tape volumes. Aggregate recovery will always request the mount of a non specific (scratch) volume.
4. Repeating the SELECTVOLUME parameter for specific volume types in a single SETSYS command causes conflict. The last entered SELECTVOLUME parameter overrides all other SELECTVOLUME parameters in this single command and is the only parameter processed.

For example, if you enter the following command, only the SELECTVOLUME(DUMP(SCRATCH)) parameter is processed. The SELECTVOLUME(MIGRATION(SPECIFIC)) and the SELECTVOLUME(BACKUP(SCRATCH)) parameters are not processed and their DFSMShsm defaults are applied.

```
SETSYS SELECTVOLUME(MIGRATION(SPECIFIC)) -  
          SELECTVOLUME(BACKUP(SCRATCH))      -  
          SELECTVOLUME(DUMP(SCRATCH))
```

To prevent this from happening, enter the command as follows. In this way, all of the parameters are processed.

```
SETSYS SELECTVOLUME(MIGRATION(SPECIFIC)) -  
          BACKUP(SCRATCH)                 -  
          DUMP(SCRATCH)
```

Another way to enter this command is to repeat the SETSYS command three times with different subparameters for the SELECTVOLUME parameter. Issuing the SELECTVOLUME command in this way allows you to group parameters together in separate sections of your PARMLIB member.

```
SETSYS SELECTVOLUME(MIGRATION(SPECIFIC))  
SETSYS SELECTVOLUME(BACKUP(SCRATCH))  
SETSYS SELECTVOLUME(DUMP(SCRATCH))
```

## SKIPABPRIMARY | NOSKIPABPRIMARY: Specifying Whether to Skip Automatic Backup of Primary Volumes

**Explanation:** SKIPABPRIMARY | NOSKIPABPRIMARY are mutually exclusive, optional parameters specifying whether or not to back up data sets on DFSMShsm-managed volumes with:

- The primary volume attribute of automatic backup, specified with the PRIMARY(AUTOBACKUP) parameter of the ADDVOL command
- The storage group attribute for automatic backup, specified with the AUTOBACKUP=YES for the storage group.

SKIPABPRIMARY specifies that during automatic backup, DFSMShsm skips the backup of DFSMShsm-managed volumes with:

- The primary volume attribute of automatic backup
- The storage group attribute of AUTOBACKUP=YES

Therefore, all users must back up their data sets on the DFSMShsm-managed volumes. DFSMShsm, however, backs up data sets while the data sets are on migration volumes that migrated from a volume with the primary volume attribute of automatic backup or from a storage group with the attribute of AUTOBACKUP=YES.

NOSKIPABPRIMARY specifies that during automatic backup, DFMSHsm backs up primary volumes with the automatic backup attribute and storage groups with the attribute of AUTOBACKUP=YES.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFMSHsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFMSHsm default is NOSKIPABPRIMARY.

## SMALLDATASETPACKING | NOSMALLDATASETPACKING: Specifying Whether DFMSHsm Should Use Small Data Set Packing

**Explanation:** SMALLDATASETPACKING | NOSMALLDATASETPACKING are mutually exclusive, optional parameters specifying whether or not to pack small data sets into predefined VSAM key-sequenced small-data-set-packing data sets on migration level 1 volumes.

SMALLDATASETPACKING specifies that when a small data set migrates, it is eligible to be packed into a predefined VSAM key-sequenced small-data-set-packing data set on a migration level 1 volume.

For *tracks*, substitute a decimal number from 1 to 18 specifying that DFMSHsm consider any data set using that number of tracks or fewer as a candidate for migration to a small-data-set-packing data set. DFMSHsm converts the *tracks* value to kilobytes with an assumed track size of device type 3380.

KB(*kilobytes*) specifies the source size of a data set to be considered as a candidate for migration to a small-data-set-packing data set. For *kilobytes*, substitute a decimal number from 1 to 800.

The source size of a DFMSHsm data set is calculated by multiplying the number of bytes per track for the device type times the number of tracks used by the data set. This calculated value is compared to the value specified in the SMALLDATASETPACKING parameter. If the calculated value is equal to or less than the value specified in the SMALLDATASETPACKING parameter, the data set is a candidate to be migrated to an SDSP. A candidate data set is eligible for migration to an SDSP data set if its estimated size, after compaction, is less than or equal to 400 kilobytes or to the value you specify, whichever is smaller. The number of bytes per track for each DFMSHsm device type is as follows:

- 3380 is 47,476 bytes per track
- 3390 is 56,664 bytes per track

The compaction size of a DFMSHsm data set is determined in one of two ways:

1. If compaction during migration is not active, the source size equals the migration size.
2. If compaction for migration is active, an internal default of 50% is used in establishing the estimated compaction size for data sets that are candidates for an SDSP. Previous compaction history is not considered for determining SDSP candidacy.

NOSMALLDATASETPACKING specifies that when small data sets migrate, they are not packed into predefined VSAM key-sequenced small-data-set-packing data

## SETSYS

sets on a level 1 volume, even if you specified the MIGRATION(SMALLDATASETpacking) parameter of the ADDVOL command for the volume DFSMShsm selects.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify *tracks* or *KB(kilobytes)* with the SMALLDATASETpacking parameter on any SETSYS command, the DFSMShsm default is 120 KB.

If you do not specify either SMALLDATASETpacking or NOSMALLDATASETpacking, the DFSMShsm default is NOSMALLDATASETpacking.

**Notes:**

1. This parameter applies only to data sets that migrate from primary volumes to migration level 1 volumes.
2. If both *tracks* and *kilobytes* are specified, only the *kilobyte* value is honored.
3. Small-data-set-packing data sets have the following advantages:
  - The volume table of contents of the migration level 1 volumes are not filled with DSCBs for small data sets.
  - Small data sets become records in the small-data-set-packing data sets, so they do not have to start on track boundaries, giving you a better use of space on the migration level 1 volumes.
  - You get reduced volume fragmentation on the migration level 1 volumes.
4. Specify both primary and secondary extents for the small-data-set-packing data sets. If you want to use small data set packing, you should specify the SMALLDATASETpacking parameter of the ADDVOL command for at least one migration level 1 volume per migration task. You do not have to specify SMALLDATASETpacking for all migration level 1 volumes. If a data set is eligible for small data set packing, DFSMShsm selects a volume that has been added to DFSMShsm with the SMALLDATASETpacking parameter.
5. The names of small-data-set-packing data sets have the following format:

*uid.SMALLDS.Vvolser*

DFSMShsm replaces *uid* with the UID you specified in the DFSMShsm startup procedure. *z/OS DFSMShsm Storage Administration Guide* explains the UID and the DFSMShsm startup procedure. It also describes small-data-set-packing data sets and shows how to create them.

## SMF | NOSMF: Specifying Whether DFSMShsm Writes SMF Records

**Explanation:** SMF(*smfid*) | NOSMF are mutually exclusive, optional parameters specifying whether DFSMShsm writes SMF records that contain DFSMShsm statistics.

SMF(*smfid*) specifies that DFSMShsm write SMF records in the SYS1.MANX or SYS1.MANY system data sets. For *smfid*, substitute a record identification. Use SMF user codes for the record identification in the range of 128 to 255.

If you specify *smfid*, DFSMShsm writes records with SMF identifications of *smfid* and *smfid+1*. Records with an identification of *smfid* contain daily statistics (DSR) and volume statistics (VSR). Records with an identification of *smfid+1* contain function statistics (FSR) and ABARS function statistics (WWFSR).

**Note:** When a DFSMShsm function executes, only selected fields within the FSR record are set. The fields set depend upon the function being performed and the method used to request the function. The fields that are set are required by the DFSMShsm REPORT command.

NOSMF specifies that no SMF records are to be written.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is NOSMF.

Additional information on this subject is available in the *z/OS DFSMShsm Implementation and Customization Guide*.

## SOURCENAMES: Specifying the Compaction-Control Qualifier of the Source Data Set

**Explanation:** SOURCENAMES(*name1,name2,...*) is an optional parameter specifying the compaction-control qualifier of data sets that should be compacted with the table for source data sets. For *name1,name2,...*, specify the compaction-control qualifiers of the data set names of those data sets you want to compact with the table for data sets that contain source code for programming languages. For example, you could specify BAS and ASM as qualifiers. For generation data group data sets, this compaction-control qualifier is the next-to-last qualifier of the data set name. For all other data sets, this compaction-control qualifier is the last qualifier of the data set name.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is that the general compaction table can compact the source data sets.

## SPILL | NOSPILL: Specifying Whether DFSMShsm Does Spill or Cleanup Processing on Full DASD Daily Backup Volumes

**Explanation:** SPILL | NOSPILL are mutually exclusive, optional parameters specifying whether DFSMShsm can do spill or cleanup processing on full-DASD daily backup volumes during backup volume selection and limiting the selection and allocation of an output volume during spill processing.

SPILL specifies that DFSMShsm spills full DASD daily backup volumes when a DASD daily backup volume is needed and none is available. Spill processing moves all but the latest backup version of each data set from the daily backup

volumes to the spill backup volumes.

Subparameter	Explanation
ANY	Any type of spill backup volume can be used for output during spill processing.
DASD	Only DASD spill backup volumes are used for output during spill processing. TAPE specifies that only tape spill backup volumes be used for output during spill processing. In addition, when a tape spill backup volume is allocated during spill or recycle processing, the volume is allocated using the unit name specified on the ADDVOL command for the volume.
TAPE( <i>unittype</i> )	Only tape spill backup volumes that can be mounted and written on the specified <i>unittype</i> are used during spill processing. In addition, when the tape spill backup volume is allocated during spill processing, the volume is allocated using the unit name specified with the TAPE subparameter of the SPILL parameter, overriding the unit name specified on the ADDVOL command for the tape spill backup volume. For <i>unittype</i> , specify a generic or esoteric unit name. The following generic unit names are acceptable: 3480, 3480X, 3490, and 3590-1. If an esoteric unit name is specified, it must have been previously defined to DFSMShsm using the USERUNITTABLE parameter of the SETSYS command.

NOSPILL specifies that DFSMShsm never spills full DASD daily backup volumes. Instead, DFSMShsm cleans up full DASD daily backup volumes when one is needed and none is available. During cleanup processing, DFSMShsm scratches the following data sets from the full unallocated DASD daily backup volume that DFSMShsm has not cleaned up in the longest period of time:

- Unneeded VTOC copy data sets
- Unneeded VCAT copy data sets
- Backup versions without backup-version (MCC) records.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify SPILL without any value, any previous spill output specification is retained.

**DFSMShsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFSMShsm default is SPILL(ANY).

**Note:** During spill, DFSMShsm does not keep the association of a primary volume and a particular backup device category. You specify this association with the PRIMARY(BACKUPDEVICECATEGORY) parameter of the ADDVOL command. For example, if you specify ADDVOL PRIMARY(BACKUPDEVICECATEGORY(DASD)), the backup version can be moved to a tape spill backup volume; however, the latest backup version of each data set on the primary volume remains on a DASD daily backup volume.

## SWAP | NOSWAP: Specifying Whether the DFMSHsm Address Space Can Be Swapped

**Explanation:** SWAP | NOSWAP are mutually exclusive, optional parameters specifying that the DFMSHsm address space can be swapped.

SWAP specifies that the DFMSHsm address space can be swapped by the MVS system resource manager. NOSWAP specifies that the DFMSHsm address space cannot be swapped by the MVS system resource manager.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFMSHsm Defaults:** If you do not specify either parameter on any SETSYS command, the DFMSHsm default is whatever your computing system would normally do with the DFMSHsm address space.

**Notes:**

1. DFMSHsm cannot be swapped while secondary address spaces are processing. While ABARS secondary address spaces are active, DFMSHsm always sets itself to NOSWAP mode. Once all secondary address spaces have completed processing, DFMSHsm will reset to the original SETSYS SWAP | NOSWAP setting.
2. To support cross-address space communication, DFMSHsm cannot be swapped when it is in nonlocal mode. If SETSYS SWAP is issued in the startup PARMLIB member, DFMSHsm is changed to NOSWAP mode temporarily and message ARC0062I is issued. If SETSYS SWAP is issued while DFMSHsm is in nonlocal mode, DFMSHsm is not swapped and message ARC0103I is issued.

## SYSOUT: Directing DFMSHsm Output

**Explanation:** SYSOUT(*class copies forms*) is an optional parameter specifying the class, number of copies, and any special forms used to print output from DFMSHsm. For *class*, substitute an alphanumeric character for the class that DFMSHsm uses when it prints output. For *copies*, substitute a decimal number from 1 to 99 for the number of copies to print of DFMSHsm output. For *forms*, substitute up to 4 alphanumeric characters for the special forms to use when printing DFMSHsm output.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFMSHsm defaults are class A, one copy, and no special form.

## SYS1DUMP | NOSYS1DUMP: Specifying Where DFMSHsm Dumps Should Be Written

**Explanation:** SYS1DUMP | NOSYS1DUMP are mutually exclusive, optional parameters specifying whether DFMSHsm dumps resulting from an abnormal end or error condition in primary or secondary address spaces be written in a system dump data set.

## SETSYS

SYS1DUMP specifies that DFMSHsm dumps be written in a system dump data set. This format is required if using the Interactive Problem Control System (IPCS). When you specify the SETSYS SYS1DUMP command and you have specified the SUPPRESSALL keyword for SVCDUMP in the SYS1.PARMLIB member ADYSETxx, the dump analysis elimination (DAE) function suppresses duplicate SVCDUMPS.

NOSYS1DUMP specifies that when DFMSHsm abends, the dump produced is directed to the dump related DD statements specified in the DFMSHsm startup procedure. These DD statements are: SYSABEND, SYSUDUMP, and SYSMDUMP.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFMSHsm default is SYS1DUMP.

## TAPEDELETION: Specifying What to Do with Tapes That No Longer Contain Valid Data

**Explanation:** TAPEDELETION is an optional parameter specifying whether recycled tape volumes be deleted from DFMSHsm control and become scratch tapes, or are to remain under DFMSHsm control as unassigned, available tape backup volumes, migration level 2 volumes, or dump volumes.

Subparameter	Explanation
HSMTAPE	The recycled volumes remain under DFMSHsm control and become either unassigned backup volumes or available migration level 2 volumes, based on the previous definition of the volume. The tape volume is now available to be selected as a daily or spill backup volume, or as a target volume for data set migration, volume migration, or recycling of tape migration level 2 or dump volumes.
SCRATCHTAPE	Recycled tape volumes are deleted from DFMSHsm control and become scratch tapes after DFMSHsm recycles them. The tape volumes are not selected as tape backup or migration level 2 volumes, but an operator can mount them in response to a mount PRIVAT request for a tape backup or migration level 2 volume.

If you specify the global TAPEDELETION(SCRATCHTAPE | HSMTAPE) parameter, the parameter applies to all functions (migration, backup, and dump). If you specify a specific volume type, the parameter applies only to that type of function. If you specify a global value and a specific volume type in a single command, the command fails.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFMSHsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFMSHsm default is SCRATCHTAPE.

**Notes:**

1. Although the HSMBACKUPTAPE parameter has been changed to HSMTAPE, if you specify HSMBACKUPTAPE, it has the same meaning as HSMTAPE. The command will not fail.
2. If you choose SCRATCHTAPE and the tape security method that DFSMShsm used is an expiration date, the DFSMSrmm VLPOOL EXPDTCHECK(N) option should be enough for DFSMSrmm to allow reuse with operator intervention and to allow relabelling to reinitialize the tape before DFSMShsm or any other user tries to reuse the tape volume.
3. If you choose SCRATCHTAPE and the tape security method that DFSMShsm used is a password, DFSMSrmm does not support password protection, so you would need to initialize the tapes to avoid problems. You can use the SECCLS parmlib options to specify the requirements to ERASE volumes DFSMShsm uses before they return to scratch. You can automate this, see Chapter 16, "Initializing and Erasing Volumes" in *z/OS DFSMSrmm Implementation and Customization Guide*.
4. If you do not use a tape management system, you choose SCRATCHTAPE, and the tape security method that DFSMShsm used is password or expiration date, you must use the IEHINITT utility to reinitialize the tape before DFSMShsm or any other user tries to reuse the tape volume.
5. If you choose HSMTAPE, you do not need to reinitialize the tapes that remain under DFSMShsm control before you reuse them as tape backup or migration level 2 volumes.
6. The disposition of tapes automatically made available for reuse depends on the TAPEDELETION parameter of the SETSYS command.  
TAPEDELETION(HSMTAPE) is equivalent to issuing a DELVOL UNASSIGN for the tapes. TAPEDELETION(SCRATCHTAPE) is equivalent to issuing a DELVOL PURGE.

## **TAPEHARDWARECOMPACT | NOTAPEHARDWARECOMPACT: Specifying the Data Format Used When Writing to a 3480X Tape Device**

**Explanation:** TAPEHARDWARECOMPACT | NOTAPEHARDWARECOMPACT are mutually exclusive, optional parameters that specify whether the Improved Data Recording Capability (IDRC) should be used when a 3480X is used as the output device.

IDRC is a form of data compaction that can improve storage capacity for most data sets. The amount of improvement depends upon the data contained within the data set.

TAPEHARDWARECOMPACT specifies that DFSMShsm *will* request that IDRC be used on eligible 3480 tape cartridges. NOTAPEHARDWARECOMPACT specifies that DFSMShsm *will not* use IDRC.

The compaction status assigned to a 3480 tape volume occurs at the time the volume is first used for output. This status is determined by the tape unit being used for output and the current specification of SETSYS TAPEHARDWARECOMPACT. DFSMShsm can be directed to use the 3480X device, but not the IDRC feature by specifying the SETSYS NOTAPEHARDWARECOMPACT command. The following table summarizes how the compaction status is assigned to an empty 3480 tape volume:

## SETSYS

SETSYS Parameter	Output Unit (3480)	Output Unit (3480X)	Output Unit (3490)	Output Unit (3590-1)
TAPEHWC	No compaction	Compaction	Compaction	Compaction
NOTAPEHWC	No compaction	No compaction	Compaction	Compaction

When output is restricted to a specific unit, the DFSMShsm unit name may change. An empty 3480 cartridge can become a 3480X or 3490 cartridge containing compacted data. An empty 3480 or 3480X cartridge can become a 3490 cartridge containing compacted data.

When output is not restricted to a specific unit, DFSMShsm selects the first available volume. There is no preference between a 3480, 3480X, or 3490 unit. The compaction status assigned to an empty tape volume is based on the following:

- The tape unit associated with the tape volume
- Whether or not 3480X or 3490 tape units are installed on the system
- The SETSYS command parameters TAPEHARDWARECOMPACT or NOTAPEHARDWARECOMPACT

The TAPEHARDWARECOMPACT parameter used with the following unit-restriction parameters causes control unit compaction to be requested:

- ABACKUP UNIT(*unittype*)
- ARECOVER TARGETUNIT(*unittype*)
- DEFINE DUMPCLASS(*class* UNIT(*unittype*))
- SETSYS ARECOVERUNITNAME(*unittype*)
- SETSYS ARECOVERML2UNIT(*unittype*)
- SETSYS ABARSUNITNAME(*unittype*)
- SETSYS BACKUP(TAPE(*unittype*))
- SETSYS CDSVERSIONBACKUP (BACKUPDEVICECATEGORY (TAPE(UNITNAME(*unittype*))))
- SETSYS MIGUNITNAME(*unittype*)
- SETSYS RECYCLEOUT(BACKUP(*unittype*))
- SETSYS SPILL(TAPE(*unittype*))
- SETSYS TAPEMIGRATION(DIRECT(TAPE(*unittype*)))
- SETSYS TAPEMIGRATION(ML2TAPE(TAPE(*unittype*)))
- SETSYS TAPEMIGRATION(NONE(ROUTETOTAPE(*unittype*)))
- SETSYS UNITNAME(*unittype*)

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either TAPEHARDWARECOMPACT or NOTAPEHARDWARECOMPACT, the DFSMShsm default is NOTAPEHARDWARECOMPACT.

## TAPEINPUTPROMPT: Specifying Whether to Suppress Input Tape Messages

**Explanation:** TAPEINPUTPROMPT specifies whether DFSMShsm should issue action messages to the operator asking if input tapes needed by DFSMShsm are available. Each function using tapes (backup, migration, dump) is handled separately.

TAPEINPUTPROMPT( ...TAPES(YES)) allows DFSMShsm to continue normal operation, which is to issue action messages ARC0313A, ARC0314A, and ARC0366A. These messages prompt the operator to check that the tapes requested by DFSMShsm are available.

**Note:** If all of the requested tapes are in an automated tape library managed by SMS tape, messages ARC0313A, ARC0314A, and ARC0366A are not issued even though (...TAPES(YES)) has been specified.

TAPEINPUTPROMPT( ...TAPES(NO)) allows you to suppress the input messages, if they are not necessary in your system configuration.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify TAPEINPUTPROMPT( ...TAPES(NO)) for a category of tapes (backup, migration, dump), DFSMShsm issues all messages related to input tapes for that category.

## TAPEMAXRECALLTASKS: Specifying the Maximum Number of Concurrent Tape Recall Tasks

**Explanation:** TAPEMAXRECALLTASKS(*tasks*) is an optional parameter specifying the maximum number of tape recall tasks that can concurrently request tape mounts. For *tasks*, specify a decimal number from 1 to 15. The value you specify must be greater than 0 and less than or equal to the value you specify with the MAXRECALLTASKS parameter.

TAPEMAXRECALLTASKS is a subset of the MAXRECALLTASKS parameter. For example, if you specify MAXRECALLTASKS(10) and TAPEMAXRECALLTASKS(6), DFSMShsm processes up to ten recall tasks concurrently, but only six can be recalls from tape migration level 2 volumes. You cannot specify a value for TAPEMAXRECALLTASKS that is greater than MAXRECALLTASKS; for example, MAXRECALLTASKS(10) and TAPEMAXRECALLTASKS(11).

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 1 tape recall task.

### Notes:

1. DFSMShsm allows only a maximum of 15 recall tasks concurrently. Also, all recall tasks can process recalls from DASD migration volumes. For example, if you specify TAPEMAXRECALLTASKS(6) and fewer than six tape recall tasks are active, DFSMShsm can process DASD recall tasks instead.
2. If you specify the same number for TAPEMAXRECALLTASKS as MAXRECALLTASKS, you may find that all tasks are waiting for tape drives and that many recalls from ML1 DASD are waiting in the queue. Specifying a value for TAPEMAXRECALLTASKS that is smaller than MAXRECALLTASKS in effect reserves a set of tasks to be always available to handle recalls from ML1 volumes.

## TAPEMIGRATION: Specifying the Type of Migration to Tape

**Explanation:** TAPEMIGRATION is an optional parameter specifying that you want DFSMSHsm to use tape migration level 2 volumes, to limit the selection and allocation of an output volume during tape migration processing, and to attempt to reconnect a data set that was previously migrated to tape. SMS-managed data sets with the LEVEL 1 DAYS NON-USAGE = NOLIMIT management class attribute are specifically prohibited from migrating to tape.

**Tape Library Relationship:** A UNITNAME can be used for filtering in the ACS routines. If you specify the unittype for this command, it will be sent to the ACS routines in SMS for the TAPEMIGRATION function.

Subparameter	Explanation
DIRECT	DFSMSHsm migrates the data sets on DFSMSHsm-managed volumes directly to tape migration level 2 volumes. If the primary volume has the AUTOBACKUP attribute, data sets on the primary volume with the change flag set to 1 will not be migrated to tape migration level 2 volumes. TAPE(ANY) or TAPE( <i>unittype</i> ) are optional subparameters of the DIRECT parameter. Their usage is explained below.
ML2TAPE	DFSMSHsm migrates the data sets on DASD migration level 1 volumes to tape migration level 2 volumes. TAPE(ANY) or TAPE( <i>unittype</i> ) are optional subparameters of the ML2TAPE parameter. Their usage is explained below.

Subparameter	Explanation
NONE	<p>DFSMShsm never migrates data sets to tape migration level 2 volumes.</p>
	<p>ROUTETOTAPE, an optional subparameter of the NONE command, specifies a tape unit name in an environment where migration level 2 tape is selected only by an external-to-DFSMShsm factor. In this environment, DFSMShsm does not choose tape as the migration level 2 device type unless one of the two following events takes place:</p>
	<ul style="list-style-type: none"> <li>• The selection of tape migration level 2 by the ARCMDEXT exit, which is taken when performing migration on a level 0 volume.</li> <li>• The migration of an SMS-managed data set that belongs to a management class indicating that the data set is to be migrated directly to migration level 2 tape.</li> </ul>
	<p>TAPE(ANY) or TAPE(<i>unittype</i>) are optional subparameters of the ROUTETOTAPE subparameter.</p>
	<p>ANY   <i>unittype</i> are mutually exclusive, optional parameters of the DIRECT, ML2TAPE, or ROUTETOTAPE subparameters. When ANY is specified for these subparameters, DFSMShsm selects any tape, depending on availability. If no tapes are available, then the SETSYS value for MIGUNITNAME is used to allocate a scratch tape. For <i>unittype</i>, substitute the type of tape unit.</p>
	<p>The following are valid types of tape units:</p>
	<ul style="list-style-type: none"> <li>• 3480</li> <li>• 3480X</li> <li>• 3490</li> <li>• 3590-1</li> </ul>
	<p>You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:</p>
	<ul style="list-style-type: none"> <li>• 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.</li> <li>• 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.</li> <li>• 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.</li> </ul>
	<p>When <i>unittype</i> is specified, DFSMShsm selects only output tapes that are compatible with <i>unittype</i>. If none are available, DFSMShsm requests a <i>unittype</i> scratch tape. If a unit name is not specified here, then DFSMShsm uses the MIGUNITNAME parameter to allocate the scratch tape.</p>

## SETSYS

Subparameter	Explanation
RECONNECT	<p>DFSMShsm reconnects a data set that is recalled from a single ML2 tape to that same ML2 tape when the data set is next migrated. A data set can be reconnected only if <b>all</b> the following conditions are met:</p> <ul style="list-style-type: none"> <li>• The data set was recalled from tape while running in a reconnect environment</li> <li>• No changes have been made to the data set since it was last recalled</li> <li>• DFSMShsm has not recycled the ML2 tape since the time of the recall</li> <li>• The SETSYS TAPEMIGRATION(RECONNECT) option is in effect</li> <li>• The SETSYS USERDATASETSERIALIZATION option is in effect</li> <li>• The catalog entry for the data set has not been altered since it was last recalled</li> <li>• The migrated data set did not span tapes</li> </ul>
RECONNECT(NONE)	<p>No reconnection is performed by DFSMShsm. Data sets recalled while this setting is in effect are not marked as reconnectable and, consequently, are not candidates for reconnection during a subsequent migration, even if this setting at the time of the subsequent migration allows reconnection.</p>
RECONNECT(ALL)	<p>Reconnection to ML2 tape is attempted on all data sets eligible to migrate, even if the data set would otherwise be migrated to ML1. Use the ARCMDEXT installation exit to preclude reconnection for selected data sets in a RECONNECT(ALL) environment, as you can allow it to reconnect data sets that would ordinarily be targeted to ML1 DASD in a RECONNECT(ML2DIRECTONLY) environment. However, users who direct data set migration to ML1 volumes by using the FORCML1 parameter on the ARCHMIG macro, the data sets are not reconnected.</p>
RECONNECT (ML2DIRECTONLY)	<p>Reconnection is attempted only on data sets eligible for direct migration to ML2 tape. Data sets not eligible for direct migration to ML2 will be migrated normally with no attempt to reconnect. The ARCMDEXT installation exit can be used to redirect data that was targeted for ML1 DASD to be written directly to ML2 tape instead, and thus have reconnection attempted for data sets that would otherwise be migrated to ML1.</p>

For additional details on reconnection, refer to the *z/OS DFSMShsm Storage Administration Guide*.

**SMS Relationship:** Parameter applies in some instances to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify DIRECT or ML2TAPE with no subparameters, the SETSYS default is TAPE(ANY). If you specify DIRECT or ML2TAPE with TAPE but no subparameter, the SETSYS default is ANY.

If you specify NONE with no subparameters, the SETSYS default is ROUTETOTAPE(ANY). If you specify NONE with ROUTETOTAPE but no subparameter, the SETSYS default is ANY.

**DFSMShsm Defaults:** If you do not specify the TAPEMIGRATION parameter on any SETSYS command, the DFSMShsm default is NONE(ROUTETOTAPE(ANY)).

If a unit name has not been specified on any SETSYS command with the NONE(ROUTETOTAPE) parameter or if NONE(ROUTETOTAPE(ANY)) has been specified or is used as the default, DFSMShsm selects the first available migration tape when a tape migration level 2 volume is required. If no tapes are available, DFSMShsm requests a scratch tape with the unit name specified or defaulted from the MIGUNITNAME parameter of the SETSYS command.

If you do not specify the RECONNECT parameter on any SETSYS command, the DFSMShsm default is NONE.

**Note:** The RECONNECT(NONE) parameter affects both recall and migration. If RECONNECT(NONE) is in effect during recall, then a data set is not flagged as a reconnection candidate. During a subsequent migration, it is still not a reconnection candidate, regardless of the value of RECONNECT. Conversely, if RECONNECT(NONE) is in effect during migration, then a data set is not a reconnection candidate, regardless of whether it was flagged as a reconnection candidate during recall.

## TAPEOUTPUTPROMPT: Specifying Whether To Suppress Output Tape Messages

**Explanation:** TAPEOUTPUTPROMPT(TAPECOPY(YES | NO)) is an optional parameter that allows correct decisions by the operator when mounting a tape during TAPECOPY. It eliminates failures caused from mounting a standard capacity cartridge instead of an enhanced capacity cartridge or vice versa, since the operator does not always know which type of tape cartridge is required.

Subparameter	Explanation
YES	DFSMShsm issues a message to the operator during TAPECOPY processing indicating which type of target tape be mounted on a particular device; however, this message goes away after the tape has been mounted.  Because using cartridge loaders for TAPECOPY causes the tape to be mounted by the cartridge load device before the operator verifies that the proper tape is mounted, an option to have the message issued for TAPEOUTPUTPROMPT as a write-to-operator-with-reply (WTOR) is available, allowing the operator to ensure that the proper tape is mounted even if cartridge load devices are being used. This option is available with a patch of the MCVT.  For a description of how to patch the MCVT for this option, refer to the topic “Tuning DFSMShsm” in the <i>z/OS DFSMShsm Implementation and Customization Guide</i> .
NO	DFSMShsm issues no message to the operator during TAPECOPY processing indicating which type of target tape is to be mounted on a particular device.

## SETSYS

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you do not specify this parameter on the SETSYS command, the default is NO. If you do specify this parameter on the SETSYS command, a message is issued without requesting a reply when the option to patch the MCVT is not used. If the option to patch the MCVT is used, a message is issued requesting a reply.

## TAPERECALLLIMITS: Specifying Limits to Continuously Mounted ML2 Tapes During Multiple Recalls

**Explanation:** TAPERECALLLIMITS(TASK(*time*) TAPE(*time*)) is an optional parameter specifying the total time that a recall task can utilize a single tape mount for processing recall requests before criteria is used to possibly demount the tape. This parameter does not apply to tape devices prior to 3480 tape devices.

Suparameter	Explanation
TASK( <i>time</i> )	Allows you to specify the number of minutes that a DFSMShsm recall task can process recall requests from a single tape mount before DFSMShsm decides whether to demount the tape or to continue processing. Once that time is exhausted, each time the recall task completes the processing of its current recall request, DFSMShsm decides whether to demount the tape or to continue processing. If the maximum number of tape recall tasks within the host are running and a higher priority tape recall request exists that can be attempted immediately, then the task is freed up to process other requests.
TAPE( <i>time</i> )	Allows you to specify the number of minutes that a recall task can process recalls from a single tape mount before additional criteria are considered. Once this time is exhausted, the recall task completes processing of its current recall request and then DFSMShsm determines whether to demount the tape or to continue processing. If another DFSMShsm host requires the mounted tape for a higher priority recall, then the tape is demounted. This results in a tape take-away from recall.

Once the recall processing stops for a specific recall task on a DFSMShsm host, then all queued recall requests on that host that require the demounted tape volume are excluded from consideration for five minutes. This allows other hosts an opportunity to retry their delayed requests for the demounted tape volume.

When DFSMShsm processes multiple recall requests that utilize one tape mount, the recall task processes the highest priority tape recall request which requires the currently mounted tape. If DFSMShsm does force a demount of the tape volume, then the task and the tape are freed up to process other higher priority recalls.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify either of the TAPERECALLLIMITS subparameters, then the default time used is 15 minutes for TASK and 20 minutes for TAPE.

**Notes:**

1. TAPE(*time*) is longer than TASK(*time*) because TAPE(*time*) requires delaying additional queued requests.
2. The Storage Administrator is able to disable the TAPERECALLLIMIT function by setting both the TASK and the TAPE time to large values, such as 1000 or even 65535 minutes.

## **TAPESECURITY: Specifying the Type of Security for Tape Volumes**

**Explanation:** **TAPESECURITY** is an optional parameter that you use to specify the type of security for your tape backup, migration level 2, and dump volumes. You can choose more than one tape security option. CDS backup tapes are not affected by this command.

<b>Subparameter</b>	<b>Explanation</b>
EXPIRATION	DFSMShsm protects each tape backup, migration level 2, and dump volume with an expiration date. Each backup version, migration copy, or dump copy on the tape volume is protected by an expiration date by placing an expiration date of 99365 in the IBM Standard Data Set Label 1 (HDR1, EOF1, and EOF1). For backup or migration, however, you can use the tape data set exit, ARCTDEXT, to change the expiration date. You can change the expiration date of a dump tape volume using the TAPEEXPIRATIONDATE optional parameter of the DEFINE command.
EXPIRATIONINCLUDE	DFSMShsm does not place a backup version or migration copy of a password-protected data set on a tape volume that is not password protected unless you specify the EXPIRATIONINCLUDE or RACFINCLUDE subparameter. Therefore, if the only tape security subparameter you specify is EXPIRATION, DFSMShsm fails the backup or migration of a password protected data set to a tape backup or migration level 2 volume.
PASSWORD	DFSMShsm protects each tape backup, migration level 2, and dump volume with a password. To password protect, place an X'F1' in the data set security byte in the IBM Standard Data Set Label (HDR1, EOF1, and EOF1).

Subparameter	Explanation
RACF	<p>DFSMShsm protects with RACF each tape backup, migration level 2, and dump volume. DFSMShsm protects the tape volume with RACF by adding it to a RACF tape volume set of DFSMShsm (HSMHSM or DFHSMx). The <i>z/OS DFSMShsm Implementation and Customization Guide</i> contains information about how to define RACF tape volume sets for DFSMShsm and ABARS.</p> <p>If TAPESECURITY RACF   RACFINCLUDE is specified, ABACKUP output tapes and ARECOVER input tapes are RACF protected, if RACF is active and if an ABARS tape volume set of HSMABR is defined.</p> <p>DFSMShsm does not place a backup version or migration copy of a password-protected data set on a tape volume that is not password protected unless you specified the RACFINCLUDE or EXPIRATIONINCLUDE subparameter. Therefore, if you specify only the RACF subparameter, DFSMShsm fails the backup or migration of a password-protected data set to a tape backup or migration level 2 volume.</p>
RACFINCLUDE	DFSMShsm protects each tape backup, migration level 2, and dump volume with RACF. In addition, DFSMShsm backs up or migrates a password-protected data set to a tape volume that is not password protected.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the default is PASSWORD.

**Notes:**

1. Although the D parameter has been changed to EXPIRATION, if you specify D, it has the same meaning as EXPIRATION. If you specify DI, it has the same meaning as EXPIRATIONINCLUDE. If you specify the PD or PE parameter, it has the same meaning as if you specify both the PASSWORD parameter and the EXPIRATION parameter.
2. If no RACF tape volume sets are defined for DFSMShsm, but all tapes are protected by an existing RACF generic profile, then SETSYS TAPESecurity(RACF | RACFINCLUDE) should be specified.
3. If you want to specify RACF or RACFINCLUDE, your computing system must meet the following conditions:
  - A sufficient level of DFSMSdfp must be installed, or you must specify the PASSWORD tape security option.
  - RACF must be installed.
  - The RACF TAPEVOL resource class must be defined in the RACF class descriptor table (CDT).
  - If you do not have a sufficient level of DFSMSdfp installed and you want to RACF-protect your tape, you must specify PASSWORD with RACF in the TAPESecurity parameter of the SETSYS command.

4. If RACF is inactive or the RACF TAPEVOL resource class is inactive, DFSMSHsm issues a message (ARC0099I).
5. The restriction about putting password-protected data sets on non password-protected tape volumes does not apply to dump volumes. Therefore, EXPIRATION and EXPIRATIONINCLUDE are equivalent options for dump processing, as are RACF and RACFINCLUDE.
6. VSAM password protected data sets are no longer supported, so DFSMSHsm checking for password protection has been removed. Thus, EXPIRATION and EXPIRATIONINCLUDE are equivalent options for migration and backup processing, as are RACF and RACFINCLUDE for VSAM data sets.

## **TAPESPANSIZE(nn nn): Reducing Tape Volume Spanning**

**Explanation:** TAPESPANSIZE(*nnnn*) is an optional parameter used to reduce the occurrences of data sets spanning migration or backup tape volumes. For *nnnn*, specify a value between 0 and 9999 in units of megabytes (MB). This value represents the maximum number of megabytes of tape (ML2 or backup) that DFMSHsm may leave unused while it tries to eliminate spanning of data sets. To state this differently, this value is the minimum size of a data set that is allowed to span tape volumes. Data sets whose size is less than the value do not normally span volumes. Only those data sets whose size is greater than or equal to the specified value are allowed to span volumes.

This parameter offers a trade-off: to reduce the occurrences of a user data set spanning tapes in exchange for some unused media at the end of each cartridge. The amount of unused media can vary from 0 to *nnnn* physical megabytes, but roughly averages 50% of the customer's median data set size. For example, if you specify 4000MB and your customer's median-sized data set is 2MB, then on average only 1MB of media is unused per cartridge.

If the SETSYS TAPEUTILIZATION parameter is set to NOLIMIT, DFSMSHsm makes no attempt to reduce data set tape volume spanning. If the SETSYS TAPEUTILIZATION parameter is set to a percent, then DFSMSHsm performs reduced data set spanning.

DFSMSHsm calculates a target data set size to use when it is determining whether a data set should fit entirely on the currently mounted tape volume. The size is calculated based on the used tracks of the data set and an estimated IDRC compaction accomplishment. If data is written to tape in IDRC format and software compaction is not being used (by either DFSMSHsm or CPU) for the data set, DFSMSHsm assumes a 2.5 to 1 compaction savings for the data set. If you want to use a different compaction assumption, see the "Tuning DFSMSHsm" section in the *z/OS DFSMSHsm Implementation and Customization Guide*. If IDRC format is not used or software compaction is used for the data set, then DFSMSHsm does not consider any compaction accomplishments when it estimates the amount of tape media the data set requires.

DFSMSHsm recommends a value of 4000MB for all IBM 3490 and 3590 tape cartridges.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMSHsm Defaults:** If you do not specify TAPESPANSIZE, the default is 500MB.

## TAPEUTILIZATION: Specifying the Desired Tape Utilization

**Explanation:** TAPEUTILIZATION is an optional parameter you can use to specify the desired tape utilization for a backup or migration tape volume written in single-file format. When a single-file format tape volume has reached the desired level of utilization (fullness), DFSMShsm forces an end-of-volume (EOV). With this parameter, you can limit the amount of media used.

LIBRARYBACKUP is a mutually exclusive, required subparameter used to specify the desired tape utilization for a backup tape stored in an SMS-managed tape library. Because esoteric unit names are ignored in an SMS-managed tape library, this is the only vehicle by which you may limit the amount of media used in a library backup cartridge. PERCENTFULL(*pct*) and NOLIMIT are mutually exclusive, optional subparameters that can be used with LIBRARYBACKUP.

LIBRARYMIGRATION is a mutually exclusive, required subparameter used to specify the desired tape utilization for a migration tape stored in an SMS-managed tape library. Because esoteric unit names are ignored in an SMS-managed tape library, this is the only vehicle by which you may limit the amount of media used in a library migration cartridge. PERCENTFULL(*pct*) and NOLIMIT are mutually exclusive, optional subparameters that can be used with LIBRARYMIGRATION.

UNITTYPE(*unittype*) is a mutually exclusive, required subparameter used to specify the desired tape utilization for a backup or migration tape written in single-file format outside of any library. PERCENTFULL(*pct*) and NOLIMIT are mutually exclusive, optional subparameters that can be used with UNITTYPE.

This command can be issued multiple times, once for each *unittype* required. You must issue this command for each unique unit type that needs a percentage different from the default. For example, if both 3480s and 3490s exist, issue a separate SETSYS TAPEUTILIZATION command. Issue a separate command for a different esoteric *unittype*. For example, if separate esoteric unit names are used for backup and migration, each one can have a different tape utilization value.

For *unittype*, specify one of the following unit names:

- 3480, which is a 3480 **without** the IDRC
- 3480X, which is a 3480 **with** the IDRC
- 3490
- 3590-1
- Any esoteric name that has been identified to DFSMShsm through the SETSYS USERUNITTABLE command.

If NOLIMIT is specified, there is no tape limiting, no action is taken to reduce data set tape volume spanning and DFSMShsm writes data until the end-of-volume is reached. It is recommended that you specify PERCENTFULL(100) on the SETSYS TAPEUTILIZATION command when reduced data set tape volume spanning is needed. Specifying NOLIMIT will disable reduced data set tape volume spanning.

CAPACITYMODE(COMPATIBILITY | EXTENDED) is an optional subparameter you can use to specify the maximum capacity to which a tape is filled.

COMPATIBILITY specifies that an IBM 3590 that emulates an IBM 3490 fills a tape to no more than the capacity allowed by an IBM 3590 that emulates an IBM 3490 that is not operating in extended capacity mode. Data on these tapes is accessible to IBM 3590 drives that emulate IBM 3490 drives, regardless of whether they are CAPACITYMODE switchable. EXTENDED specifies that an IBM 3590 that

emulates an IBM 3490 fills a tape to the same capacity as 3590 drives allow. Data on these tapes is accessible only to tape units that are CAPACITYMODE switchable.

The CAPACITYMODE subparameter is valid when all the following are true:

- CAPACITYMODE is used in conjunction with UNITTYPE
- The subparameter of UNITTYPE is an esoteric that is specified through SETSYS USERUNITTABLE
- The UNITTYPE contains only IBM 3590 drives that are emulating IBM 3490 drives that are CAPACITYMODE switchable.

When you specify CAPACITYMODE incorrectly, DFSMShsm ignores the subparameter. For example, if you specify CAPACITYMODE when the UNITTYPE is a generic, such as 3490, DFSMShsm ignores the CAPACITYMODE subparameter. Also, if you specify CAPACITYMODE for an esoteric capable of CAPACITYMODE(EXTENDED), but you do not specify COMPATIBILITY or EXTENDED, CAPACITYMODE is ignored.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** For TAPEUTILIZATION the DFSMShsm default value is 97%. If you use the DFSMShsm default value, the data on one cartridge can most likely be copied to another cartridge of the same category. If you do not plan to copy cartridges, you might specify NOLIMIT to use the entire cartridge capacity. However, it is recommended that you instead specify PERCENTFULL(100) to get the benefits of reduced tape spanning.

For TAPEUTILIZATION CAPACITYMODE, the DFSMShsm default is COMPATIBILITY. During an input operation, DFSMShsm temporarily switches the unit to CAPACITYMODE(EXTENDED) if it is given a tape in that mode. If you do not specify CAPACITYMODE for an esoteric capable of CAPACITYMODE(EXTENDED), during a DFSMShsm output function, the drives operate in CAPACITYMODE(COMPATIBILITY).

#### Notes:

1. In a duplex tape environment, DFSMShsm uses the default PERCENTFULL value of 97 percent. This value is not likely to be a problem unless you are targeting a 3590-Bx or vendor drive in 3490 emulation mode. These drives need a percent value of a few hundred to fully utilize the tape's capacity. A value of 97 percent is appropriate, however, for targeting a 3590-Ex drive, even if in 3490 emulation mode.
2. Issuing the SETSYS USERUNITTABLE command will reset the TAPEUTILIZATION for all esoteric devices to the DFSMShsm default of 97 percent. For the command to be effective, you must enter the SETSYS USERUNITTABLE command before the SETSYS TAPEUTILIZATION command.
3. UNITTYPE(*unittype*), LIBRARYBACKUP, and LIBRARYMIGRATION are mutually exclusive subparameters. A separate SETSYS command must be issued for each subparameter. For example, to use 100% of the capacity but retain the reduced tape spanning, issue the following commands:

```
SETSYS TAPEUTILIZATION(UNITTYPE(unittype) PERCENTFULL(100))
SETSYS TAPEUTILIZATION(LIBRARYBACKUP PERCENTFULL(100))
SETSYS TAPEUTILIZATION(LIBRARYMIGRATION PERCENTFULL(100))
```

4. For drives prior to the IBM 3590 Model E1x, DFSMShsm based the PERCENTFULL value on the cartridge type of the reported logical device type in emulation mode. For IBM 3590 Model E1x drives, DFSMShsm uses the reported cartridge type of the physical device to determine the tape capacity. When using these tape drives, you do not need to supply a percentage greater than 100 to reasonably fill the tapes. As a result, DFSMShsm has improved the ability to fill migration and backup tape cartridges when using IBM 3590 Model E1x drives.
5. If you have tape cartridges that have a capacity larger than the IBM enhanced-capacity tape cartridges, it is recommended that you specify the PERCENTFULL(*pct*) parameter for the unit type when those tapes will be used instead of specifying NOLIMIT. For *pct*, specify a value between 1 and 9999. For example, if you have tape cartridges that are approximately 25% larger, using a value of PERCENTFULL(122) on the SETSYS TAPEUTILIZATION command is recommended for the following reasons:
  - You want to avoid hitting the natural EOF because that would tie tapes together and until the spanning data set is invalidated, all the tapes containing the desired data set must be handled to access the one spanning data set.
  - RECYCLE has to treat the connected tapes together until the spanning data set is invalidated. This process generally delays the tapes from being returned to scratch.
  - A chain of 215 connected tapes will likely be created if TAPEUTILIZATION is not used. If you have an error and need to take some explicit corrective action on one tape, you may have to process a very long chain of tapes.
  - The TAPECOPY function will probably be able to copy these tapes but only to similar or larger tapes. However, the use of 122% rather than 125% increases the possibility of a successful tape copy by maintaining an equivalent 97% tape utilization.
6. IBM 3590 drives introduce a new microcode support; see Table 3 for the percent values to use with the SETSYS TAPEUTILIZATION command:

*Table 3. Tape Utilization Capacity for MEDIA3 through MEDIA8.*

Percent to use	3490 Mode	3590 Mode
3590B with MEDIA3 or MEDIA4	2200*	97
3590E with MEDIA3 or MEDIA4	97	97
3590H with MEDIA3 or MEDIA4	97	97
3592J with MEDIA5, MEDIA6, MEDIA7 or MEDIA8	97	97

\* If any of the 3590B drive controllers are running with a level of microcode prior to 1.9.19.0, use a value of 1100 instead.

7. If you use virtual tapes in an IBM VTS system for your backup volumes, and if the backups (and any duplexing) in IBM libraries are done exclusively to a VTS by this instance of DFSMShsm, it is recommended that you specify the PERCENTFULL(*pct*) option for the LIBRARYBACKUP parameter with a value of 118%. Specifying PERCENTFULL(118) allows DFSMShsm to fill a virtual 3490 tape to its logical capacity, rather than assuming the presence of inter-record gaps and other tape formatting blocks not actually written to a

virtual tape. This also applies to migration to an IBM VTS system. For example, to use virtual tapes for backup and migration volumes, enter the following commands:

```
SETSYS TAPEUTILIZATION(LIBRARYBACKUP PERCENTFUL(118))
SETSYS TAPEUTILIZATION(LIBRARYMIGRATION PERCENTFUL(118))
```

## **UNITNAME: Specifying the Type of Unit for Mounting a Scratch Tape during Backup or Dump**

**Explanation:** **UNITNAME(*unitname*)** is an optional parameter identifying the type of unit that should be specified the first time DFSMShsm requests that a scratch tape be mounted during backup or dump.

The BACKUP and DUMP functions use the same types of tape units. For *unitname*, substitute the type of tape unit.

The following are valid types of tape units:

- 3480
- 3480X
- 3490
- 3590-1

You can substitute an esoteric tape unit defined with the SETSYS USERUNITTABLE command. If you specify an esoteric tape unit name that does not exist in the user unit table, the command fails. If you specify:

- 3480 or 3480X, you use all the functions of the 3480 Magnetic Tape Subsystem.
- 3490, you use all the functions of the 3490 Magnetic Tape Subsystem.
- 3590-1, you use all the functions of the 3590 Magnetic Tape Subsystem.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is 3590-1.

### **Notes:**

1. For DUMP functions, if you want to specify a reel-type tape, you must use the DEFINE DUMPCLASS command.
2. For the CDS Backup function, if you want to specify a reel-type tape, you must use the SETSYS CDSVERSIONBACKUP (BACKUPDEVICECATEGORY(TAPE(UNITNAME))) command.
3. You cannot specify an esoteric unit name that represents DASD; it must represent tape.
4. DFSMShsm does not use UNITNAME when it requests that a scratch volume be mounted while continuing from another volume. Instead, DFSMShsm uses the same unit the volume was mounted on.

## **UNLOAD | NOUNLOAD: Specifying Whether to Unload MSS Virtual DASD Volumes**

The use of the UNLOAD and NOUNLOAD parameters are considered to be nonfunctional and their use is ignored by DFSMShsm.

## USERUNITTABLE | NOUSERUNITTABLE: Specifying Esoteric Tape Unit Names to DFSMShsm

The USERUNITTABLE command has two functions: 1) to identify esoteric tape unit names to DFSMShsm, and 2) to control translation of esoteric output unit names. The SETSYS USERUNITTABLE command must always be coded for esoteric unit names used by DFSMShsm whether translation is required or not. All esoterics identified to DFSMShsm with the SETSYS USERUNITTABLE command must appear in a single command.

To identify esoteric tape unit names to DFSMShsm, you must first define these esoteric tape unit names to MVS during system I/O generation. Then, you must include the esoteric tape unit names in a DFSMShsm SETSYS USERUNITTABLE command. Only after they have been successfully specified with the SETSYS USERUNITTABLE command can they be recognized and used as valid unit names with subsequent DFSMShsm commands.

For the commands required to restrict device selection, see the chapter on implementing DFSMShsm tape environments in *z/OS DFSMShsm Implementation and Customization Guide*, as follows:

- For SMS-managed tape libraries, see the table of tape data set names and unit types that are passed to an ACS routine
- For other tape libraries, see the topic on restricting device selection.

To control the translation of output unit names, you can use the SETSYS USERUNITTABLE specifications of output unit names to input unit names.

Translation occurs for translation-eligible esoteric groups. These include:

- 3480 device types with all online units of the esoteric group having cartridge loaders
- 3490 device types
- 3590 device types

Translation occurs during output processing so that when the tape units are used for input, the translated unit name is used for allocation.

There are three forms of specifications you can use to identify esoteric tape unit names to DFSMShsm:

- first, translation is not specified (*es1*)
- second, translation is specified to a different unit name (*es2out:es2in*)
- third, translation is specified to the same unit name (*es3:es3*)

### **Explanation: USERUNITTABLE(*es1*, *es2out:es2in*, *es3:es3*)**

When you specify USERUNITTABLE(*es1*, *es2out:es2in*, *es3:es3*), you are identifying four separate esoteric tape unit names in three independent specifications. You can use any of these forms of specification to identify esoteric tape unit names to DFSMShsm. You can combine specifications as we have shown here, but remember that all esoterics used in another DFSMShsm command must appear in a single SETSYS USERUNITTABLE command. Each separate form of specification is explained below.

When you specify a single esoteric (*es1*), the esoteric tape unit name *es1* is identified to DFSMShsm as valid. Output allocations are made to units associated with the particular esoteric tape unit name requested for the output function. Any cartridge loader esoteric translation is assigned to the generic unit name equivalent to the type of units associated with the esoteric tape unit name. Substitute your esoteric name for *es1*.

When you specify an out-and-in esoteric pair (*es2out:es2in*), the esoteric unit names *es2out* and *es2in* are identified to DFSMShsm as valid. Translation to an esoteric can take place. The esoteric unit name requested for the output allocation (*es2out*) may be translated to the esoteric tape unit name specified to the right of the colon (*es2in*) when output processing is completed. If translation occurs, then when the tape volume is requested to be read, input allocations are made to units associated with *es2in*. The purpose of this translation is to allow the user to use different devices for input than output. Substitute your esoteric names for *es2out* and *es2in*.

When you specify (*es3:es3*), the esoteric unit name *es3* is identified to DFSMShsm as valid. Since the same esoteric unit name is specified for both input and output, the same units are candidates for input allocations and output allocations. Substitute your esoteric name for *es3*.

The following discussion presents two examples. One is very general and one is specific. Please note that any values specified here are only examples and should not be interpreted as the values to be used for your system.

### **General Example**

```
SETSYS USERUNITTABLE(es1, es2out:es2in, es3:es3)
```

If, for example, backup is restricted to *es1* by using the SETSYS BACKUP(TAPE(*es1*)) command, migration is restricted to *es2out* by using the SETSYS TAPEMIGRATION(ML2TAPE(TAPE(*es2out*))) command, and spill is restricted to *es3* by using the SETSYS SPILL(TAPE(*es3*)) command, then the following occurs:

- Backup output allocations are made to units associated with *es1*. If *es1* is translation-eligible, input allocations for recover are allocated using the generic unit name equivalent to *es1*.
- Migration output allocations are made to units associated with esoteric tape unit name *es2out*. If *es1* is translation-eligible, input allocations for recall are made to units associated with *es2in*.
- Dump output allocations are made to units associated with esoteric tape unit name *es3*, and input allocations for restore from the tapes written in the dumping process are also made to units associated with *es3*.

### **Specific Example**

```
USERUNITTABLE(SPOUT,DPOUT,MIGOUT:RECIN,BACKUP:RECIN)
```

This example specifies five esoteric tape unit names. When you specify single esoteric tape unit names (without a colon, like SPOUT and DPOUT), any translations that occur are allocated to generic tape units. When you specify paired esoteric tape unit names (with colon separators, like MIGOUT:RECIN and BACKUP:RECIN), any translations that occur are to the specified tape unit name (RECIN in this case) and that is what will be used during later input allocations.

NOUSERUNITTABLE specifies that no esoteric tape unit names are identified to DFSMShsm. Any previously defined esoteric names are no longer known to DFSMShsm.

**SMS Relationship:** Parameter differs in meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

## SETSYS

**Tape Library Relationship:** Translation can occur for SMS tapes. However, the ACS routines can modify the resulting tape devices used. Tapes are read back on drives available to the library where the tape is resident.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is NOUSERUNITTABLE.

**Notes:**

1. If there is no unit online and available for the esoteric when the SETSYS USERUNITTABLE is issued, you will receive message ARC0103I indicating the USERUNITTABLE is invalid.
2. For IBM 3490 and 3590 tape devices, esoteric translation always occurs, regardless of the existence of cartridge loaders. If you specify a 3490 or 3590-1 esoteric unit name to direct output tape allocations, a translation of that esoteric unit name occurs. Subsequent input allocations use that translated unit name. Therefore for 3490 or 3590-1, if you specify an output esoteric unit name and want the same esoteric unit name to be used for that tape's input allocations, you must specify a translation to itself. For example, SETSYS USERUNITTABLE(TAPE:TAPE).
3. The 3490 control units (models A01, A02, A10, A20, D31, and D32) have the same read and write capabilities as the 3480X control unit.
4. You must ensure that each tape unit belonging to the esoteric group you specify can read and write on any tape written by any other tape unit that belongs to the same esoteric group. If the esoteric group contains both 3480 and 3480X devices, DFSMShsm treats both types of devices as 3480s.
5. You must define all esoteric tape unit names during system I/O generation. Do not remove from a subsequent system I/O generation those esoteric tape unit names DFSMShsm already has used during its tape processing. If you do, DFSMShsm cannot allocate the tape volume whose esoteric unit name you specified when you issued the ADDVOL command. Basically, by removing the esoteric name, you make the esoteric name an invalid unit name.
6. DFSMShsm rejects mixed combinations of device names in an esoteric group, with the following exception: it allows the use of both 3480 and 3480X device names in a single group. Improved Data Recording Capability (IDRC), however, is not used with such a group because all devices in the group are treated as 3480s. If an esoteric group associated only with 3480Xs exists, 3480s should not be added to it, because the data already written using this esoteric tape unit name may create IDRC incompatibilities.  
If DFSMShsm rejects an esoteric tape unit name, it does not reject the rest of the valid esoteric names specified in the USERUNITTABLE command. Those names are now recognized by DFSMShsm as valid esoteric tape unit names. Each time you specify USERUNITTABLE, the valid esoteric tape unit names identified with this parameter replaces any esoteric tape unit names identified with a previous USERUNITTABLE parameter of the SETSYS command.
7. If an esoteric group includes a mixture of cartridge loader and non cartridge loader units, the esoteric name translation does not take place. It is important to note that for translation to occur, at least one unit associated with the esoteric tape unit name *es2out* must be varied online, and all online units associated with *es2out* must have cartridge loaders or be 3490s. The unit name used by DFSMShsm for input is described in "Implementing DFSMShsm Tape Environments" in the *z/OS DFSMShsm Implementation and Customization Guide*.

8. If you reenter a SETSYS USERUNITTABLE command be aware that the prior table is entirely deleted and a new one is built from the new command and the MVS esoteric definitions. This will likely necessitate that you also enter the SETSYS TAPEUTILIZATION command because defaults are again in use. If you have removed an esoteric that is used in a tape output restriction specification, such as SETSYS BACKUP(TAPE(es1)), then you will also need to change those specifications.
9. To remove cartridge loader as a condition for device type 3480 esoteric unit name translation, refer to "Tuning DFSMShsm" in the *z/OS DFSMShsm Implementation and Customization Guide*.
10. For a summary of esoteric translation results, refer to the topic "Summary of Esoteric Translation Results for Various Tape Devices" in the *z/OS DFSMShsm Implementation and Customization Guide*.
11. The esoteric values specified for certain SETSYS parameters cannot resolve to reel-type tapes. See the *z/OS DFSMShsm Storage Administration Guide* for details.

## **VERSIONS: Specifying the Maximum Number of Backup Versions to Keep for Any Data Set**

**Explanation:** VERSIONS(*limit*) is an optional parameter specifying the maximum number of backup versions DFSMShsm keeps for any one data set. The maximum number of backup versions is limited to either 29 versions or 100 versions based on the BCDS record length. The following values are the valid maximum allowable number of backup versions for different BCDS record lengths:

- Record length of 2040 to 6543 — 29 versions maximum
- Record length of 6544 or more — 100 versions maximum

For *limit*, substitute a decimal number from 0 to 100. A zero (0) specifies that DFSMShsm does not create backup versions for any non-SMS-managed data set unless you specify the ALTERDS VERSIONS command.

**SMS Relationship:** Parameter does not apply to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** If you specify a value larger than the valid maximum allowable for that BCDS record length, the maximum value for that record length will be used. For example, if you specify SETSYS VERSIONS(50) and you have a BCDS record length of 2040 to 6543, the maximum allowable number of backup versions for this record length, which is 29, will be used.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default for *limit* is 2.

### **Notes:**

1. The SETSYS VERSIONS parameter is used to specify the number of backup versions for all your non-SMS-managed data sets. An authorized user, however, can specify the VERSIONS parameter of the ALTERDS command to change that number of backup versions for a specific data set. An unauthorized user can specify the VERSIONS parameter of the HALTERDS command to change that number of backup versions for a specific data set with the same high-level qualifier as the unauthorized user.
2. DFSMShsm can keep a maximum of 100 backup versions. Some versions may be for a cataloged data set with that name, some versions for uncataloged data sets with that name. The VERSIONS parameter indicates the number of backup

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versions kept for (1) the cataloged data set, and (2) the uncataloged data sets. DFSMShsm gives priority, if necessary, to versions of the cataloged data set. For example, if you specify SETSYS VERSIONS(15), when a backup version of the cataloged data set is created, no more than 14 versions will be kept for the uncataloged data set.

3. If the number of versions in the VERSIONS parameter is decreased, and the EXPIREBV command is executed prior to the time the next version is created, all excess versions—whether cataloged or uncataloged—are deleted.

## VOLCOUNT: Specifying the Method for Determining Volume Count for SMS Target Data Set Allocations when Performed by DFMSDss

**Explanation:** VOLCOUNT(ANY | NONE) is an optional parameter that affects how DFSMShsm will invoke DFMSDss for the recall and recover of data sets moved by DFMSDss. Refer to the *z/OS DFMSDss Storage Administration Reference* under the topic of the RESTORE command for more specific information about the restrictions and limitations of the DFMSDss VOLCOUNT parameter.

Subparameter	Explanation
ANY	DFSMShsm passes the VOLCOUNT(ANY) parameter to DFMSDss during the recall or recover of data moved by DFMSDss. This results in the allocation of the target data set on as many volumes as required, to a maximum of 59.
NONE	The VOLCOUNT parameter is not passed to DFMSDss. Issuing SETSYS VOLCOUNT(NONE) will reset the associated DFSMShsm indicators and DFSMShsm will operate as it did prior to the VOLCOUNT support being added. If, for example, VOLCOUNT(ANY) had been previously specified, issuing SETSYS VOLCOUNT(NONE) resets the associated DFSMShsm indicators.

The VOLCOUNT parameters of ANY or NONE are ignored if specified for data types to which they do not apply. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* to determine data set types moved by DFMSDss for DFSMShsm.

**SMS Relationship:** Parameter applies in some instances to SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** There is no SETSYS default.

**DFSMShsm Defaults:** If you do not specify SETSYS VOLCOUNT, the default is NONE.

## VOLUMEDUMP: Specifying Concurrent Copy or No Concurrent Copy for Dump Volumes

**Explanation:** VOLUMEDUMP(CC | NOCC) is an optional parameter specifying whether DFSMShsm will request that DFMSDss use the Concurrent Copy function for dump volumes.

Subparameter	Explanation
CC	DFSMShsm specifies Concurrent Copy when DFSMSdss dumps volumes. DFSMSdss determines if the device and microcode can support this operation.
NOCC	Concurrent Copy will not be used when DFSMSdss dumps volumes.

**Notes:**

1. The correct level of hardware and microcode must be present in your system environment for the Concurrent Copy function to work.
2. In a mixed hardware environment, where some volumes are capable of Concurrent Copy and others are not, specifying CC will be accepted and only apply to those volumes capable of this process, and the noncapable volumes will be dumped using traditional methods.

**SMS Relationship:** Parameter has the same meaning when applied to SMS-managed or non-SMS-managed DASD volumes or data sets.

**SETSYS Defaults:** None.

**DFSMShsm Defaults:** If you do not specify this parameter on any SETSYS command, the DFSMShsm default is NOCC.

## Summary of DFSMShsm Defaults

Table 4 is a summary of the defaults DFSMShsm uses if you never specify a SETSYS command during or after startup.

*Table 4. Summary of DFSMShsm Defaults*

DFSMShsm Defaults	Result
ABARSACTLOGMSGLEVEL(FULL)	All DFSMSdss messages that are written to the ABARS activity log.
ABARSACTLOGTYPE SYSOUT(A)	ABARS activity logs are allocated to the SYSOUT class A.
ABARSDELETEACTIVITY(N)	The ABARS activity log is not automatically deleted.
ABARSKIP(NOPPRC NOXRC)	ABACKUP processing will not skip data sets on volumes protected by peer-to-peer remote copy or extended remote copy.
ABARSOPTIMIZE(3)	DFSMShsm reads five tracks at a time.
ABARSPROCNAME(DFHSMABR)	DFSMShsm uses DFHSMABR as the base procedure name on the internal START command to start the secondary address space.
ABARSTAPES(STACK)	The default is STACK and DFSMShsm stacks output files onto a minimum number of tape volumes.
ABARSUNITNAME(3590-1)	ABARS selects 3590-1 units when invoking aggregate backup or aggregate recovery.
ABARSVOLCOUNT(NONE)	The default is NONE and DFSMShsm does not pass the VOLCOUNT parameter to DFSMSdss.
ACTLOGMSGLEVEL(FULL)	Messages are generated and logged for all activities.
ACTLOGTYPE SYSOUT(A)	If you specified SYSOUT without a class, the output is class A, one copy, no special forms.
ARECOVERML2UNIT(3590-1)	ARECOVER selects 3590-1 units when recovering data sets to ML2 tape.
ARECOVERPERCENTUTILIZED(80)	When specifying this parameter, DFSMShsm uses a default of 80% to fill non-SMS DASD recovery volumes. Otherwise, the valid values you can use range from 1 to 100.
ARECOVERTGTGDS(SOURCE)	The default is SOURCE.
ARECOVERUNITNAME(3590-1)	DFSMShsm uses a unit of 3590-1 for aggregate recovery of data sets recovered to tape.
AUTOBACKUPSTART(0)	DFSMShsm does not run automatic backup.
AUTODUMPSTART(0)	DFSMShsm does not run automatic dump.
BACKUP(INUSE(RETRY(N) DELAY(15) SERIALIZATION(REQUIRED)))	DFSMShsm does not retry a backup attempt that fails because the data set is in use. If RETRY(Y) is later specified, DFSMShsm delays for 15 minutes before attempting a retry, and requires the data set to be serialized during the retry.

Table 4. Summary of DFSMShsm Defaults (continued)

DFSMShsm Defaults	Result
BACKUPCOPIES(4)	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, DFSMShsm keeps four copies of the journal and control data sets.
BACKUPDEVICECATEGORY(TAPE)	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, DFSMShsm backs up the control data sets to tape.
BACKUPPREFIX	DFSMShsm uses the UID you specified in the DFSMShsm startup procedure.
BCDSBACKUPDSN( <i>uid.BCDS.BACKUP</i> )	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, the backup data set name for the backup control data set is <i>uid.BCDS.BACKUP</i> .
CDSVERSIONBACKUP subparameters listed separately: BACKUPCOPIES BACKUPDEVICECATEGORY DENSITY BCDSBACKUPDSN MCDSBACKUPDSN OCDSBACKUPDSN JRNLBACKUPDSN NOPARALLEL RETENTION PERIOD UNITNAME	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, DFSMShsm makes multiple backup versions of the control data sets and the journal data set.
COMPACT(NONE)	DFSMShsm does not compact any data sets.
COMPACTPERCENT(40)	If you specify that DFSMShsm compact data sets, DFSMShsm uses a default of 40% to determine whether a data set will be compacted in the future. Otherwise, DFSMShsm ignores this parameter.
CSALIMITS( MWE(4) MAXIMUM(100) ACTIVE(90) INACTIVE(30))	DFSMShsm limits the common service area storage for MWE allocation. The NOWAIT MWE limit is 4, the maximum limit is 100 KB, the active limit is 90 KB, and the inactive limit is 30 KB.

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Table 4. Summary of DFSMShsm Defaults (continued)

DFSMShsm Defaults	Result
DATAMOVER	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, DFSMShsm default for the type of data movement used when performing CDSVERSIONBACKUP, is DATAMOVER(HSM).
DAYS(1   2)	In a single-DFSMShsm-host environment, the data sets must be at least one day old. In a multiple-DFSMShsm-host environment, the data sets must be at least two days old.
DFHSDATASETSERIALIZATION	Data set serialization of system resources is not provided by system facilities.
DISASTERMODE(N)	If you specify N, DFSMShsm will request the original tape volume and makes no substitution.
DSBACKUP	For DASDSELECTIONSIZE, the default for <i>maximum</i> is 3000 KB and <i>standard</i> is 250 KB. For DASD(TASKS) or TAPE(TASKS), the default is 2. For DEMOUNTDELAY, the default for MAXIDLETASKS is 0 and MINUTES is 60.
DUMPIO(1,1)	DFSMSdss reads one track at a time.
DUPLEX	If you do not specify DUPLEX and either of its subparameters, duplexing does not occur.
EXTOFF	Installation exits remain in their current state.
EXITON	No installation exits are active.
EXPIREDATASETS(NOSCRATCH)	DFSMShsm ignores the expiration date of a data set and processes it as if the expiration date were not reached.
EXTENDEDTTOC(N)	DFSMShsm does not attempt to use extended TTOCs for migration tapes or backup tapes.
FREQUENCY(0)	DFSMShsm backs up data sets every time volume backup runs.
INCREMENTALBACKUP(ORIGINAL)	DFSMShsm creates an initial backup version (if one does not exist) for all non-VSAM and integrated catalog facility VSAM data sets regardless of the change bit in the format 1 DSCB.
INPUTTAPEALLOCATION(NOWAIT)	DFSMShsm does not ask dynamic allocation to wait for an input tape unit to be allocated. Recall and recovery use input tape units.
INTERVALMIGRATION	DFSMShsm does interval migration.
JES2	DFSMShsm uses job entry subsystem 2.
JOURNAL(SPEED)	DFSMShsm puts the journal entries on a queue but does not wait for the record to be written before DFSMShsm continues processing.

Table 4. Summary of DFSMShsm Defaults (continued)

DFSMShsm Defaults	Result
JRNBACKUPDSN( <i>uid</i> .JRNBACKUP)	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, the backup data set name for the journal control data set is <i>uid</i> .JRNBACKUP.
MAXABARSADDRESSSPACE(1)	DFSMShsm runs aggregate backup or recovery in one secondary address space.
MAXBACKUPTASKS(2)	DFSMShsm concurrently runs two volume backup tasks.
MAXCOPYPOOLTASKS( FRBACKUP(15) FRRECOV(15) DSS(24))	DFSMShsm concurrently processes a limited number of DFMSDs invocation tasks for FRBACKUP and FRRECOV. The FRBACKUP limit is 15 and the FRRECOV limit is 15. The DSS limit is the number of volumes that DFSMShsm passes to DFMSDs to process concurrently per DFMSDs invocation.
MAXDSRECOVERTASKS(2)	DFSMShsm concurrently runs two data set recovery tasks.
MAXDUMPTASKS(2)	DFSMShsm concurrently runs two volume dump tasks.
MAXEXTENTS(0)	DFSMShsm does not do extent reduction for active non-VSAM data sets.
MAXINTERVALTASKS(2)	Defaults to the value of MAXMIGRATIONTASKS.
MAXMIGRATIONTASKS(2)	DFSMShsm defaults to a maximum of 2 migration tasks that can run concurrently.
MAXRECALLTASKS(15)	DFSMShsm concurrently processes 15 recall tasks.
MAXRECYCLETASKS(2)	DFSMShsm concurrently processes two tasks, each with one input and one output unit during RECYCLE processing
MAXSSMTASKS(CLEANUP(2) TAPEMOVEMENT(1))	DFSMShsm concurrently processes a limited number of secondary space management tasks. The statistics and migration cleanup tasks limit is 2 and the automatic tape migration task limit is 1.
MCDSBACKUPDSN( <i>uid</i> .MCDS.BACKUP)	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, the backup data set name for the migration control data set is <i>uid</i> .MCDS.BACKUP.
MIGRATEPREFIX	DFSMShsm uses the UID you specified in the DFMSHsm startup procedure.

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*Table 4. Summary of DFSMShsm Defaults (continued)*

DFSMShsm Defaults	Result
MIGRATIONCLEANUPDAYS(10 30 3)	DFSMShsm keeps MCDS data set records for recalled data sets for 10 days. DFSMShsm keeps daily and volume statistics records for 30 days. DFSMShsm keeps MCDS data set records for reconnectable data sets for 3 days beyond their predicted remigration date.
MIGRATIONLEVEL1DAYS(60)	DFSMShsm does not migrate the data set from a migration level 1 volume to a migration level 2 volume if someone has recalled the data set within the last 60 days.
MIGUNITNAME(3590-1)	DFSMShsm uses a unit of 3590-1 to mount scratch tapes during migration.
ML2PARTIALSNOTASSOCIATEDGOAL	If the number of ML2 partial tapes not associated with any migration or recycle output task is more than 10 at the time of a RECYCLE ML2 command, DFSMShsm recycles the least full of the excess, leaving the 10 with the highest percentages written.
ML2RECYCLEPERCENT	This parameter has no default, however, if it is not specified, the default functionally used is the value specified for RECYCLEPERCENT. If RECYCLEPERCENT is not specified, its default is 20%.
MONITOR( BACKUPCONTROLDATASET(80) JOURNAL(80) MIGRATIONCONTROLDATASET(80) OFFLINECONTROLDATASET(80) NOSPACE NOSTARTUP NOVOLUME)	DFSMShsm prints space and volume information only in the DFSMShsm log. DFSMShsm sends warning messages to the operator when the journal data set or any control data set is 80% full.
MOUNTWAITTIME(15)	DFSMShsm waits 15 minutes for an operator to mount the tape before it issues another message asking if the tapes can be mounted.
NOACCEPTPSCBUSERID	DFSMShsm does not attempt to retrieve the user ID for TSO batch requests.
NOBACKUP	DFSMShsm does not back up or recover any data sets.
NOCONVERSION	DFSMShsm does not reblock data sets when it recalls or recovers them.
NODEBUG	DFSMShsm processes all data sets and volumes.
NOEMERGENCY	DFSMShsm processes all data sets normally.
NOERASEONSCRATCH	DFSMShsm does not check for erase of DFSMShsm-owned data sets. DFSMShsm does not ask RACF for the erase status of the user's data set when backup versions and migration copies are scratched from DFSMShsm-owned DASD volumes. The data set is deleted but the DASD residual data is not overwritten by data management.
NOOPTIMUMDASDBLOCKING	DFSMShsm writes to DFSMShsm-owned DASD in 2 KB blocks.

Table 4. Summary of DFSMShsm Defaults (continued)

DFSMShsm Defaults	Result
NOPARALLEL	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, DFSMShsm will backup the control data sets and the journal serially.
NOREQUEST	DFSMShsm does not ask operator permission when starting automatic volume space management, automatic secondary space management, automatic backup, and automatic dump at the requested time.
NOSKIPABPRIMARY	DFSMShsm automatically backs up data sets on primary volumes.
NOSMALLDATASETPACKING	DFSMShsm does not pack small data sets into SDSP data sets on migration level 1 volumes.
NOSMF	DFSMShsm does not write SMF records.
NOTAPEHARDWARECOMPACT	Improved data recording capability (IDRC) is not used when 3480X is used as the output device.
NOUNLOAD	DFSMShsm does not unload your virtual volumes.
NOUSERUNITTABLE	DFSMShsm does not use esoteric tape unit names.
OBJECTNAMES	DFSMShsm uses the general compaction table.
OCDSBACKUPDSN( <i>uid</i> .OCDS.BACKUP)	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, the backup data set name for the offline control data set is <i>uid</i> .OCDS.BACKUP.
OUTPUTTAPEALLOCATION(NOWAIT)	DFSMShsm does not ask dynamic allocation to wait for an output tape unit to be allocated. Migration, backup, and dump use output tape units.
PARTIALTAPE(REUSE)	DFSMShsm marks the tape volume full only when the volume reaches the percent full specified with the SETSYS TAPEUTILIZATION parameter.
PDA(ON)	DFSMShsm defaults to ON if the subparameters NONE or OFF are not specified. Tracing begins at DFSMShsm startup and continues until the OFF subparameter is specified or DFSMShsm is stopped or ABENDs.
PLEXNAME(PLEX0)	DFSMShsm uses a default HSMplex name of ARCPLEX0.
PRIMARYSPMGMTSTART(0)	DFSMShsm does not run automatic primary space management.

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*Table 4. Summary of DFSMShsm Defaults (continued)*

DFSMShsm Defaults	Result
PROFILEBACKUP	DFSMShsm creates a backup RACF discrete profile for every cataloged RACF-indicated data set that it backs up.
PROMOTE	No host in an HSMplex is eligible to take over the Primary or Secondary Space Management functions of a failed host.
RACFIND	DFSMShsm puts RACF-indication on migration copies and backup versions.
RECALL(ANYSTORAGEVOLUME)	DFSMShsm recalls nonpooled data sets to an online primary volume with the storage use attribute and primary volume attribute of automatic recall.
RECYCLEINPUTDEALLOCFREQUENCY(BACKUP   MIGRATION)	DFSMShsm uses zero (0) for both the BACKUP and MIGRATION subparameters. This will keep an input unit allocated until the recycle processing has completed or as long as input can be read.
RECYCLEOUTPUT(BACKUP   MIGRATION)	DFSMShsm uses any available tape.
RECYCLEPERCENT(20)	The tape volume cannot contain more than 20% valid data when DFSMShsm generically recycles a volume.
RECYCLETAPEALLOCATION(NOWAIT)	DFSMShsm does not ask dynamic allocation to wait for a tape unit to be allocated during recycle processing.
RETENTIONPERIOD(7)	The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, DFSMShsm keeps the backup copies of the DFSMShsm control data sets for 7 days.
SCRATCHFREQUENCY(9999)	DFSMShsm keeps list data sets for 9,999 days before it scratches them.
SECONDARYSPMGMTSTART(0)	DFSMShsm does not run automatic secondary space management.
SELECTVOLUME(SCRATCH)	DFSMShsm chooses scratch tapes when an end-of-volume occurs on a tape volume while DFSMShsm is using it.
SOURCENAMES	DFSMShsm uses the general compaction table.
SPILL(ANY)	DFSMShsm does spill processing on any type of spill backup volume that can be used for output.
SWAP   NOSWAP	The system resource manager decides whether or not to make the DFSMShsm address space able to be swapped.
SYSOUT(A 1)	DFSMShsm prints to class A, makes one copy, and uses no special form.
SYS1DUMP	DFSMShsm writes the output of a DFSMShsm dump to a system dump data set.

Table 4. Summary of DFSMShsm Defaults (continued)

DFSMShsm Defaults	Result
TAPEDELETION(SCRATCHTAPE)	Tapes become scratch tapes after DFSMShsm recycles them.
TAPEINPUTPROMPT(TAPES(YES))	DFSMShsm issues action messages to the operator asking if needed input tapes are available.
TAPEMAXRECALLTASKS(1)	DFSMShsm cannot process more than 1 tape recall task. The rest are DASD recall tasks. This parameter is a subset of the MAXRECALLTASKS parameter.
TAPEMIGRATION(NONE (ROUTETOTAPE(ANY)) RECONNECT(NONE))	DFSMShsm selects the first available migration tape when a tape migration level 2 volume is required. If no tapes are available, DFSMShsm selects a scratch tape with the unit name specified or defaulted from the MIGUNITNAME parameter of the SETSYS command. DFSMShsm does not perform reconnection.
TAPEOUTPUTPROMPT (TAPECOPY(NO))	If you specify N, DFSMShsm issues no message to the operator during TAPECOPY processing indicating which type of target tape is to be mounted on a particular device.
TAPERECALLLIMITS(TASK(15) TAPE(20))	DFSMShsm allows a task to continue processing from a single mount of a tape for at least 15 minutes and/or until a tape recall request of higher priority exists which can not be started until a task is freed up. Then the task is freed up for other recalls. DFSMShsm allows a task to have a tape allocated and mounted for at least 20 minutes and/or until another host needs that mounted tape for a higher priority recall. Then the tape is freed up by this host which allows other hosts an opportunity to use that tape.
TAPESECURITY(PASSWORD)	DFSMShsm uses password protection for its tape volumes.
TAPESPANSIZE(500)	DFSMShsm can leave unused up to 500 megabytes (MB) of tape during attempts to eliminate spanning data sets.
TAPEUTILIZATION PERCENTFULL(97)	DFSMShsm forces an end-of-volume on a backup or migration tape volume when it is 97% full.
TAPEUTILIZATION CAPACITYMODE(COMPATIBILITY)	If you do not specify CAPACITYMODE(EXTENDED) for an esoteric capable of CAPACITYMODE switching, the drives operate in CAPACITYMODE(COMPATIBILITY) for output. The drives use CAPACITYMODE(COMPATIBILITY) or CAPACITYMODE(EXTENDED) as necessary for input.

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Table 4. Summary of DFSMShsm Defaults (continued)

DFSMShsm Defaults	Result
UNITNAME(3590-1)	CDSVERSIONBACKUP: The default value is read from the multiple-host processor control record (MHCR). The record is updated with values specified on the SETSYS CDSVERSIONBACKUP command every time the command is issued. If the MHCR record does not exist, or the parameter (or subparameter) has never been specified, DFSMShsm uses a unit of 3590-1 to allocate scratch tapes during backup.  UNITNAME: DFSMShsm uses a unit of 3590-1 to allocate scratch tapes during backup.
VERSIONS(2)	DFSMShsm keeps two backup versions of each data set.
VOLCOUNT(NONE)	The default is NONE and DFSMShsm does not pass the VOLCOUNT parameter to DFMSDss.
VOLUMEDUMP(NOCC)	Concurrent Copy will not be used by DFMSDss when dumping volumes.

## Examples of How to Code the SETSYS Command

The following examples present common user scenarios that you can use to code the SETSYS command for your installation. Both main functions and supporting functions are illustrated in the examples. The functions are arranged in alphabetical order.

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Specifying the SETSYS Parameters for ABARS Processing

**Example:** In this example, the SETSYS parameters associated with both ABACKUP and ARECOVER processing are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

For ABARS Processing:

- All DFSMSdss messages are intercepted and written in the ABARS activity log. Parameter used is ABARSACTLOGMSGLEVEL(FULL).
- The ABARS activity log is written to DASD. Parameter used is ABARSACTLOGTYPE(DASD).
- Allow ABARS to use the default number of I/O buffers. Parameter used is ABARSBUFFERS(1).
- DFSMShsm is to delete the ABARS activity log during ABARS roll-off processing or EXPIREBV ABARSVERSIONS processing. Parameter used is ABARSDELETEACTIVITY(Y).
- Allow ABARS to use the default base procedure name when starting the ABARS secondary address space. Parameter used is ABARSPROCNAME(DFHSMABR).
- Allow DFSMShsm to stack the ABACKUP output. Parameter used is ABARSTAPES(STACK).
- Use 3590-1 as a unit name for ABARS. Parameter used is ABARSUNITNAME(3590-1).
- Use the default number of concurrent secondary addresses supported by DFSMShsm. Parameter used is MAXABARSADDRESSSPACE(1).
- The following DFSMShsm installation exits are active: ABARS expiration date setting exit, aggregate backup error exit, aggregate backup ML2 bypass exit, aggregate recovery conflict resolution exit, aggregate recovery bypass exit, and ABARS tape volume exit. Parameter used is EXITON(ED BE M2 CR SK TV).

For ABACKUP Processing:

- Use the default OPTIMIZE value when ABACKUP invokes DFSMSdss to backup level 0 DASD data sets. Parameter used is ABARSOPTIMIZE(3).
- Data sets on volumes protected by peer-to-peer remote copy or extended remote copy are backed up by ABACKUP processing. Parameters used are ABARSKIP(NOPPRC NOXRC).

For ARECOVER Processing:

- Allow DFSMShsm to pass the VOLCOUNT parameter to DFSMSdss during the ARECOVER of L0 data sets. You want to allocate as many volumes as required for the target data set. Parameter used is ABARSVOLCOUNT(ANY).
- Use 3590-1 tape units when recovering user tape volumes. Parameter used is ARECOVERUNITNAME(3590-1).

## SETSYS

- Use 3590-1 tape units when recovering migrated data sets to ML2 tape volumes. Parameter used is ARECOVERML2UNIT(3590-1).
- Use the default percentage of DASD space when filling non-SMS-managed recovery volumes. Parameter used is ARECOVERPERCENTUTILIZED(80).
- Allow DFSSMShsm to pass the TGTGDS parameter to DFSSMSdss during restore processing of SMS-managed generation data sets to level 0 DASD. Parameter used is ARECOVERTGTGDS(SOURCE).

```
SETSYS ABARSACTLOGMSG_LVL(FULL) +
        ABARSACTLOGTYPE(DASD) +
        ABARSBUFFERS(1) +
        ABARSDELETEACTIVITY(Y) +
        ABARSPROCNAME(DFHSMABR) +
        ABARSTAPES(STACK) +
        ABARSUNITNAME(3590-1) +
        MAXABARSADDRESSSPACE(1) +
        EXITON(ED BE M2 CR SK TV) +
        ABARSOPTIMIZE(3) +
        ABARSKIP(NOPPRC NOXRC) +
        ABARSVOLCOUNT(ANY) +
        ARECOVERUNITNAME(3590-1) +
        ARECOVERML2UNIT(3590-1) +
        ARECOVERPERCENTUTILIZED(80) +
        ARECOVERTGTGDS(SOURCE)
```

## Specifying the SETSYS Parameters for Backup Processing

**Example:** In this example, the SETSYS parameters associated with backup processing are specified. Where appropriate, default values or recommended values are used in the examples. These parameters are in effect until another SETSYS command is issued to change them.

- Automatic backup can start between 0030 (12:30 a.m.) and 0400 (4:00 a.m.) hours. DFSSMShsm does not begin on additional volumes after 0730 (7:30 a.m.) hours. Parameter used is AUTOBACKUPSTART(0030 0400 0730).
- If the backup processing finds a data set in use, DFSSMShsm is to retry the backup after a delay of 60 minutes, and accept the backup version even if the data set is still in use. Parameter used is BACKUP(INUSE (RETRY(Y) DELAY(60) SERIALIZATION(PREFERRED))).
- DFSSMShsm can compact a data set during backup processing to DASD. Parameter used is COMPACT(DASDBACKUP).
- You want DFSSMShsm to use the backup prefix name of HSM. Parameter used is BACKUPPREFIX(HSM).
- DFSSMShsm does not compact a data set unless 40% of the total space is saved. Parameter used is COMPACTPERCENT(40).
- DFSSMShsm creates original backup tapes that will be kept on site and alternate backup tapes that will be written at a remote site. Parameter used is DUPLEX(BACKUP(Y)).
- The following installation exits are active: data set backup exit and space management and backup exit. Parameter used is EXITON(BD SA).
- DFSSMShsm creates backup versions when data sets are changed. Parameter used is INCREMENTALBACKUP(CHANGEDONLY).
- DFSSMShsm can backup eight DASD volumes concurrently on this host. Parameter used is MAXBACKUPTASKS(8).
- DFSSMShsm retains two tape allocations for 120 minutes of inactivity, until command data set backups directed to tape are held, or until DFSSMShsm shuts down before deallocating the drives. Parameter used is DSBACKUP(TAPE(DEMOUNTDELAY(MAXIDLETASKS(2) MINUTES(120)))).

```
SETSYS AUTOBACKUPSTART(0030 0400 0730) +
  BACKUP(INUSE(RETRY(Y) DELAY(60) SERIALIZATION(PREFERRED))) +
  BACKUPPREFIX(HSM) +
  COMPACT(DASDBACKUP) +
  COMPACTPERCENT(40) +
  DUPLEX(BACKUP(Y)) +
  EXITON(BD SA) +
  INCREMENTALBACKUP(CHANGEDONLY) +
  MAXBACKUPTASKS(8) +
  DSBACKUP(TAPE(DEMOUNTDELAY(MAXIDLETASKS(2) MINUTES(120))))
```

## Specifying the SETSYS Parameters for DFSMShsm Control Data Sets

**Example:** In this example, the SETSYS parameters associated with DFSMShsm control data sets processing are specified. Where appropriate, default values or recommended values are used in the examples. These parameters are in effect until another SETSYS command is issued to change them.

- DFSMShsm invokes the DFSMSdss logical dump function for each control data set backed up. Parameter used is CDSVERSIONBACKUP(DATAMOVER(DSS)).
- DFSMShsm backs up control data sets and the journal data set to scratch tapes. Parameter used is CDSVERSIONBACKUP(BACKUPDEVICECATEGORY(TAPE)).
- DFSMShsm keeps twenty backup copies for each control data set and journal data set. Parameter used is CDSVERSIONBACKUP(BACKUPCOPIES(20)).
- You want DFSMShsm to use HSM.BCDS.BACKUP as the initial characters when allocating the backup data set for the BCDS. Parameter used is CDSVERSIONBACKUP(BCDSBACKUPDSN(HSM.BCDS.BACKUP)).
- You want DFSMShsm to use HSM.MCDS.BACKUP as the initial characters when allocating the backup data set for the MCDS. Parameter used is CDSVERSIONBACKUP(MCDSBACKUPDSN(HSM.MCDS.BACKUP)).
- You want DFSMShsm to use HSM.OCDS.BACKUP as the initial characters when allocating the backup data set for the OCDS. Parameter used is CDSVERSIONBACKUP(OCDSBACKUPDSN(HSM.OCDS.BACKUP)).
- You want DFSMShsm to use HSM.JRNL.BACKUP as initial characters when allocating the backup data set for the journal data set. Parameter used is CDSVERSIONBACKUP(JRNBACKUPDSN(HSM.JRNL.BACKUP)).
- The control data set backup exit is active. Parameter used is EXITON(CB).
- No startup, space use, or data set messages appear at the system console. Parameter used is MONITOR(NOSTARTUP NOSPACE NOVOLUME).
- DFSMShsm writes the BCDS, MCDS, and OCDS data set records in the journal data set when updated. Parameter used is JOURNAL(RECOVER).

```
SETSYS CDSVERSIONBACKUP(DATAMOVER(DSS) +
  BACKUPDEVICECATEGORY(TAPE) +
  BACKUPCOPIES(20) +
  BCDSBACKUPDSN(HSM.BCDS.BACKUP) +
  MCDSBACKUPDSN(HSM.MCDS.BACKUP) +
  OCDSBACKUPDSN(HSM.OCDS.BACKUP) +
  JRNBACKUPDSN(HSM.JRNL.BACKUP)) +
  EXITON(CB) +
  MONITOR(NOSTARTUP NOSPACE NOVOLUME) +
  JOURNAL(RECOVER)
```

## Specifying the SETSYS Parameters for Dump Processing

**Example:** In this example, the SETSYS parameters associated with dump processing are specified. Where appropriate, default values or recommended

## SETSYS

values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- Automatic dump can start between 0100 (1:00 a.m.) and 0400 (4:00 a.m.) hours. DFSMShsm does not begin additional volumes after 0630 (6:30 a.m.). Parameter used is AUTODUMPSTART(0100 0400 0630).
- You intend to use the following DFSMShsm functions: backup, dump, recovery, and expiring backup versions. Parameter used is BACKUP.
- You want DFSMShsm to use HSM as the first qualifier in the dump copy name. Parameter used is BACKUPPREFIX(HSM).
- DFSMShsm specifies to DFSMSdss that the fourth buffering technique is used for DFSMSdss DASD I/O for a full-volume dump. The fourth buffering technique has DFSMSdss read one cylinder at a time. DFSMShsm specifies to DFSMSdss that the third buffering technique is used for DFSMSdss DASD I/O, and DFSMSdss is to read five tracks at a time. Parameter used is DUMPIO(4,3).
- DFSMShsm can concurrently process two volume dump tasks. Parameter used is MAXDUMPTASKS(2).
- DFSMShsm requests that DFSMSdss use the Concurrent Copy function for dump volumes because they have adequate cache for the changed data at the time volume dumps are running. Parameter used is VOLUMEDUMP(CC).

```
SETSYS AUTODUMPSTART(0100 0400 0630) +
      BACKUP +
      BACKUPPREFIX(HSM) +
      DUMPIO(4,3) +
      MAXDUMPTASKS(2) +
      VOLUMEDUMP(CC)
```

### Specifying the SETSYS Parameters for Expiration Processing

**Example:** In this example, the SETSYS parameter associated with expiration processing is specified. Where appropriate, default values or recommended values are used in the example. This parameter is in effect until another SETSYS command is issued to change it.

- DFSMShsm scratches data sets that have an expired expiration date when performing space management and migration cleanup. Parameter used is EXPIREDATASETS(SCRATCH).

```
SETSYS EXPIREDATASETS(SCRATCH)
```

### Specifying the SETSYS Parameters for Extent Reduction Processing

**Example:** In this example, the SETSYS parameter associated with extent reduction processing is specified. Where appropriate, default values or recommended values are used in the example. This parameter is in effect until another SETSYS command is issued to change it.

- DFSMShsm reallocates all non-VSAM data sets that equal or exceed five extents. Parameter used is MAXEXTENTS(5).

```
SETSYS MAXEXTENTS(5)
```

### Specifying the SETSYS Parameters for Fast Replication Processing

**Example:** In this example, the SETSYS parameters that are associated with fast replication processing are specified. Where appropriate, default values or

recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- The maximum number of DFSMSdss invocations for each FRBACKUP command that DFSMShsm can process concurrently is 15.
- The maximum number of DFSMSdss invocations for each FRRECOV command that DFSMShsm can process concurrently is 15.
- The maximum number of volume pairs that DFSMShsm passes to each DFSMSdss invocation concurrently for backup and recover functions is 24.

```
SETSYS MAXCOPYPOOLTASKS(FRBACKUP(15) FRRECOV(15) DSS(24))
```

## Specifying the SETSYS Parameters for Interval Migration Processing

**Example:** In this example, the SETSYS parameters associated with interval migration processing are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- The space management volume exit is active. Parameter used is EXITON(MV).
- DFSMShsm does interval migration if the occupied space on a primary volume is equal to or exceeds a high threshold level when the periodic hourly space check is performed. Parameter used is INTERVALMIGRATION.
- DFSMShsm can concurrently process eight automatic interval migration tasks. Parameter used is MAXINTERVALTASKS(8).

```
SETSYS EXITON(MV) +
INTERVALMIGRATION +
MAXINTERVALTASKS(8)
```

## Specifying the SETSYS Parameters for DFSMShsm Logging and Diagnosis

**Example:** In this example, the SETSYS parameters associated with DFSMShsm logging and diagnosis are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- DFSMShsm generates and logs messages for all activities. Parameter used is ACTLOGMSGLEVEL(FULL).
- DFSMShsm dynamically allocates DASD data sets as the type of output data sets to receive messages. Parameter used is ACTLOGTYPE(DASD).
- DFSMShsm is not operating in debug mode. Parameter used is NODEBUG.
- DFSMShsm is not operating in emergency mode. Parameter used is NOEMERGENCY.
- Migration cleanup deletes the MCDS data set records for data sets that are recalled more than 10 days ago and deletes daily and volume statistics records that were created more than 90 days ago. The records cleaned up by MIGRATIONCLEANUP are used by the REPORT command and by DCOLLECT. Parameter used is MIGRATIONCLEANUP(10 90).
- No startup, space use, or data set messages appear at the system console. Parameter used is MONITOR(NOSTARTUP NOSPACE NOVOLUME).
- The problem determination aid is enabled. Parameter used is PDA.
- DFSMShsm writes SMF records that contain DFSMShsm statistics. Parameter used is SMF(240).

## SETSYS

- The output from DFSMShsm goes to system output class D, with one copy printed on a form identified by 6LPI. Parameter used is SYSOUT(D 1 6LPI).
- DFSMShsm dumps are written to a system dump data set. Parameter used is SYS1DUMP.

```
SETSYS ACTLOGMSGLEVEL(FULL) +
ACTLOGTYPE(DASD) +
NODEBUG +
NOEMERGENCY +
MIGRATIONCLEANUPDAYS(10 90) +
MONITOR(NOSTARTUP NOSPACE NOVOLUME) +
PDA +
SMF(240) +
SYSOUT(D 1 6LPI) +
SYS1DUMP
```

### Specifying the SETSYS Parameters for Migration Processing

**Example:** In this example, the SETSYS parameters associated with migration processing are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- DFSMShsm can compact data sets during migration processing to DASD. Parameter used is COMPACT(DASDMIGRATE).
- DFSMShsm does not compact a data set unless 40% of the total space is saved. Parameter used is COMPACTPERCENT(40).
- The following installation exits are active: data set migration exit, second level migration data set exit, space management volume exit, and space management and backup exit. Parameter used is EXITON(MD MM MV SA).
- DFSMShsm deletes data sets that have an expired expiration date. Parameter used is EXPIREDDATASETS(SCRATCH).
- DFSMShsm runs up to eight automatic volume space management tasks concurrently. Parameter used is MAXMIGRATIONTASKS(8).
- You want DFSMShsm to use the migration prefix name of HSM. Parameter used is MIGRATEPREFIX(HSM).
- Automatic primary space management begins if DFSMShsm is running at 0230 (2:30 a.m.). DFSMShsm ends automatic primary space management at 0630 (6:30 a.m.). Parameter used is PRIMARYSPMGMTSTART(0230 0630).
- All eligible data sets with a data set source size of 100 KB or less are considered as candidates for migration to a small-data-set-packing data set. Parameter used is SMALLDATASETPACKING(KB(100)).

```
SETSYS COMPACT(DASDMIGRATE) +
COMPACTPERCENT(40) +
EXITON(MD MM MV SA) +
EXPIREDDATASETS(SCRATCH) +
MAXMIGRATIONTASKS(8) +
MIGRATEPREFIX(HSM) +
PRIMARYSPMGMTSTART(0230 0630) +
SMALLDATASETPACKING(KB(100))
```

### Specifying the SETSYS Parameters for DFSMShsm Processing in a MVS Environment

**Example:** In this example, the SETSYS parameters associated with DFSMShsm processing in a MVS environment are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- DFSMShsm uses the defaults for CSA limiting. Parameter used is CSALIMITS(ACTIVE(90) INACTIVE(30) MAXIMUM(100) MWE(4)).
- The following installation exits are active: initialization exit and shutdown exit. Parameter used is EXITON(IN SD).
- DFSMShsm uses job entry subsystem 2. Parameter used is JES2.
- The DFSMShsm address space cannot be swapped by the MVS system resource manager. Parameter used is NOSWAP.
- DFSMShsm uses the default HSMplex name of ARCPLEX0. Parameter used is PLEXNAME(PLEX0).
- DFSMShsm considers all host in an HSMplex eligible for promotion to take over the primary functions of a failed host. Parameter used is PROMOTE(PRIMARYHOST(YES)).
- During volume backup or migration in a multiple-DFSMShsm-host environment, system facilities like GRS, perform data set serialization of system resources. Parameter used is USERDATASETSERIALIZATION.

```
SETSYS CSALIMITS(ACTIVE(90) INACTIVE(30) MAXIMUM(100) MWE(4)) +
    EXITON(IN SD) +
    JES2 +
    NOSWAP +
    PLEXNAME(PLEX0) +
    PROMOTE(PRIMARYHOST(YES)) +
    USERDATASETSERIALIZATION
```

## Specifying the SETSYS Parameters for Recall Processing

**Example:** In this example, the SETSYS parameters associated with recall processing are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- The DFSMShsm host is connected to the SYSARC\_PLEX1\_RCL common recall queue list structure. The parameter that is used is COMMONQUEUE(RECALL(CONNECT(PLEX1))).
- DFSMShsm can reblock data sets during recall processing. The parameter that is used is CONVERSION.
- The return-priority installation exits are active. Parameter used is EXITON(RP).
- A maximum of fifteen recall tasks can process concurrently. The parameter that is used is MAXRECALLTASKS(15).
- A maximum of five tape recall tasks that can concurrently request tape mounts. The parameter that is used is TAPEMAXRECALLTASKS(5).
- DFSMShsm passes the volume count parameter to DFSMSdss during the recall or recover of data that is moved by DFSMSdss. The parameter that is used is VOLCOUNT(ANY).

```
SETSYS COMMONQUEUE(RECALL(CONNECT(PLEX1))) +
    CONVERSION +
    EXITON(RP) +
    MAXRECALLTASKS(15) +
    TAPEMAXRECALLTASKS(5) +
    VOLCOUNT(ANY)
```

## Specifying the SETSYS Parameters for Recover Processing

**Example:** In this example, the SETSYS parameters associated with recover processing are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

## SETSYS

- DFSMShsm can reblock data sets during recover processing. Parameter used is CONVERSION.
- The data set reblock exit is active. Parameter used is EXITON(CD).
- A maximum of two recover tasks can process concurrently. Parameter used is MAXDSRECOVERTASKS(2).
- DFSMShsm passes the volume count parameter to DFSMSdss during recover of data moved by DFSMSdss. Parameter used is VOLCOUNT(ANY).

```
SETSYS CONVERSION +  
EXITON(CD) +  
MAXDSRECOVERTASKS(2) +  
VOLCOUNT(ANY)
```

## Specifying the SETSYS Parameters for Recycle Processing

**Example:** In this example, the SETSYS parameters associated with recycle processing are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- A maximum of two recycle tasks can process concurrently. Parameter used is MAXRECYCLETASKS(2).
- When recycling tape volumes, each DFSMShsm recycle task deallocates its input unit after each 5 connected sets of backup volumes, and after each 5 connected sets of ML2 volumes. Note: the values specified here are considered to be safe compromise values in single technology environments and you should refer to this parameters description before deciding what values to use for your installation. Parameter used is RECYCLEINPUTDEALLOCATION(BACKUP(5) MIGRATION(5)).
- During recycle processing of a tape backup volume or a tape level 2 volume, only tape spill backup volumes or tape level 2 migration volumes that can be mounted and written on the specified unit type are used for output. Parameter used is RECYCLEOUTPUT(BACKUP(3590-1) MIGRATION(3590-1)).
- DFSMShsm uses the percent valid criteria to recycle both backup and migration tape volumes. Parameter used is RECYCLEPERCENT(20).
- DFSMShsm does not wait for the recycle tape unit to be allocated for the source and target tape volumes. Parameter used is RECYCLETAPEALLOCATION(NOWAIT).

```
SETSYS MAXRECYCLETASKS(2) +  
RECYCLEINPUTDEALLOCATION(BACKUP(5) MIGRATION(5)) +  
RECYCLEOUTPUT(BACKUP(3590-1) MIGRATION(3590-1)) +  
RECYCLEPERCENT(20) +  
RECYCLETAPEALLOCATION(NOWAIT)
```

## Specifying the SETSYS Parameters for Secondary Space Management

**Example:** In this example, SETSYS parameters associated with Secondary Space Management processing are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- Automatic secondary space management begins if DFSMShsm is running at 0800 (8:00 a.m.). DFSMShsm ends automatic secondary space management at 1700 (5:00 p.m.). Note: MWEs built by secondary space management up to 1700 continue to process. If a large number of data sets needs deletion, MWE

processing continues after secondary space management stops. Parameter used is SECONDARYSPMGMTSTART(0800 1700).

- DFSMShsm keeps MCDS records for recalled data sets for 10 days. Volume statistics records are kept for 30 days and MCDS records for reconnection are kept for 3 days. Parameter used is MIGRATIONCLEANUPDAYS(10 30 3).
- A maximum of fifteen recall tasks can process concurrently. The parameter that is used is MAXRECALLTASKS(15).
- The maximum number of automatic secondary space management Statistics and Migration cleanup tasks that can run concurrently is 2.
- The maximum number of automatic secondary space management migration tasks for data sets from level 1 volumes to level 2 tape volumes that can run concurrently is 1.

```
SETSYS  SECONDARYSPMGMTSTART(0800 1700) +
        MIGRATIONCLEANUPDAYS(10 30 3) +
        MAXRECALLTASKS(15) +
        MAXSSMTASKS(CLEANUP(2) TAPEMOVEMENT(1))
```

## Specifying the SETSYS Parameters for DFSMShsm Processing in a Security Environment

**Example:** In this example, the SETSYS parameters associated with DFSMShsm processing in a security environment are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- DFSMShsm asks RACF for the erase status of a users data set when backup versions and migration copies are scratched from DFSMShsm-owned DASD volumes and if so requested, causes data management to overwrite the storage of the owned copy. Parameter used is ERASEONSCRATCH.
- DFSMShsm does not create a backup RACF discrete profile when it backs up a cataloged RACF-indicated data set. Parameter used is NOPROFILEBACKUP.
- DFSMShsm does not put RACF-indication on backup versions and migration copies. Parameter used is NORACFIND.
- DFSMShsm protects tapes with RACF. In addition, DFSMShsm backups up or migrates a password-protected data set to a tape volume that is not password-protected. Parameter used is TAPESECURITY(RACFINCLUDE).

```
SETSYS  ERASEONSCRATCH +
        NOPROFILEBACKUP +
        NORACFIND +
        TAPESECURITY(RACFINCLUDE)
```

## Specifying the SETSYS Parameters for DFSMShsm Processing in a Tape Environment

**Example:** In this example, the SETSYS parameters associated with DFSMShsm processing in a tape environment are specified. Where appropriate, default values or recommended values are used in the example. These parameters are in effect until another SETSYS command is issued to change them.

- DFSMShsm specifies to DFSMSdss that the fourth buffering technique is used for DFSMSdss DASD I/O for a full-volume dump. The fourth buffering technique has DFSMSdss read one cylinder at a time. DFSMShsm specifies to DFSMSdss that the third buffering technique is used for DFSMSdss DASD I/O, and DFSMSdss is to read five tracks at a time. Parameter used is DUMPIO(4,3).

- DFSMShsm creates original backup tapes and migration tapes that will be kept on site and alternate tapes that will be written at a remote site. Parameter used is DUPLEX(BACKUP(Y) MIGRATION(Y)).
- The following installation exits are active: tape data set exit, and tape ejected exit. Note: the TV exit is not included because most customers are using DFSMSrmm. Parameter used is EXITON(TD TE).
- DFSMShsm does not wait for an input tape unit to be allocated because in this example, the customer has plenty of tape units generally available. Parameter used in INPUTTAPEALLOCATION(NOWAIT).
- The number of allowable, not associated ML2 partial tapes is five. You want to recycle all not associated ML2 partial tapes. Parameter used is ML2PARTIALSNOTASSOCIATEDGOAL(5).
- DFSMShsm waits 15 minutes for a tape to be mounted on a nonlibrary allocated drive. Parameter used is MOUNTWAITTIME(15).
- DFSMShsm does not mark cartridge-type single-file formatted tape volumes full when the volume has been demounted. Parameter used is PARTIALTAPE(REUSE).
- DFSMShsm requests scratch tape volumes when an end-of-volume condition occurs on a tape volume. Parameter used is SELECTVOLUME(SCRATCH).
- The recycled tape volumes are deleted from DFSMShsm control and become scratch tapes. Parameter used is TAPEDELETION(SCRATCHTAPE).
- DFSMShsm migrates data sets to 3590-1 tape volumes when migrating the volumes to ML2. DFSMShsm attempts reconnection to ML2 tape on all data sets eligible to migrate. Parameter used is TAPEMIGRATION(ML2TAPE RECONNECT(ALL)).
- DFSMShsm does issue action messages to the operator asking if tapes needed by DFSMShsm recall, recover, and recycle input are available because a customer has nonrobotic tape mounting. Parameter used is TAPEINPUTPROMPT(BACKUPTAPES(NO) DUMPTAPES(NO) MIGRATIONTAPES(NO)).
- DFSMShsm issues a message to the operator during TAPECOPY processing. Parameter used is TAPEOUTPUTPROMPT(TAPECOPY(YES)).
- DFSMShsm reduces the occurrence of data set spanning tape volumes. The subparameter value of 1000 is well suited for 3590-1. Parameter used is TAPESPANSIZE(1000).
- DFSMShsm allows a recall task to be used continuously for tape recalls for at least 10 minutes and have a tape allocated and mounted for at least 5 minutes before allowing another DFSMShsm host to take the tape away for a higher priority request. Parameter used is TAPERECALLLIMITS(TASK(10) TAPE(5)).
- The 3590-1 tape unit is allocated to initially select scratch tapes during backup or dump. Parameter used is UNITNAME(3590-1).
- Identify an esoteric tape unit name to DFSMShsm for output allocations of 3590-1 tape drives. Parameter used is USERUNITTABLE(TAPE).
- DFSMShsm forces an end-of-volume (EOV) when a tape volume has reached the desired level of utilization (fullness). You want to use 97% of the capacity but retain the reduced tape spanning. Three separate SETSYS commands are required to specify each unit type to be defined. Parameters used are TAPEUTILIZATION(UNITTYPE(3590-1) PERCENTFULL(97)) and TAPEUTILIZATION(LIBRARYBACKUP PERCENTFULL(97)) and TAPEUTILIZATION(LIBRARYMIGRATION PERCENTFULL(97)).

```
SETSYS DUMPIO(4,3) +
  DUPLEX(BACKUP(Y) MIGRATION(Y)) +
  EXITON(TD TE) +
  INPUTTAPEALLOCATION(NOWAIT) +
  ML2PARTIALSNOTASSOCIATEDGOAL(0) +
  MOUNTWAITTIME(15) +
  PARTIALTAPE(REUSE) +
  SELECTVOLUME(SCRATCH) +
  TAPEDELETION(SCRATCHTAPE) +
  TAPEMIGRATION(ML2TAPE RECONNECT(ALL)) +
  TAPEINPUTPROMPT(BACKUPTAPES(NO) +
    DUMPTAPES(NO) +
    MIGRATIONTAPES(NO)) +
  TAPEOUTPUTPROMPT(TAPECOPY(YES)) +
  TAPESPANSIZE(1000) +
  TAPERECALLLIMITS(TASK(10) TAPE(5)) +
  UNITNAME(3590-1) +
  USERUNITTABLE(TAPE)
SETSYS TAPEUTILIZATION(UNITTYPE(3590-1) PERCENTFULL(97))
SETSYS TAPEUTILIZATION(LIBRARYBACKUP PERCENTFULL(97))
SETSYS TAPEUTILIZATION(LIBRARYMIGRATION PERCENTFULL(97))
```



---

## Chapter 37. STOP: Shutting Down DFSMShsm

The STOP command causes an orderly shutdown of DFSMShsm. An orderly shutdown occurs when DFSMShsm ends each attached subtask and ends all started secondary address spaces. Because many DFSMShsm commands and automatic functions can run for a long time, DFSMShsm periodically checks whether you issued a STOP command. This allows DFSMShsm to shut down as soon as possible. After DFSMShsm detaches all subtasks and all secondary address spaces end, DFSMShsm issues a message indicating that shutdown is complete. DFSMShsm then returns control to the system. The STOP command should be entered only once.

If the DUMP parameter is specified with the STOP command, DFSMShsm ends processing immediately for all primary and secondary address spaces, and there is no orderly shutdown. All secondary address spaces currently processing are canceled immediately.

When the STOP command is issued without any parameters in a sysplex environment, DFSMShsm assumes that no promotion is desired on that host.

Another way to shut down DFSMShsm is to use the MVS STOP command.

---

### Syntax of the STOP Command

```
►--STOP-- [DUMP] [PROMOTE]
```

---

### Optional Parameters of the STOP Command

This section describes the optional parameters of the STOP command.

#### DUMP: Requesting a Dump of the DFSMShsm Address Space

**Explanation:** DUMP is an optional parameter requesting a dump of the DFSMShsm address space before DFSMShsm stops processing. The SYSUDUMP, SYSMDUMP, or SYSABEND DD statement you specify in the DFSMShsm startup procedure determines where DFSMShsm sends the dump. If, however, you specify SETSYS SYS1DUMP, the DFSMShsm dumps resulting from an abnormal end or error condition are written in a system dump data set. Use caution when specifying the DUMP parameter on the STOP command when there is processing going on in a secondary address space. There is a large expenditure of system resources when processing in a secondary address space, and the DUMP parameter causes all secondary address spaces to end processing immediately.

When the STOP command is issued with the DUMP parameter in a sysplex environment, this host is eligible to have its functions taken over by another host.

**Defaults:** None.

## **STOP**

### **PROMOTE: Specifying that a Specific Host in a Sysplex is Eligible to be Promoted for Another Host**

**Explanation:** PROMOTE is an optional parameter requesting that this host in a sysplex is eligible to have its primary functions and/or Secondary Space Management functions taken over by another host.

**Defaults:** None.

---

### **Examples of How to Code the STOP Command**

The following example shows how to code the STOP command:

#### **Stopping DFSMShsm with a Dump**

**Example:** In this example, DFSMShsm is stopped and a dump is taken.

STOP DUMP

---

## Chapter 38. SWAPLOG: Switching between the DFSMShsm Log or PDA Data Sets

The SWAPLOG command is used to swap the two log data sets or swap the two PDA data sets. You can choose which data sets to swap by using the LOG or PDA optional parameters. If no optional parameter is specified on the SWAPLOG command, only the log data sets are swapped.

---

### Syntax of the SWAPLOG Command



**Note:** The SWAPLOG command has no required parameters.

---

### Optional Parameters of the SWAPLOG Command

This section describes the optional parameters of the SWAPLOG command.

#### LOG: Specifying to Swap the Log Data Sets

The two DFSMShsm log data sets are called the LOGX data set and the LOGY data set. The names of the data sets are specified in the procedure used to start DFSMShsm and also in the procedure used to print the LOGY data set.

DFSMShsm always writes information in the LOGX data set. When the LOGX data set becomes full, DFSMShsm automatically swaps the two log data sets. You can use the SWAPLOG command to swap the two log data sets. In addition, you can specify the LOGSW=YES parameter on the START DFSMShsm command to cause DFSMShsm to swap the log data sets during DFSMShsm initialization. When the log data sets are swapped, DFSMShsm does the following:

1. Stops writing information in the LOGX data set
2. Closes the LOGX data set
3. Renames the LOGX data set to a temporary name
4. Renames the LOGY data set to LOGX
5. Renames the temporary data set name to LOGY
6. Opens the new LOGX data set
7. Resumes writing information in the new LOGX data set.

After the DFSMShsm log data sets have been swapped, start the HSMLOG procedure that is supplied with the DFSMShsm licensed program. This procedure normally resides in PARMLIB. The HSMLOG procedure runs the ARCPRLLOG program to do an initial formatting of the information in the LOGY data set and to print the log data set. After running the ARCPRLLOG program, the HSMLOG procedure deletes the old LOGY data set and reallocates a new LOGY data set. The ARCPRLLOG program is also supplied with the DFSMShsm licensed program.

If you do not print the information in the LOGY data set after the log data sets are swapped and a later swap occurs, you do not have a copy of that information because DFSMShsm writes over the old information in the LOGY data set.

## SWAPLOG

The *z/OS DFSMShsm Storage Administration Guide* contains additional information about the contents of the DFSMShsm log data sets and how to print information in the DFSMShsm log.

### PDA: Specifying to Swap the PDA Data Sets

The two DFSMShsm PDA data sets are called the ARCPDOY data set and the ARCPDOX data set.

DFSMShsm always writes information in the ARCPDOX data set. When the ARCPDOX data set becomes full, DFSMShsm automatically swaps the two PDA data sets. You can use the SWAPLOG command to swap the two PDA data sets.

The *z/OS DFSMShsm Diagnosis* contains additional information about the PDA facility.

---

### Examples of How to Code the SWAPLOG Command

The following examples present how to code the SWAPLOG command:

#### Swapping the DFSMShsm LOGX and LOGY Data Sets

**Example:** In this example, since no optional parameter is specified, the DFSMShsm log data sets are swapped.

```
SWAPLOG
```

#### Swapping the DFSMShsm LOGX and LOGY Data Sets

**Example:** In this example, the DFSMShsm log data sets are swapped.

```
SWAPLOG LOG
```

#### Swapping the DFSMShsm PDA Data Sets

**Example:** In this example, the DFSMShsm PDA data sets are swapped.

```
SWAPLOG PDA
```

#### Swapping Both the DFSMShsm Log and PDA Data Sets

**Example:** In this example, both the DFSMShsm log and PDA data sets are swapped.

```
SWAPLOG LOG PDA
```

---

## Chapter 39. TAPECOPY: Making Copies of Selected Cartridge-Type Tape Volumes

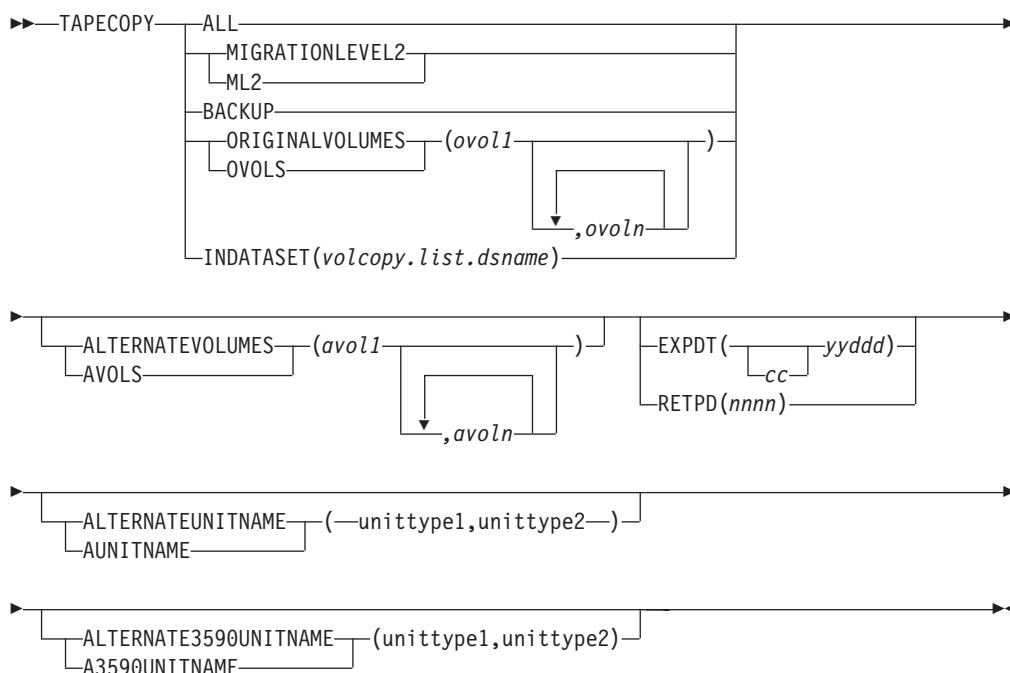
The TAPECOPY command provides a way of copying migration level 2 and backup cartridge-type single-file tape volumes. It is an alternate method to tape duplexing, which creates two tapes during the migration, backup, or recycle processes. To distinguish between copies, the input tape is called the original, and the output tape is called its alternate.

You can issue the TAPECOPY command generically for a functional category of tape volumes. Generic processing selects only those tapes that are marked full and do not already have an alternate tape copy. When processing one or more specific volumes, tapes do not have to be already marked full, and they may already have a previous tape copy alternate.

DFSMShsm gives special consideration to migration level 2 tapes in a SETSYS PARTIALTAPE(MARKFULL) environment. When DFSMShsm migrates data sets versus volumes, it does not mark output tapes as full even when running in a PARTIALTAPE(MARKFULL) environment. To allow these tapes to be copied, generic processing will mark all partial tapes as full, so that they will be selected.

The source volume for TAPECOPY may reside inside or outside a system-managed tape library. The ACS routines can be used to control whether a system-managed tape volume is used for TAPECOPY output. Refer to the *z/OS DFSMShsm Implementation and Customization Guide* for additional information.

### Syntax of the TAPECOPY Command



---

## Required Parameters of the TAPECOPY Command

This section describes the required parameters of the TAPECOPY command.

### ALL: Specifying to Copy All Eligible Cartridge-Type Single-File Tape Volumes

**Explanation:** ALL specifies that all cartridge-type single-file tape volumes that are marked as full in the OCDS TTOC record and do not have an alternate volume are to be copied. If the environment is PARTIALTAPE(MARKFULL) when this command is issued, all partially full migration level 2 tapes will be marked full.

**Tape Library Relationship:** A UNITNAME can be used for filtering in the ACS routines. If you specify the unittype for this command, it will be sent to the ACS routines in SMS for the TAPECOPY function.

When ALL is specified, DFSMShsm uses scratch tapes for the output or target volumes.

**Defaults:** None.

### MIGRATIONLEVEL2: Specifying to Create Copies of All Eligible Migration Level 2 Volumes

**Explanation:** MIGRATIONLEVEL2 specifies that all cartridge-type single-file migration level 2 tape volumes that are marked as full in the OCDS TTOC record and do not have alternate volumes are to be copied. If the environment is PARTIALTAPE(MARKFULL) when this command is issued, all partially full migration level 2 tapes will be marked full.

When MIGRATIONLEVEL2 is specified, DFSMShsm uses scratch tapes for the output or target volumes.

**Defaults:** None.

### BACKUP: Specifying to Create Copies of All Eligible Backup Tape Volumes

**Explanation:** BACKUP specifies that all cartridge-type single-file backup tape volumes that are marked as full in the OCDS TTOC record and do not have alternate volumes are to be copied. When BACKUP is specified, DFSMShsm uses scratch tapes for the output or target volumes.

**Defaults:** None.

### ORIGINALVOLUMES: Copying Specified Volumes

**Explanation:** ORIGINALVOLUMES(*ovol1...ovoln*) is a required parameter (if you are specifying which volumes are to be copied) requesting that alternate tape volume copies be created. The volumes to be copied are specified by their volume serial numbers (*ovol*). The alternate tape volumes are made even though the original volumes may not be marked full or may already have an alternate tape volume reference in the OCDS TTOC record.

The optional parameter ALTERNATEVOLUMES may be used to specify which output volumes are to be used in place of using scratch tapes. If specified, the

number of entries in ORIGINALVOLUMES and ALTERNATEVOLUMES must match. The TAPECOPY function will maintain a one-for-one correspondence between the two sets of entries.

**Defaults:** None.

## INDATASET: Specifying to Use a Data Set Containing a Volume List

**Explanation:** INDATASET(*volcopy.list.dsname*) is a required parameter specifying to use a list of original tape volumes contained in the data set supplied and create alternate tape volume copies of them. The alternate tape volumes are made even though the original volumes may not be marked as full.

*volcopy.list.dsname* is the data set name of the cataloged data set. This data set must *not* be a migrated data set when the command is issued.

When allocating the volume list data set, use the following parameters for:

<b>RECFM</b>	Specify F, FB, FS, or FBS
<b>LRECL</b>	Specify 80
<b>BLKSIZE</b>	Specify a multiple of LRECL
<b>DSORG</b>	Use physical sequential (PS) organization.

When building the volume list contents, use the following entry format:

Columns	Contents
1-6	Original volume source to be copied. Specify this volume by its volume serial number.
8-13	Alternate volume target specified by its volume serial number. You can also use a volume serial number of PRIVAT, meaning that DFSMSHsm is to use a scratch tape for the target. If a volume serial number is not specified, the default is the value found in the alternate volume field of the OCDS TTOC record.
15-21	This field is used to specify an alternate tape volume expiration date. The date is placed in the tape label but has no relation to when DFSMSHsm will remove the tape from its inventory. The alternate tape is deleted by DFSMSHsm at the same time the original tape is deleted. Use the format as <i>ccyyddd</i> and right justify the date within the field. If no expiration date is specified in this field, the expiration date specified or defaulted for the command is used.  The date is checked for validity, and the tape listed in the input record is not copied if the check fails. If the <i>cc</i> field (below) is blank, the date limits are the current date to 31 December 1999. Date limits are otherwise the current date to 31 December 2155.
<i>cc</i>	This is a field used to specify the first two digits of the year. If the current date is before 1 January 2000, this field can be left blank; the year will be interpreted as 19 <i>yy</i> .
<i>yy</i>	This field specifies the last two digits of the year.
<i>ddd</i>	This field specifies the Julian day in the year.

## TAPECOPY

### Notes:

1. If an expiration date is supplied, it is processed as described under the EXPDT parameter. The exception is that if an expiration date is invalid, only the tape listed in the input record is failed.
2. If the expiration date is not supplied in an input record, the EXPDT parameter on the TAPECOPY command is used.
3. Past dates are not recognized as expiration dates.
4. Values for ccyyddd of 1999365 and 1999366 are recognized as "never expire" dates. Values of 1998000 and 1999000 are recognized as meaningful to certain tape management systems.
5. If no expiration date is supplied, DFSMShsm uses the expiration date specified or defaulted for the command.

### INDATASET Example

The following is an example of the format for the input volume list data set:

```
Columns:1----6 8---13 15---21
Format: source target ccyyddd

      * * * Top of Data * * *
Line 1: JHG191 DBK001 2101001
Line 2: ML1002 PRIVAT 2101059
Line 3: ML2100 DBK070
Line 4: ML2101
      * * * End of Data * * *
```

### Legend:

- Line 1** JHG191 is the source volume, DBK001 is the target volume and retain the target volume until January 1, 2101.
- Line 2** ML1002 is the source volume, use a scratch tape for the target volume and retain the target volume until February 28, 2101.
- Line 3** ML2100 is the source volume, DBK070 is the target volume and retain until the date (if any) specified with the EXPDT parameter.
- Line 4** ML2101 is the source volume, use a scratch tape and retain the target volume until the date (if any) specified with the EXPDT parameter.

**Defaults:** None.

---

## Optional Parameters of the TAPECOPY Command

This section describes the optional parameters of the TAPECOPY command.

### ALTERNATEUNITNAME: Specifying Alternate Unit Names for a Tape Copy

**Explanation:** ALTERNATEUNITNAME(*unittype1,unittype2*) is used to specify the unit name associated with only a 3480, 3480X or 3490 cartridge-type single-file tape. When ALTERNATEUNITNAME is specified, the alternate tape will be allocated using the specified unit name. This will be done as long as there is no incompatibility in the unit name.

If there are two unit names specified with ALTERNATEUNITNAME, DFSMShsm will use *unittype1* when the source volume is a standard cartridge, and it will use *unittype2* when the source volume is an enhanced capacity cartridge.

**Notes:**

1. The following table shows the compatibility between original volume unit names and alternate volume unit names. This table applies when TAPECOPY output is being directed outside a system managed tape library.

Original Volume Unit Name	Alternate Volume Unit Name				
	3480	SETSYS NOTAPEHWC 3480X	SETSYS TAPEHWC 3480X	3490	3590-1
3480	C	C	I	I	I
3480X (non-IDRC)	C	C	I	I	I
3480X (IDRC)	I	I	C	I	I
3490	I	I	I	C	I
3590-1	I	I	I	I	C

**Note:** C = Compatiable I = Incompatiable

2. The 3480, 3480X, and 3490 can be considered valid generic unit names for the ALTERNATEUNITNAME parameter.

**Defaults:** None.

## ALTERNATE3590UNITNAME: Specifying 3590 Alternate Unit Name for a Tape Copy

**Explanation:** ALTERNATE3590UNITNAME(*unittype1,unittype2*) is used to specify the unit name associated with only the IBM 3590 tape subsystem. When ALTERNATE3590UNITNAME is specified, the alternate tape will be allocated using the specified unit name. This will be done as long as there is no incompatibility in the unit name.

**Defaults:** None.

## ALTERNATEVOLUMES: Specifying Which Volumes to Copy

**Explanation:** ALTERNATEVOLUMES(*avol1,...avoln*) is an optional parameter that defines which output volumes are to be used in place of scratch tapes. These tape volumes are indicated by their volume serial numbers *avol*. If specified, the number of entries in ORIGINALVOLUMES and ALTERNATEVOLUMES must match. The TAPECOPY function will maintain a one-for-one correspondence between the two sets of entries. The alternate tape volumes are made even though the original volumes may not be marked as full.

When considering 3480, 3480X, and 3490 volumes, the original volumes and the alternate volumes must use the same recording technology. If the original volume is written using the Improved Data Recording Capability (IDRC) of the 3480X, then the alternate volumes must be written using the IDRC. The reverse is true as well.

For 3490 volumes or 3590-1 volumes, the original volumes and alternate volumes must use the same media type. If the original volume is written using a standard

capacity cartridge, then the alternate volume must be written with a standard capacity cartridge (an enhanced capacity cartridge cannot be used). The reverse is true as well.

**Defaults:** None.

## **EXPDT | RETPD: Specifying a Tape Expiration Date or a Retention Period**

**EXPDT(ccyyddd) | RETPD(nnnn)** are mutually exclusive, optional parameters specifying either an expiration date or a retention period for the alternate tape volume. The date is placed in the tape label but has no relation to when DFSMShsm will remove the tape from its inventory. The alternate tape is deleted by DFSMShsm at the same time the original is deleted.

It is important for you to understand that specifying an expiration date for the alternate tape volume that would cause the alternate tape volume to return to scratch before the original tape volume returns to scratch can result in data loss. For example, consider the following scenario:

- Tape 1 is an original volume that has Tape 2 as its alternate volume.
- Tape 2 is returned to scratch by the Tape Management System because the specified expiration date is reached. Tape 2 is now known to the Tape Management System as a scratch tape; however, DFSMShsm regards this tape as a valid alternate of Tape 1. (The expiration date does not relate to when the tape is removed from the DFSMShsm inventory.)
- Tape 2 is now mounted in response to a scratch request from either DFSMShsm or another user request. After it has been written to, Tape 2 is not a valid alternate for Tape 1 anymore because it has been overwritten; however, DFSMShsm still considers Tape 2 a valid alternate of Tape 1. This, in itself, poses a problem if the alternate tape is needed, but the potential for problems continues.
- Tape 1 is now returned to scratch by the ARCTVEXT exit, which also results in Tape 2 being returned to scratch. Now, Tape 2 is again a scratch volume and the data written to Tape 2 after its return to scratch the first time can be overwritten again if mounted in response to a scratch request.

EXPDT is an optional parameter that specifies a different expiration date (other than 1999365) for the alternate tape volume. The date is checked for validity, and the entire command is rejected if the test fails. Date limits for *ccyyddd* are from the current date to 31 December 2155.

Values for *ccyyddd* of 1999365 and 1999366 are recognized as “never expire” dates. Values of 1998000 and 1999000 are recognized as meaningful to certain tape management systems.

RETPD is an optional parameter that sets the expiration date by specifying a retention period. The valid range is 0–9999. RETPD is converted to an expiration date and is processed as described under EXPDT.

**Defaults:** None.

Table 5 on page 489 shows all of the conditions for each tape volume processed by DFSMShsm. If the tape data set exit (ARCTDEXT) is in effect, DFSMShsm invokes the exit after processing any of the conditions shown in Table 5 and puts the date specified by the exit on the tape being copied.

Table 5. DFSMSHsm Processing by Condition

Conditions				DFSMSHsm...
Is an expiration date specified in the INDATASET record?	Is an expiration date specified on the TAPECOPY command?	Is the SETSYS TAPESecurity (EXPIRATION) command in effect?	Is an expiration date specified for the original volume?	
no	no	no	no	Does not protect the alternate volume with an expiration date.
no	no	no	yes	Uses its default date of 1999365.
no	no	yes	no	
no	no	yes	yes	
no	yes	no	no	
no	yes	no	yes	
no	yes	yes	no	
no	yes	yes	yes	
yes	no	no	no	
yes	no	no	yes	
yes	no	yes	no	
yes	no	yes	yes	
yes	yes	no	no	
yes	yes	yes	no	
yes	yes	yes	yes	

## Examples of How to Code the TAPECOPY Command

The following examples present different ways to code the TAPECOPY command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Specifying to Copy All Eligible Cartridge-Type Single-File Tape Volumes

**Example:** The following example illustrates how to make a copy of all the cartridge-type single-file migration and backup tapes that do not already have a copy:

```
TAPECOPY ALL
```

### Specifying to Copy a Set of Tape Volumes

**Example:** The following example illustrates how to make a copy of more than one original volume on specific alternate volumes:

```
TAPECOPY ORIGINALVOLUMES(JHG191,JHG195,JHG198) +
    ALTERNATEVOLUMES(DBK001,DBK005,DBK008)
```

## Specifying to Copy a List of Original Volumes

**Example:** This example illustrates using a data set containing a list of volumes to process that are to be retained until December 31, 2010. The expiration date for the alternate tape volume does not relate to when the tape volume is removed from the DFSMShsm inventory. In this example, if the original volume is removed from the DFSMShsm inventory after December 31, 2010, there can be an exposure to data loss.

```
TAPECOPY INDATASET(G737495.VOLIST.DATA) +  
EXPDT(2010365)
```

## Specifying the TAPECOPY Command with Enhanced Capacity Cartridge Support

**Example:** The 3490E backup and migration volumes residing on standard tape cartridges are copied using the esoteric tape unit name ES1. Those backup and migration volumes residing on enhanced capacity cartridges are copied using the esoteric tape unit name ES2. The 18-track format cartridges are copied to units allocated using ES1.

```
TAPECOPY BACKUP ALTERNATEUNITNAME(ES1, ES2)
```

All backup volumes are copied using esoteric tape unit name ES1, regardless of the type of cartridge (standard vs enhanced capacity). If only one unit is specified with ALTERNATEUNITNAME, it is the device type used for all TAPECOPY processing for backup volumes. In this case, potential exists for TAPECOPY failures if a 3490E backup volume is an enhanced capacity cartridge, and ES1 is an esoteric tape unit that is being used for output to standard tapes (for example, devices are preloaded with standard tapes).

```
TAPECOPY BACKUP ALTERNATEUNITNAME(ES1)
```

---

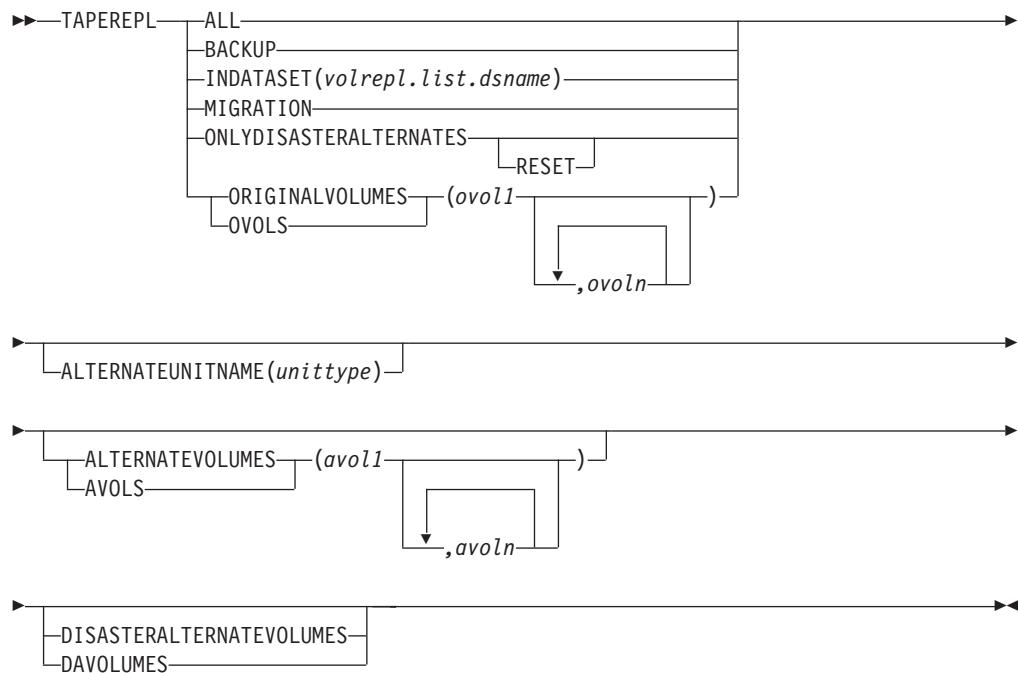
## Chapter 40. TAPEREPL: Replacing Cartridge-Type Tape Volumes with Their Alternate Volumes

The TAPEREPL command provides a way of replacing an original migration level 2 volume or a backup volume with its alternate volume. It also plays an important part during an actual disaster recovery or when you are running a disaster recovery test by allowing you to replace original volumes with their alternate volumes.

For a discussion of the steps to follow when making disaster backup copies of DFSMShsm-owned tape volumes, see "Disaster Alternate Volumes", which is in the "Disaster Backup" chapter of the *z/OS DFSMShsm Storage Administration Guide*.

---

### Syntax of the TAPEREPL Command



---

## Required Parameters of the TAPEREPL Command

This section describes the required parameters of the TAPEREPL command.

### ALL: Specifying Replacement of All Cartridge-Type Single-File Tape Volumes

**Explanation:** ALL is a required parameter specifying replacement of all cartridge-type single-file tape volumes that have alternate-tape-volume references in their OCDS TTOC records.

**Defaults:** None.

### BACKUP: Specifying Replacement of All Cartridge-Type Single-File Backup Tape Volumes

**Explanation:** BACKUP is a required parameter specifying that all references to cartridge-type single-file backup tapes with alternate volumes be replaced with references to the alternate tape volumes.

**Defaults:** None.

### INDATASET: Specifying the Use of a Data Set Containing a Volume List

**Explanation:** INDATASET is a required parameter that causes a list of original tape volume references in the supplied data set to be replaced with a list of alternate tape volume references. *volrep.list.dsname* is the data set name of the catalogued data set. This data set must *not* be a migrated data set when the command is issued.

When allocating the volume list data set, use the following parameters for:

RECFM	Specify F, FB, FS, or FBS
LRECL	Specify 80
BLKSIZE	Specify a multiple of LRECL
DSORG	Use physical sequential (PS) organization.

When building the volume list contents, use the following entry format:

Columns	Contents
1-6	Original tape volume serial number to be replaced.
8-13	Alternate tape volume serial number to use. If an alternate tape volume serial number is not specified, the value found in the alternate volume field of the original volume's OCDS TTOC record is used.

## IN DATASET Example

The following is an example of the format for the input volume list data set:

```

Columns: 1----6 8---13
Content: orig. alt.
          volser volser

      * * * Top of Data * * *
Line 1: ML1100 DBK070
Line 2: ML2101
      * * * End of Data * * *

```

### Legend:

**Line 1** specifies replacement of the original tape volume labeled ML1100 with the alternate tape volume DBK070.

**Line 2** specifies replacement of the original tape volume labeled ML2101 with the alternate tape volume specified in the OCDS TTOC record for volume ML2101.

**Defaults:** None.

## MIGRATION: Specifying Replacement of All Cartridge-Type Single-File Migration Tape Volumes

**Explanation:** MIGRATION is a required parameter specifying that all references to cartridge-type single-file migration tapes with alternate volumes be replaced with references to the alternate tape volumes.

**Defaults:** None.

## ONLYDISASTERALTERNATES: Converting Disaster Alternate Volumes to Original Volumes

**Explanation:** ONLYDISASTERALTERNATES is a required parameter that converts all disaster alternate volumes to original volumes. No optional parameters are used with ONLYDISASTERALTERNATES.

RESET is an optional subparameter that changes original volumes flagged as having disaster alternates back to the status of original volumes having normal alternates.

**Defaults:** None.

## ORIGINALVOLUMES: Specifying Volumes to Be Replaced

**Explanation:** ORIGINALVOLUMES is a required parameter specifying that all references to the original tape volume be replaced with references to the alternate tape volume. The alternate tape volume can be specified using the ALTERNATEVOLUMES parameter or, in its absence, the one found in the original volume's OCDS TTOC record.

**Defaults:** None.

## Optional Parameters of the TAPEREPL Command

This section describes the optional parameters of the TAPEREPL command.

### ALTERNATEUNITNAME: Specifying an Alternate Unit Name for a Tape Replacement

**Explanation:** ALTERNATEUNITNAME (*unittype*) is used to specify the unit name associated with 3480, 3480X or 3490 cartridge-type single-file tape. When ALTERNATEUNITNAME is specified, the tape unit name will be changed in the OCDS TTOC. This will be done as long as there is no incompatibility in the unit name.

**Notes:**

1. The following table shows the compatibility between original volume unit names and alternate volume unit names.

Original Volume Unit Name	Alternate Volume Unit Name				
	3480	SETSYS NOTAPEHWC 3480X	SETSYS TAPEHWC 3480X	3490	3590-1
3480	C	C	I	I	I
3480X (non-IDRC)	C	C	I	I	I
3480X (IDRC)	I	I	C	I	I
3490	I	I	I	C	I
3590-1	I	I	I	I	C

**Note:** C = Compatiable I = Incompatiable

2. The 3480, 3480X, and 3490 can be considered valid generic unit names for the ALTERNATEUNITNAME parameter.
3. If DISASTERALTERNEVOLMES is also specified, then the ALTERNATEUNITNAME will only be used with the DAVOLUMES while in DISASTERMODE. The ALTERNATEUNITNAME does *not* permanently replace the original unit. The LIST TTOC command will still show the original unit. When the time comes to permanently replace the original volumes with the alternate volumes, and you issue a TAPEREPL command without DAVOLUMES, the ALTERNATEUNITNAME must be specified again or the original unit name will be used. The original unit name is used if ALTERNATEUNITNAME is not specified on the command.

**Defaults:** None.

### ALTERNATEVOLUMES: Specifying the Replacement Volumes to Use

**Explanation:** ALTERNATEVOLUMES is an optional parameter that identifies specific alternate tape volumes to substitute for the original tape volumes. The alternate tape volumes are selected by their volume serial numbers *avol*. If specified, the number of entries in ORIGINALVOLUMES and ALTERNATEVOLUMES must match. The TAPEREPL function maintains a one-for-one correspondence between the two sets of entries.

**Attention**

The volumes that are specified in the ALTERNATEVOLUMES parameter will replace the volumes in ORIGINALVOLUMES even if they do not contain valid DFSSMShsm data.

**Defaults:** None.

## DISASTERALTERNATEVOLUMES: Identifying the Alternate Volume as the Disaster Alternate Volume

**Explanation:** DISASTERALTERNATEVOLUMES is an optional parameter that causes each alternate volume to be flagged as a disaster alternate volume. If DISASTERALTERNATEVOLUMES is specified, a flag is set for each ML2 tape and backup tape that has an alternate volume. The designation of “disaster alternate volume” helps distinguish between alternate volumes initially present at the recovery site and alternate volumes created later at the recovery site. If DISASTERALTERNATEVOLUMES is not specified, each original volume is replaced by its alternate volume in any of the DFSSMShsm volume and data set records that refer to it. For more information on the use of disaster alternate volumes, refer to the “Disaster Backup” topic in the *z/OS DFSSMShsm Storage Administration Guide*.

**Defaults:** None.

---

## Examples of How to Code the TAPEREPL Command

The following examples present different ways to code the TAPEREPL command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Specifying Replacement of a Damaged Tape

**Example:** The following example illustrates how to replace a damaged tape by its alternate, which is identified in the OCDS TTOC record for the damaged tape:

TAPEREPL ORIGINALVOLUMES(HB0123)

### Specifying Replacement of a Set of Tape Volumes

**Example:** The following example illustrates how to replace more than one original tape volume with respective alternate volumes:

TAPEREPL ORIGINALVOLUMES(JHG191,JHG195,JHG198) +  
ALTERNATEVOLUMES(DBK001,DBK005,DBK008)

### Specifying Replacement of a List of Original Volumes

**Example:** This example illustrates the use of a data set containing a list of volumes to process.

TAPEREPL INDATASET(G737495.VOLIST.DATA)



---

## **Chapter 41. TRAP: Requesting a Dump When a Specified Error Occurs**

The TRAP command is to be used only for maintenance purposes and is explained in the *z/OS DFSMShsm Diagnosis*.



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## Chapter 42. UPDATEC: Recovering the Control Data Sets

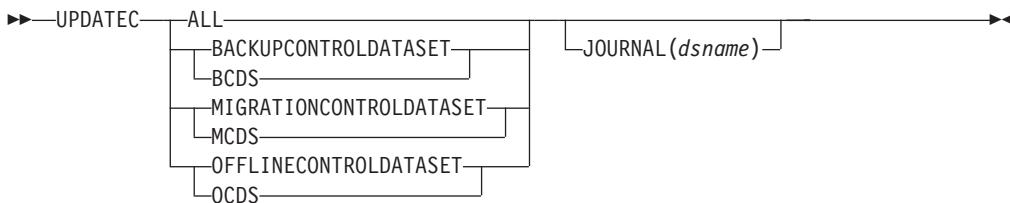
The UPDATEC command rebuilds an updated control data set and combines the entries in the specified journal data set with the restored backup copy of the BCDS, MCDS, or OCDS. You use the UPDATEC command to fix any major problems that occur in the control data sets.

When you issue the UPDATEC command, DFSMShsm places itself in emergency mode and does not write in the journal data set.

**Note:** For performance reasons, the enhanced CDS recovery function should be used to recover control data sets instead of the UPDATEC command. See “Recovering Control Data Sets Using Enhanced CDS Recovery Functions” for information on using enhanced CDS recovery functions in the *z/OS DFSMShsm Storage Administration Guide*.

---

### Syntax of the UPDATEC Command



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### Required Parameters of the UPDATEC Command

This section describes the required parameters of the UPDATEC command.

#### ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET: Specifying Which Control Data Set to Update

**Explanation:** ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET are mutually exclusive, required parameters that specify which control data sets DFSMShsm should update.

ALL specifies that DFSMShsm combines the entries from the journal data set with the restored copies of all three control data sets.

BACKUPCONTROLDATASET specifies that DFSMShsm combines the entries from the specified journal data set with the restored backup copy of the BCDS.

MIGRATIONCONTROLDATASET specifies that DFSMShsm combines the entries from the specified journal data set with the restored backup copy of the MCDS.

OFFLINECONTROLDATASET specifies that DFSMShsm combines the entries from the specified journal data set with the restored backup copy of the OCDS.

**Defaults:** None.

---

## Optional Parameters of the UPDATEC Command

This section describes the optional parameters of the UPDATEC command.

### JOURNAL: Specifying the Journal Data Set to Use

**Explanation:** JOURNAL(*dsname*) is an optional parameter specifying the fully qualified name of the journal data set to use with UPDATEC. For *dsname*, substitute the fully qualified name of the journal data set that DFSMShsm should use when it updates the BCDS, MCDS, and OCDS. You specify JOURNAL only if you do not want to use the journal data set identified with the JOURNAL DD statement in the DFSMShsm startup procedure.

**Defaults:** If you do not specify JOURNAL, DFSMShsm uses the journal data set identified with the JOURNAL DD statement in the DFSMShsm startup procedure.

If a journal is used other than the one currently identified in the journal DD statement (a journal other than the current journal means a backup journal), and if that journal is on tape, the following procedure is required:

1. The tape must be mounted without the write-protect ring.
2. After mounting the tape, you will receive a message (IEC510D) stating that the program is attempting to write on the tape, but the write-protect ring is not inserted. Reply to this message with Rnn,F which rewinds the tape. After the tape rewinds, insert the write-protect ring and remount the tape. After the tape is remounted, ready the device.

---

## Examples of How to Code the UPDATEC Command

The following examples present different ways to code the UPDATEC command:

**Note:** Any values specified here are only examples and should not be interpreted as the values to be used for your system.

### Updating the MCDS, BCDS, and OCDS with a Specified Journal Data Set

**Example:** In this example, the MCDS, BCDS, and OCDS are updated by using a specified journal data set.

```
UPDATEC ALL JOURNAL(ALT.JRNL)
```

### Updating the MCDS

**Example:** In this example, the MCDS is updated using the journal data set identified by the journal DD statement in the DFSMShsm startup procedure.

```
UPDATEC MIGRATIONCONTROLDATASET
```

---

## Appendix A. Using the AUDIT Command

This appendix contains diagnosis, modification, and tuning information.

For control data sets, the AUDIT command detects, reports, diagnoses, and (in many cases) provides repairs for discrepancies within and between the migration control data set (MCDS); the backup control data set (BCDS); the offline control data set (OCDS); VTOCs of DASD volumes; TTOCs for DFMSHsm tape volumes; and the computer system catalogs, including the master catalog and user catalogs.

For common queues, the AUDIT command enables DFMSHsm to dynamically correct inconsistencies with minimal impact on processing. Common queues have interrelated entries that may become corrupted due to abends and unexpected losses of connectivity. A corrupted common queue may cause certain requests to not be processed. DFMSHsm automatically corrects some inconsistencies, but for others, it is necessary to issue the AUDIT COMMONQUEUE command.

The five sections in this appendix can help you make the best use of the AUDIT command for your application. In sections one and two, for each of the AUDIT options, we describe the checking done, and which error conditions can be detected by using that option. For each reported condition, AUDIT may be able to determine a repair action. The actual form of the repair commands, if any, depends on the control information involved.

The options described in “Section One: Using the Enhanced Audit Command to Audit DFMSHsm Control Information” on page 503 are enhancements to the original AUDIT command described in “Section Two: Using the Original AUDIT Command to Audit DFMSHsm Data Set Information” on page 523. Table 6 compares the information driving the AUDIT options.

*Table 6. Comparison of AUDIT Options*

Driving Information	Enhanced AUDIT Option	Original AUDIT Option
Aggregate backup records	ABARSCONTROLS	None
Specific data set names	None	DATASETNAMES LEVELS
Catalog entries	None	MASTERCATALOG USERCATALOG
Backup Control Data Set	DATASETCONTROLS(BACKUP)	BCDS
Migration Control Data Set	DATASETCONTROLS(MIGRATION)	MCDS
Tape table of contents (ML2 volume)	DIRECTORYCONTROLS	VOLUMES OCDS(ML2) OCDS(ALL)
Tape table of contents (backup volume)	DIRECTORYCONTROLS	BACKUPVOLUMES BACKUPTYPE OCDS(DAILY) OCDS(SPILL) OCDS(ALL)
Volume table of contents (DASD VTOC)	DIRECTORYCONTROLS	VOLUMES

*Table 6. Comparison of AUDIT Options (continued)*

Driving Information	Enhanced AUDIT Option	Original AUDIT Option
DFSMShsm images of user data sets	MEDIACONTROLS MEDIACONTROLS(SDSP)	None
Backup-volume records	VOLUMECONTROLS(BACKUP)	None
Common queues	COMMONQUEUE	None
Migration-volume records	VOLUMECONTROLS(MIGRATION)	None
Eligible-volume records	VOLUMECONTROLS(RECOVERABLE)	None

“Section Three: Error Codes (\*ERR) and Diagnosis” on page 544 describes all the conditions reported by AUDIT, as well as repair actions taken and diagnostic suggestions for those cases where AUDIT cannot resolve a discrepancy.

“Section Four: Unexpected Errors During AUDIT” on page 581 identifies errors that may occur to prevent AUDIT from completing its checking.

“Section Five: Other Considerations for Using AUDIT” on page 584 presents considerations for using AUDIT in a multiple-DFSMShsm-host environment and suggestions for printing output.

**Note:** If AUDIT is executing and backup of the DFSMShsm control data sets has been started (via BACKVOL CDS command or AUTOBACKUP), all DFSMShsm functions on the host that started this backup are halted until the AUDIT function and the backup of the DFSMShsm CDS's have completed.

---

## Section One: Using the Enhanced Audit Command to Audit DFSMShsm Control Information

The following AUDIT commands audit and report errors within DFSMShsm controls. When the FIX parameter is specified, AUDIT often completes repairs.

- AUDIT ABARSCONTROLS (*agname*), page 504
- AUDIT COMMONQUEUE, page 504
- AUDIT DATASETCONTROLS (BACKUP), page 505
- AUDIT DATASETCONTROLS (MIGRATION), page 506
- AUDIT DIRECTORYCONTROLS VOLUMES, page 508
- AUDIT MEDIACONTROLS (SDSP) VOLUMES, page 511
- AUDIT MEDIACONTROLS VOLUMES, page 512
- AUDIT VOLUMECONTROLS (BACKUP), page 515
- AUDIT VOLUMECONTROLS (MIGRATION), page 516
- AUDIT VOLUMECONTROLS (RECOVERABLE), page 517

AUDIT FIX will diagnose and repair many of the errors it can detect. There may be times, however, when you want to audit without fixing errors. During an audit, the AUDIT function serializes control records, which allows it to compare several sources of information. While the control records are serialized, they are static and the comparisons are valid. Once the audit has completed, the system returns to its normal dynamic mode, and these comparisons may no longer be valid.

Your decision concerning the use of the FIX parameter to repair errors depends mostly upon two factors:

- First, how busy is DFSMShsm? The higher the activity, the faster your audit report becomes obsolete.
- Second, what is the scope of your audit? If you just want to check the status of one DASD volume, then running AUDIT without the FIX parameter will be helpful. If you audit many controls, your report becomes obsolete quickly.

When auditing a common queue, FIX does not create the same concerns as when auditing other controls. In general, FIX should always be specified when auditing a common queue.

When using the AUDIT functions listed in Section One, you receive important information in the report header and the report body:

- The header of your audit report confirms the performed audit and shows the time, the date, and the system identification. The second line of the report header reflects the AUDIT command and parameters that you have entered.
- The body of your audit report normally consists of two lines printed for each detected error. The first line gives you the error code and a brief description of the error. The lines immediately following the error code list the appropriate repair commands whenever the AUDIT function is able to identify them.

AUDIT COMMONQUEUE does not generate a report. The only output of AUDIT COMMONQUEUE is message ARC1544I.

During an audit, AUDIT executes the following sequence:

1. DETECTION: AUDIT checks for inconsistent sources of information that might prevent DFSMShsm from retrieving a data set (or group of data sets), or accessing a DFSMShsm-owned volume.

2. DIAGNOSIS: AUDIT attempts to refer to one or more additional sources of information (a reality outside of the conflicting sources), when it detects an inconsistency. In many instances, AUDIT is able to list either a repair action (FIX) or a recommendation for further diagnosis of the detected error.
3. FIX: AUDIT initiates repair action, when you specify the FIX parameter and when AUDIT determines the appropriate FIX.

You can determine whether repair action has been initiated by examining two items on the audit report. When FIX is specified for a common queue, all detected errors will be fixed. No specific information is given concerning each error.

1. Was the FIX parameter specified?
2. Did AUDIT list the appropriate repair action?

---

## Using the AUDIT ABARSCONTROLS Parameter

When you specify AUDIT ABARSCONTROLS (*agname*), AUDIT makes the following checks for each ABR (Q) record in the BCDS (or for only those ABR records associated with the specified aggregate group name):

- If no ABR records are found for a specified aggregate group, AUDIT reports **\*ERR 166**.
- If no ABR record is found at all, AUDIT reports **\*ERR 167**.
- If the control file indicated in an ABR record is not cataloged, AUDIT reports **\*ERR 168**.
- If at least one type of data file (DFSMSSdss or internal) is present for an ABR record,
  - If a DFSMSSdss data file is indicated, but the file is not cataloged, and it was created by DFMSHsm, AUDIT reports **\*ERR 168**;
  - If an internal data file is indicated, but the file is not cataloged, and it was created by DFMSHsm, AUDIT reports **\*ERR 168**.
- If no data file is present for an ABR record, AUDIT reports **\*ERR 165**.
- If an instruction/activity log file is indicated, but the file is not cataloged, and it was created by DFMSHsm, AUDIT reports **\*ERR 168**.

The FIX or NOFIX option is ignored for ABARSCONTROLS since only diagnosis messages are issued.

## Diagnosis and Repair Action for ABARSCONTROLS

When you request AUDIT ABARSCONTROLS, AUDIT does not fix any of the errors detected. See “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544 for some troubleshooting hints for any reported conditions.

---

## Using the AUDIT COMMONQUEUE Parameter

When you specify the AUDIT COMMONQUEUE parameter, AUDIT scans the entries in the common queue. When you specify AUDIT COMMONQUEUE(RECALL), AUDIT scans the entries in the Common Recall Queue (CRQ) for logical inconsistencies within the structure.

## Diagnosis and Repair Action for COMMONQUEUE(RECALL)

The following indicate that the CRQ may be corrupted:

- Message ARC1506E was issued.
- Message ARC1187E was issued.

- Recall requests are unexpectedly not being selected for processing.

**Note:** If recall requests are unexpectedly not being selected for processing, issue the QUERY ACTIVE command and examine message ARC1541I. This message displays the factors that affect the selection of requests from the CRQ. A status of anything other than CONNECTED or a hold level of anything other than NONE are probable reasons why certain recall requests are not being selected.

**Note:** An unexpected loss of connectivity to the CRQ may also introduce errors, but in most cases DFSMShsm automatically corrects those errors. When this occurs, you may see the multiple issuance of message ARC1102I. Message ARC1102I is issued when DFSMShsm attempts to recall a data set that has already been recalled. It is normal for this message to occur at the time of a loss of connectivity and it does not indicate a problem with the CRQ list structure.

If you believe that the CRQ has been corrupted, issue the AUDIT COMMONQUEUE(RECALL) FIX command. When this command is issued, DFSMShsm scans the entries in the CRQ and attempts to correct logical inconsistencies within the structure. AUDIT cannot correct all types of errors and may report that zero errors were detected even though there are errors in the CRQ structure.

**Note:** The following parameters are not used with AUDIT COMMONQUEUE:

- ALL
- OUTDATASE | SYSOUT | TERMINAL
- REPORT(ALL | ERRORS)
- SERIALIZATION(DYNAMIC | CONTINUOUS)

If after issuing the AUDIT command, message ARC1506E or message ARC1187E occurs repeatedly, or certain data sets are unexpectedly not being selected for recall processing, refer to *z/OS DFSMShsm Storage Administration Guide* for more information about correcting errors within the CRQ.

---

## Using the AUDIT DATASETCONTROLS (BACKUP) Parameter

When you specify the AUDIT DATASETCONTROLS (BACKUP) parameter, AUDIT makes the following checks for each valid data set (**B**) record in the BCDS (or for only those specified by the DSNAMES or LEVELS parameter):

- If a backup version (**C**) record indicates the version is on a given tape backup volume, but the TTOC (**T**) base record for that volume does not exist, AUDIT reports \*ERR 17.
- If a data set record refers to a backup version for which there is no version record, AUDIT reports \*ERR 39.
- If a data set record refers to a backup version record that does not refer back to the data set record, AUDIT reports \*ERR 39.
- If the entry in a data set record's version index and the backup version record itself indicate that version is on a certain backup volume, but there is no backup volume (**X**) record for that volume serial number, AUDIT reports \*ERR 41. (The error can apply to any of the tape volumes spanned by a multivolume backup version.)

- If the entry in a data set record's version index and the backup version record itself indicate that version is on a certain migration volume, but there is no migration volume (V) record for that volume serial number, AUDIT reports **\*ERR 42**.
- If a backup version is found on its indicated migration volume, but no move (M) record exists for that version, AUDIT reports **\*ERR 43**.
- If the entry in a data set record's version index and the backup version record itself indicate that version is on a certain DASD backup volume, but the backup volume record indicates the volume is a tape (or vice versa), AUDIT reports **\*ERR 44**.
- If the entry in a data set record's version index and the backup version record itself indicate that version is on a certain migration volume, but the volume is not mounted or (according to its VTOC) does not contain the backup version, AUDIT reports **\*ERR 47**.
- If a specified data set name has no data set record, AUDIT reports **\*ERR 48**.

When the scope of the audit is *not* limited by either DSNAMES0 or LEVELS0, AUDIT makes additional checks:

- If an invalid record type is found in the BCDS, AUDIT reports **\*ERR 30**.
- If a (L) record calls for backing up a migrated data set, but no MCDS record exists for that data set, AUDIT reports **\*ERR 46**.

When you specify the AUDIT DATASETCONTROLS(BACKUP) parameter, AUDIT also checks to ensure version (C) records have an associated entry in a data set (B) record. The check is made for each version (C) record or for only those specified by the LEVELS parameter. A fully qualified backup version name can be used with the LEVELS parameter to process a single MCC record. If the backup version record refers to a BCDS data set (B) record that does not exist, or the (B) record exists but does not refer to the version (C) record, AUDIT reports **\*ERR 40**.

**IMPORTANT:** Each FIXCDS command generated with this error is dependent on previous FIXCDS commands. If NOFIX is used, the offsets in the output data set are invalid.

## Diagnosis and Repair Action for DATASETCONTROLS (BACKUP)

When you request AUDIT DATASETCONTROLS (BACKUP):

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 30, 40, 41, 42, 43, 44, and 46.
- AUDIT recommends an additional diagnostic step for error messages (\*ERR) 17 if the backup tape involved is a volume written in single file format. If you want AUDIT to continue its attempt to identify a repair action, you must specify an additional AUDIT command using the recommended parameter.
- For other reported conditions, see "Section Three: Error Codes (\*ERR) and Diagnosis" on page 544 for some troubleshooting hints.

---

## Using the AUDIT DATASETCONTROLS (MIGRATION) Parameter

When you specify the AUDIT DATASETCONTROLS (MIGRATION) parameter, AUDIT makes the following checks for each valid data set (D) record in the MCDS (or for only those specified by the DSNAMES or LEVELS parameter):

- If a data set record indicates a valid migrated copy, but the data set is uncataloged, AUDIT reports **\*ERR 03**.

- If a data set record indicates a valid migrated copy, but the data set's catalog entry does not refer to volume serial MIGRAT, AUDIT reports **\*ERR 09**.
- If a data set record indicates the migration copy is on a given tape volume, but the TTOC base record (or indicated extension) does not exist, AUDIT reports **\*ERR 17**.
- If a specified data set name has no data set record, AUDIT reports **\*ERR 19**.
- If a data set record indicates that a migration copy is on a certain volume, but there is no migration volume record for that volume serial number, AUDIT reports **\*ERR 20**. (The error could apply to any of the tape volumes spanned by a multivolume migration copy.)
- If a data set record indicates the migration copy is on a given DASD (or tape) migration volume, but the migration volume record indicates the volume is a tape (or DASD) volume, AUDIT reports **\*ERR 21**.
- If a data set record created by HSM Release 3 or later indicating that a migration copy is *not* in an SDSP data set, but no alias (A) record exists for the migration copy, AUDIT reports **\*ERR 22**.
- If a data set record indicates the existence of a VSAM-associations (O) record, but no such record exists, AUDIT reports **\*ERR 23**.
- If a VSAM-associations record refers to a migrated VSAM component, but there is no catalog entry for the component, or the catalog entry is something other than a non-VSAM entry referring to single volume serial MIGRAT, AUDIT reports **\*ERR 24**.
- If a VSAM-associations record refers to a migrated VSAM component, and its catalog entry properly indicates a migration copy, but no alias record exists for the VSAM component, AUDIT reports **\*ERR 25**.
- If a data set record indicates the existence of a back up migrated data set (L) record, but no such record exists, AUDIT reports **\*ERR 26**.
- If a migration volume's TTOC has no valid entry for a migration copy supposedly starting on that tape, or continuing from another tape, AUDIT reports **\*ERR 29**. This error may occur if AUDIT DATASETCONTROLS is executed while migration is currently updating a given TTOC record. If this should occur, run AUDIT DATASETCONTROLS while migration is inactive.

When the scope of the audit is *not* limited by either DSNAMES() or LEVELS(), AUDIT makes additional checks:

- If a VSAM-associations record refers to a data set record that does not exist, or that does not refer back to the VSAM-associations record, AUDIT reports **\*ERR 27**.
- If an alias record refers to a data set record that does not exist, AUDIT reports **\*ERR 28**.
- If an invalid record type is found in the MCDS, AUDIT reports **\*ERR 30**.

## **Diagnosis and Repair Action for DATASETCONTROLS (MIGRATION)**

When you request AUDIT DATASETCONTROLS (MIGRATION):

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 20, 21, 22, 24, 25, 26, 27, 28, and 30.
- AUDIT recommends an additional diagnostic step for error messages (\*ERR) 17 and 29 if the migration tape involved is a volume written in single file format. If you want AUDIT to continue its attempt to identify a repair action, you must specify an additional AUDIT command using the recommended parameter.

- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

---

## Using the AUDIT DIRECTORYCONTROLS Parameter

When you specify the DIRECTORYCONTROLS VOLUMES(volser...) parameter, for each volume serial number specified AUDIT cross-checks information in the volume's directory (a VTOC or TTOC) with control records in the MCDS or BCDS, whichever applies in a given situation. AUDIT then reports any discrepancies found.

To determine the type of directory for each volume serial specified, AUDIT first checks for a volume record. If no migration volume record or backup volume record exists for a specified volume serial number, AUDIT reports **\*ERR 110**. When AUDIT finds a volume record, its content determines what further checking is done.

When AUDIT can determine the appropriate fix for an error, the fix is included in the list report.

## Errors Detected When Using DIRECTORYCONTROLS for a DASD Migration Volume

For each volume record indicating a DASD migration volume, AUDIT makes the following checks for each DSCB having the attributes DFSMShsm assigns to its data sets (other DSCBs are ignored):

- If the first qualifier of a data set name indicates a migration copy, but there is no alias record in the MCDS, AUDIT reports **\*ERR 140**.
- If the DSCB for a migration copy or backup version indicates an empty data set (TTR of 0), AUDIT reports **\*ERR 141**.
- If the first qualifier of a data set name indicates a backup version, but there is no backup version record in the BCDS, AUDIT reports **\*ERR 142**.
- If the backup version record corresponding to a DSCB does not indicate a version scheduled for deletion, and there is no move record for that version, AUDIT reports **\*ERR 43**.
- If the first qualifier of a data set name indicates a VTOC copy for a certain volume, but there is no eligible volume (P) record for that volume in the BCDS, AUDIT reports **\*ERR 143**.
- If the eligible volume record corresponding to a VTOC copy DSCB indicates
  - The volume has not been backed up; or
  - Its related VTOC copy data sets are on other volumes; or
  - Its VTOC copy data set is not (determined by the qualifiers in its name) the one we started fromAUDIT reports **\*ERR 144**.
- If the first qualifier of a data set name indicates a Dump VTOC copy for a certain volume, but there is no eligible volume record for that volume in the BCDS, AUDIT reports **\*ERR 145**.
- If the eligible volume record corresponding to a Dump VTOC copy DSCB indicates there are no valid dump generations for that volume, AUDIT reports **\*ERR 146**.
- If the eligible volume record indicates there is at least one dump generation, but no dump generation record refers to the Dump VTOC copy we started from, AUDIT reports **\*ERR 146**.

- When there is a catalog entry for the dsname indicating it is migrated, but the dsname's first qualifiers are not recognized as DFSMShsm generated,
  - If there is no valid data set record in the MCDS, AUDIT reports **\*ERR 147**.
  - If there is a valid data set record in the MCDS referring to the volume we started from, but indicating the migration copy is in an SDSP data set, AUDIT reports **\*ERR 148**.
  - When there is a valid data set record in the MCDS, but it indicates a migration copy on some other DASD volume (not in an SDSP data set),
    - If the other volume is mounted, but the dsname cannot be found in its VTOC, AUDIT reports **\*ERR 147**.
    - If the other volume is mounted and the dsname is found in its VTOC, AUDIT reports **\*ERR 149**.
    - If the other volume is not mounted, AUDIT reports **\*ERR 148**.
  - When there is a valid data set record in the MCDS, but it indicates a migration copy on a tape volume,
    - If a valid TTOC entry can be found for that tape volume, AUDIT reports **\*ERR 149**.
    - If no valid TTOC entry can be found, AUDIT reports **\*ERR 147**.

## **Diagnosis and Repair Action for DIRECTORYCONTROLS for DASD**

When you request AUDIT DIRECTORYCONTROLS VOLUMES(volser...) for a DASD:

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 43, 141, 142, 143, 144, 145, 146, 147, and 149.
- AUDIT may recommend an additional diagnostic step for error messages (\*ERR) 140 and 148. If you want AUDIT to continue its attempt to identify a repair action, you must specify an additional AUDIT command using the recommended parameter.
- For other reported conditions and troubleshooting hints, see "Section Three: Error Codes (\*ERR) and Diagnosis" on page 544.

## **Errors Detected When Using DIRECTORYCONTROLS for a Tape Volume**

For each volume record indicating a *tape migration* volume, AUDIT makes the following checks:

- If no TTOC base record exists, AUDIT reports **\*ERR 17**.
- When the TTOC exists, AUDIT makes the following checks for each valid data set entry in that TTOC:
  - If there is a catalog entry indicating a migrated data set, but no data set record in the MCDS, AUDIT reports **\*ERR 113**.
  - If there is a catalog entry indicating a migrated data set, and a data set record indicating a valid migration copy on *some other* volume:
    - If the data set record indicates that other volume is a tape, but there is no TTOC base record for that other volume; or
    - If the data set record indicates that other volume is a DASD volume, but its VTOC has no DSCB for the migration copy
- AUDIT reports **\*ERR 115**.
- If a TTOC entry is not flagged as valid, but has an alias record in the MCDS, AUDIT reports **\*ERR 114**.

For each volume record indicating a *tape backup* volume, AUDIT makes the following checks:

- If no TTOC base record exists, AUDIT reports **\*ERR 17**.
- When the TTOC exists, AUDIT makes the following checks for each valid data set entry in that TTOC:
  - If, in the BCDS, a backup version record exists, but
    - No data set record exists; or
    - The existing data set record does not refer to the backup version recordAUDIT reports **\*ERR 116**.
  - If the TTOC entry indicates either a VTOC or VCAT copy data set for a given volume:
    - If there is no eligible volume record for that volume, AUDIT reports **\*ERR 117**
    - If the existing eligible volume record does not refer to the VTOC or VCAT copy we started from, AUDIT reports **\*ERR 118**.
  - If a TTOC entry is not flagged as valid, but has a backup version record in the BCDS, AUDIT reports **\*ERR 116**.

For either a migration or backup volume, AUDIT makes the following checks, after finding the base TTOC record:

- If the alternate volume serials for duplex volumes do not match between the TTOC and either the MCT or MCV, AUDIT reports **\*ERR 58**.
- If one or more TTOC extension records are missing from the TTOC set, AUDIT reports **\*ERR 111**.
- If there is an extraneous TTOC extension record, AUDIT reports **\*ERR 112**.
- When the TTOC base record indicates the first entry, either a migrated data set or a backup version continues (spans) from another tape volume, referred to as the predecessor volume
  - If the data set entry is INVALID, AUDIT reports **\*ERR 125**.
  - If there is no TTOC for the predecessor volume and the data set entry is VALID, AUDIT reports **\*ERR 119**.
  - If the TTOC for the predecessor volume is found, but does not indicate the volume being audited as a successor, and the data set entry is VALID, AUDIT reports **\*ERR 120**.
  - If the last data set in the predecessor's TTOC is not the same dsname as the first data set in the TTOC of the volume being audited, AUDIT reports **\*ERR 121**.
- When the TTOC base record indicates the last entry, either a migrated data set or a backup version continues (spans) to another tape volume, referred to as the successor volume
  - If the data set entry is INVALID, AUDIT reports **\*ERR 125**.
  - If there is no TTOC for the successor volume and the data set entry is VALID, AUDIT reports **\*ERR 122**.
  - If the TTOC for the successor volume is found, but does not indicate the volume being audited as a predecessor, and the data set entry is VALID, AUDIT reports **\*ERR 123**.
  - If the first data set in the successor's TTOC is not the same dsname as the last data set in the TTOC of the volume being audited, AUDIT reports **\*ERR 124**.
- If the total valid block count, as determined by the AUDIT function, differs from the value currently reflected in the in the base TTOC record, the AUDIT function corrects the total valid block count in the base TTOC record. This correction can also occur in predecessor or successor TTOC base records.

## Diagnosis and Repair Action for DIRECTORYCONTROLS for Tape

When you request AUDIT DIRECTORYCONTROLS VOLUMES(volser...) for a tape volume:

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 111, 112, 113, 114, 115, 116, 118, and 125.
- AUDIT may recommend an additional diagnostic step for error message (\*ERR) 17, 119, 120, 121, 122, 123, and 124. If you want AUDIT to continue its attempt to identify a repair action, you must specify an additional AUDIT command using the recommended parameter.
- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

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## Using the AUDIT MEDIACONTROLS (SDSP) VOLUMES Parameter

When you specify AUDIT MEDIACONTROLS (SDSP) VOLUMES(volser...), for each specified volume AUDIT cross-checks its SDSP data set (if any) for consistency with the other DFSMShsm control records to which it refers. (Note that VOLUMES is a required parameter.) AUDIT then produces a list of errors.

For each specified volume serial number, AUDIT makes the following checks:

- If there is no migration volume record or the record does not indicate a DASD ML1 volume, AUDIT reports **\*ERR 50**.
- If the volume is mounted, but its VTOC does not contain a DSCB for an SDSP data set, AUDIT reports **\*ERR 160**.
- For an existing SDSP data set, AUDIT makes the following checks for each migration copy's set of records:
  - When the catalog entry indicates that the data set is migrated:
    - If there is no data set record in the MCDS or the data set record indicates an invalid copy, AUDIT reports **\*ERR 147**.
    - If the data set record indicates a valid migration copy on some other mounted DASD volume, but that migration copy cannot be found or cannot be opened or does not have valid control information, AUDIT reports **\*ERR 147**.
    - If the data set record indicates a valid migration copy elsewhere on this volume or on some other mounted volume, and that migration copy exists and can be opened,
      - If the time stamp for that migration copy is *earlier* than that for the copy in the SDSP we started from, AUDIT reports **\*ERR 147**.
      - If the time stamp for that migration copy is *later* than that for the copy in the SDSP we started from, AUDIT reports **\*ERR 149**.
    - If the data set record indicates a valid migration copy on a tape volume or on a DASD volume that is not mounted, AUDIT reports **\*ERR 148**.
  - If there is no catalog entry for the data set, AUDIT reports **\*ERR 161**.
  - If the catalog entry indicates the data set is *not* migrated, AUDIT reports **\*ERR 162**.
  - If the migration copy has one or more *gaps* in the sequence of data records, AUDIT reports **\*ERR 163**.

## Diagnosis and Repair Action for MEDIACONTROLS (SDSP) VOLUMES

When you request AUDIT MEDIACONTROLS (SDSP):

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 147, 149, 161, and 162.
- AUDIT may recommend an additional diagnostic step for error message (\*ERR) 148. If you want AUDIT to continue its attempt to identify a repair action, you must specify an additional AUDIT command using the recommended parameter.
- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

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## Using the AUDIT MEDIACONTROLS VOLUMES Parameter

When you specify the AUDIT MEDIACONTROLS VOLUMES(*volser...*) parameter without the SDSP qualifier, AUDIT checks control information in the common dataset descriptor (CDD, required at the start of every DFMSHsm-generated copy) in each possible DFMSHsm image of a user data set on the specified volumes. AUDIT then produces a list of errors.

To determine the type of media for each volume serial number specified, AUDIT first checks for a volume record.

- If no migration volume record and no backup volume record exists for a specified volume serial number, AUDIT reports \*ERR 110.
- If the volume record indicates a level 0 (not DFMSHsm-owned) volume, AUDIT reports \*ERR 110.
- If a backup volume record exists, indicating a DASD volume, AUDIT reports \*ERR 50.

When AUDIT finds a proper volume record, its content drives further checking.

## Errors Detected When Using MEDIACONTROLS for a DASD Migration Volume

For each specified volume serial number that identifies a mounted DASD migration volume, AUDIT makes the following checks for each data set with a DSCB having the attributes DFMSHsm assigns to its data sets (other DSCBs are ignored):

- For a dsname with leading qualifiers indicating a *migration copy*:
  - If AUDIT cannot identify the first record as a CDD, it reports \*ERR 150.
  - When the first record is a CDD:
    - If there is no data set record in the MCDS:
      - If a catalog entry indicates the data set is migrated, AUDIT reports \*ERR 133 (see also “Diagnosing Error 133” on page 513).
      - If a catalog entry indicates a nonmigrated data set, AUDIT reports \*ERR 149.
    - If the data set record exists, but is not flagged as valid:
      - If a catalog entry indicates the data set is migrated, AUDIT reports \*ERR 133 (see also “Diagnosing Error 133” on page 513).
      - If there is no catalog entry, AUDIT reports \*ERR 149.
      - If a catalog entry indicates a nonmigrated data set, AUDIT reports \*ERR 149.
    - If there is a valid data set record in the MCDS:

- If a catalog entry indicates the data set is migrated, but there is no alias record, AUDIT reports **\*ERR 140**.
- If a catalog entry indicates the data set is migrated, but the data set record in the MCDS refers to a different copy, AUDIT reports **\*ERR 149**.
- If there is no catalog entry, AUDIT reports **\*ERR 151**.
- If a catalog entry indicates a nonmigrated data set, AUDIT reports **\*ERR 152**.
- For a dsname with leading qualifiers indicating a *backup version*:
  - If AUDIT cannot identify the first record as a CDD, it reports **\*ERR 150**.
  - If the first record is a CDD, but the corresponding data set record in the BCDS has no reference to a backup version with this name, AUDIT reports **\*ERR 142**.
- For a dataset with
  - A dsname *not* generated by DFSMShsm, and
  - A CDD as a first record, and
  - A catalog entry indicating the data set is migrated, but
  - No data set record in the MCDS,
 AUDIT reports **\*ERR 133** (see also “Diagnosing Error 133”).

## Diagnosis and Repair Action for MEDIACONTROLS for DASD

When you request AUDIT MEDIACONTROLS for DASD:

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR 133, 140, 142, 149, 151, and 152).

**Diagnosing Error 133:** If AUDIT reports **\*ERR 133** for a migrated VSAM data set, but cannot determine the name of its base cluster to recreate a data set record, AUDIT reports also condition **169**.

- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Errors Detected When Using MEDIACONTROLS for a Tape Volume

For each specified volume serial number identifying a DFSMShsm-owned backup or migration tape volume, AUDIT next verifies the type and format of tape. If the volume record indicates a tape *other than* one in single file format, AUDIT reports **\*ERR 130**.

For a tape volume in single file format, AUDIT mounts the tape and reads blocks sequentially, searching for CDD control information marking the start of one or more blocks constituting a data set copy. (A given tape may contain the start or continuation of a copy spanning volumes.) When a CDD is found, AUDIT uses the data there—and the number of blocks read since the *last* CDD found—to check other control information, and to verify or reconstruct an entry in the TTOC records for the volume.

If AUDIT cannot allocate or mount a tape volume, it reports **\*ERR 131**. If AUDIT can allocate and mount the volume, it continues.

- If it finds no corresponding TTOC base record, AUDIT first reports **\*ERR 51** (for a migration volume) or **\*ERR 71** (for a backup volume).
- If AUDIT finds the TTOC base record and that record indicates that there were in-storage records that may not have been written to the OCDS, AUDIT reports **\*ERR 164**.

## No TTOC Record Exists for a Migration Volume

If the TTOC base is missing, AUDIT makes the following checks:

- For a CDD with a corresponding data set record, flagged as *valid*, in the MCDS:
  - If the catalog entry indicates the data set is migrated, but the data set record indicates a migration copy on some other volume or elsewhere on this volume, AUDIT reports **\*ERR 149**.
  - If there is no catalog entry, or the catalog entry indicates a nonmigrated data set, AUDIT reports **\*ERR 132**.
- For a CDD with a corresponding data set record, flagged as *invalid*, in the MCDS, if the catalog entry indicates the data set is migrated, AUDIT reports **\*ERR 133** (see also “Diagnosing Error 133” on page 515).
- For a CDD with a corresponding catalog entry indicating a migrated data set, but with no data set record in the MCDS, AUDIT reports **\*ERR 133** (see also “Diagnosing Error 133” on page 515).

If no CDD record is found on the tape, AUDIT reports condition **134**.

## Checking TTOC Entries for a Migration Volume

If AUDIT finds the TTOC base record, it checks the sequence of CDDs against the sequence of TTOC entries found in the base record and zero or more TTOC extensions. If a TTOC extension is missing, AUDIT reports **\*ERR 111**.

- For a CDD with a corresponding data set record in the MCDS:
  - If the block count in the *previous* TTOC entry does not agree with the number of blocks read since the *previous* CDD found, AUDIT reports **\*ERR 135**.
  - If there is no catalog entry or the catalog entry indicates a nonmigrated data set, AUDIT reports **\*ERR 132**.
  - If the catalog indicates the data set is migrated, but the data set record is flagged invalid, AUDIT reports **\*ERR 133** (see also “Diagnosing Error 133” on page 515).
  - If the catalog indicates the data set is migrated, but the corresponding TTOC entry is flagged invalid, AUDIT reports **\*ERR 136**.
- For a CDD with a corresponding catalog entry:
  - If the catalog entry indicates a nonmigrated data set, AUDIT reports **\*ERR 132**.
  - If the catalog entry indicates a migrated data set, but there is no data set or alias record in the MCDS, AUDIT reports **\*ERR 133** (see also “Diagnosing Error 133” on page 515).

At the end of the volume:

- If the valid block count in the TTOC does not agree with the number of valid blocks read, AUDIT reports **\*ERR 137**.
- If the total block count in the TTOC does not agree with the total number of blocks read, AUDIT reports **\*ERR 138**.

## No TTOC Record Exists for a Backup Volume

If the TTOC base is missing, AUDIT generates for each CDD found:

- A TTOC entry flagged *valid* if the BCDS contains a data set record referring to a backup version record for the current position on the tape;
- A TTOC entry flagged *invalid* if the BCDS contains a data set record for the CDD, but none of the backup version records refers to the current position on the tape.

If no CDD record is found on the tape, AUDIT reports condition **134**.

## Checking TTOC Entries for a Backup Volume

If AUDIT finds the TTOC base record, it checks the sequence of CDDs against the sequence of TTOC entries found in the base record and zero or more TTOC extensions. If a TTOC extension is missing, AUDIT reports **\*ERR 111**.

For a CDD with a corresponding data set record in the BCDS:

- If the block count in the *previous* TTOC entry does not agree with the number of blocks read since the *previous* CDD has been found, AUDIT reports **\*ERR 135**.
- If the data set record refers to a backup version record for the current position on the tape, but the corresponding TTOC entry is flagged invalid, AUDIT reports **\*ERR 136**.

At the end of the volume:

- If the valid block count in the TTOC does not agree with the number of valid blocks read, AUDIT reports **\*ERR 137**.
- If the total block count in the TTOC does not agree with the total number of blocks read, AUDIT reports **\*ERR 138**.

## Diagnosis and Repair Action for MEDIACONTROLS for Tape

When you request AUDIT MEDIACONTROLS for a tape volume:

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 51, 71, 111, 132, 133, 134, 135, 136, 137, 138, and 164.

**Diagnosing Error 133:** If AUDIT reports **\*ERR 133** for a migrated VSAM data set, but cannot determine the name of its base cluster to recreate a data set record, AUDIT reports also **\*ERR 169**.

- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

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## Using the AUDIT VOLUMECONTROLS (BACKUP) Parameter

When you specify the AUDIT VOLUMECONTROLS (BACKUP) parameter, AUDIT first cross-checks BCDS backup volume records for consistency with other related DFSMShsm control records.

If there is no backup volume record for a specified volume serial number, AUDIT reports **\*ERR 70**.

For an existing backup volume record (for a specified volume serial, or for each backup volume of a specified type), AUDIT makes the following checks:

- If the alternate volume serials for duplex volumes do not match between the TTOC and either the MCT or MCV, AUDIT reports **\*ERR 58**.
- If the backup volume record indicates a tape volume, but there is no TTOC record, AUDIT reports **\*ERR 71**.
- If the backup volume record indicates a RACF protected volume, but the TTOC record does not, or vice versa, AUDIT reports **\*ERR 52**.
- If the backup volume and TTOC records indicate RACF protection, but there is no entry in RACF TAPEVOL for the volume, AUDIT reports **\*ERR 53**.
- If there *is* a RACF TAPEVOL entry for the volume, but the backup volume and TTOC records do *not* indicate RACF protection, AUDIT reports **\*ERR 53**.
- If there is no entry in the appropriate backup volume cycle (R) record, AUDIT reports **\*ERR 77**.

- If the backup volume record indicates a tape, and the existing backup volume cycle entry indicates a DASD volume, or vice versa, AUDIT reports \*ERR 74.
- If the backup volume record indicates a volume that's full, but the backup volume cycle entry does not, or vice versa, AUDIT reports \*ERR 75.
- If the backup volume record indicates a single file format tape, but the backup volume cycle entry does not, or vice versa, AUDIT reports \*ERR 76.

## Checking Backup Volume Cycle Records

Next, AUDIT checks each entry in the backup volume cycle records:

- If an entry has no corresponding backup volume record, AUDIT reports \*ERR 77.
- If the backup volume record exists, but indicates a different usage from that of the entry, AUDIT reports \*ERR 72.

For each backup volume cycle record set:

- If the last extension of a backup volume cycle set indicates there should be another extension, or there is a gap in the extension numbers for a record set, AUDIT reports \*ERR 78.
- If some extension, other than the last, indicates that there is no additional extension, AUDIT reports \*ERR 79.

## Checking TTOC Records for Backup Volumes

Finally, checking is driven by TTOC records (if any) in the OCDS:

- If the AUDIT is limited to a specific BACKUPTYPE, or to specific volume serial numbers, AUDIT checks only the corresponding TTOC records.
- If the scope of the AUDIT is *not* limited to specific volume serial numbers or to a specified BACKUPTYPE, or if BACKUPTYPE(ALL) is specified, AUDIT checks *all* TTOC records for backup volumes.

For each TTOC record:

- If there is no backup volume record, AUDIT reports \*ERR 71.
- If the backup volume record exists, but indicates a different usage from that of the TTOC record, AUDIT reports \*ERR 73.

## Diagnosis and Repair Action for VOLUMECONTROLS (BACKUP)

When you request AUDIT VOLUMECONTROLS (BACKUP):

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 52, 53, 71, 72, 74, 75, 76, 77, 78, and 79.
- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

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## Using the AUDIT VOLUMECONTROLS (MIGRATION) Parameter

When you specify the AUDIT VOLUMECONTROLS (MIGRATION) parameter, AUDIT first cross-checks MCDS migration volume records for consistency with other related DFSMShsm control records.

For a specified volume serial number: if there is no migration volume record or if the record indicates a level 0 volume, AUDIT reports \*ERR 50.

For an existing migration volume record (for a specified volume serial, or for each migration volume), AUDIT makes the following checks:

- If the migration volume record indicates a tape volume, but there is no TTOC record, AUDIT reports \*ERR 51.
- If the migration volume record indicates a RACF protected volume, but the TTOC record does not, or vice versa, AUDIT reports \*ERR 52.
- If the migration volume and TTOC records indicate RACF protection, but there is no entry in RACF TAPEVOL for the volume, AUDIT reports \*ERR 53.
- If there *is* a RACF TAPEVOL entry for the volume, but the migration volume and TTOC records do *not* indicate RACF protection, AUDIT reports \*ERR 53.
- If the alternate volume serials for duplex volumes do not match between the TTOC and either the MCT or MCV, AUDIT reports \*ERR 58.

## Checking the Level 2 Control Record

If the level 2 control (**S**) record exists, AUDIT checks each entry:

- If there is no migration volume record for a given entry (key range), AUDIT reports \*ERR 54.
- If the corresponding migration volume record indicates usage *other than* a DASD level 2 volume, AUDIT reports \*ERR 55.

## Checking Migration Level 1 Free Space Records

- If the last extension of the free space (**I**) record set indicates there should be another extension, AUDIT reports \*ERR 56.
- If some extension, other than the last, indicates that there is no additional extension, AUDIT reports \*ERR 57.

## Diagnosis and Repair Action for VOLUMECONTROLS (MIGRATION)

When you request AUDIT VOLUMECONTROLS (MIGRATION):

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 52, 53, 56, and 57.
- AUDIT may recommend an additional diagnostic step for error message (\*ERR) 51. If you want AUDIT to continue its attempt to identify a repair action, you must specify an additional AUDIT command using the recommended parameter.
- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

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## Using the AUDIT VOLUMECONTROLS (RECOVERABLE) Parameter

When you specify the AUDIT VOLUMECONTROLS (RECOVERABLE) parameter, AUDIT cross-checks BCDS control records that concern recoverable (“eligible”) volumes, that is, volumes that have been backed up or dumped. These control records are checked against other DFSMShsm controls to which they refer. AUDIT then produces a list of errors.

If a specified volume serial has not been backed up or dumped, AUDIT reports \*ERR 105.

If an existing eligible volume (**P**) record indicates that the volume is owned by DFSMShsm, but there is no migration volume record in the MCDS or backup volume record in the BCDS for that volume, AUDIT reports \*ERR 90.

## Checking Backup Related Controls

For an eligible volume record (for a specified volume serial, or for each eligible volume) indicating the volume has been *backed up* at least once, AUDIT makes the following checks for each indicated VTOC copy data set:

- If the data set is stored on a migration volume for which there is no migration volume record in the MCDS, AUDIT reports **\*ERR 91**.
- If the data set is stored on a DASD backup volume for which there is no backup volume record in the BCDS, AUDIT reports **\*ERR 92**.
- If the data set is stored on backup tape:
  - If there is no backup volume record for the tape volume, AUDIT reports **\*ERR 92**.
  - If the data set spans tape volumes, and there is no backup volume record for the second tape, AUDIT reports **\*ERR 93**.

## Checking Dump Related Controls

For an eligible volume record (for a specified volume serial, or for each eligible volume) indicating the volume has been *dumped* at least once, AUDIT makes the following checks:

- If the eligible volume refers to a dump generation for which there is no dump generation (G) record, AUDIT reports **\*ERR 94**.
- For a dump generation record with a dump copy referring to a dump volume:
  - If there is no dump volume (Y) record, AUDIT reports **\*ERR 95**.
  - If the dump volume record exists, but is not flagged as belonging to a dump copy, AUDIT reports **\*ERR 96**.
  - If the generation referred to from a valid entry in a dump volume record is not the same as the generation referring to that dump volume, or the generation indicates a dump copy starts on a dump volume but the file sequence number is not the same as the entry number of the copy in the dump volume record, or the generation indicates a dump copy spans to a dump volume but the entry referring to the generation is not the first in the dump volume record, AUDIT reports **\*ERR 97**.
  - If the dump class name in the dump volume record is not the same as the class name in the generation referring to that dump volume, AUDIT reports **\*ERR 99**.
  - If the volume sequence number in the dump volume record is not the same as the sequence of that volume in the dump copy within the dump generation referring to that volume, AUDIT reports **\*ERR 100**.
  - If there is no migration volume record for the volume containing the dump copy's VTOC copy data set, AUDIT reports **\*ERR 101**.

If the scope of the AUDIT is *not* limited to specific volumes, the next check is driven by dump generation records:

- If a dump generation record refers to a volume for which there is no eligible volume record, AUDIT reports **\*ERR 102**.
- If a dump generation record refers to a volume with an eligible volume record that does *not* refer back to that generation, AUDIT reports **\*ERR 103**.

If the scope of the AUDIT is *not* limited to specific volumes, or a generation record for a dumped volume cannot be found, or a dump volume record referred to by a generation does not refer back to that generation, the last check is driven by dump volume records flagged as valid:

- If the dump volume refers to a generation for which there is no dump generation record, AUDIT reports **\*ERR 104**.
- When the dump generation record exists:
  - If the dump volume is not part of any dump copy in the generation, AUDIT reports **\*ERR 98**.
  - If the dump class name in the dump volume record is not the same as the class name in the generation referring to that dump volume, AUDIT reports **\*ERR 99**.
  - If the volume sequence number in the dump volume record is not the same as the sequence of that volume in the dump copy within the dump generation referring to that volume, AUDIT reports **\*ERR 100**.

## **Diagnosis and Repair Action for VOLUMECONTROLS (RECOVERABLE)**

When you request AUDIT VOLUMECONTROLS (RECOVERABLE):

- AUDIT usually identifies a repair (and takes repair action when FIX is specified) for error messages (\*ERR) 91 and 101.
- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Summary of Errors Detected by the Options Described in Section One

Table 7 summarizes the errors detected and corrected by the audits listed in “Section One: Using the Enhanced Audit Command to Audit DFSMShsm Control Information” on page 503. In this table, a D signifies that the error is detected, and a C signifies that the error is corrected when you specify the FIX parameter.

*Table 7. Summary of Errors Detected by the Listed AUDIT Options*

Error Number	ABARS	DSCTL (BACKUP)	DSCTL (MIG)	DIRCTL	MEDCTL (SDSP)	MEDCTL	VOLCTL (BACKUP)	VOLCTL (MIG)	VOLCTL (RECOV)
*ERR 03			D						
*ERR 09			D						
*ERR 17		D	D	D					
*ERR 19			D						
*ERR 20			C						
*ERR 21			C						
*ERR 22			C						
*ERR 23			D						
*ERR 24			C						
*ERR 25			C						
*ERR 26			C						
*ERR 27			C						
*ERR 28			C						
*ERR 29			D						
*ERR 30		C	C						
*ERR 39			D						
*ERR 40			C						
*ERR 41			C						
*ERR 42			C						
*ERR 43		C		C					
*ERR 44			C						
*ERR 45			D						
*ERR 46			C						
*ERR 47			D						
*ERR 48			D						
*ERR 50					D	D		D	
*ERR 51						C		C	
*ERR 52							C	C	
*ERR 53							C	C	
*ERR 54								D	
*ERR 55								D	
*ERR 56								C	
*ERR 57								C	
*ERR 58				D			D	D	
*ERR 70							D		
*ERR 71						C	C		
*ERR 72							C		
*ERR 73							D		
*ERR 74							C		

*Table 7. Summary of Errors Detected by the Listed AUDIT Options (continued)*

Error Number	ABARS	DSCTL (BACKUP)	DSCTL (MIG)	DIRCTL	MEDCTL (SDSP)	MEDCTL	VOLCTL (BACKUP)	VOLCTL (MIG)	VOLCTL (RECOV)
*ERR 75							C		
*ERR 76							C		
*ERR 77							C		
*ERR 78							C		
*ERR 79							C		
*ERR 90								D	
*ERR 91								C	
*ERR 92								D	
*ERR 93								D	
*ERR 94								D	
*ERR 95								D	
*ERR 96								D	
*ERR 97								D	
*ERR 98								D	
*ERR 99								D	
*ERR 100								D	
*ERR 101								C	
*ERR 102								D	
*ERR 103								D	
*ERR 104								D	
*ERR 105								D	
*ERR 110					D		D		
*ERR 111					C		C		
*ERR 112					C				
*ERR 113					C				
*ERR 114					C				
*ERR 115					C				
*ERR 116					C				
*ERR 117					D				
*ERR 118					C				
*ERR 119					D				
*ERR 120					D				
*ERR 121					D				
*ERR 122					D				
*ERR 123					D				
*ERR 124					D				
*ERR 125					C				
*ERR 130							D		
*ERR 131							D		
*ERR 132							C		
*ERR 133							C		
*ERR 134							C		
*ERR 135							C		
*ERR 136							C		

*Table 7. Summary of Errors Detected by the Listed AUDIT Options (continued)*

Error Number	ABARS	DSCTL (BACKUP)	DSCTL (MIG)	DIRCTL	MEDCTL (SDSP)	MEDCTL	VOLCTL (BACKUP)	VOLCTL (MIG)	VOLCTL (RECOV)
*ERR 137						C			
*ERR 138						C			
*ERR 140				D		C			
*ERR 141				C					
*ERR 142				C		C			
*ERR 143				C					
*ERR 144				C					
*ERR 145				C					
*ERR 146				C					
*ERR 147				C	C				
*ERR 148				D	D				
*ERR 149				C	C	C			
*ERR 150						D			
*ERR 151						C			
*ERR 152						C			
*ERR 160					D				
*ERR 161					C				
*ERR 162					C				
*ERR 163					D				
*ERR 164						C			
*ERR 165	D								
*ERR 166	D								
*ERR 167	D								
*ERR 168	D								
*ERR 169						D			

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## **Section Two: Using the Original AUDIT Command to Audit DFSMShsm Data Set Information**

This section describes the AUDIT parameters used to detect and to report discrepancies in data set information recorded in DFSMShsm control data sets, the VTOCs identifying data sets, and catalogs.

When the FIX parameter is specified, AUDIT can correct certain errors.

In general, the primary options listed in this section perform less extensive diagnosis than those listed in Section One. There is some overlap between the parameters in the two sections. You may want to refer to “Section One: Using the Enhanced Audit Command to Audit DFSMShsm Control Information” on page 503 as you choose the AUDIT parameters that will best serve your needs.

The AUDIT commands covered in Section Two include:

- AUDIT DATASETNAMES and LEVELS, page 524
- AUDIT VOLUMES, page 526
- AUDIT BACKUPVOLUMES and BACKUPTYPE, page 529
- AUDIT MASTERCATALOG and USERCATALOG, page 532
- AUDIT MIGRATIONCONTROLDATASET, page 534
- AUDIT BACKUPCONTROLDATASET, page 537
- AUDIT OFFLINECONTROLDATASET, page 539
- AUDIT ALL (equivalent to AUDIT MCDS, then AUDIT BCDS, then AUDIT OCDS(ALL))

The parameters specified in the AUDIT command determine which data sets are audited. SMS-managed data sets are processed similarly to the audit of non-SMS-managed data sets. You can audit:

- Specific data sets
- All cataloged data sets that have the same set of initial characters of the data set name
- All data sets that reside on a specified non-SMS-managed volume
- All data sets that reside on backup volumes of a specified backup type
- All data sets cataloged in a specified catalog
- All data sets that have a data set record in the MCDS
- All data sets that have a data set record in the BCDS
- All data sets that have an entry in an OCDS TTOC record of a specified type

Audit information is written to a SYSOUT or user specified data set, in tabular form, with each row representing the result for one data set. In most cases, you can request that the audit output, in a different format, be sent to the terminal from which the AUDIT command has been issued. However, large reports, such as AUDIT ALL, cannot be sent to the terminal.

Table 8 explains the information that can be reported for a data set.

*Table 8. Headings of Output When You Audit Data Set Information*

Printer Output Heading	Terminal Label	Description
ERROR TYPE	ERROR TYPE	**NONE under this heading specifies that no error has been found for the specified data set. *ERR nn specifies the error number detected for the data set.
DATA SET NAME	DSN	The entry under this heading is the name of the data set being audited.
AUDITED VOLUME	AUDITED VOL	This is the serial number of the primary, migration, or backup volume being audited.
DATA SET ON VOLUME	DSN ON VOL	A serial number under this heading is the serial number of the primary, migration, or backup volume that contains the data set being audited. In addition, a volume serial number indicates that the data set is cataloged. ?????? indicates that the existence of the data set on the volume indicated by the catalog could not be verified. If *ERR 16 or *ERR 17 occurs, this field can contain additional diagnostic information. See “Section Three: Error Codes (*ERR) and Diagnosis” on page 544.
CATALOGED TO VOLUME	CTLG VOL	A serial number under this heading is the serial number of the volume where the data set resides as recorded in the catalog. MIGRAT indicates that the data set is on a migration volume. -NONE-indicates that no record of the data set exists in the catalog. OFFLNE indicates that the catalog could not be opened.
MIGRATED TO VOLUME	MIG VOL	A serial number under this heading is the serial number of the migration volume that contains the data set as recorded in the MCDS. RECALLED indicates that the data set is on a mounted primary volume as indicated in the MCDS. DELETED indicates that the data set has been deleted as indicated in the MCDS. -NONE-specifies that no record of the data set exists in the MCDS.
BACKED UP TO VOLUME	BACK VOL	A serial number under this heading is the serial number of the backup volume that contains the most recent backup version of the data set as recorded in the BCDS. -NONE-indicates that no BCDS backup version record has been found for the data set. (This is not an error if the data set is a VTOC copy data set or a VCAT copy data set, or if the data set resides on a DASD backup volume.)
DUPLICATE DSN ON VOLUME	DUP DSN ON VOL	If the catalog indicates that a data set of the same name resides on a volume other than the one being audited and that fact is verified, the serial number of the other volume is listed under this heading.

**Note:** All errors listed in AUDIT reports are described in “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Using the AUDIT DATASETNAMES and LEVELS Parameters

To get an audit of specific data sets, specify the AUDIT DATASETNAMES parameter. To get an audit of all data sets having the same set of initial characters of their data set names, specify the AUDIT LEVELS parameter.

When you specify either of these options, AUDIT tries to read MCDS data set (**D**) records, if any, and catalog entries, if any, corresponding to the data sets or range of data sets you specify.

If there is no data set record in the MCDS for a specified data set:

- If there is also no catalog entry, the data set (according to its name) is a backup version, but no move (**M**) record exists for that version, AUDIT reports **\*ERR 01**.
- If there is no catalog entry, and the data set is *not* (according to its name)
  - A generation data set (GDS)
  - SYSCTLG
  - SYS1.VTOCIX
  - A VTOC copy data set
  - A dump VTOC copy data setAUDIT reports **\*ERR 01**.
- If a catalog entry exists, and indicates the data set is not migrated, AUDIT reports condition **04** (not necessarily an error).
- If a catalog entry exists, but indicates the data set *is* migrated, AUDIT reports **\*ERR 10**.

When there *is* an MCDS data set record:

1. If the data set record indicates a migration copy on tape, but the TTOC (**T**) records for the indicated migration volume do not contain an entry for the data set, AUDIT reports **\*ERR 16**.
  2. If the data set record indicates a migration copy on tape, but the positioning information in the data set record does not agree with the information in the TTOC, or the indicated TTOC extension cannot be found, AUDIT reports **\*ERR 17**.
- When neither condition 1 nor condition 2 holds:
    - If there is no catalog entry, but the data set record indicates a migrated copy, AUDIT reports **\*ERR 03**.
    - If both the catalog entry and the data set record indicate the data set is not migrated, but AUDIT cannot (using the OBTAIN function) verify the data set is on the volume indicated in the catalog, AUDIT reports **\*ERR 06**.
    - If a catalog entry exists, indicating the data set is not migrated, but the data set record indicates the data set *is* migrated:
      - If AUDIT cannot verify the data set is on the volume indicated in the catalog, AUDIT reports **\*ERR 09**.
      - If the data is on the volume indicated in the catalog, AUDIT reports **\*ERR 18**.
    - If a catalog entry exists, indicating the data set is migrated, but the data set record indicates the data set is now on a primary volume, AUDIT reports **\*ERR 11**.

If the specified data set is not supported by DFSMShsm (that is, not a VSAM base cluster and not a non-VSAM data set), AUDIT reports **\*ERR 15**.

## Information Reported When Using AUDIT DATASETNAMES and LEVELS

When you specify the DATASETNAMES parameter, the audit information is reported for each specified data set, even if there is no audit error. With the LEVELS parameter, to request that audit information be reported for all the data sets audited or for only those data sets for which audit errors are detected, specify the REPORT parameter.

Figure 5 is a sample of the printer output when you audit data sets.

-- DFSMShsm AUDIT - DATASET -- LISTING - AT 18:09:53 ON 91/01/24					
ERROR TYPE	DATA SET NAME	DATA SET ON VOLUME	CATALOGED TO VOLUME	MIGRATED TO VOLUME	BACKED UP TO VOLUME
**NONE	H952762.PSFB.F40AU001.DSET01	PRIM01	PRIM01	-NONE-	BATP01
*ERR 10	H952762.PSFB.F40AU001.DSET02	??????	MIGRAT	-NONE-	BATP01
- END OF - DATASET - LISTING -					

Figure 5. Sample List of Output for AUDIT DATASETNAMES

Figure 6 is a sample of the terminal output when you audit data sets.

```
AUD=DS      DSN=H952762.PSFB.F40AU001.DSET01          ERROR TYPE= **NONE
DSN ON VOL=PRIM01   CTLG VOL=PRIM01  MIG VOL= -NONE-    BACK VOL=BATP01

AUD=DS      DSN=H952762.PSFB.F40AU001.DSET02          ERROR TYPE= *ERR 10
DSN ON VOL=??????  CTLG VOL=MIGRAT  MIG VOL= -NONE-    BACK VOL=BATP01
ARC0802I DFSMShsm AUDIT ENDING
```

Figure 6. Sample Terminal Output for AUDIT DATASETNAMES

Table 8 on page 524 explains the headings and labels used.

## Diagnosis and Repair Action for AUDIT DATASETNAMES and LEVELS

When you request AUDIT DATASETNAMES or AUDIT LEVELS, AUDIT does not fix any of the detected errors. For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Using the AUDIT VOLUMES Parameter

To request an audit of the data sets on one or more non-SMS-managed primary volumes or migration volumes, specify the AUDIT VOLUMES parameter.

For a specified volume serial, AUDIT first reads the volume record from the MCDS. If you do not include a volume serial number with the VOLUMES parameter, all the non-SMS-managed primary volumes and migration volumes that have volume records in the MCDS are audited.

In the following discussions, the master catalog and any associated user catalogs are called simply “the catalog”.

“Errors Encountered during AUDIT VOLUMES, BACKUPVOLUMES, or BACKUPTYPE” on page 583 describes conditions which can cause AUDIT to fail its checking.

## Errors Detected When Using AUDIT VOLUMES for a Primary or Migration DASD

Given a volume record indicating a DASD, the volume table of contents (VTOC) for the volume drives the audit. AUDIT handles each Format 1 DSCB in the VTOC as follows:

If the DSCB indicates any of the following, AUDIT does not check the data set further:

- SYSCTLG
- SYS1.VTOCIX
- SYS1.VVDS
- Model DSCB
- Multivolume data set

If the DSCB indicates a utility data set, AUDIT does not check it further. If FIX is specified, AUDIT scratches and uncatalogs the data set, overriding any expiration date, and issuing a message to identify the data set.

For each remaining DSCB, AUDIT tries to read a corresponding data set record from the MCDS.

When there is no data set record for the data set:

- If the data set (according to its name) is a backup version, but no move record exists for that version, AUDIT reports **\*ERR 01**.
- If there is no catalog entry, AUDIT reports condition **01**.
- If a catalog entry exists, but indicates the data set is on a primary volume *other than* the volume being audited, AUDIT reports **\*ERR 05**.
- If a catalog entry exists, but indicates the data set *is* migrated, AUDIT reports **\*ERR 10**.
- If the data set is not supported by DFSMShsm (that is, not a VSAM base cluster and not a non-VSAM data set), AUDIT reports condition **15**.

When there *is* an MCDS data set record for the data set:

- If the data set record indicates the data set has been migrated, then recalled:
  - If the recall volume is the same as the primary volume being audited, but there is (now) no catalog entry, AUDIT reports **\*ERR 02**.
  - If a catalog entry exists, but indicates the data set is on a primary volume different from the recall volume, AUDIT reports **\*ERR 07**.
  - If a catalog entry exists, but indicates the data set is on a primary volume different from the one being audited, AUDIT reports **\*ERR 08**.
  - If a catalog entry exists, but indicates the data set is now migrated, AUDIT reports **\*ERR 11**.
- If the data set record indicates the data set is now migrated:
  1. If the data set record indicates a migration copy on tape, but the TTOC records for the indicated migration volume do not contain an entry for the data set, AUDIT reports **\*ERR 16**.
  2. If the data set record indicates a migration copy on tape, but the positioning information in the data set record does not agree with the information in the TTOC, or the indicated TTOC extension cannot be found, AUDIT reports **\*ERR 17**.

When neither condition 1 nor condition 2 holds:

- If there is (now) no catalog entry, AUDIT reports **\*ERR 03**.
- If a catalog entry exists, indicating the data set is on the volume being audited, AUDIT reports **\*ERR 18**.

When you specify the AUDIT VOLUMES command to audit a migration level 1 volume, be aware of the following:

- Data sets in a small-data-set-packing data set are not audited.
- Data sets that have been backed up with the BACKDS command and temporarily reside on migration level 1 volumes are audited.

## Errors Detected When Using AUDIT VOLUMES for a Tape Migration Volume

Given a volume record indicating a tape migration volume, the tape table of contents (TTOC) records for the volume drive the audit. For each valid data set entry in the TTOC, AUDIT makes the following checks:

When there is no data set record in the MCDS for the data set:

- If there is (now) no catalog entry, AUDIT reports condition **01**.
- If a catalog entry exists, but indicates the data set *is* migrated, AUDIT reports **\*ERR 10**.

When there *is* a data set record in the MCDS, indicating the data set is now migrated:

- If the data set record indicates a migration copy on tape, but the positioning information in the data set record does not agree with the information in the TTOC, AUDIT reports **\*ERR 17**.
- If there is (now) no catalog entry, AUDIT reports **\*ERR 03**.
- If a catalog entry exists, indicating the data set is on a primary volume, AUDIT reports **\*ERR 18**.

## Information Reported When Using AUDIT VOLUMES

Figure 7 is a sample of the printer output when you audit primary or migration volume information.

-- DFMSHsm AUDIT - VOLUME -- LISTING - AT 10:21:20 ON 91/02/02					
AUDITING PRIMARY VOLUME, VOLSER = PRIM02					
ERROR TYPE	DATA SET NAME	AUDITED VOLUME	CATALOGED TO VOLUME	MIGRATED TO VOLUME	DUPLICATE DSN ON VOLUME
*ERR 02	H952762.PSFB.F40AU001.DSET03	PRIM02	-NONE-	RECALLED	
- END OF - VOLUME - LISTING -					

Figure 7. Sample List of Output for AUDIT VOLUMES

Figure 8 is a sample of the terminal output when you audit a primary or migration volume.

```
ARC0801I DFSMSHsm AUDIT STARTING
AUDITING VOLUMES, VOLSER = PRIM02
AUD=VL DSN=H952762.PSFB.F40AU001.DSET03          ERROR TYPE= *ERR 02
AUDITED VOL=PRIM02 CTLG VOL= -NONE-   MIG VOL=RECALLED DUP DSN ON VOL=
```

Figure 8. Sample Terminal Output for AUDIT VOLUMES

Table 8 on page 524 explains the headings and labels used.

## Diagnosis and Repair Action for AUDIT VOLUMES

When you request AUDIT VOLUMES:

- AUDIT attempts repair action when FIX is specified, for error messages (\*ERR) 01 and 02 for a primary volume, and 03 for a migration volume. In each case, AUDIT issues a message that describes the type of correction attempted and whether or not the fix has been successful. When a fix is unsuccessful, the message contains the return code from the routine attempting the fix.
- For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Using the AUDIT BACKUPVOLUMES and BACKUPTYPE Parameters

When you specify AUDIT BACKUPVOLUMES to request an audit of the data sets with copies on one or more backup volumes, AUDIT first tries to read from the BCDS the backup volume record for each specified volume, or for every backup volume. The device type in each *volume record* determines further checking.

When you specify AUDIT BACKUPTYPE, AUDIT first tries to read from the BCDS the backup cycle volume (BVR) records for

- A specified day, or
- All days in the backup cycle, or
- All spill volumes, or
- All daily and spill backup volumes.

For each entry in a backup cycle volume record, AUDIT then tries to read the corresponding backup volume record. The device type in each *entry* determines further checking.

“Errors Encountered during AUDIT VOLUMES, BACKUPVOLUMES, or BACKUPTYPE” on page 583 describes conditions which can cause AUDIT to fail its checking.

## Error Detected When Using AUDIT BACKUPVOLUMES or BACKUPTYPE for a Backup DASD

Given an indication of a backup DASD, the volume table of contents (VTOC) for the volume drives the audit. AUDIT handles each Format 1 DSCB in the VTOC as follows:

If the DSCB indicates a utility data set, AUDIT does not check it further. If FIX is specified, AUDIT scratches and uncatalogs the data set, overriding any expiration

date, and issuing a message to identify the data set. (The utility data set names detected on primary and migration volumes should not occur on a backup volume.)

If the DSCB indicates any of the following, AUDIT does not check the data set further:

- A VSAM data set
- An unmovable data set
- ~~Indexed sequential organization~~

For each remaining DSCB, AUDIT tries to read a corresponding backup version record from the BCDS. If such a record exists, but the volume indicated in that record is not the same as the volume being audited, AUDIT reports \*ERR 14.

## Error Detected When Using AUDIT BACKUPVOLUMES or BACKUPTYPE for a Tape Backup Volume

Given an indication of a tape backup volume, AUDIT uses the backup category in the backup volume record to read the tape table of contents (TTOC) records for the volume. Those TTOC records drive the audit for that volume.

For each valid data set entry in the TTOC, AUDIT tries to read a backup version record from the BCDS. If such a record exists, but none of the volumes (including any spanned volumes) indicated in that record is the same as the volume being audited, AUDIT reports \*ERR 14.

## Information Reported When Using BACKUPVOLUMES and BACKUPTYPE

When you specify AUDIT BACKUPVOLUMES or AUDIT BACKUPTYPE, the order of the output for the different requests is as follows:

- AUDIT BACKUPVOLUMES
  - The output is ordered according to the sequence of the volume serial numbers in the BCDS.
- AUDIT BACKUPVOLUMES(volser...)
  - The order is the order you specify.
- AUDIT BACKUPTYPE(SPILL)
  - The order is that of the entries in the spill backup cycle volume record.
- AUDIT BACKUPTYPE(DAILY(day))
  - The order is that of the entries in the daily BVR for the specified day.
- AUDIT BACKUPTYPE(DAILY)
  - The order is for all volumes for day 1, then all for day 2, and so forth, until all daily backup volumes have been audited. In addition, for each day, the order of the output is that of the entries in the BVR for that particular day.
- AUDIT BACKUPTYPE(ALL)
  - The order is all daily backup volumes, then all spill backup volumes.

Figure 9 is a sample list of printer output you can request when you audit a backup volume.

```
-- DFMSHSM AUDIT -          BACKUP VOLUME -- LISTING - AT 10:13:08 ON 91/02/02
AUDITING BACKUP TAPE VOLUME, VOLSER = BATP01

ERROR          DATA SET NAME      AUDITED      BACKED UP
TYPE           VOLUME           VOLUME        TO VOLUME

**NONE         HSM40.VTOC.VPRIM01.D84033.T100500    BATP01      -NONE-
**NONE         HSM40.BACK.G834921.RRDS.H4033.T100644    BATP01      BATP01
**NONE         HSM40.BACK.G834921.RRDS.H4033.T100720    BATP01      BATP01
*ERR 14        HSM40.BACK.H952762.PSF.H4033.T100746    BATP01      -NONE-
**NONE         HSM40.BACK.H952762.PSF.H4033.T100802    BATP01      BATP01
**NONE         HSM40.BACK.H952762.PSF.H4033.T100817    BATP01      BATP01
*ERR 14        HSM40.BACK.H952762.PSF.H4033.T100833    BATP01      -NONE-
**NONE         HSM40.BACK.H952762.PSF.H4033.T100847    BATP01      BATP01
**NONE         HSM40.BACK.H952762.PSF.H4033.T100903    BATP01      BATP01
**NONE         HSM40.BACK.H952762.PSF.H4033.T100916    BATP01      BATP01
- END OF -    BACKUP VOLUME - LISTING -
```

Figure 9. Sample List of Output for AUDIT BACKUPVOLUMES

Figure 10 is a sample terminal list you can request when you audit a backup volume.

```
AUDITING VOLUMES, VOLSER = BATP01

AUD=TV  DSN=HSM40.VTOC.VPRIM01.D84033.T100500      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL -NONE-

AUD=TV  DSN=HSM40.BACK.G834921.RRDS.H4033.T100644      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL BATP01

AUD=TV  DSN=HSM40.BACK.G834921.RRDS.H4033.T100720      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL BATP01

AUD=TV  DSN=HSM40.BACK.H952762.PSF.H4033.T100746      ERROR TYPE  *ERR 14
AUDITED VOL BATP01      BACKUP VOL -NONE-

AUD=TV  DSN=HSM40.BACK.H952762.PSF.H4033.T100802      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL BATP01

AUD=TV  DSN=HSM40.BACK.H952762.PSF.H4033.T100817      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL BATP01

AUD=TV  DSN=HSM40.BACK.H952762.PSF.H4033.T100833      ERROR TYPE  *ERR 14
AUDITED VOL BATP01      BACKUP VOL -NONE-

AUD=TV  DSN=HSM40.BACK.H952762.PSF.H4033.T100847      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL BATP01

AUD=TV  DSN=HSM40.BACK.H952762.PSF.H4033.T100903      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL BATP01

AUD=TV  DSN=HSM40.BACK.H952762.PSF.H4033.T100916      ERROR TYPE  **NONE
AUDITED VOL BATP01      BACKUP VOL BATP01
ARC0802I DFMSHSM AUDIT ENDING
```

Figure 10. Sample Terminal List for AUDIT BACKUPVOLUMES

Table 8 on page 524 explains the headings and labels used.

## Diagnosis and Repair Action for AUDIT BACKUPVOLUMES and BACKUPTYPE

When you request AUDIT BACKUPVOLUMES or BACKUPTYPE, AUDIT attempts repair action when FIX is specified, for error message (\*ERR) 14 for a tape backup volume. In each case, AUDIT issues a message that describes the type of correction attempted and whether or not the fix has been successful. When a fix is unsuccessful, the message contains the return code from the routine attempting the fix. (See “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.)

## Using the AUDIT MASTERCATALOG and USERCATALOG Parameters

You can request the following catalog audits with the AUDIT command:

- An audit of the master catalog by specifying the MASTERCATALOG parameter
- An audit of a user catalog by specifying the USERCATALOG parameter

When you specify the FIX parameter, the AUDIT function enqueues continually on the DFSMShsm control data sets during the entire audit, to minimize the possibility of other DFSMShsm functions making changes to them. Because auditing a complete catalog can take considerable time, AUDIT issues the following message:

```
ARC0803A WARNING: AUDIT OF CATALOG MAY DEGRADE PERFORMANCE,  
REPLY 'Y' TO START AUDIT OR 'N' TO CANCEL AUDIT COMMAND.
```

If the system operator does not reply with a Y, a message is sent to the system console stating that the operator canceled the audit of the catalog.

Assuming the audit is not canceled, the data sets driving the audit are those that are supported for migration and have a cluster (VSAM) or alien (non-VSAM) entry in the specified catalog. For each such entry, AUDIT makes the following checks:

If the catalog entry indicates a data set on a primary volume of a device type managed by DFSMShsm:

- If AUDIT cannot verify (using the OBTAIN function) that the non-VSAM data set is indeed on the indicated volume (the volume may not be mounted):
  - If there is no MCDS data set record, AUDIT reports **\*ERR 04**.
  - If there is an MCDS data set record indicating the data set has been recalled, AUDIT reports **\*ERR 06**.
- If there is an MCDS data set record, indicating the data set is migrated:
  1. If the data set record indicates a migration copy on tape, but the TTOC records for the indicated migration volume do not contain an entry for the data set, AUDIT reports **\*ERR 16**.
  2. If the data set record indicates a migration copy on tape, but the positioning information in the data set record does not agree with the information in the TTOC, or the indicated TTOC extension cannot be found, AUDIT reports **\*ERR 17**.

When neither condition 1 nor condition 2 holds, AUDIT reports **\*ERR 09**.

- If the data set is on the indicated volume, but the MCDS data set record indicates the data set is migrated, AUDIT reports **\*ERR 18**.

If the catalog entry indicates a migrated data set:

- If there is no MCDS data set record, AUDIT reports **\*ERR 10**.
- If there is an MCDS data set record indicating the data set has been recalled, AUDIT reports **\*ERR 11**.

## Information Reported When Using **MASTERCATALOG** and **USERCATALOG**

Figure 11 is a sample list of printer output you can request when you audit master catalog information.

-- DFSMSHsm AUDIT - CATALOG -- LISTING - AT 18:37:05 ON 91/01/24					
ERROR TYPE	DATA SET NAME	DATA SET ON VOLUME	CATALOGED TO VOLUME	MIGRATED TO VOLUME	BACKED UP TO VOLUME
*ERR 04	TTL.IMS.STAGE2	??????	P3282B	-NONE-	
*ERR 04	TTL.ISPF.PROFILE	??????	P3282B	-NONE-	
**NONE	TTL.JCL.CNTL	P3282B	P3282B	-NONE-	
*ERR 04	TTL.SPFEDEITA	??????	P3282B	-NONE-	
*ERR 04	TTL.SPFEEDITB	??????	P3282B	-NONE-	
**NONE	TTL.SPFLG01.LIST	P3282B	P3282B	-NONE-	
**NONE	TTL.SPFTEMP1.CNTL	P3282B	P3282B	-NONE-	
**NONE	VTAM.CNTL	P3282B	P3282B	-NONE-	

- END OF - CATALOG - LISTING -

Figure 11. Sample List of Output for AUDIT **MASTERCATALOG**

Figure 12 is a sample list of printer output you can request when you audit user catalog information.

-- DFSMSHsm AUDIT - CATALOG -- LISTING - AT 10:13:51 ON 91/02/02					
AUDITING NEWSAM.CAT	DATA SET NAME	DATA SET ON VOLUME	CATALOGED TO VOLUME	MIGRATED TO VOLUME	BACKED UP TO VOLUME
*ERR 10	D324711.POFB.N.F40CM012.DSET01	??????	MIGRAT	-NONE-	
*ERR 04	D324711.POFB.N.F40CM013.DSET01	??????	PRIM01	-NONE-	
*ERR 04	D324711.POFB.N.F40CM013.DSET02	??????	PRIM01	-NONE-	
*ERR 10	D324711.PSF.N.F40CM012.VSPRIMER	??????	MIGRAT	-NONE-	
*ERR 04	D324711.PSF.N.VSPRIMER	??????	PRIM01	-NONE-	
*ERR 10	D324711.PSFBN.F40CM012.DSET02	??????	MIGRAT	-NONE-	
*ERR 04	D324711.PSFBN.F40CM013.DSET01	??????	PRIM01	-NONE-	
*ERR 04	D324711.PSFBN.F40CM013.DSET02	??????	PRIM01	-NONE-	
*ERR 04	D324711.PSFBN.F40CM029.DSET04	??????	PRIM01	-NONE-	
*ERR 04	D324711.PSFBN.F40CM029.DSET08	??????	PRIM02	-NONE-	
*ERR 04	D324711.PSFBN.F40CM029.DSET09	??????	PRIM02	-NONE-	
*ERR 04	D324711.PSFBN.F40EM013.DSET01	??????	PRIM01	-NONE-	
*ERR 04	D324711.PSFBN.F40HM007.FILL.UP	??????	MIG101	-NONE-	
*ERR 04	D324711.PSFBN.TEST	??????	PRIM01	-NONE-	
*ERR 04	D324711.PSFBN.TEST.DSET01	??????	PRIM01	-NONE-	
*ERR 04	D324711.PSFBR.F40FP058.DSET02	??????	PRIM01	-NONE-	
*ERR 04	D324711.PSFBR.F40RP023.DSET06	??????	PRIM02	-NONE-	
*ERR 04	D324711.PSFBR.F40RP045.DSET04	??????	PRIM01	-NONE-	
**NONE	G834921.ISPF.PROFILE	P3282B	P3282B	-NONE-	
**NONE	G834921.RRDS.N.F40EX001.CLUSTER3	PRIM01	PRIM01	-NONE-	
**NONE	G834921.RRDS.N.F40EX001.CLUSTER4	PRIM01	PRIM01	-NONE-	

- END OF - CATALOG - LISTING -

Figure 12. Sample List of Output for AUDIT **USERCATALOG**

Table 8 on page 524 explains the headings and labels used.

## Diagnosis and Repair Action for AUDIT **MASTERCATALOG** and **USERCATALOG**

When you request AUDIT **MASTERCATALOG** or AUDIT **USERCATALOG**, AUDIT does not fix any of the detected errors. You may, however, be able to use the

FIXCDS command to add or change a record of a data set in the MCDS, to make the catalog and the MCDS agree. To find out how to use the FIXCDS command, refer to the *z/OS DFSMShsm Diagnosis*.

For any reported condition and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

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## Using the AUDIT MIGRATIONCONTROLDATASET Parameter

When you specify AUDIT MIGRATIONCONTROLDATASET, the data set records in the MCDS drive the audit. For each such record (data set), AUDIT makes the following checks:

1. If the data set record indicates a migration copy on tape, but the TTOC records for the indicated migration volume do not contain an entry for the data set, AUDIT reports **\*ERR 16**.
2. If the data set record indicates a migration copy on tape, but the positioning information in the data set record does not agree with the information in the TTOC, or the indicated TTOC extension cannot be found, AUDIT reports **\*ERR 17**.

When neither condition 1 nor condition 2 holds:

- If there is no catalog entry, but the data set record indicates a migrated copy, AUDIT reports **\*ERR 03**.
- If both the catalog entry and the data set record indicate the data set is not migrated, but AUDIT cannot (using the OBTAIN function) verify the data set is on the volume indicated in the catalog, AUDIT reports **\*ERR 06**.
- If a catalog entry exists, indicating the data set is not migrated, but the data set record indicates the data set *is* migrated:
  - If AUDIT cannot verify the data set is on the volume indicated in the catalog, AUDIT reports **\*ERR 09**.
  - If the data set is on the volume indicated in the catalog, AUDIT reports **\*ERR 18**.
- If a catalog entry exists, indicating the data set is migrated, but the data set record indicates the data set is now on a primary volume, AUDIT reports **\*ERR 11**.

## Information Reported When Using MIGRATIONCONTROLDATASET

Figure 13 is a sample list of printer output that you can request when you audit the MCDS.

*Figure 13. Sample List of Output for AUDIT MCDS*

Figure 14 is a sample terminal list that you can request when you audit the MCDS.

AUD=MC DSN=D324711.ESDS.R.F40RP123.CLUSTER2 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP02	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=D324711.PSF.N.F40RL016.DSET01 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP02	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=D324711.PSF.N.F40RL055.DSET02 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP02	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=D324711.PSF.R.F40RP123.DSET02 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP02	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=G834921.KSDS.N.F40TM479.CLUSTER1 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP01	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=G834921.PSF.N.F40TM479.DSET03 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP03	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=H952762.PSFB.F40AU001.DSET03 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP03	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=H952762.PSFB.F40AU001.DSET04 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP01	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=M059259.BDAM.N.F40RL025.DSET01 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP02	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=M059259.PSF.N.F40RL050.DSET02 DSN ON VOL=?????? CTLG VOL=PRIM01 MIG VOL=RECALLED	ERROR TYPE= *ERR 06 BACK VOL=
AUD=MC DSN=M059259.PSF.N.F40RL056.DSET12 DSN ON VOL=?????? CTLG VOL=-NONE- MIG VOL=M2TP03	ERROR TYPE= *ERR 03 BACK VOL=
AUD=MC DSN=M100222.GDG.N.F40RP123.DSET03.G0002V00 DSN ON VOL=?????? CTLG VOL=PRIM05 MIG VOL=RECALLED	ERROR TYPE= *ERR 06 BACK VOL=
AUD=MC DSN=M100222.KSDS.R.F40RP123.CLUSTER1 DSN ON VOL=?????? CTLG VOL=PRIM05 MIG VOL=RECALLED	ERROR TYPE= *ERR 06 BACK VOL=
AUD=MC DSN=M100222.PSFB.N.F40RP124.DSET01 DSN ON VOL=?????? CTLG VOL=PRIM03 MIG VOL=RECALLED	ERROR TYPE= *ERR 06 BACK VOL=

Figure 14. Sample Terminal List for AUDIT MCDS

Table 8 on page 524 explains the headings and labels used.

## Diagnosis and Repair Action for AUDIT MIGRATIONCONTROLDATASET

When you request AUDIT MIGRATIONCONTROLDATASET, AUDIT attempts repair action when FIX is specified, for error message (\*ERR) 03. In each instance, AUDIT issues a message that describes the type of correction attempted and whether or not the fix has been successful. When a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Using the AUDIT BACKUPCONTROLDATASET Parameter

When you specify AUDIT BACKUPCONTROLDATASET, the data set records in the BCDS drive the audit. A backed up data set is audited if either:

- At least one backup version was made when the data set was cataloged, *or*
- An MCDS data set record exists (the data set was migrated at some time).

For each such record (data set), AUDIT makes the following checks:

1. If the MCDS data set record indicates a migration copy on tape, but the TTOC records for the indicated migration volume do not contain an entry for the data set, AUDIT reports **\*ERR 16**.
2. If the MCDS data set record indicates a migration copy on tape, but the positioning information in the data set record does not agree with the information in the TTOC, or the indicated TTOC extension cannot be found, AUDIT reports **\*ERR 17**.

When neither condition 1 nor condition 2 holds:

- If there is no catalog entry, but the data set record indicates a migrated copy, AUDIT reports **\*ERR 03**.
- If a catalog entry exists, indicating a data set on a primary volume:
  - If AUDIT cannot (using the OBTAIN function) verify the data set is on the volume indicated in the catalog:
    - If there is no MCDS data set record, AUDIT reports **\*ERR 04**.
    - If the MCDS data set record indicates the data set was migrated, then recalled, AUDIT reports **\*ERR 06**.
    - If the MCDS data set record indicates the data set is now migrated, AUDIT reports **\*ERR 09**.
  - If the data set is on the indicated volume, but the MCDS data set record indicates the data set is migrated, AUDIT reports **\*ERR 18**.
- If a catalog entry exists, indicating a migrated data set:
  - If there is no MCDS data set record, AUDIT reports **\*ERR 10**.
  - If the MCDS data set record indicates the data set was migrated, then recalled, AUDIT reports **\*ERR 11**.

## Information Reported When Using BACKUPCONTROLDATASET

Figure 15 is a sample list of printer output that you can request when you audit the BCDS.

DFSMShsm AUDIT - DFSMShsm CONTROL DATASET -- LISTING - AT 18:52:05 ON 91/01/24					
AUDIT THE BACK UP CONTROL DATASET					
ERROR TYPE	DATA SET NAME	DATA SET ON VOLUME	CATALOGED TO VOLUME	MIGRATED TO VOLUME	BACKED UP TO VOLUME
**NONE	H952762.PSFB.F40AU001.DSET01	PRIM01	PRIM01	-NONE-	BATP01
*ERR 06	H952762.PSFB.F40AU001.DSET03	??????	PRIM04	RECALLED	BATP01
**NONE	M059259.PSF.N.F40RL035.DSET01	??????	-NONE-	RECALLED	BACK01
*ERR 03	H952762.PSFB.F40AU001.DSET04	??????	-NONE-	M2TP01	BATP02
**NONE	M059259.PSF.N.F40RL050.DSET03	??????	-NONE-	RECALLED	BACK01
**NONE	M100222.KSDS.R.F40RP125.DSET01	PRIM01	PRIM01	-NONE-	BACK01
- END OF -	CATALOG - LISTING -				

Figure 15. Sample List of Output for AUDIT BCDS



Figure 16 is a sample terminal list that you can request when you audit the BCDS.

AUD=BC	DSN=H952762.PSFB.F40AU001.DSET01	ERROR TYPE= **NONE	
DSN ON VOL=PRIM01	CTLG VOL=PRIM01	MIG VOL= -NONE-	BACK VOL=BATP01
AUD=BC	DSN=H952762.PSFB.F40AU001.DSET03	ERROR TYPE= *ERR 06	
DSN ON VOL=???????	CTLG VOL=PRIM04	MIG VOL=RECALLED	BACK VOL=BATP01
AUD=BC	DSN=H952762.PSFB.F40AU001.DSET04	ERROR TYPE= *ERR 03	
DSN ON VOL=???????	CTLG VOL=-NONE-	MIG VOL=M2TP01	BACK VOL=BATP02
AUD=BC	DSN=M059259.PSF.N.F40RL035.DSET01	ERROR TYPE= **NONE	
DSN ON VOL=???????	CTLG VOL=-NONE-	MIG VOL=RECALLED	BACK VOL=BACK01
AUD=BC	DSN=M059259.PSF.N.F40RL050.DSET03	ERROR TYPE= **NONE	
DSN ON VOL=???????	CTLG VOL=-NONE-	MIG VOL=RECALLED	BACK VOL=BACK01
AUD=BC	DSN=M100222.KSDS.R.F40RP125.DSET01	ERROR TYPE= **NONE	
DSN ON VOL=PRIM01	CTLG VOL=PRIM01	MIG VOL=-NONE-	BACK VOL=BACK01
ARC0802I	DFSMShsm AUDIT ENDING		

Figure 16. Sample Terminal List for AUDIT BCDS

Table 8 on page 524 explains the headings and labels used.

## Diagnosis and Repair Action for AUDIT BACKUPCONTROLDATASET

When you request AUDIT BACKUPCONTROLDATASET, AUDIT attempts repair action when FIX is specified, for error message (\*ERR) 03. In each instance, AUDIT issues a message that describes the type of correction attempted and whether or not the fix has been successful. When a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Using the AUDIT OFFLINECONTROLDATASET Parameter

When you specify AUDIT OFFLINECONTROLDATASET, you must also specify which tape table of contents (TTOC) records you wish to drive the audit. You can choose records for:

- A specific day in the backup cycle (DAILY(day)), or
- All days in the backup cycle (DAILY), or
- All spill volumes (SPILL), or
- All level 2 migration tape volumes (ML2), or
- All backup and migration tape volumes (ALL).

## Errors Detected When Using OFFLINECONTROLDATASET for Backup

If you request any category of backup volume, AUDIT reads from the OCDS the TTOC records for all backup tapes in the categories specified.

For each valid data set entry in each TTOC, AUDIT tries to read a backup version record from the BCDS. If a backup version record exists, but none of the volumes (including any spanned volumes) indicated in that record is the same as the volume whose TTOC is driving the audit, AUDIT reports \*ERR 14.

## Errors Detected When Using OFFLINECONTROLDATASET for Migration

If you request the ML2 category, AUDIT reads from the OCDS the TTOC records for all migration level 2 tape volumes.

For each valid data set entry in each TTOC, AUDIT uses the data set name in that entry to find a corresponding data set record from the MCDS:

- If that name was apparently generated by DFSShsm for a migration copy (the second qualifier is .HMG.), AUDIT tries to read the corresponding alias (A) record from the MCDS. If this record can be read, AUDIT uses it to try to read the data set record.
- If the name in the TTOC entry is not recognized as generated by DFSShsm, or if no alias record can be found, AUDIT uses the name in the TTOC entry to read the data set record.

For each data set, AUDIT then makes the following checks:

- If there is no catalog entry, but the data set record indicates a migrated copy, AUDIT reports **\*ERR 03**.
- If a catalog entry exists, indicating the data set is on a primary volume:
  - If there is no MCDS data set record, AUDIT reports **\*ERR 04**.
  - If there is an MCDS data set record, indicating the data set has been recalled, but to a volume different from the one recorded in the catalog, AUDIT reports **\*ERR 08**.
  - If the data set record indicates a migration copy on tape, but the positioning information in the data set record does not agree with the information in the TTOC, or the indicated TTOC extension cannot be found, AUDIT reports **\*ERR 17**.
  - If the data set record indicates the data set is now migrated to a DASD, AUDIT reports **\*ERR 18**.
- If the catalog entry indicates a migrated data set:
  - If there is no MCDS data set record, AUDIT reports **\*ERR 10**.
  - If there is an MCDS data set record, indicating the data set has been recalled, AUDIT reports **\*ERR 11**.

## Information Reported When Using OFFLINECONTROLDATASET

The order of output for the different requests for auditing the OCDS is as follows:

- AUDIT OFFLINECONTROLDATASET(DAILY(day)):  
The output is in ascending volume serial number order for tape daily backup volumes assigned to the day you specify.
- AUDIT OFFLINECONTROLDATASET(DAILY):  
The output is ordered by all volumes assigned to day 1, then all volumes assigned to day 2, and so forth, until DFSShsm has audited all tape daily backup volumes in the OCDS.
- AUDIT OFFLINECONTROLDATASET(SPILL):  
The output is in ascending volume serial number order for tape spill volumes in the OCDS.
- AUDIT OFFLINECONTROLDATASET(ML2):  
The output is in ascending volume serial number order for tape migration level 2 volumes in the OCDS.

- AUDIT OFFLINECONTROLDATASET(ALL):
  1. All tape daily backup volumes. These are ordered by day, with the volumes for each day in ascending volume serial number order.
  2. All tape spill backup volumes. These are in ascending volume serial number order.
  3. Unassigned tape backup volumes. These are in ascending volume serial number order.
  4. Migration level 2 volumes. These are in ascending volume serial number order.

Figure 17 is a sample list of printer output you can request when you audit OCDS information for all tape volumes.

-- DFMSHsm AUDIT - DFMSHsm CONTROL DATASET -- LISTING - AT 18:36:38 ON 91/01/24			
AUDITING THE OFFLINE CONTROL DATASET			
ERROR TYPE	DATA SET NAME	AUDITED VOLUME	BACKED UP TO VOLUME
**NONE	HSM40.VTOC.VPRIM01.D84024.T180240	BATP01	-NONE-
**NONE	HSM40.BACK.H952762.PSFB.H4024.T180339	BATP01	BATP01
**NONE	HSM40.BACK.H952762.PSFB.H4024.T180412	BATP01	BATP01
**NONE	HSM40.BACK.H952762.PSFB.H4024.T180432	BATP01	BATP01
*ERR 14	HSM40.BACK.H952762.PSFB.H4024.T180458	BATP01	BATP02
AUDITING THE OFFLINE CONTROL DATASET, MIGRATION VOLUME = M2TP01			
ERROR TYPE	DATA SET NAME	AUDITED VOLUME	CATALOGED TO VOLUME MIGRATED TO VOLUME DUPLICATE DSN ON VOLUME
*ERR 03	H952762.PSFB.F40AU001.DSET04	M2TP01	-NONE- M2TP01
- END OF -	CATALOG - LISTING -		

Figure 17. Sample List of Output for AUDIT OCDS(ALL)

Figure 18 is a sample terminal list you can request when you audit OCDS information for all tape migration level 2 volumes.

AUDITING OCDS, MIGRATION VOL=M2TP01			
AUD=L2	DSN=H952762.PSFB.F40AU001.DSET04	ERROR TYPE=	*ERR 03
AUDITED VOL=M2TP01	CTLG VOL=-NONE-	MIG VOL=	M2TP01 DUP DSN ON VOL=
ARC0802I	DFMSHsm	AUDIT	ENDING

Figure 18. Sample Terminal List for AUDIT OCDS(ML2)

Table 8 on page 524 explains the headings and labels used.

## Diagnosis and Repair Action for AUDIT OFFLINECONTROLDATASET

When you request AUDIT OFFLINECONTROLDATASET, AUDIT attempts repair action when FIX is specified, for error messages (\*ERR) 03 and 14. In each instance, AUDIT issues a message that describes the type of correction attempted and whether or not the fix has been successful. When a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

For other reported conditions and troubleshooting hints, see “Section Three: Error Codes (\*ERR) and Diagnosis” on page 544.

## Summary of Errors Detected by the Options Described in Section Two

Table 9 summarizes the errors detected and corrected by the audits listed in “Section Two: Using the Original AUDIT Command to Audit DFSMShsm Data Set Information” on page 523. In this table, a D signifies that the error is detected, and a C signifies that the error is corrected when you specify the FIX parameter.

Table 9. Summary of Errors Detected or Corrected by the Listed AUDIT Options

Error Number	Data Set Audit	Primary Volume Audit	Migration Volume Audit	Backup Volume Audit	Master Catalog Audit	User Catalog Audit	Migration Control Data Set Audit	Backup Control Data Set Audit	Offline Control Data Set Audit
*ERR 01	D	C	D						
*ERR 02		C							
*ERR 03	D	D	C				C	C	C
*ERR 04	D				D	D		D	D
*ERR 05		D	D						
*ERR 06	D				D	D	D	D	
*ERR 07		D							
*ERR 08		D	D						D
*ERR 09	D				D	D	D	D	
*ERR 10	D	D			D	D		D	D
*ERR 11	D	D	D		D	D	D	D	D
*ERR 12		D							
*ERR 14				C					C
*ERR 15	D	D	D						
*ERR 16	D		D		D	D	D	D	
*ERR 17	D		D		D	D	D	D	D
*ERR 18	D	D	D		D	D	D	D	D

## Section Three: Error Codes (\*ERR) and Diagnosis

This section lists the error conditions that AUDIT can detect.

For certain reported conditions involving control information (see Sections One and Two), the AUDIT command can determine an Audit Repair Action. If the FIX option is specified, the AUDIT function will take the specified action. Where the verbs “patch,” “create,” or “delete” appear in the table, the AUDIT function generates a FIXCDS command (or series of commands) to make the specified changes. The column below also contains additional diagnostic information for some errors.

It is recommended that you direct AUDIT output to a specific data set, and that you review that output for errors that may have occurred when AUDIT tried to repair a problem.

For those cases where AUDIT cannot repair the problem, some Troubleshooting Hints have been provided.

**Note:** The error messages are listed sequentially, but not every number in the sequence has been used.

*Table 10. Error Codes Used in AUDIT Reports*

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 01</b>		
Neither the catalog nor the MCDS has a record of the data set being audited. This condition can also be caused by the user catalog being offline. <b>Note:</b> This condition may not be an error.	For AUDIT VOLUMES (primary):  AUDIT tries to catalog the data set.	If you are auditing a specific data set or level: <ul style="list-style-type: none"><li>• A dsname or qualifier may have been misspelled; if so, correct the misspelling and reissue the command.</li><li>• The data set may be uncataloged, in which case DFSMShsm would not have a migration copy.</li></ul> If there is no misspelling, the catalog in which the data set is cataloged may be offline; if so, the catalog must be brought online before reissuing the command.
<b>*ERR 02</b>		
The catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a primary volume.	For AUDIT VOLUMES (primary):  If the primary volume being audited is the same as the volume serial indicated in the MCDS record, AUDIT tries to catalog the data set.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 03</b>		
<p>The catalog has no entry for the data set that is being audited, but the MCDS record indicates that the data set is on a migration volume.</p>		<p>For <b>AUDIT DSNAMEs</b>:</p> <p>Because there is no catalog entry for the data set with the migration copy, that copy is most likely an old one that has not yet been scratched, probably because of a previous error when the data set was being recalled or deleted. There are two methods to correct the problem: (1) issue the HSEND DELETE command for the data set, deleting the D and A records in the MCDS immediately; or (2) have the migration copy and its D record removed during the next migration cleanup by using the FIXCDS D <i>dsname</i> PATCH() command to reset the assigned flag (MCDFASN) bit to 0 (off) and to set the needs scratch flag (MCDFNSCR) bit to 1 (on).</p> <pre>FIXCDS D <i>dsname</i></pre> <pre>PATCH(X'06' BITS(0.....1..))</pre> <p>This command <i>resets</i> the assigned bit and <i>sets</i> the needs scratch bit.</p> <p>Also possible: the catalog entry was inadvertently deleted, and the migrated copy is still valid. If this is the case, rebuild the catalog entry as a non-VSAM data set with a volume serial of "MIGRAT".</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 03 (continued)</b>		
The catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a migration volume.	<p>For <b>AUDIT VOLUMES, MCDS, BCDS, or OCDS</b>:</p> <p>AUDIT catalogs the data set and (for VSAM) any VSAM intercept object names associated with the data set, with a volume serial of MIGRAT.</p> <p><b>Note:</b> If the data set in question is a rolled-off generation data set (GDS), no error is reported, and the GDS is <i>not</i> recataloged.</p>	<p>For <b>AUDIT VOLUMES</b> (primary):</p> <p>Although there is no catalog entry for the migrated data set, there is an uncataloged data set with the same name on the primary volume being audited.</p> <p>If you can verify that there is no relationship between these two data sets, the <i>persistence</i> of the migration copy is probably caused by a previous error when the data set was being recalled or deleted. You can have the migration copy and its D record removed during the next migration cleanup by using the FIXCDS D <i>dsname</i> PATCH() command to reset the assigned flag (MCDFASN) and to set the needs scratch flag (MCDFNSCR).</p> <p><code>FIXCDS D <i>dsname</i></code></p> <p><code>PATCH(X'06' BITS(0.....1.))</code></p> <p>This command <i>resets</i> the assigned bit and <i>sets</i> the needs scratch bit.</p>
<b>*ERR 04</b>		
The catalog record of the data set being audited indicates that the data set is on a level 0 volume, but this could not be verified. No MCDS record of the data set exists for this error condition. This may or may not be an error.		If you can verify that the data set in question is on the volume indicated by the catalog entry, there is no problem. Otherwise, you should either delete the catalog entry or alter it to indicate the correct volume serial numbers.
<b>*ERR 05</b>		
The data set is cataloged on a volume other than the volume being audited. No MCDS record exists for the data set.		The volume being audited apparently has an uncataloged data set with the same name as a data set (on another volume) that <i>is</i> cataloged. You may want to rename the uncataloged data set, then catalog it also under its new name.

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 06</b>		
The catalog and the MCDS records for the data set being audited indicate that the data set is on a primary volume. The data set, however, is not on the volume recorded in the catalog, and the volume where the data set does reside cannot be determined.		<p>The volume in question may not be mounted.</p> <p>If you can verify which volume contains the data set in question, alter the catalog entry to indicate the correct volume. Otherwise, if you can verify that the data set is no longer needed, delete the catalog entry.</p> <p>The existence of the MCDS record indicates that migration cleanup has not yet removed that record of a previously recalled data set.</p>
<b>*ERR 07</b>		
The serial number of the volume containing the data set being audited as recorded in the catalog does not agree with the serial number of the primary volume containing the data set as recorded in the MCDS. The two conflicting volume serial numbers are on the lists under the CATALOGED TO VOLUME and MIGRATED TO VOLUME headings, respectively.		This condition can occur when a migrated data set is recalled, moved to another primary volume, and the audit is done before migration cleanup has removed the MCDS record. After migration cleanup has removed the record, the AUDIT function no longer reports the condition.
<b>*ERR 08</b>		
The catalog indicates that a data set of the same name resides on a volume other than the one being audited. The MCDS record indicates a primary volume.		The volume being audited apparently has an uncataloged data set with the same name as a data set (on another volume) that <i>is</i> cataloged. You may want to rename the uncataloged data set, then catalog it also under its new name.

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 09</b>		
<p>The catalog record of the data set being audited indicates that the data set is on a volume not managed by DFSMShsm, but the MCDS indicates that the data set is on a migration volume.</p>		<p>The catalog may have been offline to DFSMShsm when the catalog entry for the data set in question was replaced with one for a nonmigrated (or recalled) data set. The condition could have also been caused by a DELETE NOSCRATCH operation. The MCDS record for the data set will have the serial number of the volume from which the data set was migrated.</p> <p>If you can determine that the current catalog entry has the correct status for the data set, use the FIXCDS D <i>dsname</i> PATCH() command to reset the assigned flag (MCDFASN) and to set the needs scratch flag (MCDFNSCR) in the MCDS record; this causes the next migration cleanup to remove the migration copy.</p> <pre>FIXCDS D <i>dsname</i></pre> <pre>PATCH(X'06' BITS(0.....1.))</pre> <p>This command <i>resets</i> the assigned bit and <i>sets</i> the needs scratch bit.</p> <p>If, however, you determine that the correct status for the data set is a migrated copy, then alter the data set now referred to by the catalog entry to refer to volume MIGRAT.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 10</b>		
<p>The catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS has no record of the data set.</p>		<p>To indicate a migrated data set, DFSMShsm uses the volume serial MIGRAT in the catalog entry for that data set. If someone in your organization catalogs data sets on a primary volume called MIGRAT, change that volume serial number and alter all related catalog entries to avoid confusion with DFSMShsm's indicator.</p> <p>If no such primary volume MIGRAT exists, then you need to verify whether the data set in question is <i>supposed</i> to be migrated:</p> <ul style="list-style-type: none"> <li>• If it is and you need to recall the data set, you need to locate the migration copy. (If no previous LIST output or activity log identifies the migration volume, do a LIST VTOC [for each DASD migration volume] or LIST TTOC [for each tape migration volume].) Then reconstruct the MCDS record, using the following command:</li> </ul> <pre>FIXCDS D <i>dsname</i>         ADDMIG(<i>volser</i>)</pre> <p>Another way to rebuild the data set record is to run AUDIT MEDIACONTROLS, once you have determined the volume serial number. This may be required for successful recall of the data set.</p> <ul style="list-style-type: none"> <li>• If the data set is <i>not supposed</i> to be migrated, either delete the catalog entry, or alter it to refer to a different (primary) volume.</li> </ul>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 11</b>		
The catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS record indicates that the data set is on a primary volume.		<p>To indicate a migrated data set, DFSMShsm uses the volume serial MIGRAT in the catalog entry for that data set. If someone in your organization catalogs data sets on a primary volume called MIGRAT, change that volume serial number and alter all related catalog entries to avoid confusion with DFSMShsm's indicator.</p> <p>If no such primary volume MIGRAT exists, then an error has apparently occurred during an attempted recall of the data set in question. You need to verify whether the data set is <i>supposed</i> to be migrated:</p> <ul style="list-style-type: none"> <li>• If it is and you need to be able to recall the data set, use the FIXCDS D <i>dsname</i> DISPLAY command to determine from the MCDS record what migration volume has held the migration copy, verify (with the LIST or AUDIT command) that the migration copy is still on that migration volume, and set the assigned flag (MCDFASN) in the MCDS record by using a FIXCDS D <i>dsname</i> PATCH() command.</li> </ul> <p>This command <i>sets</i> the assigned bit.</p> <pre>FIXCDS D <i>dsname</i> PATCH(X'06' BITS(1.....))</pre>
<b>*ERR 12</b>		
The catalog and MCDS records of the data set being audited indicate that the data set is on a migration volume, but the mounted volume table entry indicates that the volume is not a migration volume. (The data set is apparently a very old migration copy, made before HSM Release 3.)		<p>Most likely an uncataloged data set on the volume has the same name as a (very old) cataloged migrated data set. This is not an error, but you should catalog all your data sets.</p> <p>Otherwise, if you can determine (from lists of migration volumes, and so forth) that DFSMShsm <i>should</i> have considered the volume as a migration volume, then use the FIXCDS V <i>volser</i> PATCH() command to set the flag in the volume record that identifies the volume as a migration volume rather than a level-0 volume.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 14</b>		
The BCDS backup version record of the data set being audited specifies a serial number that does not match the serial number of the backup volume being audited. If the data set resides on a tape volume, this error is detected only if the volume is also not spanned by the data set being audited.	For a tape backup volume, AUDIT sets the invalid flag in the TTOC entry, and in the TTOC for any spanned volume.	
<b>*ERR 15</b>		
Either the catalog entry for this data set indicates that the type of data set is not supported by DFMSHsm migration, or the entry did not indicate a volume for the data set.		<p>For <b>AUDIT DSNAMES</b>: Most likely this error is a typing error in specifying a particular data set to be audited; the object cataloged by that name is not one that is supported by DFMSHsm. Correct the spelling of the <i>dsname</i> and reissue the AUDIT command.</p> <p>For <b>AUDIT VOLUMES</b>: Since the catalog indicates the data set is something not supported by migration (for instance, a VSAM page space), this may not be an error. Even so, it is probably best to move the data set to another volume.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 16</b>		
<p>The TTOC records do not coincide with the catalog and the MCDS data set record. One of the following conditions may have occurred:</p> <ul style="list-style-type: none"> <li>The catalog and the MCDS data set record say the data set is migrated. The volume serial number of the TTOC, however, does not match the volume serial number in the MCDS data set record, or (according to that record) of any volumes the data set might span.</li> <li>The catalog and the MCDS data set record indicate that the data set is on a specific primary volume. The TTOC, however, contains a valid data set entry for the data set, which means the data set has been migrated (and may have been recalled).</li> <li>If the DATA SET ON VOLUME field contains "INVALID", the TTOC indicates that the data set copy is invalid.</li> <li>If the DATA SET ON VOLUME field contains "NO ENT", one of the following conditions is true: <ul style="list-style-type: none"> <li>If the tape being audited is in single-file format, the data set cannot be found in the TTOC extension identified by the MCD record.</li> <li>If the tape being audited is a multifile tape, the file block identifiers (FBID) in the TTOC do not coincide with the FBID in the MCD record. This situation may be resolved by recalling and again migrating the data set in error.</li> </ul> </li> </ul>		<p>The TTOC entry may identify a previous migration copy. A system failure most likely occurred before DFSMShsm was able to invalidate it. You can use the FIXCDS T command to invalidate the entry for the data set in question:</p> <pre>FIXCDS T key ENTRY(dsname) PATCH(X'34' BITS(.0.....))</pre> <p>Verify that the migration volume referred to in the data set record actually contains a migration copy of the data set. (If the volume is a tape volume, you can issue a LIST TTOC command.)</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 17</b>		
<p>Here are the possible error conditions AUDIT reports and their meanings:</p> <p><b>OFFLINE</b> The catalog cannot be opened, and is probably offline.</p> <p><b>NO TTC</b> The TTOC record of the migration volume or backup volume as indicated in the data set record does not exist. The missing TTOC record can be either the base TTOC record or an extension TTOC record.</p> <ul style="list-style-type: none"> <li>-<b>SEQ1-</b> The first data set file sequence number in the base TTOC record is greater than the data set file sequence number indicated in the MCDS data set record.</li> <li>-<b>SEQ1-</b> The last data set file sequence number in the base TTOC record is less than the data set file sequence number indicated in the MCDS data set record for a non-VSAM data set.</li> <li>-<b>SEQ1-</b> The last data set file sequence number in the base TTOC record plus one is less than the data set file sequence number indicated in the MCDS record for a VSAM data set.</li> <li>-<b>SEQ2-</b> The TTOC record shows a data set name based on the data set file sequence number found in the MCDS data set record. This data set name in the TTOC does not match the data set name in the MCDS data set record.</li> </ul>		<p>Check that the catalog is online to DFSMShsm while the AUDIT command is running; an offline catalog can cause this error indication.</p> <p>If the catalog is <i>not</i> offline, then diagnosis depends on the tape format involved:</p> <ul style="list-style-type: none"> <li>• If the tape is in single-file format, run the AUDIT MEDCTL command against the tape volume to determine, by checking the tape volume, whether the MCDS data set record or the TTOC record set is in error. (The FIX option will regenerate a TTOC set.)</li> <li>• If the tape is in multifile format, the TTOC entry most likely represents an out of date copy and can be invalidated by using the FIXCDS T command:</li> </ul> <pre>FIXCDS T key ENTRY(dsname) PATCH(X'34' BITS(.0.....))</pre>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 18</b>		
The catalog record of the data set being audited indicates that the data set is on a primary volume, but the MCDS indicates that the data set is on a migration volume.		<p>The catalog may have been offline to DFSMShsm when the catalog entry for the data set in question was replaced with one for a nonmigrated (or recalled) data set. The MCDS record for the data set will have the serial number of the volume from which the data set was migrated.</p>
<b>*ERR 19 userdsn HAS NO D RECORD</b>		
Data set <i>userdsn</i> is not migrated. No data set (D) record can be found.		<p>If you can determine that the current catalog entry has the correct status for the data set, then use the FIXCDS D <i>dsname</i> PATCH() command to reset the assigned flag (MCDFASN) and to set the needs scratch flag (MCDFNSCR) in the MCDS record; this causes the next migration cleanup to remove the migration copy.</p>
		<pre>FIXCDS D <i>dsname</i> PATCH(X'06' BITS(0.....1.))</pre>
		<p>This command <i>resets</i> the assigned bit and <i>sets</i> the needs scratch bit.</p>
		<p>If, however, you determine that the correct status for the data set is a migrated copy, then rename and recatalog the data set now referred to by the catalog and alter the original catalog entry to refer to volume MIGRAT.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 20 userdsn ON migvol, BUT NO V RECORD</b>		
The catalog indicates that data set <i>userdsn</i> has been migrated and the MCDS indicates that the migration copy is on a specific migration volume ( <i>migvol</i> ); but there is no migration volume (V) record for that volume.	<p>If the D record is flagged to indicate the copy is in an SDSP data set, and</p> <ul style="list-style-type: none"> <li>• If an SDSP data set can be found on the volume, an ADDVOL command is generated for the L1 volume.</li> <li>• If no SDSP data set can be found on the volume, but the migration copy can be found there, the D record is patched to reset the SDSP flag, and an ADDVOL command is generated for the L1 volume.</li> </ul> <p>If the D record is not flagged for a copy in an SDSP data set, and the migration copy can be found on the volume, an ADDVOL command is generated for the L1 volume.</p>	
<b>*ERR 21 userdsn INDICATES DEVICE TYPE X'...', V RECORD INDICATES X'...'</b>		
For user data set <i>userdsn</i> , a data set (D) record exists, indicating that the migration copy is on a migration volume of device type X'...', but the volume (V) record for that volume indicates a different device type X'...'.	<p>If the volume record indicates tape, and a TTOC record exists, the data set (D) record is patched to replace the device type.</p> <p>If the volume record indicates DASD and the migration copy can be found on the volume, the data set (D) record is patched to replace the device type.</p>	
<b>*ERR 22 userdsn HAS NO ALIAS RECORD</b>		
The data set (D) record for user data set <i>userdsn</i> indicates that the migration copy is not in an SDSP data set. Therefore, there should be a MCDS alias record identifying the migration copy; but the MCDS alias record does not exist.	If the migration copy can be found on the volume, an alias (A) record is created.	
<b>*ERR 23 userdsn—VSAM ASSOCIATIONS RECORD MISSING</b>		
The MCDS data set (D) record for user data set <i>userdsn</i> indicates the existence of a MCDS VSAM association (O) record, but no such record exists.		If the VSAM data set has already been recalled, then the D record is extraneous; you can use the FIXCDS command to delete it.

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 24 userdsn—MISSING VSAM INTERCEPT OBJECT</b>		
The MCDS VSAM associations (O) record for the migration copy of data set <i>userdsn</i> indicates the existence of an intercept object representing one of the components of the VSAM data set. The catalog entry for this object is <i>not</i> a non-VSAM entry indicating MIGRAT as its only volume serial.	The VSAM Association (O) record is patched, to correspond to the actual components found.	
<b>*ERR 25 userdsn—component MIGRATED, BUT NO ALIAS RECORD</b>		
The VSAM associations (O) record for the migration copy of data set <i>userdsn</i> indicates the existence of an intercept object representing a <i>component</i> of the VSAM data set. This <i>component</i> has a non-ICF catalog entry with a volume serial of MIGRAT, but the MCDS alias (A) record does not exist.	The alias (A) record for the component is created.	
<b>*ERR 26 userdsn—L RECORD MISSING</b>		
The MCDS data set record for data set <i>userdsn</i> indicates that a BCDS backup migrated data set (L) record has been created, but no such L record exists.	If a BCDS data set (B) record is found that indicates a backup was made after the migration date, the MCDS data set (D) record is patched to reset the L-record flag.  If no such B record is found and the D record indicates the migration copy is on L1, a BACKDS command is generated for the data set.	
<b>*ERR 27 userdsn—EXTRANEous VSAM ASSOCIATIONS RECORD</b>		
A VSAM-associations (O) record refers to an MCDS data set (D) record for data set <i>userdsn</i> . Either the data set record does not exist, or (if present) does not indicate the existence of a VSAM-associations record.	The VSAM Association (O) record is deleted.	
<b>*ERR 28 userdsn—EXTRANEous ALIAS RECORD</b>		
An extraneous MCDS alias (A) record is referring to an MCDS data set (D) record for data set <i>userdsn</i> , but the MCDS data set (D) record does not exist.	If there is no data set (D) record, <ul style="list-style-type: none"><li>• The alias (A) record is deleted;</li><li>• If the A record indicates a VSAM component, and the catalog entry for that component indicates that it is migrated, the catalog entry is deleted.</li></ul>	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 29 userdsn—NO TTOC RECORD</b>		
An MCDS data set (D) record for a migration copy of data set <i>userdsn</i> indicates the migration copy is on a migration tape volume. Either no TTOC record exists for the migration volume, or no TTOC extension contains a valid entry for the migration copy.		You can run AUDIT MEDCTL against the migration tape in the D record, and (if FIX is specified) AUDIT will rebuild the TTOC. This error may occur if AUDIT DATASETCONTROLS is executed while migration is currently updating a given TTOC record. If this occurs, run AUDIT DATASETCONTROLS while migration is inactive.
<b>*ERR 30 INVALID CDS RECORD TYPE</b>		
An invalid record type has been detected in the control data set (MCDS or BCDS) being audited.	The unknown record is deleted (internally).	
<b>*ERR 39 userdsn IS MISSING version</b>		
The BCDS data set (B) record for <i>userdsn</i> refers to a backup <i>version</i> of that data set. However, the corresponding backup version (C) record no longer exists or exists but does not refer back to this (B) record.		<p>The time and date stamp incorporated in the version name may indicate a version old enough that it is no longer useful, and the copy referred to by that version name may no longer exist.</p> <p>If a LIST BCDS LEVEL(<i>userdsn</i>) indicates there are other available versions of <i>userdsn</i>, you may not need the missing version.</p> <p>If there is no other available version, you need to determine (for example, from a previous LIST output) what backup volume contains the version, so that you can use the "FIXCDS C <i>version</i> ..." command to regenerate the C record.</p> <p>You should discover what caused the deletion of the C record and correct that problem to avoid future occurrences.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 40 userdsn - backup version name MISSING B RECORD</b>		
<p>The backup version (C) record refers to a BCDS data set record that does not exist, or the (B) record exists but does not refer to the version (C) record.</p> <p>In the message, <i>userdsn</i> is the original data set name in the (B) record and <i>version</i> is the generated backup name in the (C) record.</p> <p>IMPORTANT: Each FIXCDS command generated with this error is dependent on previous FIXCDS commands. If NOFIX is used, the offsets in the output data set are invalid.</p>	<p>If the version (C) record indicates the version is invalid, then a BDELETE command is issued to delete the version (C) record.</p> <p>If the version (C) record indicates the backup version is for an uncataloged data set or a data set with the RACF erase on scratch option, then no action is taken.</p> <p>If the version (C) record refers to a data set (B) record that does not exist, then a new (B) record is created and the version added.</p> <p>If the data set (B) record referred to by the version record exists but does not refer to this backup version, then one of the following actions will be performed:</p> <ul style="list-style-type: none"> <li>• If the maximum versions allowed has been reached and this version is older than any of those described in the data set record, then this version is deleted.</li> <li>• If the maximum versions allowed has not been reached, then the data set (B) record is extended. <ul style="list-style-type: none"> <li>– If the version is older than any of those described in the (B) record, then it will be added at the end.</li> <li>– If the version is not the oldest, then it will be inserted in proper date order.</li> </ul> </li> </ul>	<p>The number of versions specified by SETSYS VERSIONS or in the management class is ignored and new versions may be added until the system maximum has been reached. Subsequent BACKUP, EXPIREBV, or BDELETE commands can be used to cleanup unwanted versions. The RECYCLE command must be run to delete the versions from the backup volumes.</p> <p>GENERATION and VERSION numbers are not updated in the data set (B) record as versions are added. Different versions may have duplicate numbers.</p> <p>Versions are added to the (B) record in date order. If multiple version exist for the same date, they are not specifically ordered by time.</p> <p>Cataloged versions take precedence over uncataloged versions with newer dates.</p>
<b>*ERR 41 version INDICATED ON backvol, BUT NO X RECORD</b>		
<p>The backup version (C) record for <i>version</i> indicates the version is on backup volume <i>backvol</i>, but no BCDS backup volume (X) record exists for <i>backvol</i>.</p>	<p>If the volume is found to be an L1 volume, the data set (B) record is patched to indicate L1 residence of this version.</p> <p>If the volume is the second or later of a multivolume version, an ADDVOL command is generated for volume serial <i>backvol</i>.</p>	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 42 version INDICATED ON migvol, BUT NO V RECORD</b>		
A backup version (C) record indicates <i>version</i> is on migration volume <i>migvol</i> (that is, it has been created by the (H)BACKDS command), but no MCDS volume record (V) exists for <i>migvol</i> .	If the volume is found to be a backup volume, the data set (B) record is patched to indicate the version is not on L1. Otherwise, an ADDVOL command is generated for the L1 volume.	
<b>*ERR 43 version RESIDES ON migvol, BUT NO M RECORD</b>		
<b>*ERR 43 migvol - CONTAINS version, BUT NO M RECORD</b>		
Backup version <i>version</i> exists on migration volume <i>migvol</i> , but no BCDS move backup version (M) record exists for moving the version to a backup volume.	<p>If a backup version (C) record exists for the version, and</p> <ul style="list-style-type: none"> <li>• If a BCDS data set (B) record referring to the version exists, an M record is created.</li> <li>• If no such B record exists, the C record is patched for subsequent deletion and scratching of the backup version.</li> </ul>	
<b>*ERR 44 version INDICATES DEVICE TYPE X'...', X RECORD INDICATES X'...'</b>		
The BCDS backup version (C) record for <i>version</i> indicates the version is on a backup volume of device type X'...', but the volume (X) record for that volume indicates a different device type X'...'.	<p>If the volume record indicates tape, and a TTOC record exists, the backup version record is patched to replace the device type.</p> <p>If the volume record indicates DASD, and the backup version can be found on the volume, the backup version record is patched to replace the device type.</p>	
<b>*ERR 45 version - NO TTOC ENTRY</b>		
A BCDS backup version (C) record for <i>version</i> indicates the version is on a backup tape volume. Either no TTOC record exists for the backup volume, or no TTOC extension contains a valid entry for the backup version.		
<b>*ERR 46 userdsn - BAD L RECORD</b>		
A backup migrated data set (L) record refers to a migration copy of data set <i>userdsn</i> , but no MCDS data set (D) record exists.	The L record is deleted.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 47 version INDICATED ON migvol, BUT CANNOT BE FOUND</b>		
The BCDS data set (B) record indicates that <i>version</i> is on migration volume <i>migvol</i> and a backup version (C) record exists, but either <i>migvol</i> is not mounted or it does not contain the backup version.		<p>If the version is no longer needed, no action need be taken.</p> <p>If the migration volume is mounted, but you know the version is on a different volume, you can use the FIXCDS command to update volume serial numbers in the C record for the version.</p> <p>If the migration volume is not mounted, it should be mounted to provide access to the version.</p>
<b>*ERR 48 userdsn HAS NO B RECORD</b>		
Data set <i>userdsn</i> , specified as a parameter for auditing backup controls, is not backed up (does not have a BCDS data set (B) record).		The data set name may be spelled incorrectly.
<b>*ERR 50 volser NOT A MIGRATION VOLUME [(DUMP   BACKUP   LEVEL-0)]</b>		
Specified volume <i>volser</i> is not a migration volume as there is no MCDS migration volume record. <ul style="list-style-type: none"> <li>• If volume <i>volser</i> is a BCDS dump volume record, it will be reported as (DUMP).</li> <li>• If volume <i>volser</i> is a BCDS backup volume record, it will be reported as (BACKUP).</li> <li>• If volume <i>volser</i> is a level-0 volume, it will be reported as (LEVEL-0).</li> </ul>		<p>The volume serial specified in the command may be spelled incorrectly.</p> <p>If not, and the volume is identified as a different type of DFSMShsm-owned or DFSMShsm-managed volume, you cannot use this AUDIT option on the volume.</p> <p>If the volume serial is not misspelled and you have evidence that the volume was once managed by DFSMShsm, you need to check DFSMShsm logs to determine why the volume was deleted.</p>
<b>*ERR 51 volser - V RECORD INDICATES TAPE, NO TTOC EXISTS</b>		
A migration (V) record for volume <i>volser</i> exists, but no TTOC base record is found.	<p>If the volume record indicates</p> <ul style="list-style-type: none"> <li>• A tape <i>other than</i> one in single-file format, and</li> <li>• An empty volume</li> </ul> <p>an ADDVOL command is generated for <i>volser</i>.</p> <p>If the volume record indicates a tape in single-file format, the base TTOC is created, and individual data set TTOC entries are created as the tape is read.</p>	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
	<b>*ERR 52 volser - V RECORD INDICATES NO RACE, TTOC INDICATES RACF</b>	
	<b>*ERR 52 volser - X RECORD INDICATES NO RACE, TTOC INDICATES RACF</b>	
	<b>*ERR 52 volser - X RECORD INDICATES RACE, TTOC INDICATES NO RACF</b>	
For volume <i>volser</i> , there is a conflict between either the MCDS volume (V) record or the BCDS backup volume (X) record and the TTOC. The V record or the X record for <i>volser</i> indicates a RACF protected tape, but the TTOC record does not, or vice versa.	If RACF indicates that the volume is RACF protected, either the TTOC or the volume record is patched to indicate that protection.	
	<b>*ERR 53 volser - RACF-INDICATED, BUT NOT IN DFSSMShsm'S TAPEVOL</b>	
	<b>*ERR 53 volser - IN DFSSMShsm'S TAPEVOL, BUT NOT RACF INDICATED</b>	
For volume <i>volser</i> , there is a conflict between either the MCDS volume (V) record or the BCDS backup volume (X) record and DFSSMShsm's TAPEVOL volume set. The V record or the X record for <i>volser</i> indicate a RACF protected tape, but DFSSMShsm's TAPEVOL volume set does not, or vice versa.	If RACF indicates that the volume is not in DFSSMShsm's tape volume set, RACF is invoked to add the volume to the set; otherwise, the volume record is patched to indicate RACF protection.	
	<b>*ERR 54 volser IN L2CR RECORD, NO V RECORD</b>	
Volume <i>volser</i> , which is in the L2CR record, does not have a MCDS volume (V) record.		If the volume is not intended to be (or is no longer) a DASD level-2 migration volume, you can use the FIXCDS command to remove the entry for the volume from the L2CR record or use the DEFINE ML2 to redefine the list of volumes to be associated with the key range involved. Otherwise, issue an ADDVOL command for the volume, to reidentify it to DFSSMShsm as a DASD level-2 migration volume.
	<b>*ERR 55 volser IN L2CR RECORD NOT DASD L2 VOLUME</b>	
Volume <i>volser</i> in the L2CR record has a corresponding MCDS volume (V) record that indicates a volume type other than DASD (L2).		If the V record for the volume correctly indicates that the volume is not a DASD level-2 migration volume, you can use the FIXCDS command to remove the entry for the volume from the L2CR record or use the DEFINE ML2 to redefine the list of volumes to be associated with the key range involved. Otherwise, use the FIXCDS command to correct the V record so that the volume is identified as a DASD level-2 migration volume.
	<b>*ERR 56 MC1 EXTENSION nnnn MISSING</b>	
The last MC1 migration level-1 free space (1) record incorrectly indicates that there is another extension record <i>nnnn</i> .	The last MC1 extension is patched to indicate no continuation.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 57 MC1 EXTENSION nnnn EXTRANEous</b>		
There is an extraneous extension record <i>nnnn</i> in the MCDS migration level-1 free space record.	The extraneous MC1 extension is deleted.	
<b>*ERR 58 orig volser ALTERNATE TAPE VOLSERS MISMATCHED: TTOC ttoc volser {MCT mct volser   MCV mcv volser}</b>		
The alternate volume serials for duplex volumes do not match between the TTOC <i>ttoc volser</i> and either the MCT <i>mct volser</i> or the MCV <i>mcv volser</i> .		
<b>*ERR 70 volser NOT A BACKUP VOLUME [(DUMP MIGRATION LEVEL-0)]</b>		
Volume <i>volser</i> is not a backup volume as there is no BCDS backup volume record. <ul style="list-style-type: none"> <li>If volume <i>volser</i> is a BCDS dump volume, it is reported as (DUMP).</li> <li>If volume <i>volser</i> is a MCDS migration volume, it is reported as (MIGRATION).</li> <li>If volume <i>volser</i> is a level-0 volume, it is reported as (LEVEL-0).</li> </ul>		<p>The volume serial specified in the command may be spelled incorrectly.</p> <p>If not, and the volume is identified as a different type of DFSMSHsm-owned or DFSMSHsm-managed volume, you cannot use this AUDIT option on the volume.</p> <p>If the volume serial is not misspelled and you have evidence that the volume was once known to DFSMSHsm, you need to check DFSMSHsm logs to determine why the volume was deleted.</p>
<b>*ERR 71 volser - TTOC EXISTS, NO X RECORD</b>		
The TTOC base record was found for volume <i>volser</i> , but the backup volume (X) record is missing.		<p>Using ICETOOL, scan the OCDS starting at offset 9 for six positions (9,6, CH, EQ, C'volser') for the orphan volser.</p> <p>Document all TTOC records found i.e., 02-volser-0013, etc.</p> <p>Once the orphan TTOC entries are identified, it is up to the discretion of the user as to their disposition.</p>
<b>*ERR 71 volser - X RECORD INDICATES TAPE, NO TTOC EXISTS</b>		
A backup volume (X) record for volume <i>volser</i> exists, but no TTOC base record has been found.	<p>For <b>VOLUMECONTROLS(BACKUP)</b> If the X record indicates an empty volume, an internal ADDVOL command is generated for <i>volser</i>.</p> <p>For <b>MEDIACONTROLS</b>: The base TTOC is created, and individual data set TTOC entries are created as the tape is read.</p>	
<b>*ERR 72 volser - X RECORD - {SP UN DAY nn}, BVR - {UN DAY nn SP}</b>		

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
A BVR is a BCDS backup cycle volume record subdivided into spill and day of backup cycle (daily).	The BVR entry is deleted.	
A BVR lists a backup volume <i>volser</i> , but there is a mismatch between the BCDS backup volume (X) record type {SP   UN   DAY nn} and the BVR type {UN   DAY nn   SP}.		

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 73 volser - X RECORD - {SP UN DAY nn}, TTOC - {UN DAY nn SP}</b>		
The usage for volume <i>volser</i> in the BCDS backup volume (X) record is inconsistent with the {SP UN DAY nn} usage in the TTOC record key.		Depending on your intended backup usage for the volume, use the FIXCDS command to correct either the TTOC record set (the base and any extensions), or the X record.
<b>*ERR 74 volser - X RECORD INDICATES TAPE, BVR ENTRY INDICATES DASD</b>		
<b>*ERR 74 volser - X RECORD INDICATES DASD, BVR ENTRY INDICATES TAPE</b>		
A BVR is a BCDS backup cycle volume record subdivided into spill and day of backup cycle (daily).  The BVR record entry does not agree with the BCDS backup volume (X) record as to whether volume <i>volser</i> is a DASD or tape volume.	The BVR entry is patched to agree with the volume record.	
<b>*ERR 75 volser - X RECORD INDICATES FULL, BVR ENTRY INDICATES NOT FULL</b>		
<b>*ERR 75 volser - X RECORD INDICATES NOT FULL, BVR ENTRY INDICATES FULL</b>		
A BVR is a BCDS backup cycle volume record subdivided into spill and day of backup cycle (daily).  There is a conflict between a BVR entry and a BCDS backup volume (X) record, where the X record indicates <i>full</i> but the BVR record indicates <i>not full</i> , or vice versa.	The BVR entry is patched to agree with the volume record.	
<b>*ERR 76 volser - X RECORD INDICATES SINGLE-FILE TAPE, BVR IS MULTI-FILE</b>		
<b>*ERR 76 volser - X RECORD INDICATES MULTI-FILE TAPE, BVR IS SINGLE-FILE</b>		
A BVR is a BCDS backup cycle volume record subdivided into spill and day of backup cycle (daily).  There is a conflict between a BVR entry and a BCDS backup volume (X) record, for volume <i>volser</i> . The X record indicates a multifile format whereas the BVR entry indicates a single-file format, or vice versa.	The BVR entry is patched to agree with the volume record.	
<b>*ERR 77 volser - X RECORD, NO BVR ENTRY</b>		
A BVR is a BCDS backup cycle volume record subdivided into spill and day of backup cycle (daily).  A BVR entry exists for volume <i>volser</i> , but there is no BCDS backup volume (X) record for the volume, or vice versa.	If the BVR entry is missing, an ADDVOL command is generated for the volume, to create the missing entry.  If the volume record is missing, the BVR entry is deleted.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 78 BVRxx EXTENSION nnnn MISSING</b>		
<p>A BVR is a BCDS backup cycle volume record subdivided into spill and day of backup cycle (daily).</p> <p>In the BVR record set, the last entry indicates that there is another extension (<i>nnnn</i>), but the extension does not exist.</p>	<p>The missing BVR extension is created.</p>	
<b>*ERR 79 BVRxx EXTENSION nnnn EXTRANEous</b>		
<p>A BVR is a BCDS backup cycle volume record subdivided into spill and day of backup cycle (daily).</p> <p>There is an extraneous extension <i>nnnn</i> in the BVR record set <i>BVRxx</i>.</p>	<p>The previous BVR extension is patched to indicate the continuation.</p>	
<b>*ERR 90 volser - NO V OR X RECORD</b>		
<p>An eligible volume (P) record indicates that volume <i>volser</i> has been backed up or dumped and is a DFMSHsm volume, but neither a BCDS backup volume (X) record nor a MCDS migration volume (V) record exists for volume <i>volser</i>.</p>		<p>If the P record represents a DFMSHsm-owned volume that was backed up at some point and then deleted, the P record can be left as it is, in case you need to recover the volume.</p> <p>If the volume is not a DFMSHsm-owned volume, you can use the FIXCDS command to reset the DFMSHsm-owned flag in the P record.</p>
<b>*ERR 91 volser - vtoccopy INDICATED ON migvol, BUT NO V RECORD</b>		
<p>The BCDS eligible volume (P) record for volume <i>volser</i> indicates that VTOC copy data set <i>vtoccopy</i> is on migration volume <i>migvol</i>, but no corresponding MCDS volume (V) record exists for <i>migvol</i>.</p>	<p>If the VTOC copy can be found on the volume, an ADDVOL command is generated for an L1 volume.</p>	
<b>*ERR 92 volser - vtoccopy INDICATED ON backvol, BUT NO X RECORD</b>		
<p>The BCDS eligible volume (P) record for volume <i>volser</i> indicates that VTOC copy data set <i>vtoccopy</i> is on backup volume <i>backvol</i>, but no corresponding BCDS backup volume (X) record exists for <i>backvol</i>.</p>		<p>If you can confirm that the VTOC copy data set still resides on the volume, then you can add the volume as a backup volume, using the ADDVOL command.</p>
<b>*ERR 93 volser - vtoccopy INDICATED SPANNING TO backvol, BUT NO X RECORD</b>		
<p>The BCDS eligible volume (P) record for volume <i>volser</i> indicates that VTOC copy data set <i>vtoccopy</i> spans to a second volume (<i>backvol</i>). No BCDS backup volume (X) record exists, however, for <i>backvol</i>.</p>		<p>The data set is probably an obsolete VTOC copy data set. If the volume indicated by qualifier ".Vvolser" has not been backed up (or dumped) since the date indicated in qualifier ".Dyyddd", issue the BACKVOL command for the volume.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 94 volser - NO DGN RECORD FOR <i>generation</i></b>		
The BCDS eligible volume record for volume <i>volser</i> refers to dump generation <i>generation</i> , but no corresponding dump generation (G) record exists.		If *ERR 103 occurs for the volume in *ERR 94, use the FIXCDS command to correct either the G record or the <i>generation</i> entry in the P record.
<b>*ERR 95 volser - NO DVL RECORD FOR <i>dumpvol</i> IN COPY <i>n</i> OF <i>generation</i></b>		
The BCDS eligible volume record for volume <i>volser</i> indicates one or more dump generation record keys. Dump generation copy <i>n</i> of dump generation <i>generation</i> describes a dump volume ( <i>dumpvol</i> ). No BCDS dump volume record exists for <i>dumpvol</i> .		You should use the ADDVOL command to identify the volume as a dump volume.  If the generation contains other dump copies or if you have no need to restore data from that generation (for example, there is a later generation), no further action is needed. Otherwise, use the FIXCDS command to update the Y record for the volume, using the dump class and volume sequence data from the dump copy information in the G record.
<b>*ERR 96 volser - INVALID DVL RECORD FOR <i>dumpvol</i> IN COPY <i>n</i> OF <i>generation</i></b>		
For volume <i>volser</i> , there is an invalid BCDS dump volume record for dump volume <i>dumpvol</i> in copy <i>n</i> . This is described in the dump generation (G) record for <i>generation</i> .		If you know (for example, from DFSMShsm LIST output) that the volume does contain part of a dump copy for <i>generation</i> , use the FIXCDS command to turn on the valid flag in the Y record for the volume.
<b>*ERR 97 volser - BAD CHAIN FROM <i>generation</i> TO <i>dumpvol</i></b>		
1) The dump generation (G) record for <i>generation</i> refers to dump volume <i>dumpvol</i> as holding part of a dump copy, but the dump volume (Y) record for <i>dumpvol</i> contains part of a different generation. 2) The position of dump volser <i>dumpvol</i> in the array of volumes for its dump copy in the (G) record is inconsistent with the position of the entry in the (Y) record which refers to that generation.		If you know (for example, from DFSMShsm LIST output) that the volume does contain part of a dump copy for <i>generation</i> , use the FIXCDS command to update the Y record for the volume to refer to that generation.  You may also see an *ERR 98 message for the dump volume.
<b>*ERR 98 volser - BAD CHAIN FROM <i>dumpvol</i> TO <i>generation</i></b>		
The dump volume (Y) record for <i>dumpvol</i> indicates that the volume contains part of a dump copy in generation <i>generation</i> , but the dump generation (G) record for <i>generation</i> does not refer to volume <i>dumpvol</i> .		If you also see an *ERR 97 message referring to the volume, use the FIXCDS command to update the Y record for the volume to refer to the <i>generation</i> mentioned in the *ERR 97 message.

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 99 volser - CLASS class1 OF dumpvol, CLASS class2 IN generation</b>		
For dump generation <i>generation</i> of eligible volume <i>volser</i> , dump volume <i>dumpvol</i> is supposed to contain part of a dump copy. However, the CLASS ( <i>class1</i> ) listed in the BCDS dump volume record and the CLASS ( <i>class2</i> ) listed in the BCDS dump generation record are not the same.		Based on your knowledge from previous DFSMShsm output of the intended dump class for the dump volume, use the FIXCDS command to correct the dump class name in either the Y record for the volume or the G record for <i>generation</i> .
<b>*ERR 100 volser - BAD VOL SEQ FOR dumpvol IN COPY n OF generation</b>		
For eligible volume <i>volser</i> , the volume sequence number for dump volume <i>dumpvol</i> in the dump volume record does not agree with the sequence number for that volume in copy <i>n</i> in the dump generation (G) record for <i>generation</i> .		Based on your knowledge from previous DFSMShsm output of the sequence of dump volumes in the dump copy, use the FIXCDS command to correct the volume sequence field in the Y record for the volume, or the position of the volume in the dump copy's array of volumes in the G record for the generation.
<b>*ERR 101 volser - dumpvtoccopy INDICATED ON migvol, BUT NO V RECORD</b>		
A BCDS eligible record for volume <i>volser</i> exists, indicating that dump VTOC copy data set <i>dumpvtoccopy</i> should exist on migration volume <i>migvol</i> . No MCDS migration volume (V) record exists for <i>migvol</i> .	If the DUMPVTOC copy can be found on the volume, an ADDVOL command is generated for an L1 volume.	
<b>*ERR 102 volser - NO P RECORD FOR generation</b>		
For volume <i>volser</i> , there is a dump generation record ( <i>generation</i> ) that does not have a corresponding BCDS eligible volume (P) record.		If you need to restore the dumped volume from this generation, use the FIXCDS command to recreate the P record, such that it refers to the generation.
<b>*ERR 103 volser - NO INDICATION OF generation</b>		
For volume <i>volser</i> there is a BCDS eligible volume (P) record, but that record has no indication of generation <i>generation</i> , even though a dump generation (G) record exists for that generation.		If *ERR 94 occurs for the volume mentioned in *ERR 103, you should use the FIXCDS command to correct either the DGN record or the <i>generation</i> entry in the P record.
<b>*ERR 104 dumpvol - NO DGN RECORD FOR generation</b>		
The dump volume record for <i>dumpvol</i> indicates that the volume is part of a copy in dump generation <i>generation</i> , but no dump generation (G) record exists for the generation.		If you also see an *ERR 97 message referring to the volume, you should use the FIXCDS command to update the Y record for the volume to refer to the <i>generation</i> mentioned in the *ERR 97 message.
<b>*ERR 105 volser - NO P RECORD</b>		
For volume <i>volser</i> , there is no BCDS eligible volume (P) record.		The volume serial specified in the command may be spelled incorrectly.

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 110 volser - NO V OR X RECORD [DUMP]</b>		
For volume <i>volser</i> , there is no MCDS volume (V) record or BCDS backup volume (X) record. DUMP indicates that a dump volume (Y) record exists for <i>volser</i> .		<p>The volume serial specified in the command may be spelled incorrectly.</p> <p>If not, and the volume is identified as a different type of DFSMShsm-owned or DFSMShsm-managed volume, you cannot use this AUDIT option on the volume.</p> <p>If the volume serial is not misspelled and you have evidence that the volume was once known to DFSMShsm, you need to check DFSMShsm logs to determine why the volume was deleted.</p>
<b>*ERR 111 volser - MISSING TTOC EXTENSION nnnn</b>		
Volume <i>volser</i> is missing one or more TTOC extensions ( <i>nnnn</i> ). (Gaps exist in the sequence of extension numbers.)	The missing TTOC extension is created.	
<b>*ERR 112 volser - EXTRANEOUS TTOC EXTENSION nnnn</b>		
For volume <i>volser</i> , TTOC extension <i>nnnn</i> is extraneous.	The extraneous TTOC extension is deleted.	
<b>*ERR 113 volser TTOC EXT. nnnn - NO {A   D} RECORD FOR ttocdsn</b>		
In TTOC extension <i>nnnn</i> for volume <i>volser</i> , the data set entry for <i>ttocdsn</i> is flagged to indicate a valid copy, but one of the following conditions exists: <ul style="list-style-type: none"> <li>No MCDS data set (D) record or MCDS alias entry (A) record exists for <i>ttocdsn</i>.</li> <li>An MCDS alias entry (A) record exists for <i>ttocdsn</i> but the MCDS data set (D) record referred to does not.</li> </ul>	An MCDS data set (D) record is created for the TTOC entry. <b>Note:</b> If a (D) record was not created for data set <i>ttocdsn</i> , this tape begins with a partial data set. To have a (D) record properly created and built for this data set, you need to run AUDIT MEDIACONTROLS against the tape volume <i>volser</i> .	
<b>*ERR 114 volser - TTOC EXT. nnnn - ttocdsn HAS 'A' REC</b>		
In TTOC extension <i>nnnn</i> for volume <i>volser</i> , the data set entry for <i>ttocdsn</i> does not indicate a valid copy, but an MCDS alias entry (A) record exists for <i>ttocdsn</i> .	If there is no corresponding D record, the alias (A) record for the TTOC entry is deleted.  If the corresponding D record is no longer valid and the catalog does <i>not</i> indicate the data set is migrated, the alias (A) record for the TTOC entry is deleted.  If the corresponding D record is valid and indicates a migration copy at the current location, the TTOC entry is flagged valid.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 115 volser - TTOC EXT. nnnn - ttocdsn IS MIGRATION COPY</b>		
Volume <i>volser</i> with TTOC extension <i>nnnn</i> indicates that <i>ttocdsn</i> is a valid migration copy. The catalog indicates that the data set is migrated. The corresponding MCDS data set (D) record indicates a different migration volume from volume <i>volser</i> , but that volume (according to its TTOC, for a tape volume, or its VTOC, for a DASD volume) does not contain the migration copy.	The MCDS data set (D) record is updated to refer to this TTOC entry.	
<b>*ERR 116 volser - TTOC EXT. nnnn - ttocdsn HAS INVALID C RECORD</b>		
In TTOC extension <i>nnnn</i> for volume <i>volser</i> , the data set entry for <i>ttocdsn</i> does not indicate a valid copy, but a BCDS backup version (C) record exists for <i>ttocdsn</i> .		
<b>*ERR 116 volser - TTOC EXT. nnnn - ttocdsn HAS INVALID C RECORD (continued)</b>		
In TTOC extension <i>nnnn</i> for volume <i>volser</i> , the data set entry for <i>ttocdsn</i> is flagged as a valid copy, and a BCDS backup version (C) record exists for <i>ttocdsn</i> , but a corresponding BCDS data set record does not exist, or does not refer to that version.	All associated backup version records are deleted from DFSMShsm's control dataset, and the TTOC entry is patched invalid.	
<b>*ERR 117 volser - TTOC EXT. nnnn - NO P RECORD FOR vtoccopy</b>		
<b>*ERR 117 volser - TTOC EXT. nnnn - NO P RECORD FOR vcatcopy</b>		
For volume <i>volser</i> with TTOC extension <i>nnnn</i> , no BCDS eligible volume (P) record exists for VTOC copy data set <i>vtoccopy</i> or <i>vcatcopy</i> .		The data set is probably an obsolete VTOC (or VCAT) copy data set created when the volume indicated in the qualifier ".Vvolser" was backed up. Because no P record now exists for that volume, or if you need the backup, you should issue the BACKVOL command for the volume to create a backup and to regenerate the P record.
<b>*ERR 118 volser - TTOC EXT. nnnn - vtoccopy NOT IN P RECORD FOR srcvol</b>		
<b>*ERR 118 volser - TTOC EXT. nnnn - vcatcopy NOT IN P RECORD FOR srcvol</b>		
For volume <i>volser</i> , TTOC extension <i>nnnn</i> indicates a VTOC copy ( <i>vtoccopy</i> ) or a VCAT copy ( <i>vcatcopy</i> ), but <i>vtoccopy</i> or <i>vcatcopy</i> is not referred to in the corresponding BCDS eligible volume (P) record for <i>srcvol</i> .	The current TTOC entry is patched invalid.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 119 volser - NO PREDECESSOR TTOC FOR prevol</b>		
The TTOC for volume <i>volser</i> indicates that the first data set (migration copy or backup version) on the tape volume is continued (spans) from volume <i>prevol</i> . However, no corresponding (migration or backup) TTOC base record exists for tape volume <i>prevol</i> .		
<b>*ERR 120 volser - NOT A SUCCESSOR FROM TTOC FOR prevol</b>		
The TTOC for volume <i>volser</i> indicates that the first data set (migration copy or backup version) on the tape volume is continued (spans) from volume <i>prevol</i> . The TTOC, however, for <i>prevol</i> does not indicate volume <i>volser</i> as a successor.		
<b>*ERR 121 volser - ttocdsn NOT SPANNED FROM TTOC FOR prevol</b>		
The TTOC for volume <i>volser</i> indicates that the first data set ( <i>ttocdsn</i> ) on the tape volume is continued (spans) from the volume <i>prevol</i> , and the TTOC for <i>prevol</i> indicates <i>volser</i> as a successor volume; but the last TTOC entry for volume <i>prevol</i> has a different data set name from the first TTOC entry for the current volume <i>volser</i> .		
<b>*ERR 122 volser - NO SUCCESSOR TTOC FOR sucvol</b>		
The TTOC for volume <i>volser</i> indicates that the last data set on the tape volume continues on (spans to) volume <i>sucvol</i> . There is, however, no corresponding (migration or backup) TTOC base record for tape volume <i>sucvol</i> .		
<b>*ERR 123 volser - NOT A PREDECESSOR TO TTOC FOR sucvol</b>		
The TTOC for volume <i>volser</i> indicates that the last data set (migration copy or backup version) on the tape volume continues on (spans to) volume <i>sucvol</i> . The TTOC, however, for <i>sucvol</i> does not indicate volume <i>volser</i> as a predecessor.		
<b>*ERR 124 volser - ttocdsn NOT SPANNED TO TTOC FOR sucvol</b>		
The TTOC for volume <i>volser</i> indicates that the last data set ( <i>ttocdsn</i> ) on the tape volume continues on (spans to) volume <i>sucvol</i> . A TTOC record set exists for volume <i>sucvol</i> , and it indicates <i>volser</i> as a predecessor volume; but the first TTOC entry for volume <i>sucvol</i> has a different data set name from the last TTOC entry for the current volume <i>volser</i> .		

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 125 volser1 SPANS {TO   FROM} volser2, BUT ttcdsn THAT SPANNED IS NO LONGER VALID</b>		
volser1 is the volume being audited. If TO is the insert, volser2 is the successor volume and the last data set (ttcdsn) on volser1 continues on (spans to) volser2. If FROM is the insert, volser2 is the predecessor volume and the first data set on volser1 spans from volser2. The TTOC for volser1 indicates that volser2 is also needed for ttcdsn, but this is incorrect since ttcdsn is no longer valid.	If a TTOC exists for volser2 and it indicates a data set spans to or from volser1 and the spanning data set names are the same on both TTOCs, the TTOC for volser2 is corrected by patching the appropriate field, TTCSUCVL or TTCPREVL, to blanks. The TTOC for volser1 is corrected by patching the appropriate field, TTCSUCVL or TTCPREVL, to blanks.	
<b>*ERR 130 volser - NOT SINGLE-FILE-FORMAT 3480 TAPE VOLUME</b>		
For volume volser, either a MCDS volume record or a BCDS backup volume record exists, but does not indicate a cartridge type tape written in single-file format.		The MEDIACONTROLS option cannot be used with this volume, because the volume is not written in single-file format.
<b>*ERR 131 volser - CANNOT BE MOUNTED.</b>		
For volume volser, either a MCDS volume record or a BCDS backup volume record exists, but the volume cannot be allocated or mounted.		The volume cannot be mounted, or the operator has chosen not to mount the tape volume. Determine that the volume is accessible to your operator before reissuing this AUDIT command for this volume.
<b>*ERR 132 volser - userdsn NO LONGER MIGRATED</b>		
A migration copy of userdsn exists on migration volume volser, but no catalog entry exists for userdsn, or the catalog indicates that userdsn is on a level-0 volume.	<p>If there is no MCDS data set (D) record and the current TTOC entry is flagged valid, the TTOC entry is patched invalid, and an existing alias (A) record is deleted;</p> <p>If a data set (D) record refers to the current copy on this tape, the TTOC entry is patched valid until the problem can be resolved;</p> <p>If the D record refers to another copy and the current TTOC entry is flagged valid, the TTOC entry is patched invalid.</p>	
<b>*ERR 133 volser - userdsn (MIGRATED) NEEDS VALID D RECORD</b>		
For volume volser, the catalog indicates that user data set name userdsn is migrated (volser is MIGRAT), but the MCDS data set (D) record either does not exist or is not flagged as valid.	The current TTOC entry is patched valid. A valid MCDS data set (D) record and (if needed) an alias (A) record are created.	If the data set in question is a VSAM component, see ERR 169 for additional diagnostic data and handling. If Audit rebuilt the MCD record for a VSAM data set and used the data component name for the key, further action is required to change the key to the cluster name. See ERR 169 for details and instructions.

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 134 volser - CANNOT IDENTIFY ANY DFSMShsm DATA SET</b>		
The MCDS volume (V) record indicates that volume <i>volser</i> is a migration volume, but there is no common data set descriptor (CDD) record found on the tape, thus no DFSMShsm migration copy or backup version can be identified.	The first data set TTOC entry is patched invalid.	
<b>*ERR 135 volser - TTOC ENTRY FOR <i>ttocdn</i> - BLOCK COUNT SHOULD BE <i>nnnn</i></b>		
In volume <i>volser</i> , the block count indicated for TTOC entry <i>ttocdn</i> does not agree with the actual block count. The TTOC block count should be <i>nnnn</i> .	The TTOC entry is patched with the correct block count.	
<b>*ERR 136 volser - TTOC ENTRY FOR <i>ttocdn</i> - SHOULD BE VALID</b>		
For volume <i>volser</i> , both the MCDS data set (D) record and the catalog indicate that the TTOC entry for <i>ttocdn</i> should be flagged as valid, but it is flagged as invalid.	The TTOC entry is patched valid, and (if needed) an alias (A) record is created.	
<b>*ERR 137 volser - TTOC BASE NEEDS VALID-BLOCK COUNT <i>nnnn</i></b>		
For volume <i>volser</i> , a block count discrepancy exists between the number of blocks of valid data and the count of valid blocks in the TTOC base record. The TTOC base record needs to be updated with the valid block count of <i>nnnn</i> .	The base TTOC is patched with the valid block count.	
<b>*ERR 138 volser - TTOC BASE NEEDS TOTAL-BLOCK COUNT <i>nnnn</i></b>		
For volume <i>volser</i> , a block count discrepancy exists between the number of blocks of data and the count of blocks in the TTOC base record. The TTOC base record needs to be updated with the block count of <i>nnnn</i> .	The base TTOC is patched with the total block count.	
<b>*ERR 140 <i>migvol</i> - <i>userdsn</i> HAS NO ALIAS RECORD</b>		
<b>*ERR 140 <i>migvol</i> - <i>cdddsn</i> HAS NO ALIAS RECORD</b>		
For migration volume <i>migvol</i> , no MCDS alias entry (A) record exists for one of the following conditions:	An alias (A) record is created, referring to this migration copy.	
<ul style="list-style-type: none"> <li>Data set name <i>userdsn</i> in the VTOC has the form of a DFSMShsm-generated migration copy name.</li> <li>Data set name <i>cdddsn</i>, in what appears to be a common data set descriptor (CDD) record, indicates a migration copy. (The catalog entry for <i>cdddsn</i> indicates volume serial MIGRAT; an MCDS data set (D) record for <i>cdddsn</i> refers to an alias (A) record for the migration copy.)</li> </ul>		

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 141 migvol - SCRATCHED EMPTY DATA SET {migdsn   version}</b>		
For migration volume <i>migvol</i> , migration copy <i>migdsn</i> or backup version <i>version</i> is empty.	The empty data set is scratched and uncataloged.	
<b>*ERR 142 migvol - version HAS NO C RECORD</b>		
For migration volume <i>migvol</i> , one of the following conditions exists for the data set named <i>version</i> in the VTOC: <ul style="list-style-type: none"> <li>• The name has the form of a DFSMShsm-generated backup version name, but no corresponding BCDS backup version (C) record exists.</li> <li>• The first record of data set <i>version</i> appears to be a common data set descriptor (CDD) record, but the index of versions in the B record does not refer to <i>version</i>.</li> </ul>	The data set is scratched.	
<b>*ERR 143 migvol - NO P RECORD FOR <i>srcvol</i> OF <i>vtoccopy</i></b>		
<b>*ERR 143 migvol - NO P RECORD FOR <i>srcvol</i> OF <i>vcatcopy</i></b>		
Migration volume <i>migvol</i> contains either the VTOC copy <i>vtoccopy</i> or the VCAT copy <i>vcatcopy</i> made during a backup of volume <i>srcvol</i> . However, no BCDS eligible volume (P) record exists for source volume <i>srcvol</i> .	The copy data set is scratched and uncataloged.	
<b>*ERR 144 migvol - <i>vtoccopy</i> NOT IN P RECORD FOR <i>srcvol</i></b>		
<b>*ERR 144 migvol - <i>vcatcopy</i> NOT IN P RECORD FOR <i>srcvol</i></b>		
Migration volume <i>migvol</i> contains either the VTOC copy <i>vtoccopy</i> or the VCAT copy <i>vcatcopy</i> made during a backup of volume <i>srcvol</i> . The BCDS eligible volume (P) record does not refer to either <i>vtoccopy</i> or <i>vcatcopy</i> .	The copy data set is scratched and uncataloged.	
<b>*ERR 145 migvol - NO P RECORD FOR <i>srcvol</i> OF <i>dumpvtoccopy</i></b>		
Migration volume <i>migvol</i> contains the dump VTOC copy <i>dumpvtoccopy</i> made during a volume dump of <i>srcvol</i> . However, no BCDS eligible volume (P) record exists for source volume <i>srcvol</i> .	The copy data set is scratched and uncataloged.	
<b>*ERR 146 migvol - <i>dumpvtoccopy</i> NOT IN ANY DGN RECORD FOR <i>srcvol</i></b>		
Migration volume <i>migvol</i> contains the dump VTOC copy <i>dumpvtoccopy</i> made during a volume dump of <i>srcvol</i> . However, no dump generation record (DGN) exists that refers to <i>dumpvtoccopy</i> .	The copy data set is scratched and uncataloged.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 147 migvol - userdsn NEEDS D RECORD</b>		
<p>User data set <i>userdsn</i> is on migration volume <i>migvol</i>. The catalog indicates that this data set is migrated. The MCDS data set (D) record for <i>userdsn</i> is either missing or indicates some other migration volume, but the VTOC or TTOC for that other migration volume does not refer to <i>userdsn</i>.</p>	<p>The D record is created, or patched, to refer to the copy on the migration volume being audited.</p>	
<p>The <i>userdsn</i> is not recognized as a DFSMShsm-generated name.</p>		

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 148 migvol - userdsn MAY BE OLD MIGRATION COPY</b>		
<p>An MCD record was found for the migrated data set on the volume, or in the SDSP data set being processed. The catalog indicates that this data set is migrated. A discrepancy was found between the MCD record and the volume being audited.</p>		<p>For AUDIT MEDIACONTROLS(SDSP) VOLUME(<i>volser</i>):</p> <p>If the MCD record indicates this data set is on tape, the AUDIT output will recommend AUDIT MEDIACONTROLS VOLUME(<i>tapevolser</i>).</p> <p>If the data set is determined to be properly migrated to tape and you want the SDSP entry removed to prevent further ERR148s, then</p> <ol style="list-style-type: none"> <li>1. Recall the migrated copy from the tape volume.</li> <li>2. Create an MCD record for the data set in the SDSP as follows:</li> </ol> <pre>FIXCDS D <i>userdsn</i> ADDMIG(<i>sdsppvol</i>)</pre> <p><b>Note:</b> If the MCD create fails due to an already existing MCD record, delete the existing MCD record and create a new MCD record for the SDSP data set as suggested. The command to delete the MCD record is:</p> <pre>FIXCDS D <i>userdsn</i> DELETE</pre> <ol style="list-style-type: none"> <li>3. Delete the MCD entry from the MCDS and remove the entry from the SDSP by issuing the following command:</li> </ol> <pre>HSEND DELETE <i>userdsn</i></pre> <p>The MCD record indicates it is not in an SDSP data set, and the issuance of an OBTAIN for the data set on the volume indicated in the MCD record resulted in “volume not mounted”.</p> <p>The MCD record indicates an SDSP data set, but the volume indicated in the MCD record does not match the volume being audited. The volume indicated in the MCD record cannot be checked because we could not allocate the SDSP data set on that volume, or the volume was not mounted.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 148 migvol - userdsn MAY BE OLD MIGRATION COPY (continued)</b>		
An MCD record was found for the migrated data set on the volume, or in the SDSP data set being processed. The catalog indicates that this data set is migrated. A discrepancy was found between the MCD record and the volume being audited.		<p>For AUDIT DIRECTORYCONTROLS VOLUMES(<i>dasdvol</i>), the MCD record indicates the migration copy was created before HSM Release 3, and</p> <ul style="list-style-type: none"> <li>The MCD record indicates the data set is in an SDSP data set. However, AUDIT found the migrated data set on the DASD volume being audited. AUDIT will recommend running AUDIT MEDIACONTROLS(SDSP) VOLUMES(<i>sdspvol</i>) to assist in diagnosing the error.</li> <li>The MCD record says it is on a DASD volume other than the one currently being audited. AUDIT tried to OBTAIN the data set from that other volume, but the volume was not mounted. AUDIT will recommend AUDIT MEDIACONTROLS VOLUMES(<i>volser</i>) of the volume indicated in the MCD record.</li> </ul>
<b>*ERR 149 migvol - migdsn IS OLD MIGRATION COPY</b>		
User data set <i>migdsn</i> is on migration volume <i>migvol</i> . The catalog indicates that <i>migdsn</i> is migrated. The MCDS data set (D) record for <i>migdsn</i> refers to a migration copy on a different volume. The VTOC or TTOC for that other migration volume indicates that a migration copy of <i>migdsn</i> does exist on that volume.  The <i>migdsn</i> is not recognized as a DFSMShsm-generated name.	The data set is scratched. If an alias (A) record exists, it is deleted.	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 150 migvol - version HAS NO CDD RECORD</b>		
On migration volume <i>migvol</i> , the first record in (what appears to be, by its name) migration copy <i>migdsn</i> or in (what appears to be, by its name) backup version <i>version</i> , cannot be identified as a common data set descriptor (CDD) record.		<p>The data set, if named like a DFSMShsm backup version, may nevertheless not be a DFSMShsm data set. If it is not, and because the data set is on a migration volume, not a backup volume, there should be no problem.</p> <p>If the data set <i>is</i> a backup version, it is not possible to recover it without a CDD as the first record, and there is no point in having DFSMShsm move the version to a backup volume.</p> <ul style="list-style-type: none"> <li>• If no C record exists, the version can be scratched from the volume.</li> <li>• If a C record exists for the version, issue the BDELETE command to delete the version.</li> </ul>
<b>*ERR 151 migvol - cdddsn NOT CATALOGED, HAS COPY migdsn</b>		
On migration volume <i>migvol</i> , the first record in (what appears to be, by its name) migration copy <i>migdsn</i> appears to be a common data set descriptor (CDD) record created from data set <i>cdddsn</i> . There is, however, no catalog entry for <i>cdddsn</i> .	The MCDS data set (D) record is patched as invalid, and patched to indicate that the migration copy is to be scratched. The record will automatically be cleaned up the next time DFSMShsm migration runs (secondary space management processing).	
<b>*ERR 152 migvol - cdddsn NOT MIGRATED, HAS COPY migdsn</b>		
On migration volume <i>migvol</i> , the first record in (what appears to be, by its name) migration copy <i>migdsn</i> appears to be a Common Data set Descriptor (CDD) record created from data set <i>cdddsn</i> . The catalog entry, however, for <i>cdddsn</i> indicates that the data set is not migrated.	The MCDS data set (D) record is patched as invalid, and patched to indicate that the migration copy is to be scratched. The record will automatically be cleaned up the next time DFSMShsm migration runs (secondary space management processing).	
<b>*ERR 160 migvol - DOES NOT HAVE SDSP DATA SET</b>		
For migration volume <i>migvol</i> , no SDSP data set listed in the VTOC exists. The name of such a data set must be <i>uid.SMALLDS.Vmigvol</i> , where <i>uid</i> is the authorized userid for the current startup of DFSMShsm.		<p>The volume serial specified in the command may be spelled incorrectly.</p> <p>If not, your installation may have changed the UID value in the DFSMShsm startup procedure since the SDSP data set on the volume was created. You may need to rename the data set, changing the first qualifier to the current UID value.</p>

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 161 migvol - userdsn NOT CATALOGED, HAS {VALID   INVALID} COPY IN SDSP</b>		
<p>The small data set packing (SDSP) data set on migration volume <i>migvol</i> contains a migration copy of <i>userdsn</i>, but that data set is not cataloged. The message text indicates whether the data set appears to be valid or invalid.</p>	<p>If there is no data set (D) record, and no catalog entry, the migration copy is deleted (internally) from the SDSP.</p> <p>If there is a D record, but no catalog entry, and the copy has gaps in its records, the migration copy is deleted (internally) from the SDSP, and the D record is patched invalid.</p> <p>If the D record identifies the migration copy as valid (that is, recalled) and the data set is not cataloged, and the D record does not indicate that the migration copy needs to be scratched, a FIXCDS PATCH command is generated by AUDIT to turn on the “needs scratch” indicator.</p>	<p>If there is a D record, but no catalog entry, and the D record appears to represent a valid migration copy, you should determine one of the following:</p> <ul style="list-style-type: none"> <li>• If the data set is invalid and you want it deleted, you should issue an HSEND DELETE command, to have associated records deleted and have the data set removed from the SDSP. Following is an example of the HSEND DELETE command:</li> </ul> <pre>HSEND DELETE userdsn</pre> <ul style="list-style-type: none"> <li>• If the data set is valid, you should catalog it to a volume serial of ‘MIGRAT’.</li> </ul>
<b>*ERR 162 migvol - userdsn NOT MIGRATED, HAS COPY IN SDSP</b>		
<p>The small data set packing (SDSP) data set on migration volume <i>migvol</i> contains a migration copy of <i>userdsn</i>, but the catalog entry for that data set indicates that the data set is not migrated.</p>	<p>If there is no data set (D) record, the migration copy is deleted (internally) from the SDSP.</p> <p>If there is a D record, but the catalog does not indicate MIGRAT, and the copy has gaps in its records, the migration copy is deleted (internally) from the SDSP, and the D record is patched invalid.</p> <p>If there is a D record, but the catalog does not indicate MIGRAT, and there are no record gaps in the copy, and the D record is flagged other than “invalid, needs scratch,” the D record is patched as invalid, and patched to indicate that the migration copy be scratched.</p>	

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 163 migvol - userdsn MISSING ONE OR MORE RECORDS IN SDSP</b>		
The small data set packing (SDSP) data set on migration volume <i>migvol</i> contains a migration copy of <i>userdsn</i> , but the migration copy is missing one or more records.		If the data set is no longer needed, you can issue a DELETE command for the data set.  If you can recall the data set successfully, then the record gap is not significant. If the data set cannot be recalled successfully, but a backup copy exists, then delete the data set (to remove the catalog entry and D record), and issue the RECOVER command for the data set.
<b>*ERR 164 TTOC FOR VOLUME volser INDICATES IN-STORAGE RECORDS EXIST</b>		
The TTOC for the tape volume indicates that in storage records existed that may not have been written to the OCDS on DASD. After this AUDIT has completed, all data sets on the tape will have entries in the existing TTOC record for this volume.	The TTCFAIST bit in the base TTOC is patched off.	
<b>*ERR 165 NO DATA FILES ARE INDICATED FOR ABR RECORD KEY = <i>abrrecordkey</i></b>		
The ABR record with key <i>abrrecordkey</i> indicates that neither a DFSMSdss data file nor an internal data file is included with the aggregate backup.		The ABR record specified is invalid and should be deleted.
<b>*ERR 166 ABARSCONTROLS SPECIFIED USING AGGREGATE GROUP = <i>aggroupname</i>. A MATCHING AGGREGATE GROUP NAME COULD NOT BE FOUND IN THE BCDS.</b>		
The aggregate group name specified with the AUDIT command has no ABR records (has not been backed up).		Aggregate group name <i>agname</i> was probably spelled incorrectly.
<b>*ERR 167 ABARSCONTROLS SPECIFIED, BUT NO ABR RECORDS WERE FOUND IN THE BCDS.</b>		
The BCDS has no record of aggregate backup activity.		No ABR records exist, therefore no aggregate backups have successfully completed.
<b>*ERR 168 [CONTROL   DFSMSdss DATA   INTERNAL DATA   INSTRUCTION/ACTIVITY LOG] FILE NAME = <i>filename</i>, INDICATED IN THE ABR RECORD, BUT IS NOT CATALOGED. ABR RECORD KEY = <i>abrrecordkey</i></b>		
The aggregate group backup refers to a particular file, but the file cannot be found in the catalog.		You should catalog the file indicated by <i>filename</i> .

Table 10. Error Codes Used in AUDIT Reports (continued)

Description	Audit Repair Action	Troubleshooting Hints
<b>*ERR 169 MCD RECORD CREATED FOR VSAM DATA SET <i>dsname</i> NEEDS NEW KEY</b>		
In diagnosing error 133 for a migrated VSAM data set, AUDIT cannot determine its base cluster name and has used data component name <i>dsname</i> to recreate the MCDS data set record.		<p>You need to determine the base cluster name of the VSAM data set, and issue a FIXCDS command to change the key of the MCD record:</p> <p>FIXCDS D <i>dsname</i></p> <p>NEWKEY(<i>base cluster_name</i>)</p> <p>Then, if AUDIT re-created an alias (A) record, you can either</p> <ul style="list-style-type: none"> <li>recall and remigrate the VSAM data set; or</li> <li>issue a FIXCDS command to patch the alias record: where <i>generated_name</i> can be found in the AUDIT output that created the alias record, or at offset X'9C' (field MCDMCANM) in the MCD record.</li> </ul> <p>FIXCDS A <i>generated_name</i></p> <p>PATCH(X'4'<i>base cluster_name</i>)</p>

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## Section Four: Unexpected Errors During AUDIT

Unexpected errors during an audit are errors that do not relate directly to the purpose of the audit, which is to find and repair problems with DFSMShsm data sets and controls. For example, if the AUDIT function attempts to fix a problem and the command used to complete the fix fails, the AUDIT function provides you with an error message.

If such an error occurs, the AUDIT function writes a brief message to an output data set in the form of MSG 9xx. The AUDIT function will also write an informational message (MSG 998 or 999) to describe the AUDIT function running when the error occurs.

In addition, the DFSMShsm command activity log contains any associated ARCxxxxx messages that describe the actual problem.

### Unexpected Error Messages

<b>MSG 900</b>	ERROR ON ADDVOL OF VOLUME( <i>volser</i> ) An error has been encountered in performing the ADDVOL command for the VOLUME indicated.
<b>MSG 901</b>	ERROR ON FIXCDS COMMAND An error has been encountered in performing the FIXCDS command.
<b>MSG 902</b>	GENCB ERROR An error has been encountered in performing the GENCB macro.
<b>MSG 903</b>	ERROR LOCKING CDS An error has been encountered while RESERVING/ENQUEUEING or RELEASING/DEQUEUEING the DFSMShsm CDSs.
<b>MSG 904</b>	ERROR BUILDING MVT FOR VOLUME( <i>volser</i> ) An error has been encountered during the building of a volume table entry for the VOLUME indicated.
<b>MSG 905</b>	[ALLOCATION   DEALLOCATION] ERROR FOR [( <i>datasetname</i> )   VOLUME( <i>volser</i> )] An error has been encountered during ALLOCATION DEALLOCATION processing for the DATASET indicated or the VOLUME indicated.
<b>MSG 906</b>	LOCATE ERROR ON VOLUME( <i>volume</i> ) An error has been encountered in the performing of the LOCATE macro for the VOLUME indicated.
<b>MSG 907</b>	[GETMAIN   FREEMAIN] ERROR FOR SUBPOOL( <i>subpool</i> ) An error has been encountered in the performing of either the GETMAIN or the FREEMAIN macro.
<b>MSG 908</b>	ERROR CLOSING [DSN( <i>datasetname</i> )   VOLUME( <i>volser</i> )   SDSP FOR VOLUME( <i>volser</i> )]. An error has been encountered during the CLOSING of the data set indicated. The data set is on either the SDSP VOLUME indicated or the VOLUME indicated.

<b>MSG 909</b>	ERROR OPENING [DSN( <i>datasetname</i> )   SDSP FOR VOLUME( <i>volser</i> )]  An error has been encountered during the OPENING of the data set indicated. The data set is on either the SDSP VOLUME indicated or the VOLUME indicated.
<b>MSG 910</b>	ERROR READING [DSN   VTOC] FOR VOLSER( <i>volser</i> )  An error has been encountered during the READING of the data set indicated. The data set is on either the SDSP VOLUME indicated or the VOLUME indicated.
<b>MSG 911</b>	ERROR DELETING CATALOG ENTRY FOR { <i>record_key</i> }  An error has been encountered during the DELETING of the indicated CATALOG entry.
<b>MSG 912</b>	ERROR [DELETING   READING   WRITING] CDS RECORD, KEY = { <i>record_key</i> }  An error has been encountered during either DELETING, READING, or WRITING a record in DFSMShsm's CDS records.
<b>MSG 913</b>	ERROR CONVERTING MCP RECORD, KEY = { <i>record_key</i> }  An error has been encountered that prevented the indicated MCP record from being converted to the release 3 format.
<b>MSG 914</b>	ERROR ON BDELETE COMMAND  An error has been encountered in performing the BDELETE command.
<b>MSG 915</b>	VOLUME <i>volser</i> HAS A DISASTER ALTERNATE VOLUME  The volume <i>volser</i> has a disaster alternate volume that is currently being used. AUDIT MEDIACONTROLS of volumes with disaster alternate volumes is not permitted.
<b>MSG 916</b>	I/O ERROR ON VOLUME <i>volser</i>  An I/O error has been encountered reading the tape during AUDIT processing.
<b>MSG 917</b>	AUDIT SKIPPING EXISTING TTOC RECORDS FOR VOLUME <i>volser</i>  AUDIT has detected in-storage TTOC records for this volume that were not written to the OCDS. This allows AUDIT to fast forward to an indicated point on this tape volume, reducing the time required to audit this tape and restore the OCDS records.
<b>MSG 918</b>	AUDIT IS SKIPPING VOLUME <i>volser</i> . CAPACITYMODE(EXTENDED) IS NOT SUPPORTED IN THIS RELEASE.  The volume that is being audited is in CAPACITYMODE(EXTENDED). DFSMShsm V1R4 does not support it. Use DFSMShsm V1R5 or higher for auditing this volume.
<b>MSG 998</b>	AUDIT CONTINUING, COMMAND ACTIVITY LOG MAY CONTAIN ADDITIONAL INFORMATION

AUDIT has encountered an unexpected error. This message is proceeded by a 9xx message that indicates the type of error and related information. Additional information may be found in the DFSMSHsm command activity log. The AUDIT command continues with either the next data set or volume.

**MSG 999**

AUDIT ENDING EARLY, SEE COMMAND ACTIVITY LOG

The AUDIT function has encountered an unexpected error. This message is proceeded by a 9xx message that indicates the type of error and related information. Additional information can be found in the DFSMSHsm command activity log. The AUDIT command is ENDING because of the error encountered.

## **Errors Encountered during AUDIT VOLUMES, BACKUPVOLUMES, or BACKUPTYPE**

AUDIT can encounter certain conditions, as follows, when requested to audit data set information on a primary, migration, or backup volume. The conditions are listed in the order in which they might be encountered.

**ARC0500I**

CANNOT ALLOCATE VOLUME *volser*, DARC=*reascode*

The volume cannot be allocated. The error message contains the volume serial number and the return code from dynamic allocation.

**ARC0525I**

*dsname* SCRATCH FAILED ON VOLUME=*volser*,RC=*retcode*

In attempting to scratch (or scratch and uncatalog) a utility data set, either the scratch or uncatalog operation failed.

**ARC0805I**

I/O ERROR OCCURRED DURING READING OF VTOC ON VOLUME *volser*

When reading data set control blocks, AUDIT encountered an I/O error.

**ARC0806I**

OPEN OF VTOC FOR VOLUME *volser* FAILED

AUDIT was not able to open the volume table of contents (VTOC) to read the data set control blocks.

**ARC0807I**

INSUFFICIENT SPACE FOR READING VTOC OF VOLUME *volser*

AUDIT could not get buffer space to read the data set control blocks.

**ARC0808I**

UNABLE TO AUDIT VOLUME *volser*

The volume has not been previously identified with the ADDVOL command, or is not mounted.

Also, if an error occurs when AUDIT tries to read the job file control block (JFCB) when opening the VTOC, the AUDIT command sends the identification of the module with the error to the DFSMSHsm log and to the operator and abnormally ends auditing with a dump.

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## Section Five: Other Considerations for Using AUDIT

There may be other considerations when you use the AUDIT command, such as with using multiple DFSMShsm hosts, printing audit information, and encountering errors.

### Multiple DFSMShsm Host Considerations with the AUDIT Command

For the greatest accuracy in a multiple-host HSMplex, with any AUDIT command other than AUDIT COMMONQUEUE, issue the command from one host after you have stopped DFSMShsm in the other hosts. For most users, this is unrealistic even though AUDIT may report discrepancies due to the concurrent operation of multiple hosts. If you cannot stop DFSMShsm in the other hosts, use one of the following approaches when you issue the AUDIT command:

- Run the AUDIT NOFIX command once, and then run it again several days later. Those errors common to both executions are likely to be true discrepancies in the CDSs.
- Execute the AUDIT command from one host immediately after restoring a CDS from backups, before other hosts are started.
- For AUDIT COMMONQUEUE, it is best to issue the command when all hosts are active and connected.

**Note:** If AUDIT is running and backup of the DFSMShsm control data sets has started (using BACKVOL CDS command or AUTOBACKUP), all DFSMShsm functions on the host that started this backup are halted until the AUDIT function and the backup of the DFSMShsm CDSs have completed.

### Printing Information from the AUDIT Command

When you have decided what to audit, you can specify whether you want to audit information only for data sets with error conditions or all data sets. You can also specify if you want the AUDIT command to try to fix the error condition automatically.

When you issue the AUDIT command, printer output is always produced and sent to the SYSOUT data set or to an alternative output data set. When you issue AUDIT ... TERMINAL, output is printed at the terminal from which the command is issued in addition to the printer output.

If you have the output sent to an alternative output data set, you identify the data set name with the OUTDATASET parameter. It is recommended that you always direct your AUDIT output to an alternative data set, and that you thoroughly review this output for content, accuracy, and understanding of corrections. At times, the output will contain further diagnostic and troubleshooting recommendations for errors that were encountered. Always investigate any reported MSGxxx error, and you should understand and accept any failures, and not ignore them.

**Note:** This is not applicable for AUDIT COMMONQUEUE.

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## Appendix B. Using the LIST Command

You use the LIST command to determine the status of DFSMShsm and SMS-managed volumes and data sets. This appendix describes the categories of information you can list, explains the output of the LIST command, and contains sample lists.

All references to primary volumes in this appendix include the SMS-managed volumes that have been internally ADDVOLed to DFSMShsm, thereby becoming eligible for DFSMShsm automatic processing.

You can list the following categories of information:

Category	Location
Aggregate backup and recovery activity	page 586
Backup volumes	page 591
Copy pools	page 592
Copy pool backup storage groups	page 594
Data sets	page 596
Dump class	page 603
Dump volumes	page 604
Migration / Primary volume from MCDS	page 610
Migration / Primary volume from BCDS	page 617
DFSMShsm host serialization (HOSTID)	page 621
Tape volume from TTOC	page 621
User authorization	page 628

When you list primary volume, migration volume, or data set information, you can decide whether DFSMShsm lists the information from the MCDS, the BCDS, or both.

You can also decide to let DFSMShsm print the output from the LIST command at your terminal, send it to a SYSOUT data set, or send it to an alternative output data set. This appendix contains sample printer output and sample terminal output for all categories of information.

### Requesting Information for Aggregate Backup and Recovery Activity Information

To get a list of aggregate backup and recovery information for all the aggregate groups that DFSMShsm manages, specify LIST AGGREGATE(\*). This command orders the output in alphanumeric sequence by aggregate group name. To get a list of the information for all the active versions of a specific aggregate group that DFSMShsm manages, specify LIST AGGREGATE(agname).

Table 11 presents the header information for any aggregate volume.

*Table 11. Headings of Output when You Request Information for Aggregate Backup and Recovery*

Printer Output Heading	Terminal Label	Description
ABR RECORD KEY	ABRKEY	This field contains the key of the ABR record.
AGGREGATE GROUP NAME	AGNAME	This field contains the name of the aggregate group processed.
DFSMShsm VERSION	HSMVERS	This field contains the DFSMShsm version and release number.
AGGREGATE ACCOUNT CODE	AGGREGATE ACCOUNT CODE	This field contains an installation-defined accounting code for the aggregate.
ABACKUP DATE	ABKDATE	This field contains the date when ABACK was performed.
ABACKUP TIME	ABKTIME	This field contains the time when ABACK was performed.
VERSION	VERSION	This field contains the version number for this ABACKUP.
COPY NUMBER	COPYNUM	This field contains the copy number to which this ABR record pertains.
UNITNAME	UNIT	This field contains the unitname.
NUMBER OF COPIES	NUMCOPIES	This field contains the number of copies created for this version of the ABACKUP output.
SOURCE SYSTEM	SRCSYS	This field contains the source system name.
MANAGEMENT CLASS	MGMTCLS	This field contains the name of the management class that is associated with the aggregate group that was backed up.
REMOTE DESTINATIONS	REM-DEST	This field is reserved for future function.
CONTROL FILE NAME	CF	This field contains the data set name of the control file.
DFSMSdss DATA FILE NAME	DFLO	This field contains the data set name of the DFSMSdss data file.
INTERNAL I/O DATA FILE NAME	DFINT	This field contains the data set name of the Internal/IO data file.
ACTIVITY LOG/INSTRUCTION FILE NAME	INS/LOGF	This field contains the data set name of the instruction/activity log file. ** ERROR ** at the end of the data set name field indicates an error occurred during the ABACKUP. The file is not recoverable.
ABACKUP ACTIVITY LOG DATA SET NAME	ABKLOGDSN	This field contains the data set name of the ABACKUP activity log.
INSTRUCTION DATA SET NAME	INSTDSN	This field contains the data set name of the instruction data set.

## Aggregate Backup and Recovery Activity

*Table 11. Headings of Output when You Request Information for Aggregate Backup and Recovery (continued)*

Printer Output Heading	Terminal Label	Description
FILTER OUTPUT DATA SET NAME	FODSN	This field contains the data set name of the FILTER OUTPUT data set.
CONTROL FILE VOLSERS	CFVOLS	This field contains a list of the volume serial numbers that contain the control file and associated library names.
DFSMSdss DATA FILE VOLSERS	DFLOVOLS	This field contains a list of the volume serial numbers that contain the DFSMSdss data file and associated library names.
INTERNAL I/O DATA FILE VOLSERS	DFINTVOLS	This field contains a list of the volume serial numbers that contain the I/O data file and associated library names.
INSTRUCTION / ACTIVITY LOG FILE VOLSERS	INS/LOGFVOLS	This field contains a list of the volume serial numbers that contain the instruction/activity log file and associated library names.
TAPE EXPIRATION DATE	TPEXPDAT	This field contains the expiration date for the ABARS output files.
NUMBER OF USER TAPES	DSTPCNT	This field contains the number of tapes.
NUMBER OF ACCOMPANY TAPES	ACCTPCNT	This field contains the number of tape volumes containing data sets from the ACCOMPANY list.
STORAGE USED AT ABACKUP SITE LO, ML1, ML2, TOTAL	ABKLOSTO, ABKML1STO, ABKML2STO, ABKTOTSTO	This field contains the amount of data that was backed up from the various hierarchy levels. L0=Level 0 DASD, ML2=ML2 tape/DASD, ML1=ML1 DASD, TOTAL=total amount of data backed up.
ABACKUP CPU TIME	A BACKUP CPU TIME	This field contains the CPU time that was used for the ABACKUP of this aggregate group.
TAPE STACKING	TAPE STACKING	This field indicates if the ABACKUP output files have been stacked or not stacked.
DATE	ARVDATE-TIME	This field contains the date when the last ARECOVER was performed.
RETCODE	ARVRC	This field contains the return code of the most recent ARECOVER.
OPTION	ARVOPT	This field contains the performed ARECOVER option: EXECUTE/VERIFY/PREPARE
XMIT=Y/N	XMIT	This field indicates if the XMIT option was requested.
STORAGE REQUIREMENTS LO, ML1, ML2, TOTAL	ABKLOSTO, ABKML1STO, ABKML2STO, ABKTOTSTO	This field contains the storage required to complete recovery.
ARECOVER ACTIVITY LOG DATA SET NAME	ARVLOGDSN	This field contains the data set name of the ARECOVER activity log that is associated with the latest ARECOVER.
CONFLICT RESOLUTION DATA SET NAME	CONDSDN	This field contains the data set name of the CONFLICT RESOLUTION data set that is associated with the latest ARECOVER.
RESTART DATA SET NAME	RSTDSDN	This field contains the data set name of the RESTART data set that is associated with the latest ARECOVER.
ARECOVER CPU TIME	ARECOVER CPU TIME	This field contains the CPU time used for the ARECOVER of this aggregate group.

## Aggregate Backup and Recovery Activity

Table 11. Headings of Output when You Request Information for Aggregate Backup and Recovery (continued)

Printer Output Heading	Terminal Label	Description
TAPE STACKING	TAPE STACKING	This field indicates if the ABACKUP output files have been stacked or not stacked.

## Aggregate Backup and Recovery Activity

Figure 19 is a sample of a terminal list when you have specified AGGREGATE(PAY1) VERSION(0002), and TERMINAL parameters.

```
ARC0300I **OPER** ISSUED==>LIST AGGREGATE(AGR1) TERM
ABRKEY=AGR1.1996290000101
HSMVERS=V1.4.0 AGNAME=AGR1
AGGREGATE ACCOUNT CODE=TESTACCTCODEUPTO32CHARS
VERSION=0001 COPYNUM=01 NUMCOPIES=01
ABKDATE-TIME=1996/10/16, 15:48 UNIT=3590-1      SRC SYS=3090
MGMTCLS=NONE
REM-DEST= DESTID          TRANS-OK
    NONE
CF=AGR1.C.C01V0001
DFLO=AGR1.D.C01V0001
DFINT=AGR1.O.C01V0001
INS/LOGF=AGR1.I.C01V0001
ABKLOGDSN=HSMACT.H1.ABACKUP.AGR1.D96290.T154833
INSTDSN=HSMATH0.TEST.INSTRUCT
FODSN=None
CFVOLS=
    VOLs= A00058
    LIBS= *NO_LIB*
DFLOVOLS=
    VOLs= A00058
    LIBS= *NO_LIB*
DFINTVOLS=
    VOLs= A00058
    LIBS= *NO_LIB*
INS/LOGFVOLS=
    VOLs= A00058
    LIBS= *NO_LIB*
TPEXPDATE=1999/12/31 DSTPCNT=0000 ACCTPCNT=0000
ABKLOST0=0000001141K ABKML1ST0=0000000000K
ABKML2ST0=0000000000K ABKTOTST0=0000001141K
ABACKUP CPU TIME=00:00:00.32
TAPE STACKING = YES
ARC0140I LIST COMPLETED,      32 LINE(S) OF DATA OUTPUT
```

Figure 19. Sample Terminal List when You Specify AGGREGATE(PAY1), VERSION(0002) and TERMINAL.

## Aggregate Backup and Recovery Activity

Figure 20 is a sample of a printer list when you have specified AGGREGATE(PAY1), VERSION(0001), and ODS.

```
--- DFSMSHSM CONTROL DATASET AGGREGATE BACKUP AND RECOVERY VERSION LISTING ----
AT 15:28:29 ON 1996/10/16 FOR SYSTEM=3090

ABR RECORD KEY = AGR1.1996290000101
AGGREGATE GROUP NAME = AGR1                               DFSMSHSM VERSION = V1.4.0
AGGREGATE ACCOUNT CODE = TESTACCTCODEUPTO32CHARS
ABACKUP DATE = 1996/10/16        ABACKUP TIME = 15:25:59
VERSION = 0001          COPY NUMBER = 01
UNIT NAME = 3590-1          NUMBER OF COPIES = 01
SOURCE SYSTEM = 3090
MANAGEMENT CLASS = NONE
REMOTE DESTINATIONS =           DESTINATION ID          TRANS. OK
                                NONE

CONTROL FILE NAME = AGR1.C.C01V0001
DFSMSDSS DATA FILE NAME = AGR1.D.C01V0001
INTERNAL I/O DATA FILE NAME = AGR1.O.C01V0001
ACTIVITY LOG/INSTRUCTION FILE NAME = AGR1.I.C01V0001

ABACKUP ACTIVITY LOG DATA SET NAME = HSMACT.H1.ABACKUP.AGR1.D96290.T152559
INSTRUCTION DATA SET NAME = HSMATH0.TEST.INSTRUCT
FILTER OUTPUT DATA SET NAME = NONE

CONTROL FILE VOLSERs =
VOLS= A00048
LIBS= *NO_LIB*
DFSMSDSS DATA FILE VOLSERs =
VOLS= A00048
LIBS= *NO_LIB*
INTERNAL I/O DATA FILE VOLSERs =
VOLS= A00048
LIBS= *NO_LIB*
INSTRUCTION/ACTIVITY LOG FILE VOLSERs =
VOLS= A00048
LIBS= *NO_LIB*
TAPE EXPIRATION DATE = 1999/12/31

NUMBER OF USER TAPES = 0000
NUMBER OF ACCOMPANY TAPES = 0000

STORAGE USED AT ABACKUP SITE :
L0          ML1          ML2          TOTAL
0000001141K 0000000000K 0000000000K 0000001141K

ABACKUP CPU TIME = 00:00:00.30
TAPE STACKING = YES

ARECOVER INFORMATION: NONE

----- END OF - AGGREGATE BACKUP AND RECOVERY VERSION - LISTING -----
```

Figure 20. Sample Printer List when You Specify AGGREGATE(PAY1), VERSION(001) and ODS.

## Requesting Information for Backup Volumes

You specify the LIST command with the BACKUPVOLUME parameter to get a list of the information for all the backup volumes that DFSMShsm manages. The command lists the volumes in alphanumeric sequence by volume serial number. You specify LIST BACKUPVOLUME(volser) to get a list of the information for a specific backup volume that DFSMShsm manages. Table 12 presents the header information for any backup volume:

*Table 12. Headings of Output when You Request Information for Backup Volumes*

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the backup volume.
DEVICE TYPE	DEVTYP	This field contains the name of the unit where this volume can be allocated.
BACKUP TYPE	BACKTYP	DAILY or SPILL indicates the DFSMShsm volume category of the backup volume. AVAIL indicates that the backup category has not been assigned and the volume is available as a daily or spill backup volume when DFSMShsm uses the volume for the first time.
VOL FULL	FULL	For a DASD backup volume, a YES indicates that DFSMShsm has failed to back up a data set because the backup volume does not have enough space. For a tape backup volume, a YES indicates that while DFSMShsm is writing to the tape, the end-of-tape marker is reached or a data-movement error has occurred. The volume has been marked full to prevent further use.
TOTAL TRACKS	TOTAL TRKS	This field contains the total track capacity of the DASD volume. This field does not apply to tape.
FREE TRACKS	FREE TRKS	This field contains the number of tracks on the DASD volume available for data sets. This field does not apply to tape.
THRESH	THRESH	This field contains the threshold of occupancy for the DASD backup volume. This field does not apply to tape.
LAST BACKUP DATE	LAST BACKUP DATE	This field contains the date when the volume was most recently used as a target volume for backup, spill, or recycle processing.
PSWD	PSWD	A YES or Y indicates that the tape volume is password protected. This field does not apply to DASD.
EXP	EXP	A YES or Y indicates that the tape volume is protected by an expiration date. This field does not apply to DASD.
RACF	RACF	A YES or Y indicates that the tape volume is RACF protected. This field does not apply to DASD.
EMPTY	EMPTY	A YES or Y indicates that the tape volume is empty. This field does not apply to DASD.
IDRC	IDRC	<p>Y = Volume contains data in the Improved Data Recording Capability format.</p> <p>N = Volume does not contain data in the Improved Data Recording Capability format.</p> <p>** = Volume is empty—not assigned the Improved Data Recording Capability format.</p>

## Backup Volumes

Table 12. Headings of Output when You Request Information for Backup Volumes (continued)

Printer Output Heading	Terminal Label	Description
DUPLEX ALT	DUPLEX ALT	<p><i>volsr</i> indicates the volume serial number of the duplexed alternate</p> <p>*PEND* indicates that an exception condition and an internal TAPECOPY is pending</p> <p>*NONE* indicates that the volume was not created in a duplexing environment</p> <p>NA indicates that the original volumes are DASD rather than tape</p>
PCT FULL	PCT FULL	This field contains the percentage of the backup volume used for a tape written using 3590 architecture. A value of **** means the percentage is unknown.

Figure 21 is a sample printer list of all the backup volumes when you specify the BACKUPVOLUME parameter. If you requested information for only one volume, the list has only one entry.

**Note:** If \*\*\*\* appears in the FREE TRACKS field for a DASD backup volume, DFSMShsm has not yet calculated—and therefore does not know—the amount of free space on this volume.

1- DFSMShsm Control Dataset - Backup Volume-- Listing ----- AT 10:55:46 ON 01/04/03 FOR SYSTEM=3090															
VOLSER	DEVICE TYPE	BACKUP TYPE	VOL FULL	TOTAL TRACKS	FREE TRACKS	THRESH	LAST DATE	BACKUP	PSWD	EXP	RACF	EMPTY	IDRC	DUPLEX ALT	PCT FULL
A00002	3480	DAILY	NO	*****	*****	***	00/09/05	YES	NO	NO	NO	N	*NONE*	****	
A00017	3480	DAILY	YES	*****	*****	***	00/08/25	YES	NO	NO	NO	N	*NONE*	****	
A00018	3480	DAILY	NO	*****	*****	***	00/10/31	YES	NO	NO	NO	N	*NONE*	****	
BACK01	3390	DAILY	NO	00000150	00000021	090	01/04/02	***	***	***	***	NA	NA	NA	
BACK02	3390	DAILY	NO	00000150	00000023	090	01/04/03	***	***	***	***	NA	NA	NA	
BACK03	3390	SPILL	NO	00000150	*****	090	00/00/00	***	***	***	***	NA	NA	NA	
----- END OF - Backup Volume - Listing -----															

Figure 21. Sample Printer List of All the Backup Volumes when You Specify BACKUPVOLUME

## Requesting Information for Copy Pools

You specify the LIST command with the COPYPOOL parameter to get a list of information for each version of each copy pool that has at least one fast replication backup version. The command lists the copy pools in alphanumeric sequence by copy pool name. You specify LIST COPYPOOL(cpname) to get a list of the detailed information for each version of the specified copy pool. The information includes source volume to target volume pairings. Table 13 presents the header information for copy pools:

Table 13. Headings of Output when You Request Information for Copy Pools

Printer Output Heading	Terminal Label	Description
COPYPOOL	COPYPOOL	This field contains the copy pool name.
VERSION	VERSION	This field contains the copy pool version number.
VALID	VALID	This field indicates whether the copy pool version is valid

Table 13. Headings of Output when You Request Information for Copy Pools (continued)

Printer Output Heading	Terminal Label	Description
VTOCENQ	VTOCENQ	This field indicates whether DFSMShsm serialized on the VTOCs of the volumes that were processed.
DATE	DATE	This field contains the creation date of the copy pool version.
TIME	TIME	This field contains the creation time of the copy pool version.
TOKEN (C)	TOKEN (C)	This field contains the token in alphanumeric format.
TOKEN (H)	TOKEN (H)	This field contains the token in hexadecimal format.
*SGNAME	SGNAME	This field contains the storage group name.
*SOURCE	SOURCE	This field lists source volumes in the storage group.
*TARGET	TARGET	This field lists target volumes in the storage group.

\*Appears only if you specify COPYPOOL(cpname).

Figure 22 is a sample printer list of all the copy pools when you specify the COPYPOOL parameter.

```
-- DFSMShsm CONTROL DATASET --COPY POOL--LISTING ----- AT 16:42:50 ON 02/09/12 FOR SYSTEM=3090
COPYPOOL = CP001

VERSION VALID VTOCENQ      DATE        TIME
 007     Y       Y   2002/09/12    16:40:22
TOKEN(C)=C'CP001$02231'
TOKEN(H)=X'C3D7F0F0F15BF0F2F2F3F1'

VERSION VALID VTOCENQ      DATE        TIME
 006     Y       Y   2002/09/11    16:34:17
TOKEN(C)=C'CP001$02230'
TOKEN(H)=X'C3D7F0F0F15BF0F2F2F3F0'

COPYPOOL = CP002

VERSION VALID VTOCENQ      DATE        TIME
 007     Y       Y   2002/09/12    16:41:38
TOKEN(C)=C'CP002$02231'
TOKEN(H)=X'C3D7F0F0F25BF0F2F2F3F1'

----- END OF -- COPY POOL -- LISTING -----
```

Figure 22. Sample Printer List of All the Copy Pools when You Specify COPYPOOL

Figure 23 is a sample printer list of a specific copy pool when you specify the COPYPOOL(cpname) parameter.

## Copy Pool Backup Storage Groups

```
-- DFMSHsm CONTROL DATASET --COPY POOL--LISTING ----- AT 16:47:21 ON 02/09/12 FOR SYSTEM=3090
COPYPOOL = CP001

VERSION  VALID VTOCENQ      DATE          TIME
 007      Y       Y   2002/09/12    16:40:22
TOKEN(C)=C'CP001$02231'
TOKEN(H)=X'C3D7F0F0F15BF0F2F2F3F1'

SGNAME  SOURCE - TARGET  SOURCE - TARGET  SOURCE - TARGET  SOURCE - TARGET
SGRP1    SRC006 - TAR003  SRC009 - TAR004  SRC011 - TAR008  SRC012 - TAR010
           SRC023 - TAR011
SGRP2    SRC015 - TAR012  SRC019 - TAR016  SRC025 - TAR024  SRC034 - TAR025
           SRC036 - TAR026  SRC037 - TAR029

VERSION  VALID VTOCENQ      DATE          TIME
 006      Y       Y   2002/09/11    16:34:17
TOKEN(C)=C'CP001$02230'
TOKEN(H)=X'C3D7F0F0F15BF0F2F2F3F0'

SGNAME  SOURCE - TARGET  SOURCE - TARGET  SOURCE - TARGET  SOURCE - TARGET
SGRP1    SRC006 - TAR005  SRC009 - TAR007  SRC011 - TAR013  SRC012 - TAR018
           SRC023 - TAR022
SGRP2    SRC015 - TAR023  SRC019 - TAR027  SRC025 - TAR028  SRC034 - TAR030
           SRC036 - TAR032  SRC037 - TAR033

----- END OF -- COPY POOL -- LISTING -----
```

Figure 23. Sample Printer List of a Specific Copy Pool when You Specify COPYPOOL(cpname)

## Requesting Information for Copy Pool Backup Storage Groups

You specify the LIST command with the COPYPOOLBACKUPSTORAGEGROUP(cpbsgname) parameter to get a list of volumes in the copy pool backup storage group that DFMSHsm has assigned as a target volume. The corresponding source volumes are also listed. The command lists the specified copy pool storage group's target volumes in alphanumeric sequence by volume serial number.

Figure 24 is a sample printer list of a specific copy pool backup storage group when you specify the COPYPOOLBACKUPSTORAGEGROUP(cpbsgname) parameter.

## Copy Pool Backup Storage Groups

```
-- DFSMSshm CONTROL DATASET ----CPBSG----LISTING ----- AT 16:48:16 ON 02/09/12 FOR SYSTEM=3090
COPYPOOLBACKUP STORAGE GROUP =TARG1

SOURCE TARGET
SRC006 TAR003
SRC007 TAR004
SRC006 TAR005
SRC007 TAR007
SRC011 TAR008
SRC012 TAR010
SRC023 TAR011
SRC018 TAR012
SRC011 TAR013
SRC019 TAR016
SRC012 TAR018
SRC023 TAR022
SRC018 TAR023
SRC025 TAR024
SRC034 TAR025
SRC036 TAR026
SRC019 TAR027
SRC025 TAR028
SRC037 TAR029
SRC034 TAR030
SRC036 TAR032
SRC037 TAR033

----- END OF -- CPBSG ----- LISTING -----
```

Figure 24. Sample Printer List of a Specific Copy Pool Backup Storage Group when You Specify COPYPOOLBACKUPSTORAGEGROUP(cpbsgname)

## Requesting Information for Data Sets

To get a list of the information for all migrated data sets with the same first qualifier, specify the LIST command with the LEVEL(*qualifier*) parameter. The command lists the data sets in alphanumeric sequence by data set name.

To get a list of the information for *all* migrated data sets, specify the LIST command with the DATASETNAME parameter. The command lists the data sets in alphanumeric sequence by data set name followed by a summary list. To get a list of the information for a specific data set, specify the LIST command with a specific DATASETNAME(*dsname*) parameter.

You can specify one or more of the subparameters of the SELECT parameter to restrict the list to data sets that meet certain criteria.

When you request information for data sets, you can also request whether information should be listed from the MCDS, BCDS, or both control data sets.

## Requesting Data Set Information from the Migration Control Data Set

Table 14 presents the header information for list all data sets, list all data sets that have the same first qualifier, or list a specific data set.

Table 14. Headings of Output when You Request MCDS Information for Data Sets

Printer Output Heading	Terminal Label	Description
DATASET NAME	DSN	This field contains the name of the user data set.
MIGRATED ON VOLUME	MIGVOL	This field contains the volume serial number of the migration volume the data set is on if the data set is currently migrated. If the data set is on more than one tape migration level 2 volume, this field contains the volume serial number of the first volume the data set is on. The field contains ONLINE if the data set has been recalled.
LAST REF DATE	LAST REF	This field contains the date of the most recent reference of the data set.
MIGRATED DATE	MIG	This field contains the date when the data set was last migrated.
TRKS ALLOC	TRKS	If the data set is currently migrated, this field contains the number of tracks allocated for the data set on the primary volume from which the data set migrated. If the data set is recalled, this field is the number of tracks allocated for the recalled data set.
QTY 2K BLKS	2K BLKS	This field contains the size, in 2 KB blocks, of the data set on the migration volume. This field does not apply to tape.
TIMES MIG	TIMES MIG	This field contains the number of times DFSMShsm has migrated the data set. If migration cleanup has deleted the data set record, this is the number of times DFSMShsm has migrated the data set since the record was deleted.
DS ORG	DSO	This field contains the type of data set organization: PE (partitioned data set extended) PS (physical sequential), PO (partitioned), DA (BDAM), VS (VSAM), PSL (large format sequential) or *** if the data set organization is unknown.
SDSP DS	SDSP	A YES under this heading indicates that the data set resides in a small-data-set-packing data set.

Table 14. Headings of Output when You Request MCDS Information for Data Sets (continued)

Printer Output Heading	Terminal Label	Description
QTY 16K BLOCKS	16K BLOCKS	This field contains the size, in 16 KB blocks, of the data set on the tape migration level 2 volume. If the data set is recalled but might be eligible for reconnection during a subsequent migration, this value contains the size, in 16 KB blocks, that the data set would be on the tape migration level 2 volume. This field does not apply to DASD migration volumes.
LAST MIG VOLUME	LAST MIGVOL	This field contains the volume serial number of the last tape migration level 2 volume if the data set spans more than one tape volume. *NONE* indicates that the data set does not span more than one tape volume. This field does not apply to DASD.
A field containing only **** is not applicable (see individual field descriptions in the sample lists.)		

Figure 25 is a sample of a printer list from the MCDS for all data sets. If you request information for a specific data set, the list contains only the entry for that data set.

-----DFSMShsm CONTROL DATASET - MIGRATED DATA SET-- LISTING ----- AT 10:24:20 ON 91/06/02 FOR SYSTEM=381A											
DATASET NAME	MIGRATED ON VOLUME	LAST REF DATE	MIGRATED DATE	TRKS ALLOC	QTY 2K BLKS	TIMES MIG	DS ORG	SDSP DS	QTY 16K BLKS	LAST MIG VOLUME	
G834921.RRDS.N.F40EX001.CLUSTER3	MIG101	91/04/02	87/02/02	000020	000006	01	VS	NO	*****	*****	
G834921.RRDS.N.F40EX001.CLUSTER4	MIG101	91/04/02	87/02/02	000020	000006	01	VS	NO	*****	*****	
H952762.PSF.N.F40EX001.DSET01	MIG101	91/04/02	87/02/02	000019	000048	01	VS	NO	*****	*****	
H952762.PSF.N.F40EX001.DSET03	MIG101	91/04/02	87/02/02	000019	000048	01	VS	NO	*****	*****	
H952762.PSF.N.F40EX001.DSET05	MIG101	91/04/02	87/02/02	000019	000048	01	VS	NO	*****	*****	
H952762.PSF.N.F40EX001.DSET06	MIG101	91/04/02	87/02/02	000019	000048	01	VS	NO	*****	*****	
H952762.PSF.N.F40EX001.VSPRIMER	MIG101	91/04/02	87/02/02	000012	000005	01	VS	NO	*****	*****	

Figure 25. Sample Printer List when You Specify DATASETNAME and MIGRATIONCONTROLDATASET

To get a list of the VSAM data sets from the MCDS, specify the LIST command with the DATASETNAME SELECT(VSAM) parameters. The list of VSAM data sets contains the same header information and a list of object names by which you can automatically recall the data set.

## Data Sets

Figure 26 is a sample printer list from the MCDS for VSAM data sets when you specify the DATASETNAME SELECT(VSAM) and MIGRATIONCONTROLDATASET parameters.

----- DFSMSHsm CONTROL DATASET - MIGRATED DATA SET-- LISTING ----- AT 10:22:08 ON 91/05/02 FOR SYSTEM=381A											
DATASET NAME	MIGRATED ON VOLUME	LAST REF DATE	MIGRATED DATE	TRKS ALLOC	QTY 2K BLKS	TIMES MIG	DS ORG	SDSP DS	QTY 16K BLKS	LAST MIG VOLUME	
G834921.KSDS.N.F40EX001.CLUSTER3	MIG101	91/02/02	91/03/02	000020	000006	01	VS	NO	*****	*****	
BASE D OBJECT NAME = G834921.KSDS.N.F40EX001.DATA3											
BASE I OBJECT NAME = G834921.KSDS.N.F40EX001.INDX3											
G834921.KSDS.N.F40EX001.CLUSTER4	MIG101	91/02/02	91/03/02	000020	000006	01	VS	NO	*****	*****	
BASE D OBJECT NAME = G834921.KSDS.N.F40EX001.DATA4											
BASE I OBJECT NAME = G834921.KSDS.N.F40EX001.INDX4											

Figure 26. Sample Printer List of VSAM Data Sets when You Specify DATASETNAME, SELECT(VSAM), and MIGRATIONCONTROLDATASET

Table 15 presents the header information when you specify the DATASETNAME or LEVEL(qualifier) parameter. If you want only a summary list, specify the SUMMARY parameter of the LIST command.

Table 15. Headings of Output when You Request a Summary of the Data Sets in the Migration Control Data Set

Printer Output Heading	Terminal Label	Description
MIGRATED DATA SETS	MIGRATED DATA SETS	This field contains the number of data sets listed.
TRACKS MIGRATED	TRACKS	This field contains the sum of the tracks allocated for all the data sets listed (see TRKS ALLOC in Table 14 on page 596).
BYTES MIGRATED	BYTES	This field contains the number of user bytes of data that migrated. It can be represented in units of K (1 024 bytes), M (1 048 576 bytes), G (1 073 741 824 bytes), or T (1 099 511 627 776 bytes).

Figure 27 is a sample printer list of data sets when you specify DATASETNAME and SUMMARY parameters.

- DFSMSHSM CONTROL DATASET - SUMMARY-- LISTING ----- AT 12:49:13 ON 01/04/05 FOR SYSTEM=3090		
MIGRATED DATA SETS	TRACKS MIGRATED	BYTES MIGRATED
000000012K	000000218K	00001429K
----- END OF - MIGRATED DATASET - LISTING -----		

Figure 27. Sample Printer List when You Specify DATASETNAME and SUMMARY

## Requesting Data Set Information from the Backup Control Data Set

Table 16 presents the header information for list all data sets, list all data sets that have the same first qualifier, lists a specific data set, or list any copy pools that a volume is a part of.

Table 16. Headings of Output for All Data Sets when You Request Information from the BCDS

Printer Output Heading	Terminal Label	Description
DSNAME	DSN	This field contains the data set name of the data set that was backed up.
BACKUP FREQ	BACK FREQ	This field contains the number of days that must elapse after DFSMShsm backs up a data set before DFSMShsm can automatically back up the data set again.  *** indicates that the data set is SMS-managed.
MAX BACKUP VERSIONS	MAX VERS	This field contains the maximum number of backup versions of the data set that DFSMShsm is to keep. If more than one data set has backup versions with the same data set name, DFSMShsm can list more than the maximum number of backup versions.  ** indicates that the data set is SMS-managed.
BACKUP VERSION DATA SET NAME	BDSN	This field contains the data set name of the backup version.
BACKUP VOLUME	BACKVOL	This field contains the volume serial number of the volume the backup version is on. The volume can be a backup volume or a migration level 1 volume.
FROM VOLUME	FRVOL	This field contains the volume serial number of the primary volume where the data set is when DFSMShsm makes the backup version. If the data set is migrated at the time of backup, this field contains the volume serial number of the primary volume from which the data set migrates.
BACKUP DATE	BACKDATE	This field contains the date the backup version was created.
BACKUP TIME	BACKTIME	This field contains the time the backup version was created.
SYS CAT	CAT	YES indicates that the backup version was made from a cataloged data set.
GEN NMBR	GEN	This field contains the generation number of the backup version. The most recent backup version is 0, the next most recent is 1, and so forth.
VER NMBR	VER	This field contains the version number of the backup version. This is an absolute number that uniquely identifies this backup version during its life span. The numbering begins at 1 for the first backup version of the data set.
UNS/RET	UNS/RET	This field indicates special or exception conditions. UNS indicates that the data set was unserialized when backed up. RET indicates that the version listed is a retired version. U/R indicates an unserialized, retired version. NO indicates a version that is neither unserialized nor retired.
RACF IND	RACF IND	YES indicates that the RACF indicator was on at the time of backup. NO indicates that the RACF indicator was not on at the time of backup.
BACKUP PROF	BACK PROF	YES indicates that a RACF discrete backup profile exists. NO indicates that a RACF discrete backup profile does not exist.

Figure 28 is a sample printer list of all data sets when you specify the DATASETNAME and BACKUPCONTROLDATASET parameters. If you request

## Data Sets

information for a specific data set, the list contains only the entries for that data set.

- DFSMSHsm CONTROL DATASET - BACKUP DATASET-- LISTING ----- AT 12:02:16 ON 95/02/16 FOR SYSTEM=3090												
DSNAME = SMSRLS2.HRL2CR8.N02.KSDS		BACKUP FREQ = ***, MAX BACKUP VERSIONS = ***										
BACKUP VERSION DATA SET NAME		BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS RET	RACF IND	BACKUP PROF	
DFHSM.BACK.T145911.SMSRLS2.HRL2CR8.I5047	BACK01	SMS001	95/02/16	11:59:15	YES	000	002	UNS	NO	NO	NO	
DFHSM.BACK.T594911.SMSRLS2.HRL2CR8.I5047	MIG101	SMS001	95/02/16	11:49:59	YES	001	001	NO	NO	NO	NO	

----- END OF - BACKUP DATASET - LISTING -----

Figure 28. Sample Printer List of All Data Sets when You Specify DATASETNAME and BACKUPCONTROLDATASET

Figure 29 is a sample printer list for all data sets when you specify the BACKUPCONTROLDATASET and LEVEL parameters.

--- DFSMSHsm CONTROL DATASET - BACKUP DATASET-- LISTING ----- AT 12:02:14 ON 95/01/16 FOR SYSTEM=3090												
DSNAME = M100222.KSDS.R.E211RP39		BACKUP FREQ = 000, MAX BACKUP VERSIONS = 04										
BACKUP VERSION DATA SET NAME		BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS RET	RACF IND	BACKUP PROF	
DFHSM.BACK.T155911.M100222.KSDS.I1014	BACK13	SMS001	95/01/14	11:59:15	YES	000	012	NO	NO	NO	NO	
DFHSM.BACK.T594911.M100222.KSDS.I1014	BACK13	SMS001	95/01/14	11:49:59	YES	001	011	NO	NO	NO	NO	
DFHSM.BACK.T265811.M100222.KSDS.I1014	BACK13	SMS001	95/01/14	11:58:25	YES	002	008	NO	NO	NO	NO	
DFHSM.BACK.T165011.M100222.KSDS.I1012	BACK14	SMS001	95/01/12	11:50:15	YES	003	007	NO	NO	NO	NO	
DFHSM.BACK.T365011.M100222.KSDS.I1012	BACK14	SMS001	95/01/12	11:50:35	YES	004	006	NO	NO	NO	NO	
DSNAME = M100222.NEWKSDS.R.F211RP11.CLUSTER3		BACKUP FREQ = 000, MAX BACKUP VERSIONS = 01										
BACKUP VERSION DATA SET NAME		BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS RET	RACF IND	BACKUP PROF	
DFHSM.BACK.T075511.M100222.NEWKSDS.I1015	BACK15	PRIM13	95/01/15	11:55:06	YES	000	013	NO	YES	NO	NO	
DSNAME = M100222.NEWKSDS.R.F211RP11.CLUSTER5		BACKUP FREQ = 000, MAX BACKUP VERSIONS = 01										
BACKUP VERSION DATA SET NAME		BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS RET	RACF IND	BACKUP PROF	
DFHSM.BACK.T035911.M100222.NEWKSDS.I1015	BACK15	PRIM13	95/01/15	11:59:02	YES	000	002	UNS	YES	YES	YES	
DSNAME = M100222.NEWKSDS.R.F211RP13.CLUSTER3		BACKUP FREQ = 000, MAX BACKUP VERSIONS = 01										
BACKUP VERSION DATA SET NAME		BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS RET	RACF IND	BACKUP PROF	
DFHSM.BACK.T345511.M100222.NEWKSDS.I1009	BACK14	PRIM13	95/01/09	11:55:34	YES	000	003	NO	YES	NO	NO	
DSNAME = M100222.NEWKSDS.R.F211RP13.CLUSTER5		BACKUP FREQ = ***, MAX BACKUP VERSIONS = **										
BACKUP VERSION DATA SET NAME		BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS RET	RACF IND	BACKUP PROF	
DFHSM.BACK.T215711.M100222.NEWKSDS.I1009	BACK13	PRIM13	95/01/09	11:57:20	YES	000	001	RET	YES	YES	YES	

Figure 29. Sample Printer List of All Data Sets when You Specify BACKUPCONTROLDATASET and LEVEL

## Requesting Data Set Information from the MCDS and BCDS

To get a list of data set information from the MCDS and BCDS, specify the LIST command with the DATASETNAME BOTH parameters. To get a list of the information from the MCDS and BCDS for a specific data set specify the LIST command with the DATASETNAME(*dsname*) BOTH parameters.

The information is provided in separate lists. In each list, the data sets are in alphanumeric sequence by data set name.

Figure 30 is a sample printer list of all data sets when you specify the DATASETNAME, BOTH, and INCLUDEPRIMARY parameters. If you request information for a specific data set, the list contains only the entries for that data set.

- DFSMSHSM CONTROL DATASET - MIGRATED DATASET-- LISTING ----- AT 12:49: 13 ON 01/04/05 FOR SYSTEM=3090																					
DATASET NAME	MIGRATED ON VOLUME	LAST REF DATE	MIGRATED DATE	TRKS ALLOC	QTY 2K BLKS	TIMES MIG	DS ORG	SDSP DS	QTY 16K BLKS	LAST MIG VOLUME											
D324711.ESDS.R.F40RP123.CLUSTER2	A00015	00/08/27	00/08/27	000016	*****	002	VS	NO	000000	*NONE*											
HSMATH0.GDGDS.N10.GDG.G0001V00	ONLINE	91/01/16	91/01/16	000019	0000000	005	PS	NO	*****	*****											
HSMATH0.GDGDS.N10.GDG.G0002V00	ONLINE	91/01/18	91/01/18	000019	0000000	001	PS	NO	*****	*****											
HSMATH0.GDG5.G0001V00	ONLINE	91/01/20	91/01/20	000002	0000000	004	PS	YES	*****	*****											
HSMATH0.GDG5.G0002V00	ONLINE	00/00/00	00/00/00	000000	0000000	001	PS	NO	*****	*****											
MRECN.DS1	ONLINE	91/12/30	90/12/30	000001	0000000	004	PS	NO	*****	*****											
OW46279.NONVSAM	ONLINE	91/01/01	90/01/01	000001	0000000	004	PS	NO	*****	*****											
OW46279.PO	A00001	00/10/09	00/10/10	000015	*****	002	PO	NO	000000	*NONE*											
TEST.BVR	WORK01	00/08/18	01/04/02	000001	0000001	001	PS	NO	*****	*****											
TEST.SMS	A00005	00/10/31	00/10/31	000015	*****	001	PS	NO	000014	*NONE*											
- DFSMSHSM CONTROL DATASET - SUMMARY-- LISTING -----AT 12:49:13 ON 01/04/05 FOR SYSTEM=3090																					
MIGRATED DATA SETS		TRACKS MIGRATED		BYTES MIGRATED																	
000000000K		000000001K		00000429K																	
-----END OF - MIGRATED DATASET - LISTING -----																					
DSNAME = H952762.PSFB.F40LI001.DSET01	BACKUP FREQ = 000, MAX BACKUP VERSIONS = 02																				
BACKUP VERSION DATA SET NAME	BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS/ RET	RACF IND	BACKUP PROF											
HSM40.BACK.T155911.H952762.PSFB.I1024	MIG101	PRIM01	01/01/24	11:59:15	YES	000	002	U/R	NO	NO											
HSM40.BACK.T594911.H952762.PSFB.I1024	BATP01	PRIM01	01/01/24	11:49:59	YES	001	001	NO	NO	NO											
DSNAME = M059259.PSFB.N.F40RL022.DSET02	BACKUP FREQ = 000, MAX BACKUP VERSIONS = 02																				
BACKUP VERSION DATA SET NAME	BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS/ RET	RACF IND	BACKUP PROF											
HSM40.BACK.T034511.M059259.PSFB.I1333	BACK01	PRIM02	01/11/29	11:45:02	NO	000	001	NO	NO	NO											
DSNAME = M100222.KSDS.R.F40RP125.DSET01	BACKUP FREQ = 000, MAX BACKUP VERSIONS = 03																				
BACKUP VERSION DATA SET NAME	BACKUP VOLUME	FROM VOLUME	BACKUP DATE	BACKUP TIME	SYS CAT	GEN NMBR	VER NMBR	UNS/ RET	RACF IND	BACKUP PROF											
HSM40.BACK.T033011.M100222.KSDS.I1025	BACK01	PRIM01	01/01/25	11:30:03	YES	000	003	NO	NO	NO											
HSM40.BACK.T593011.M100222.KSDS.I1024	BACK01	PRIM01	01/01/24	11:30:59	YES	001	002	NO	NO	NO											
HSM40.BACK.T312911.M100222.KSDS.I1023	BACK01	PRIM01	01/01/23	11:29:32	YES	002	001	UNS	NO	NO											
-----END OF - BACK-UP DATASET - LISTING -----																					

Figure 30. Sample Printer List of All Data Sets when You Specify DATASETNAME, BOTH, and INCLUDEPRIMARY

## Data Sets

### Requesting Data Set Information for the Latest Backup Version

Table 17 presents the information contained in a list of cataloged data sets whose latest backup version is on the specified backup volume.

Table 17. Headings of Output when You Request Data Set Information for the Latest Backup Version

Printer Output Heading	Terminal Label	Description
DATA SET NAME	DSN	This field contains the original data set name of the backup version.
FROM VOLUME	FRVOL	This field contains the volume serial number of the primary volume where the data set is when DFSMShsm makes the backup version. If the data set is migrated at the time of backup, this field contains the volume serial number of the primary volume from which the data set migrates.
BACKUP DATE	BACKDATE	This field contains the date the backup version has been created.
BACKUP TIME	BACKTIME	This field contains the time the backup version has been created.
UNS/RET	UNS/RET	This field indicates special or exception conditions. UNS indicates that the data set was unserialized when backed up. RET indicates that the version listed is a retired version. U/R indicates an unserialized, retired version. NO indicates a version that is neither unserialized nor retired.

Figure 31 is a sample of a printer list having specified the LIST command with the DATASETNAME and SELECT(VOLUME(volser)) parameters.

```
---DFSMShsm CONTROL DATASET - LATEST VERSION BACK05 -- LISTING ---- AT 12:02:20 ON 95/02/16 FOR SYSTEM=3090
      DATA SET NAME          FROM      BACKUP      BACKUP      UNS/
                  VOLUME     DATE       TIME       RET
SMSRLS2.HRL2CR8.N02.KSDS    SMS001   95/02/16 11:59:30   NO
SMSRLS2.HRL2CR8.N03.KSDS    SMS001   95/02/16 11:59:40   NO
SMSRLS2.HRL2CR8.N04.KSDS    SMS001   95/02/16 11:59:49   NO
SMSRLS2.HRL2CR8.N05.KSDS    SMS001   95/02/16 11:59:59   NO
----END OF - LATEST VERSION BACK05 - LISTING ----
```

Figure 31. Sample Printer List when you specify DATASETNAME and SELECT(VOLUME(volser))

Figure 32 is a sample of a list having specified the LIST command with the DATASETNAME, TERMINAL, and SELECT(VOLUME(volser)) parameters.

```
DSN=SMSRLS2.HRL2CR8.N02.KSDS          BACKVOL=BACK01
FRVOL=SMS001 BACKDATE=95/02/16 BACKTIME=11:59:15 UNS/RET=NO
ARC0140I LIST COMPLETED,
ARC0140I(CONT)           3 LINE(S) OF DATA OUTPUT
```

Figure 32. Sample Terminal List when you specify DATASETNAME and SELECT(VOLUME(volser))

## Requesting Dump Class Information

To get a list of the dump class information for a specific type of volume managed by DFSMShsm, specify the LIST command with the DUMPCLASS(*class*) parameter. Table 18 presents the information for dump class.

Table 18. Headings of Output when You Request Dump Class Information

Printer Output Heading	Terminal Label	Description
DUMP CLASS	CLASS	This field contains the type of dump class for the unit type.
UNIT TYPE	UNIT	This field contains the type of unit.
AUTO REUSE	REUSE	This field indicates (YES or Y, NO or N) whether the volume for this dump class is automatically available for reuse.
DATASET RESTORE	RESTORE	This field indicates (YES or Y, NO or N) whether to allow a physical data set restore from a full-volume dump copy for this dump class.
RESET CHANGE	RESET	This field indicates (YES or Y, NO or N) whether the change bit for each data set is to be reset by DFSMSdss following a successful full-volume dump.
CLASS DISABLE	DISABLE	This field indicates (YES or Y, NO or N) whether the dump class is disabled.
DAY	DAY	This field contains the day in the dump cycle. This may be **.
FREQ	FREQ	This field contains the minimum number of days that must elapse between the last volume dump to this class and the next automatic dump.
RETPD	RETPD	This field contains the number of days dump copies for this dump class must be retained. This may be *NOLIM.
TAPE EXPDT	TAPEEXPDT	This field contains the expiration date for the dump copies created in this dump class. This may be *****.
VTOC COPIES	VTOCCOPIES	This field contains the number of VTOC copies.
STACK	STACK	This field contains the maximum number of dump copies to be written to a dump volume in this dump class. This may be **, which is treated the same as a value of one.
DISPOSITION	DISP	This field contains the disposition of the dump volume of this unit type. This may be *****.

Figure 33 is a sample printer list of the dump classes when you specify the DUMPCLASS parameter. If you specify the parameter DUMPCLASS(*class*), only dump volumes of *class* are listed.

```
---- DFSMShsm CONTROL DATASET -DUMP CLASS-BCDS--- LISTING ---- AT 13:31:36 ON 91/12/31 FOR SYSTEM=SYSA
      DUMP     UNIT     AUTO    DATASET   RESET   CLASS          TAPE     VTOC
      CLASS    TYPE    REUSE   RESTORE  CHANGE  DISABLE    DAY    FREQ   RETPD   EXPDT  COPIES  STACK  DISPOSITION
      WEEKLY   3490    NO     NO     NO     YES    **    030   *NOLIM 1999365  001    012   OFFSITE AT CAVERNS
---- END OF - DUMP CLASS - LISTING ----
```

Figure 33. Sample Printer List of Dump Classes of Dump Volumes when You Specify DUMPCLASS

## Requesting Information for Dump Volumes

To get a list of the information for a specific dump volume managed by DFSMShsm, specify the LIST command with the DUMPVOLUME(*volser*) parameter. To get a list of the information for the dump volumes of the requested status managed by DFSMShsm, specify the LIST command with the DUMPVOLUME parameter without the volume serial number and with a status parameter (AVAILABLE, UNAVAILABLE, EXPIRED, UNEXPIRED, or NORETENTIONLIMIT). The command lists the volumes in alphanumeric sequence by volume serial number.

Table 19 explains the header information for any dump volume. These fields are listed for each dump volume and for each dump copy stacked on the volume.

*Table 19. Headings of Output when You Request Information for Dump Volumes*

Printer Output Heading	Terminal Label	Description												
DUMP VOLSER	DUMPVOL	This field contains the volume serial number of the dump volume.												
VOL STATUS	STAT	<p>This field contains the status of the dump volume. Possible values are:</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>AVAIL</td> <td>An available volume is one that has been added to DFSMShsm's inventory but never used or that has been used but has since been invalidated and remains under DFSMShsm ownership.</td> </tr> <tr> <td>UNAVA</td> <td>An unavailable volume is one that has had its contents invalidated, but was not eligible to be automatically reused.</td> </tr> <tr> <td>EXPIR</td> <td>An expired volume is one that contains parts of one or more valid dump copies, and has reached or passed its expiration date.</td> </tr> <tr> <td>UNEXP</td> <td>An unexpired volume is one that contains parts of one or more valid dump copies, and has not reached its expiration date.</td> </tr> <tr> <td>NORET</td> <td>No retention limit.</td> </tr> </tbody> </table>	Value	Meaning	AVAIL	An available volume is one that has been added to DFSMShsm's inventory but never used or that has been used but has since been invalidated and remains under DFSMShsm ownership.	UNAVA	An unavailable volume is one that has had its contents invalidated, but was not eligible to be automatically reused.	EXPIR	An expired volume is one that contains parts of one or more valid dump copies, and has reached or passed its expiration date.	UNEXP	An unexpired volume is one that contains parts of one or more valid dump copies, and has not reached its expiration date.	NORET	No retention limit.
Value	Meaning													
AVAIL	An available volume is one that has been added to DFSMShsm's inventory but never used or that has been used but has since been invalidated and remains under DFSMShsm ownership.													
UNAVA	An unavailable volume is one that has had its contents invalidated, but was not eligible to be automatically reused.													
EXPIR	An expired volume is one that contains parts of one or more valid dump copies, and has reached or passed its expiration date.													
UNEXP	An unexpired volume is one that contains parts of one or more valid dump copies, and has not reached its expiration date.													
NORET	No retention limit.													
UNIT TYPE	UNIT	This field contains the unit type of the dump volume.												
SEQ	FILESEQ	This field contains the number of the file containing the dump copy. If the field contains '***', then the file shown is continued from another dump tape.												
SOURCE VOLSER	SOURCEVOL	This field contains the volume serial number of the source for this dump copy.												
SMS	SMS	<p>This field indicates whether a volume is SMS-managed.</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>Identifies the volume as SMS-managed</td> </tr> <tr> <td>No</td> <td>Identifies the volume as non-SMS-managed.</td> </tr> </tbody> </table>	Value	Meaning	Yes	Identifies the volume as SMS-managed	No	Identifies the volume as non-SMS-managed.						
Value	Meaning													
Yes	Identifies the volume as SMS-managed													
No	Identifies the volume as non-SMS-managed.													
CLASS	CLASS	This field contains the dump class of the dump volume.												
DUMPED DATE	DUMPED DATE	This field contains the date of the dump copy.												
DUMPED TIME	DUMPED TIME	This field contains the time of the dump copy.												

Table 19. Headings of Output when You Request Information for Dump Volumes (continued)

Printer Output Heading	Terminal Label	Description
EXP DATE	EXPDATE	This field contains the expiration date of the dump volume.
IDRC	IDRC	<p>Y = Volume contains data in the Improved Data Recording Capability format.</p> <p>N = Volume does not contain data in the Improved Data Recording Capability format.</p> <p>** = Volume is empty - not assigned the Improved Data Recording Capability format.</p>
LIBRARY	LIBRARY	<p>This field contains the tape library information for the volume. The field can be:</p> <ul style="list-style-type: none"> <li>• library name—the library with which the tape volume is associated</li> <li>• *NO LIB*—the tape volume is not associated with a tape library</li> <li>• *ERROR**—an error occurs when the library information is retrieved. Check the command activity log for additional messages.</li> </ul>
PCT FULL	PCT FULL	This field contains the percentage of the dump volume used by all its dump copies. A value of '100' means the last dump copy spans to another volume. A value of '***' means the percentage is unknown.
SET OF DUMP VOLSERs	DUMPVOLS	This field contains a list of volume serial numbers for the tape volumes used to dump the source volume.

Figure 34 is a sample printer list of the specified dump volume when you specify the DUMPVOLUME(volser) parameter.

```
---- DFSMSshm CONTROL DATASET -DUMP VOLUME-BCDS--- LISTING --- AT 16:18:44 ON 98/09/12 FOR SYSTEM=381A
      DUMP   VOL    UNIT     SOURCE      DUMPED      DUMPED          PCT      SET OF DUMP
      VOLSER STATUS TYPE SEQ VOLSER SMS CLASS DATE        TIME      EXP DATE    IDRC  LIBRARY  FULL  VOLSERs
      A00359 UNEXP 3490           BITON          1998/10/12 N      STORE001 18
      01 PRIM01 NO    1998/01/14 16:17:55          A00359 *****
DUMP COPY DATA SET NAME = DFHSM.DMP.T551706.BITON.D98255.VPRIM01
      02 SMS001 YES   1998/01/14 16:20:55          A00359 *****
DUMP COPY DATA SET NAME = DFHSM.DMP.T552012.BITON.D98255.VSMS001
----- END OF - DUMP VOLUME - LISTING -----
```

Figure 34. Sample Printer List of the Specified Dump Volume when You Specify DUMPVOLUME(volser)

## Dump Volumes

Figure 35 is a sample printer list for all available volumes when you specify the SELECT(AVAILABLE) parameters.

```
---- DFSMShsm CONTROL DATASET -DUMP VOLUME-BCDS--- LISTING      --- AT 16:18:52 ON 98/09/12 FOR SYSTEM=381A
DUMP VOL UNIT SOURCE          DUMPED      DUMPED          PCT      SET OF DUMP
VOLSER STATUS TYPE SEQ VOLSER SMS CLASS DATE        TIME      EXP DATE IDRC LIBRARY FULL    VOLSER
A00400 AVAIL 3590 ** ***** * BITON ****:***** **:***:*** ****:***** ** STORE001 *** 
A00423 AVAIL 3590 ** ***** * T03   ****:***** **:***:*** ****:***** ** STORE001 *** 
A00500 AVAIL 3490 ** ***** * T100  ****:***** **:***:*** ****:***** ** *NO LIB* *** 
A00618 AVAIL 3490 ** ***** * T100  ****:***** **:***:*** ****:***** ** *NO LIB* *** 
----- END OF - DUMP VOLUME - LISTING -----
```

Figure 35. Sample Printer List for all Available Volumes when You Specify SELECT(AVAILABLE)

Figure 36 is a sample printer list of all dump volumes when you specify the DUMPVOLUME parameter without (volser).

```
---- DFSMShsm CONTROL DATASET -DUMP VOLUME-BCDS--- LISTING      --- AT 16:18:52 ON 91/09/12 FOR SYSTEM=381A
DUMP VOL UNIT SOURCE          DUMPED      DUMPED          PCT      SET OF DUMP
VOLSER STATUS TYPE SEQ VOLSER SMS CLASS DATE        TIME      EXP DATE IDRC LIBRARY FULL    VOLSER
A00359 UNEXP 3490           BITON
  01 PRIM01 NO   1998/01/14 16:17:55 1998/12/31 N STORE001 22   A00359 *****
  02 SMS001 YES  1998/01/14 16:20:55
A00100 AVAIL 3490           BITON
A01000 UNEXP 3590           T01
  01 PRIM02 NO   1998/02/20 04:10:30 1998/12/31 N STORE001 *** 
  02 SMS001 YES  1998/02/20 04:12:15
  03 SMS002 YES  1998/02/20 04:14:20
  04 SMS003 YES  1998/02/20 04:14:20
A01012 UNEXP 3590           T01
  01 SMS003 YES  1998/02/20 04:14:20 1998/12/31 N STORE200 05   A01000 A01012
  05 SMS004 YES  1998/02/20 04:16:46
----- END OF - DUMP VOLUME - LISTING -----
```

Figure 36. Sample Printer List of all Dump Volumes when You Specify DUMPVOLUME without (volser)

## Requesting Dump Content Information for Dump Volumes

Table 20 explains the dump content header information for dump volumes. These fields are listed for each dump volume and for each dump copy stacked on the volume.

*Table 20. Headings of Output when You Request Dump Content Information for Dump Volumes*

Printer Output Heading	Terminal Label	Description												
DUMP VOLSER	DUMPVOL	This field contains the volume serial number of the dump volume.												
VOL STATUS	STAT	<p>This field contains the status of the dump volume. Possible values are:</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td><b>AVAIL</b></td> <td>An available volume is one that has been added to DFSMShsm's inventory but never used or that has been used but has since been invalidated and remains under DFSMShsm ownership.</td> </tr> <tr> <td><b>UNAVA</b></td> <td>An unavailable volume is one that has had its contents invalidated, but was not eligible to be automatically reused.</td> </tr> <tr> <td><b>EXPIR</b></td> <td>An expired volume is one that contains parts of one or more valid dump copies, and has reached or passed its expiration date.</td> </tr> <tr> <td><b>UNEXP</b></td> <td>An unexpired volume is one that contains parts of one or more valid dump copies, and has not reached its expiration date.</td> </tr> <tr> <td><b>NORET</b></td> <td>No retention limit.</td> </tr> </tbody> </table>	Value	Meaning	<b>AVAIL</b>	An available volume is one that has been added to DFSMShsm's inventory but never used or that has been used but has since been invalidated and remains under DFSMShsm ownership.	<b>UNAVA</b>	An unavailable volume is one that has had its contents invalidated, but was not eligible to be automatically reused.	<b>EXPIR</b>	An expired volume is one that contains parts of one or more valid dump copies, and has reached or passed its expiration date.	<b>UNEXP</b>	An unexpired volume is one that contains parts of one or more valid dump copies, and has not reached its expiration date.	<b>NORET</b>	No retention limit.
Value	Meaning													
<b>AVAIL</b>	An available volume is one that has been added to DFSMShsm's inventory but never used or that has been used but has since been invalidated and remains under DFSMShsm ownership.													
<b>UNAVA</b>	An unavailable volume is one that has had its contents invalidated, but was not eligible to be automatically reused.													
<b>EXPIR</b>	An expired volume is one that contains parts of one or more valid dump copies, and has reached or passed its expiration date.													
<b>UNEXP</b>	An unexpired volume is one that contains parts of one or more valid dump copies, and has not reached its expiration date.													
<b>NORET</b>	No retention limit.													
UNIT TYPE	UNIT	This field contains the unit type of the dump volume.												
SEQ	FILESEQ	This field contains the number of the file containing the dump copy. If the field contains '***', then the file shown is continued from another dump tape.												
SOURCE VOLSER	SOURCEVOL	This field contains the volume serial number of the only dump copy on the volume, or the dump copy specified with DUMPCONTENTS(srcvol).												
SMS	SMS	<p>This field indicates whether a volume is SMS-managed.</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td><b>Yes</b></td> <td>Identifies the volume as SMS-managed</td> </tr> <tr> <td><b>No</b></td> <td>Identifies the volume as non-SMS-managed.</td> </tr> </tbody> </table>	Value	Meaning	<b>Yes</b>	Identifies the volume as SMS-managed	<b>No</b>	Identifies the volume as non-SMS-managed.						
Value	Meaning													
<b>Yes</b>	Identifies the volume as SMS-managed													
<b>No</b>	Identifies the volume as non-SMS-managed.													
CLASS	CLASS	This field contains the dump class of the dump volume.												
DUMPED DATE	DUMPED DATE	This field contains the date of the dump copy.												
DUMPED TIME	DUMPED TIME	This field contains the time of the dump copy.												
EXP DATE	EXPDATE	This field contains the expiration date of the dump volume.												

## Dump Volumes

Table 20. Headings of Output when You Request Dump Content Information for Dump Volumes (continued)

Printer Output Heading	Terminal Label	Description														
IDRC	IDRC	<p>Y = Volume contains data in the Improved Data Recording Capability format.</p> <p>N = Volume does not contain data in the Improved Data Recording Capability format.</p> <p>** = Volume is empty - not assigned the Improved Data Recording Capability format.</p>														
LIBRARY	LIB	<p>This field contains the tape library information for the volume. The field can be:</p> <ul style="list-style-type: none"> <li>• library name—the library with which the tape volume is associated</li> <li>• *NO LIB*—the tape volume is not associated with a tape library</li> <li>• *ERROR**—an error occurs when the library information is retrieved. Check the command activity log for additional messages.</li> </ul>														
PCT FULL	PCT FULL	This field contains the percentage of the dump volume used by all its dump copies. A value of '100' means the last dump copy spans to another volume. A value of '***' means the percentage is unknown.														
SET OF DUMP VOLSERs	DUMPVOLS	<p>This field contains a list of volume serial numbers for the tape volumes used to dump the source volume.</p> <p><b>Note:</b> Only one VTOC copy data set is kept for a given dump copy. The above entries are given for a single volume serial number. The following entries are repeated once for each data set that has been dumped to the dump volume. The values shown represent the data set names as they appear in the data set VTOC entry for the data sets.</p>														
SOURCE VOLUME	SOURCEVOL	This field contains the volume serial number of the source volume.														
DATASET NAME	DSN	This field contains the data set name of the dump copy whose contents are listed below.														
ORG	ORG	<p>This field contains the data set organization on the dumped volume. Possible values are:</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>DA</td> <td>BDAM</td> </tr> <tr> <td>PE</td> <td>Partitioned data set extended</td> </tr> <tr> <td>PO</td> <td>Partitioned organization</td> </tr> <tr> <td>PS</td> <td>Physical sequential</td> </tr> <tr> <td>VS</td> <td>VSAM</td> </tr> <tr> <td>**</td> <td>Unknown data set organization</td> </tr> </tbody> </table>	Value	Meaning	DA	BDAM	PE	Partitioned data set extended	PO	Partitioned organization	PS	Physical sequential	VS	VSAM	**	Unknown data set organization
Value	Meaning															
DA	BDAM															
PE	Partitioned data set extended															
PO	Partitioned organization															
PS	Physical sequential															
VS	VSAM															
**	Unknown data set organization															
MULTI	MULTI	<p>This field contains the non-VSAM indicator for determining if a data set is a multivolume data set. Possible values are:</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>Data resides on multiple volumes</td> </tr> <tr> <td>No</td> <td>Data resides on a single volume</td> </tr> <tr> <td>***</td> <td>VSAM data sets whether multivolume, single volume, or VTOC index.</td> </tr> </tbody> </table>	Value	Meaning	Yes	Data resides on multiple volumes	No	Data resides on a single volume	***	VSAM data sets whether multivolume, single volume, or VTOC index.						
Value	Meaning															
Yes	Data resides on multiple volumes															
No	Data resides on a single volume															
***	VSAM data sets whether multivolume, single volume, or VTOC index.															
CREATED	CREATE	This field contains the creation date of the data set on the dumped volume.														
REFERENCED	REF	This field contains the date the data set was last referred to.														

## Dump Volumes

*Table 20. Headings of Output when You Request Dump Content Information for Dump Volumes (continued)*

Printer Output Heading	Terminal Label	Description
EXP DATE	EXP	This field contains the expiration date of the data set. This may be **NONE**.
RACF	RACF	This field indicates whether the data set is RACF protected. <b>Note:</b> If the data set is protected with a generic profile, this field indicates NO. It is only an indication of VTOC information.
PSWD	PSWD	This field indicates whether the data set is password protected.
CHANGED	CHANGED	This field indicates whether the data set has been opened for something other than input since the last backup copy was made. *** Is presented for a VTOC index.

The list data is obtained from the Format-1 label. For some data set VTOC entry types, not all of the above fields are maintained.

Figure 37 is a sample printer list of dump content information for a specific dump volume when you specify the DUMPVOLUME(volser) and DUMPCONTENTS(srcvol) parameters.

---- DFSMSHsm CONTROL DATASET -DUMP VOLUME-BCDS--- DC CONTENTS										--- AT 16:18:31 ON 98/09/12 FOR SYSTEM=381A		
DUMP VOL UNIT SOURCE	VOLSER	STATUS	TYPE	SEQ	VOLSER	SMS	CLASS	DUMPED DATE	DUMPED TIME	EXP DATE	IDRC	LIBRARY
A01000 UNEXP 3590					T01					1998/12/31 N	STORE200	100
DUMP COPY DATA SET NAME = DFHSM.DMP.T551706.T01.D98255.VPRIM02												
CONTENTS OF VTOC COPY FOR SOURCE VOLUME PRIM02												
-----												
DATASET NAME	ORG	MULTI	CREATED	REFERENCED	EXP DATE	RACF	PSWD	CHANGED				
HSMAUTHO.OW27973T.N01.PSFB	PS	NO	91/09/12	91/09/12	00/00/00	NO	NO	YES				
HSMAUTHO.OW27973T.N02.PSFB	PS	NO	91/09/12	91/09/12	00/00/00	NO	NO	YES				
HSMAUTHO.OW27973T.N03.PSFB	PS	NO	91/09/12	91/09/12	00/00/00	NO	NO	YES				
HSMAUTHO.OW27973T.N04.PSFB	PS	NO	91/09/12	91/09/12	00/00/00	NO	NO	YES				
HSMAUTHO.OW27973T.N05.PSFB	PS	NO	91/09/12	91/09/12	00/00/00	NO	NO	YES				
HSMAUTHO.OW27973T.N06.ESDS.DATA	VS	***	91/09/12	91/09/12	99/12/31	***	***	YES				
HSMAUTHO.OW27973T.N07.ESDS.DATA	VS	***	91/09/12	91/09/12	99/12/31	***	***	YES				
HSMAUTHO.OW27973T.N08.ESDS.DATA	VS	***	91/09/12	91/09/12	99/12/31	***	***	YES				
HSMAUTHO.OW27973T.N09.ESDS.DATA	VS	***	91/09/12	91/09/12	99/12/31	***	***	YES				
HSMAUTHO.OW27973T.N10.ESDS.DATA	VS	***	91/09/12	91/09/12	99/12/31	***	***	YES				
SYSL.VVDS.VPRIM02	VS	***	91/09/12	00/00/00	00/00/00	***	***	NO				
DUMP COPY DATA SET NAME = DFHSM.DMP.T551706.BITON.D98255.VPRIM01												
02 SMS001 YES					1998/02/20 04:12:15					A01000	*****	
DUMP COPY DATA SET NAME = DFHSM.DMP.T552012.BITON.D98255.VSMS001												
03 SMS002 YES					1998/02/20 04:13:25					A01000	*****	
DUMP COPY DATA SET NAME = DFHSM.DMP.T551706.BITON.D98255.VSMS002												
04 SMS003 YES					1998/02/20 04:14:20					A01000	A01012	
----- END OF - DUMP VOLUME - LISTING -----												

*Figure 37. Sample Printer List when You Specify DUMPVOLUME(volser) and DUMPCONTENTS(srcvol)*

---

## Requesting Information for Migration or Primary Volumes from the Migration Control Data Set

To get a list of information for migration or primary volumes, specify the LIST command with the VOLUME, PRIMARYVOLUME, or MIGRATIONVOLUME parameters. Each parameter gives you the following results:

<b>VOLUME</b>	Specific primary or migration volume
<b>VOLUME(volser)</b>	Specific primary or migration volume
<b>PRIMARYVOLUME</b>	All primary volumes
<b>PRIMARYVOLUME(volser)</b>	Specific primary volume
<b>MIGRATIONVOLUME</b>	All migration volumes
<b>MIGRATIONLEVEL1</b>	All migration level 1 volumes
<b>MIGRATIONLEVEL2</b>	All migration level 2 volumes
<b>MIGRATIONLEVEL2(DASD)</b>	All DASD migration level 2 volumes
<b>MIGRATIONLEVEL2(TAPE)</b>	All tape migration level 2 volumes

When you request information for migration or primary volumes, you can also request that information be listed from the MCDS, BCDS, or both control data sets. When you specify MIGRATIONCONTROLDATASET, DFSMSHsm lists information about primary and migration volumes. When you specify BACKUPCONTROLDATASET, DFSMSHsm lists information about primary volumes that DFSMSHsm has backed up.

## Requesting Primary and Migration Volume Information from the MCDS

When you specify LIST VOLUME, DFSMSHsm prints the list in the following order:

1. Primary volumes
2. Migration level 1 volumes
3. Migration level 2 DASD volumes
4. Migration level 2 tape volumes

When you specify LIST MIGRATIONVOLUME, DFSMSHsm prints the list in the following order:

1. Migration level 1 volumes
2. Migration level 2 DASD volumes
3. Migration level 2 tape volumes

Table 21 shows the headings and descriptions of the output when DFSMShsm lists information from the MCDS for primary or DASD migration volumes.

*Table 21. Description of Output from the MCDS for Primary or DASD Migration Volumes*

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the primary or migration volume.
DEVICE TYPE	DEVTYPE	This field contains the name of the unit where this volume can be allocated.
VOLUME TYPE	VOLTYPE	<p>PRIM: The volume has been added as a primary volume.</p> <p>P SMS: The volume is known as an SMS-managed volume.</p> <p>LEV 1: The volume has been added as a migration level 1 volume.</p> <p>LEV 1-OV: The OVERFLOW subparameter has been specified on the ADDVOL command for the DASD migration level 1 volume.</p> <p>L2-AV: The volume has been added as a DASD migration level 2 volume and is still available to be assigned a key range.</p> <p>L2-UN: The volume has been added as a DASD migration level 2 volume and has already been assigned a key range.</p> <p>D: The DRAIN attribute has been specified on the ADDVOL command for the DASD migration level 1 or level 2 volume. For example: LEV-1 D, L2-AV D, and L2-UN D.</p>
THRESHOLD HI---LOW	HI-THRESH LO-THRESH	This field contains the high and low threshold of occupancy defined for this volume. The low threshold of occupancy applies only to primary volumes. Values for SMS-managed volumes are from storage group attributes that DFSMShsm last retrieved from SMS and are not necessarily the most current values.
FRAG INDEX	FRAG	The number under this heading is a qualitative measure of the scattered free space on a volume. The values of the index can range from 0 to 1. The higher the value, the more fragmented the free space on the volume.
HOSTID AUTO MIG---BACK---DUMP	AUTO-HOST MIG	The character listed is the ID of the DFSMShsm host that assigned the primary volume attribute of automatic space management. A NONE indicates that no DFSMShsm host has assigned the primary volume attribute of space management to the volume. This field applies only to DFSMShsm primary volumes. SMS-managed volumes are excluded with asterisks (*).
HOSTID AUTO MIG---BACK---DUMP	BACK	The character listed is the ID of the DFSMShsm host that assigned the primary volume attribute of automatic backup to the volume. A NONE indicates that no DFSMShsm host has assigned the primary volume attribute of automatic backup to the volume. This field applies only to DFSMShsm primary volumes. SMS-managed volumes are excluded with asterisks (*).

## Migration / Primary Volumes from MCDS

Table 21. Description of Output from the MCDS for Primary or DASD Migration Volumes (continued)

Printer Output Heading	Terminal Label	Description
HOSTID AUTO MIG---BACK---DUMP	DUMP	The character listed is the ID of the DFMSHsm host that assigned the primary volume attribute of automatic dump to the volume. A NONE indicates that no DFMSHsm host has assigned the primary volume attribute of automatic dump to the volume. This field applies only to DFMSHsm primary volumes. SMS-managed volumes are excluded with asterisks (*).
AUTO RECL	AUTO-RECALL	A YES or Y indicates that the volume is eligible to receive data sets that have the primary volume attribute of automatic recall. This field applies only to DFMSHsm primary volumes. SMS-managed volumes are excluded with asterisks (*).
SDSP AVAIL	SDSP	YES or Y indicates the following: <ul style="list-style-type: none"> <li>• This volume contains a small-data-set-packing data set and</li> <li>• This volume was ADDVOLed with the SDSP parameter and</li> <li>• The SETSYS SMALLDATASET PACKING command was specified</li> </ul> This field applies only to migration level 1 volumes.
MIN AGE	MIN-AGE	This field contains the inactive age of the data set that most recently migrated from the volume during the last volume space management. SMS-managed volumes are excluded with asterisks (*).
MIGRATED DS--TRKS	MIGDS MIGTRKS	This is the number of data sets that has been migrated or deleted from the volume during the last volume space management. Tracks are not applicable for level 0 volumes and are excluded with asterisks (*). Both fields are only applicable for the last VOLUME request, not for a LEVEL request like secondary space management.
DATE---TIME LAST MIGRATED	MIGDATE-TIME	This is the date and time of the last migration from this volume if primary, or to this volume if Level 2 DASD. This field is invalid for Level 1 volumes.
SPACE-MGMT TYPE/AGE	SPACE-MGMT	This is the space management technique assigned to this volume. MIG indicates migration, DBA indicates data set deletion, and DBU indicates data set retirement. Values for SMS-managed volumes are from storage group attributes that DFMSHsm last retrieved from SMS and are not necessarily the most current values.
SPACE-MGMT TYPE/AGE	AGE	This field applies only to DFMSHsm primary volumes. SMS-managed volumes are excluded with asterisks (*). This is the number of days a data set on this volume must be inactive before it is eligible for the type of space management indicated under SPACE-MGMT. DEFAULT or DEF indicates that the age criteria is not specified for the volume in the ADDVOL command. In this case, the age criteria is the larger of SETSYS days value and integrity value, which is based on whether DFMSHsm is running in a single-DFMSHsm-host environment or in a multiple-DFMSHsm-host environment.
BUDEV CATGY	BACKUP-DEVICE-CATEGORY	This field indicates the backup device category, tape or DASD, assigned to this volume. If no category has been assigned, the field contains ANY. This field applies only to DFMSHsm primary volumes. SMS-managed volumes are excluded with asterisks (*).

## Migration / Primary Volumes from MCDS

*Table 21. Description of Output from the MCDS for Primary or DASD Migration Volumes (continued)*

Printer Output Heading	Terminal Label	Description
DUMP CLASS	DUMPCLASS	This is the dump class of the primary or migration volume. Values for SMS-managed volumes are from storage group attributes that DFSMShsm last retrieved from SMS and are not necessarily the most current values.
A field containing only **** is not applicable to this volume (see individual field descriptions in the sample lists).		

Figure 38 is a sample printer list of primary volumes when you specify the PRIMARYVOLUME and MIGRATIONCONTROLDATASET

```
- DFSMSHSM CONTROL DATASET - PRIMARY VOLUME-MCDS--- LISTING ----- AT 12:40:59 ON 01/04/05 FOR SYSTEM=3090
VOLSER DEVICE VOLUME THRESHOLD FRAG HOSTID AUTO AUTO SDSP MIN MIGRATED DATE---TIME SPACE-MGMT BUDEV DUMP
      TYPE   TYPE    HI--LOW INDX MIG--BACK-DUMP RECL ELIG AGE DS-----TRKS LAST Migrated TYPE/AGE CATGY CLASS
PRIM01 3390 PRIM 100 *** .000 1 NONE NONE YES *** 000 00001K ***** 01/04/02 00:00 MIG 001 ANY *****
PRIM02 3390 PRIM 100 *** .045 1 NONE NONE YES *** 000 00000K ***** 01/04/05 10:19 MIG 001 ANY *****
SMS001 3390 P SMS 010 001 .000 **** * * * * * *** *** 00002K ***** 01/04/03 17:00 MIG *** **** *****
SMS002 3390 P SMS 010 001 .303 **** * * * * * *** *** 00001K ***** 01/04/03 17:05 MIG *** **** *****
SMS003 3390 P SMS 010 001 .114 **** * * * * * *** *** 00000K ***** 01/04/03 17:05 MIG *** **** *****
SMS004 3390 P SMS 010 001 .086 **** * * * * * *** *** 00000K ***** 01/04/03 17:06 MIG *** **** *****
----- END OF - PRIMARY VOLUME - LISTING -----
```

*Figure 38. Sample Printer List of Primary Volumes from the MCDS when You Specify PRIMARYVOLUME and MIGRATIONCONTROLDATASET*

Figure 39 is a sample printer list of DASD migration level 1 volumes when you specify the MIGRATIONLEVEL1 and MIGRATIONCONTROLDATASET parameters. The format of the printer list for a specific primary or DASD migration volume, for all primary and DASD migration volumes, or for all primary volumes or all DASD migration volumes has the same format as that shown in Figure 38 and Figure 39. If you request information for more than one volume, the list has multiple entries.

```
-- DFSMSHSM CONTROL DATASET - MIGRATE VOLUME-MCDS--- LISTING ----- AT 09:59:11 ON 01/04/05 FOR SYSTEM=3090
VOLSER DEVICE VOLUME THRESH FRAG HOSTID AUTO AUTO SDSP MIN MIGRATED DATE---TIME SPACE-MGMT BUDEV DUMP
      TYPE   TYPE    HI--LOW INDX MIG--BACK-DUMP RECL ELIG AGE DS-----TRKS LAST Migrated TYPE/AGE CATGY CLASS
MIG101 3390 LEV 1 100 *** .000 **** * * * * * * * NO *** 00000K 000012K 01/04/02 23:35 *** *** **** *****
MIG102 3390 LEV 1 100 *** .000 **** * * * * * * * NO *** 00001K 000023K 01/04/02 23:47 *** *** **** *****
MIG103 3390 LEV 1 100 *** .000 **** * * * * * * * NO *** 00001K 000004K 01/04/03 00:34 *** *** **** *****
----- END OF - MIGRATE VOLUME - LISTING -----
```

*Figure 39. Sample Printer List of Migration Volumes from the MCDS when You Specify MIGRATIONVOLUME and MIGRATIONCONTROLDATASET*

## Migration / Primary Volumes from MCDS

Figure 40 is a sample terminal list for a primary volume when you specify the VOLUME, MIGRATIONCONTROLDATASET, and TERMINAL parameters. The format of the terminal list for a specific primary volume or DASD migration volume or for all primary volumes or all DASD migration volumes has the same format as shown in Figure 40, except that the third line is not produced for migration level 1 volumes. If you request information for only one volume, the list has only one entry.

```
VOL=PRIM13 DEVTYPE=P SMS MIGDS=0000 MIGTRKS=****
MIGDATE-TIME=00/00/00 00:00 FRAG=.037 HI-THRESH=100 LO-THRESH=***
MIN-AGE=*** BACKUP-DEVICE-CATEGORY=**** AUTO-RECALL=*
SDSP=*** SPACE-MGMT=MIG AGE=*** AUTO-HOST MIG=** BACK=** DUMP=**
DUMPCCLASS = DCLASS01 DCLASS02 DCLASS03 DCLASS04 DCLASS05
```

Figure 40. Sample Terminal List of a Volume from the MCDS when You Specify VOLUME, MIGRATIONCONTROLDATASET, and TERMINAL

Table 22 shows the headings of the output when DFSMShsm lists information from the MCDS for tape migration level 2 volumes.

Table 22. Headings of Output when You Request Information from the MCDS for Tape Migration Level 2 Volumes

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the tape migration level 2 volume.
DEVICE TYPE	DEVTYPE	This field contains the name of the unit where this volume can be allocated.
MIGRATE TYPE	MIGTYP	L2-TP: The tape volume has been added as a tape migration level 2 volume.
VOL FULL	VOL FULL	A YES or Y indicates that an end-of-tape marker is reached or a data-movement error occurs while DFSMShsm is writing on the tape volume.
DATE VOL LAST SP MANAGED	SP-MGT-DATE	This is the date that DBA/DBU was last performed on this volume.
VOL EMPTY	VOL EMPTY	A YES or Y indicates that the volume is empty.
DELETED DS	DELDS	This is the number of data sets that were deleted from the volume during the last volume space management.
PSWD	PSWD	A YES or Y indicates that the tape volume is password protected.
EXP	EXP	A YES or Y indicates that this tape volume is protected by an expiration date.
RACF	RACF	A YES or Y indicates that the tape volume is RACF protected.
AVAILABLE	AVAIL	A YES or Y indicates that the tape volume is available. A NO or N normally results from a reply by an operator indicating that the tape will not be mounted.

## Migration / Primary Volumes from MCDS

*Table 22. Headings of Output when You Request Information from the MCDS for Tape Migration Level 2 Volumes (continued)*

Printer Output Heading	Terminal Label	Description
IN USE	IN USE	NO: The tape volume is not being used.  MIGD: Data set migration is using the tape volume.  MIGV: Volume migration is using the tape volume.  RECL: Recall is using the tape volume.  RCYS: The tape volume is a recycle source volume.  RCYT: The tape volume is a recycle target volume.  DBAU: Data set deletion or data set retirement is using the tape volume.
SELECTED	SELD	A YES or Y indicates that this volume is a target migration tape, is not marked full, and was the last tape selected for a migration function. Issue the QUERY MIGRATION command for each host to determine which DFSMSHsm migration function has selected this volume.
IDRC	IDRC	Y = Volume contains data in the Improved Data Recording Capability format.  N = Volume does not contain data in the Improved Data Recording Capability format.  ** = Volume is empty—not assigned the Improved Data Recording Capability format.
DUPLEX ALT	DUPLEX ALT	<i>volser</i> indicates the volume serial number of the duplexed alternate.  *PEND* indicates that an exception condition occurred and an internal TAPECOPY is pending.  *NONE* indicates that the volume was not created in a duplexing environment. Although an alternate copy may exist that was created by TAPECOPY, no duplex alternate exists.  NA indicates that the original volumes are DASD rather than tape.
PCT FULL	PCT FULL	This field contains the percentage of the migration volume used for a tape written using 3590 architecture. A value of **** means the percentage is unknown.

## Migration / Primary Volumes from MCDS

Figure 41 is a sample printer list of tape migration level 2 volumes when you specify the MIGRATIONLEVEL2(TAPE) and MIGRATIONCONTROLDATASET parameters.

-- DFSMSHSM CONTROL DATASET - MIGRATE VOLUME-MCDS--- LISTING ----- AT 09:59:11 ON 01/04/05 FOR SYSTEM=3090																	
VOLSER	DEVICE	VOLUME	THRESH	FRAG	HSTID	AUTO-	AUTO	SDSP	MIN	MIGRATED	DATE---	TIME	SPACE-MGMT	BUDDEV	DUMP		
TYPE	TYPE	TYPE	HI--LOW	INDX	MIG--BACK-DUMP	RECL	ELIG	AGE	DS----	TRKS	LAST	MIGRATED	TYPE/AGE	CATGY	CLASS		
MIG101	3390	LEV 1	100	*** .000	****	****	NONE	***	NO	***	00000K	000012K	01/04/02	23:35	*** ***	****	
MIG102	3390	LEV 1	100	*** .000	****	****	NONE	***	NO	***	00001K	000023K	01/04/02	23:47	*** ***	****	
MIG103	3390	LEV 1	100	*** .000	****	****	NONE	***	NO	***	00001K	000004K	01/04/03	00:34	*** ***	****	
----- END OF - MIGRATE VOLUME - LISTING -----																	
1- DFSMSHSM CONTROL DATASET - MIGRATE VOLUME-MCDS--- LISTING ----- AT 09:59:11 ON 01/04/05 FOR SYSTEM=3090																	
VOLSER	DEVICE	MIGRATE	VOL	DATE	VOL	LAST	VOL	DELETED	PSWD	EXP	RACF	AVAILABLE	IN USE	SELECTED	IDRC	DUPLEX	PCT
TYPE	TYPE	FULL	SP	MANAGED	EMPTY		DS								ALT	FULL	
A00001	3480	L2-TP	NO	00/00/00	NO		0000	YES	NO	NO	YES	-NO-	NO	N	*NONE*	****	
A00005	3480	L2-TP	NO	00/00/00	NO		0000	YES	NO	NO	YES	-NO-	NO	N	*NONE*	****	
A00015	3480	L2-TP	NO	00/00/00	NO		0000	YES	NO	NO	YES	-NO-	NO	N	*NONE*	****	
A00016	3580	L2-TP	YES	00/00/00	NO		0000	YES	NO	NO	YES	-NO-	NO	N	*NONE*	34.8	
A00019	3580	L2-TP	NO	00/00/00	NO		0000	YES	NO	NO	YES	-NO-	NO	N	*NONE*	****	
A00021	3580	L2-TP	NO	00/00/00	NO		0000	YES	NO	NO	YES	-NO-	NO	N	*NONE*	100	
----- END OF - MIGRATE VOLUME - LISTING -----																	

Figure 41. Sample Printer List of Tape Migration Level 2 Volumes when You Specify MIGRATIONLEVEL2(TAPE) and MIGRATIONCONTROLDATASET

## Requesting Migration / Primary Volume Information from the Backup Control Data Set

Table 23 presents the header information from the BCDS for the list of primary or migration volumes.

*Table 23. Headings of Output when You Request Information from the BCDS for Primary or Migration Volumes*

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the volume.
SMS	SMS	This field indicates whether a volume is SMS-managed. <b>Value Meaning</b> Yes Identifies the volume as SMS-managed No Identifies the volume as non-SMS-managed.
OWNED BY VSAM CATALOG	VSAM CTLG	This field contains the data set name of the VSAM catalog that currently controls the volume. If the volume is not owned by a VSAM catalog, this field contains NOT OWNED BY VSAM CATALOG. If the controlling catalog is the master catalog, this field contains **MASTER CATALOG**.
CATALOG ON VOLSER	CTLG VOL	This field contains the volume serial number of the volume on which the catalog resides, SYSRES, or blanks.
LAST BACKED UP DATE TIME	LAST BACKED UP ON	This field contains the date and time of the last volume backup for the volume.
DUMPCLASS	LAST DUMPED TO CLASS	This is the dump class of the primary or migration volume.
DUMPED	ON	This field contains the date of the latest dump in the class.
TIME	AT	This field contains the time of the latest dump in the class.
EXP DATE	EXP DATE	This field contains the expiration date of the latest dump in the class. If RETENTIONPERIOD(NOLIMIT) was specified with the DEFINE DUMPCLASS or BACKVOL command, the value stored is zero (0) and the value displayed is *NOLIMIT.

A field containing only \*\*\* is not applicable to this volume (see individual field descriptions in the sample lists).

## Migration / Primary Volumes from BCDS

Figure 42 is a sample printer list from the BCDS for a specific primary volume when you specify PRIMARYVOLUME(volser) and BACKUPCONTROLDATASET parameters. The format of the printer list for all primary volumes has the same format as that shown in Figure 42. Similar output is produced for migration level 1 volumes if requested, using the VOLUME, MIGRATIONVOLUME, or MIGRATIONLEVEL1 parameters. If you request information for only one volume, the list has only one entry.

```
----- DFMSHsm CONTROL DATASET PRIMARY VOLUME-BCDS--- LISTING ----- AT 13:31:36 ON 91/12/31 FOR SYSTEM=SYSA
VOLSER SMS OWNED BY VSAM CATALOG          CATALOG LAST BACKED UP
                                              ON VOLSER DATE     TIME    DUMPCLASS DUMPED      TIME     EXP DATE
PRIM01 YES VSAM.CATALOG.PRIM01             PRIM01  91/01/15 00:59  DCLASS01  91/01/31 01:59:05 *NOLIMIT
                                              DCLASS02 91/01/31 01:59:05 87/12/31
                                              DCLASS03 91/01/31 01:59:05 87/12/31
                                              DCLASS04 91/01/31 01:59:05 87/12/31
                                              DCLASS05 91/01/31 01:59:05 87/12/31
----- END OF - PRIMARY VOLUME - LISTING -----
```

Figure 42. Sample Printer List from the BCDS when You Specify PRIMARYVOLUME(volser) and BACKUPCONTROLDATASET

Figure 43 is a sample terminal list from the BCDS for primary volumes when you specify the VOLUME, BACKUPCONTROLDATASET, and TERMINAL. The second line is not produced when the volume is a migration level 1 volume. The format of the terminal list for a specific backup volume is the same as the format shown in Figure 43. If you request information for only one volume, the list has only one entry.

```
VOL=PRIM01, SMS=YES  VSAM CTLG=USERCAT.PRIM01
CTLG VOL=PRIM01, LAST BACKED-UP ON 90/04/24 AT 20:49
LAST DUMPED TO CLASS DCLASS01 ON 91/01/31 AT 01:59:05 EXP DATE *NOLIMIT

VOL=PRIM02, SMS=NO   VSAM CTLG=USERCAT.PRIM02
CTLG VOL=PRIM02, LAST BACKED-UP ON 90/04/24 AT 20:49
LAST DUMPED TO CLASS DCLASS01 ON 91/01/31 AT 01:59:05 EXP DATE *NOLIMIT
```

Figure 43. Sample Terminal List from the BCDS when You Specify VOLUME, BACKUPCONTROLDATASET, and TERMINAL

## Requesting Primary Volume Dump Information from the Backup Control Data Set

Table 24 presents the header information when you request dump information from the BCDS for primary volumes.

*Table 24. Headings of Output when You Request Dump Information from the BCDS for Primary Volumes*

Printer Output Heading	Terminal Label	Description
SOURCE VOLSER	SOURCEVOL	This field contains the volume serial number of the source volume.
GEN	GEN	This field contains relative generation number of the dump for the volume.
SMS	SMS	This field indicates whether a volume is SMS-managed. <b>Value Meaning</b> <b>Yes</b> Identifies the volume as SMS-managed <b>No</b> Identifies the volume as non-SMS-managed.
DUMPED	DATE	This field contains the date of the dump for the volume.
TIME	TIME	This field contains the time of the dump for the volume.
CLASS	DUMPCLASS	This field contains the dump class of the primary volume.
EXP DATE	EXPDATE	This field contains the expiration date of the dump. This may be *NOLIMIT on both the printer listing and on the terminal.
SET OF DUMP VOLSERs	DUMPVOLS	This field contains a list of volume serial numbers of each tape volume used for this dump.

Figure 44 is a sample printer list of the dump information for a specific primary volume.

```
----- DFSMShsm CONTROL DATASET PRIMARY VOLUME-BCDS--- ALLDUMPS----- AT 13:31:36 ON 91/12/31 FOR SYSTEM=SYSA
SOURCE                      SET OF DUMP
VOLSER GEN SMS  DUMPED      TIME    CLASS   EXP DATE  VOLSERs
PRIM01  00 YES 91/01/31  01:59:05  DCLASS01  *NOLIMIT  TAP011 TAP012 TAP013 TAP014 TAP015 TAP016 TAP017 TAP018 TAP019
                                         TAP01B TAP01C TAP01D TAP01E TAP01F ***** ***** ***** *****
                                         DCLASS02 91/12/31  TAP021 TAP022 TAP023 TAP024 TAP025 TAP026 TAP027 TAP028 TAP029
01 NO  90/12/31  00:59:05  DCLASS01  91/11/30  TAP001 TAP002 TAP003 TAP004 TAP005 TAP006 TAP007 TAP008 TAP009
----- END OF - PRIMARY VOLUME - LISTING -----
```

*Figure 44. Sample Printer List from the BCDS when You Specify ALLDUMPS with PRIMARYVOLUME(volser) and BACKUPCONTROLDATASET*

## Requesting Contents of Backup VTOC for a Primary Volume

Table 25 presents the header information when you request the contents of backup VTOC information for primary volumes.

*Table 25. Headings of Output when You Request Contents of Backup VTOC Information from the BCDS for Primary Volumes*

Printer Output Heading	Terminal Label	Description												
VTOC COPY	VTOCCOPY	This field contains the VTOC copy number.												
PRIMARY VOLUME	SOURCEVOL	This field contains the volume serial number of the source volume.												
DATASET NAME	DSN	This field contains the data set name on the primary volume.												
ORG	ORG	<p>This field contains the data set organization on the primary volume. Possible values are:</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>DA</td> <td>BDAM</td> </tr> <tr> <td>PE</td> <td>Partitioned data set extended</td> </tr> <tr> <td>PO</td> <td>Partitioned organization</td> </tr> <tr> <td>PS</td> <td>Physical sequential</td> </tr> <tr> <td>VS</td> <td>VSAM</td> </tr> </tbody> </table> <p>Unknown data set organization</p>	Value	Meaning	DA	BDAM	PE	Partitioned data set extended	PO	Partitioned organization	PS	Physical sequential	VS	VSAM
Value	Meaning													
DA	BDAM													
PE	Partitioned data set extended													
PO	Partitioned organization													
PS	Physical sequential													
VS	VSAM													
MULTI	MULTI	<p>This field contains the non-VSAM indicator for determining if a data set is a multivolume data set. Possible values are:</p> <table> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>Data resides on multiple volumes</td> </tr> <tr> <td>No</td> <td>Data resides on a single volume.</td> </tr> </tbody> </table> <p>VSAM data sets, whether multivolume, single volume, or VTOC index.</p>	Value	Meaning	Yes	Data resides on multiple volumes	No	Data resides on a single volume.						
Value	Meaning													
Yes	Data resides on multiple volumes													
No	Data resides on a single volume.													
CREATED	CREATE	This field contains the creation date of the data set on the primary volume.												
REFERENCED	REF	This field contains the date the data set was last referred to.												
EXP DATE	EXP	This field contains the expiration date of the data set. This may be **NONE**.												
RACF	RACF	This field contains the indication whether the data set is RACF-protected.												
PSWD	PSWD	This field contains the indication whether the data set is password protected.												
CHANGED	CHANGED	This field contains the indication whether the data set has been opened for something other than input since the last backup copy was made. *** Is presented for a VTOC index.												
The list data is obtained from the Format-1 label. For some data set VTOC entry types, not all of the above fields are maintained.														

Figure 45 is a sample printer list of the contents of a backup VTOC for a specific primary volume.

----- DFSMSHsm CONTROL DATASET -PRIMARY VOLUME-BCDS--- BCONTENTS --- AT 13:31:36 ON 91/07/31 FOR SYSTEM=SYSA								
CONTENTS OF BACKUP VTOC COPY # 01 FOR PRIMARY VOLUME PRIM01								
DATASET NAME	ORG	MULTI	CREATED	REFERENCED	EXP DATE	RACF	PSWD	CHANGED
C253800.POFB.F40CM012.DS04.TEST12	PO	YES	91/03/31	92/05/24	92/12/31	YES	NO	YES
HSMATH0.OY45746T.N01.PSFB	PS	NO	93/09/12	93/09/12	00/00/00	YES	YES	NO
B588374.DRIVER.N02.ESDS.DATA	VS	***	92/01/31	93/09/01	95/12/25	YES	NO	YES

Figure 45. Sample Printer List from the BCDS when You Specify PRIMARYVOLUME(volser), BACKUPCONTENTS, and BACKUPCONTROLDATASET

## Requesting a List of Records Serialized by DFSMSHsm host ID

You specify LIST HOST(*hostid*) to get a list of all MCDS, BCDS, and OCDS records currently serialized by the specified DFSMSHsm host ID.

Table 26 presents the header information when you request a list of records serialized by DFSMSHsm host ID.

Table 26. Headings of Output when You Request Information about Records Serialized by DFSMSHsm host ID

Printer Output Heading	Terminal Label	Description
HOSTID	HOSTID	This field contains the DFSMSHsm host ID of the DFSMSHsm host that serialized the record.
TYPE	TYPE	This field contains the type of control data set record.
KEY	KEY	This field contains the record key.

Figure 46 is a sample printer list of records serialized by a specific DFSMSHsm host when you specify the HOST(*hostid*) parameter. If you also specify RESET, the HOSTID field in each serialized record is set to X'00'.

```
ARC0817I HOSTID=3 FOUND IN DFSMSHsm CONTROL DATA SET RECORD,
TYPE=V KEY=M2TP01, RESET SUCCESSFUL
ARC0817I HOSTID=3 FOUND IN DFSMSHsm CONTROL DATA SET RECORD,
TYPE=R, KEY=BVR01-0000, RESET SUCCESSFUL
ARC0817I HOSTID=3 FOUND IN DFSMSHsm CONTROL DATA SET RECORD,
TYPE=T, KEY=L2-M2TP01-0000, RESET SUCCESSFUL
```

Figure 46. Sample Printer List when You Specify HOST(*hostid*) and RESET

## Requesting Information from the Tape Table of Contents (TTOC)

You specify LIST TAPETABLEOFCONTENTS(volser) to get a list of the information contained in the TTOC for a tape backup or migration level 2 volume managed by DFSMSHsm. Preceding the list is an echo of the LIST command issued.

Table 27 presents the header information for when you request information from the TTOC.

## Tape Volumes from TTOC

*Table 27. Headings of Output when You Request Information from the Tape Table of Contents*

Printer Output Heading	Terminal Label	Description
VOLSER	VOLSER	This field contains the volume serial number of the tape volume.
UNIT NAME	UNIT NAME	This field contains the name of the unit where this volume can be allocated.
VOL TYPE	VOL TYPE	This field contains the DFSMShsm volume category of the tape volume. SPILL indicates a spill backup volume. D(nn) indicates a backup volume assigned to day nn in the backup cycle. UNASS indicates that the volume has not been assigned as a daily or spill backup volume, or that it has been assigned as a daily backup volume but not to a specific day in the backup cycle. ML2 indicates that the volume is a tape migration level 2 volume.
REUSE CAPACITY	CAPACITY	This field contains the nominal number of blocks that DFSMShsm could write to this tape if it were emptied and written again. It is the actual average in this HSMplex for all full tapes of its cartridge type, recording technology, and function as calculated by the reporting host when it last started DFSMShsm. The blocks are 16 384 bytes each.  ***** indicates that no ML2 or backup tape volumes marked full exist.
VALID BLKS	VALID BLOCKS	This field contains the number of blocks of data on the tape volume that are still valid.
PCT VALID	PCT VALID	This field contains the percent that this tape's valid blocks are of the reuse capacity.  A value of 100 is shown for tapes whose number of valid blocks exceed the reuse capacity.
VOL STATUS	VOL STATUS	Empty under this heading indicates that the tape is empty.  Full under this heading indicates that while DFSMShsm was writing to tape, either an end-of-tape marker was reached or a data-movement error occurred, and the volume was marked full to prevent further use.  Partial under this heading indicates that the tape is neither empty nor full. The tape has been written to but may or may not contain valid data.
RACF	RACF	YES or Y indicates that the tape volume is RACF protected.
PREV VOL	PREV VOL	If this field contains a volume serial number, the first data set on this tape volume is valid and does not begin on this volume, but is a continuation of the last data set on the indicated previous volume. If the field contains NONE, either the first data set is not valid or it begins on this volume.
SUCC VOL	SUCC VOL	If this field contains a volume serial number, the last data set on this tape volume is valid and does not end on this volume. The data set is continued on the indicated succeeding volume as the first data set on that volume. If the field contains NONE, either the last data set is not valid or it ends on this volume.
NUM REC	NUM REC	This field contains the number of offline control data set T records, including the base and extension records, used to contain this TTOC.

Table 27. Headings of Output when You Request Information from the Tape Table of Contents (continued)

Printer Output Heading	Terminal Label	Description
ONE FILE	ONE FILE	A YES or Y indicates that the tape volume has a single file containing the user data sets. A NO or N indicates that each user data set on the tape volume is in a separate tape data set. An *** indicates the ONE FILE is irrelevant because DFSMShsm has not written on the volume.
ALT VOL	ALTVOL	Volume serial number of duplicate tape copy created by DFSMShsm TAPECOPY command; *NONE* if duplicate tape is not so created; ***** indicating that the information is not known. If the optional parameter SELECT (DISASTERALTERNATEVOLUMES) is specified, this field shows the alternate tape volume that has been flagged as disaster alternate volume.
LIB	LIB	This field contains the tape library information for the volume. The field can be: <ul style="list-style-type: none"> <li>• library name—the library with which the tape volume is associated</li> <li>• *NO LIB*—the tape volume is not associated with a tape library</li> <li>• *ERROR**—an error occurs when the library information is retrieved. Check the command activity log for additional messages.</li> </ul>
STORAGE GROUP	STORAGE GROUP	This field contains the name of the storage group. If there is a library name for the volume, there must be a storage group name. Connected tape volumes must be in the same storage group and library. The storage group field can be: <ul style="list-style-type: none"> <li>• storage group name—storage group name associated with the tape volume</li> <li>• **NO SG*—a storage group is not associated with this volume</li> <li>• *ERROR**—an error occurs when the library information is retrieved. Check the command activity log for additional messages.</li> </ul>
DATA SET NAME	DATA SET NAME	This field contains the name of the data sets on the volume. If the data set is on a tape backup volume, this name is the DFSMShsm-generated backup version name. If a data set is on a tape migration level 2 volume, this name is the original data set name, not the migrated data set name that DFSMShsm generates.
NUM BLOCKS	NUM BLOCKS	This field contains the number of blocks used on this volume for this data set.
RELATIVE FBID	REL FBID	This field contains the file sequence number of this data set or the set of blocks relative to the beginning of the single tape volume. For example, the first data set or data set segment on the tape volume has a relative FBID of 4 independent of any predecessor tapes.
VSAM	VSAM	YES or Y indicates that the data set is a backup version or a migration copy of a VSAM data set.
RACF	RACF	YES or Y indicates that the data set is discretely RACF-protected.
LAST REF DATE	LAST REF DATE	This field contains the last date when the migrated data set was referred to. This field does not apply to backup versions.

## Tape Volumes from TTOC

*Table 27. Headings of Output when You Request Information from the Tape Table of Contents (continued)*

Printer Output Heading	Terminal Label	Description
EXP DATE	EXP DATE	This field contains the expiration date of the user's data set. This field does not apply to backup versions. For ML2 tapes, asterisks means the date is a never expire date.
A field containing only **** is not applicable to this volume (see individual field descriptions in the sample lists.)		

**Note:** The LIST TTOC volser ODS dsn command can take an extensive amount of time to complete processing when trying to write out over 1 million data set entries in the ODS dsn. You can only get a million records if you are using extended TTOCs.

Nine reports are possible for the LIST TTOC display output. The report columns are all the same. Only the header and trailer inserts will change to indicate what type of report has been requested on the input command.

- If the input command is issued for a list of tape volumes that have DISASTERALTERNATEVOLUMES, the header and trailer insert will be DISASTER ALTERNATE - LISTING.
- If the input command is issued for a list of tape volumes that have failed recycle, then the header and trailer insert will be FAILED RECYCLE - LISTING.
- If the input command is issued for a list of tape volumes that have failed create, then the header and trailer insert will be FAILED CREATE - LISTING.
- If the input command is issued for tape volumes that contain data sets that span four or more volumes, then the header and trailer insert will be EXCESSIVE VOLUME - LISTING.
- If the input command is issued for a list of tape volumes that have TAPETABLEOFC CONTENTS SELECT(CONNECTED), then the trailer insert will be \*\*\*END OF CONNECTED TAPE VOLUME SET \*\*\*.
- If the input command is issued for a list of ML2 volumes taken away by RECALL or ABACKUP, then the header and trailer insert will be RECALL TAKE AWAY — LISTING.
- If the input command is issued for a list of volumes having alternate tapes in a library, then the header and trailer insert will be LIBRARY(ALTERNATE) — LISTING.
- If the input command is issued for a list of volumes having alternate tapes not in a library, then the header and trailer insert will be NOLIB(ALTERNATE) — LISTING.
- If the input command issued is other than those listed above, the header and trailer insert will be TAPE VOLUME TTOC - LISTING.

Figure 47 is a sample of an ODS output dataset list when you have specified the TAPETABLEOFC CONTENTS SELECT(CONNECTED) parameter.

```
---- DFSMSshm CONTROL DATASET - TAPE VOLUME TTOC - LISTING - AT 08:08:11 ON 92/07/30 FOR SYSTEM=381A
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
      NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
A00200 3490 D(01) 00124000 00000017 001 FULL NO *NONE* A00300 001 YES *NONE* *NO LIB* **NO SG*
A00300 3490 D(01) 00124000 00000009 001 FULL NO A00200 *NONE* 001 YES *NONE* *NO LIB* **NO SG*
***END OF CONNECTED TAPE VOLUME SET ***
A00800 3490 D(01) 00124000 00000007 001 FULL NO *NONE* A00700 001 YES *NONE* *NO LIB* **NO SG*
A00700 3490 D(01) 00124000 00000005 001 FULL NO A00800 A00600 001 YES *NONE* *NO LIB* **NO SG*
A00600 3490 D(01) 00124000 00000004 001 FULL NO A00700 *NONE* 001 YES *NONE* *NO LIB* **NO SG*
***END OF CONNECTED TAPE VOLUME SET ***
----- END OF - TAPE VOLUME TTOC - LISTING -----
```

Figure 47. Sample Printer List when You Specify TAPETABLEOFC CONTENTS SELECT(CONNECTED)

Figure 48 is a sample of a terminal list when you have specified TAPETABLEOFC CONTENTS, NODATASETINFORMATION and TERMINAL parameter.

```
VOLSER=A00800 UNITNAME=3480X VOL TYPE=D(01) CAPACITY=00031000 RACF=NO
VALID BLKS=00000007 PCT VALID=001 VOL STATUS=FULL PREV VOL=*NONE*
SUCC VOL=A00700 NUM REC=001 ONE FILE=YES ALTVOL=A02002
LIBRARY=*NO LIB* STORAGE GROUP=**NO SG*
ARC0140I LIST COMPLETED,
ARC0140I(CONT)        4 LINE(S) OF DATA OUTPUT
```

Figure 48. Sample Terminal List when You Specify TAPETABLEOFC CONTENTS, NODATASETINFORMATION and TERMINAL

Figure 49 is a sample of a printer list when you have specified the TAPETABLEOFC CONTENTS parameter with DATASETINFORMATION.

```
---- DFSMSshm CONTROL DATASET - TAPE VOLUME TTOC - LISTING - AT 23:06:33 ON 92/05/03 FOR SYSTEM=381A
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
      NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
BATP01 3480X D(01) 00031000 00000006 001 FULL NO *NONE* *NONE* 001 YES *NONE* *NO LIB* **NO SG*
      DATA SET NAME          NUM BLOCKS RELATIVE FBID VSAM RACF LAST REF DATE EXP DATE
DFHSM.BACK.T380306.HSMATH0.F2553L03.I1001    00001     0001   NO   NO *****      *****
DFHSM.BACK.T550306.HSMATH0.F2553L03.I1001    00001     0002   NO   NO *****      *****
DFHSM.BACK.T560306.HSMATH0.F2553L03.I1001    00001     0003   NO   NO *****      *****
DFHSM.BACK.T153306.HSMATH0.F2553L03.I1001    00003     0004   NO   NO *****      *****
----- END OF - TAPE VOLUME TTOC - LISTING --- --
```

Figure 49. Sample Printer List when You Specify TAPETABLEOFC CONTENTS with DATASETINFORMATION

## Tape Volumes from TTOC

Figure 50 is a sample printer list when you have specified TAPETABLEOFC CONTENTS, SELECT, NOALTERNATEVOLUMES, and LIBRARY parameters.

```
----- DFMSHsm CONTROL DATASET - TAPE VOLUME TTOC - LISTING - AT 23:06:33 ON 94/05/03 FOR SYSTEM=381A
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
M2TP02 3490 ML2 00124000 00000002 001 FULL YES *NONE* *NONE* 001 *NONE* *NONE* ATLL1B01 ATLSG001
M2TP03 3490 ML2 00124000 00000002 001 PART NO *NONE* *NONE* 001 *NONE* *NONE* ATLL1B01 ATLSG001
-----END OF - TAPE VOLUME TTOC - LISTING -----
```

Figure 50. Sample Printer List when You Specify TAPETABLEOFC CONTENTS, SELECT, NOALTERNATEVOLUMES, and LIBRARY

Figure 51 is a sample printer list when you have specified TAPETABLEOFC CONTENTS, SELECT, and DISASTERALTERNATEVOLUMES parameter. The volumes under the heading ALT VOL are disaster alternate volumes.

```
----- DFMSHsm CONTROL DATASET - DISASTER ALTERNATE - LISTING - AT 23:06:34 ON 94/05/03 FOR SYSTEM=381A
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
M2TP02 3490 ML2 00124000 00000002 001 FULL YES *NONE* *NONE* 001 *NONE* M2TP12 ATLL1B01 ATLSG001
M2TP03 3490 ML2 00124000 00000002 001 PART NO *NONE* *NONE* 001 *NONE* M2TP13 ATLL1B01 ATLSG001
-----END OF - DISASTER ALTERNATE - LISTING -----
```

Figure 51. Sample Printer List when You Specify TAPETABLEOFC CONTENTS, SELECT, and DISASTERALTERNATEVOLUMES

Figure 52 is a sample of a printer list when you have specified TAPETABLEOFC CONTENTS, SELECT, ML2 and FAILEDRECYCLE parameters.

```
----- DFMSHsm CONTROL DATASET - FAILED RECYCLE - LISTING - AT 23:06:33 ON 94/05/03 FOR SYSTEM=143A
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
M2TP03 3490 ML2 00124000 00000003 001 FULL YES *NONE* *NONE* 001 YES *NONE* *NO LIB* **NO SG*
M2TP04 3490 ML2 00124000 00000003 001 FULL YES *NONE* *NONE* 001 YES *NONE* *NO LIB* **NO SG*
BATP04 3490 ML2 00124000 00000003 001 FULL YES *NONE* *NONE* 001 YES *NONE* *NO LIB* **NO SG*
----- END OF - FAILED RECYCLE - LISTING -----
```

Figure 52. Sample Printer List when You Specify TAPETABLEOFC CONTENTS, SELECT, ML2 and FAILEDRECYCLE.

## Tape Volumes from TTOC

Figure 53 is a sample of a printer list when you have specified TAPETABLEOFCOMENTS and FAILEDCREATE parameters.

```
----- DFSMSshm CONTROL DATASET - FAILED CREATE - LISTING - AT 23:06:33 ON 94/05/03 FOR SYSTEM=143A
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
  NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
BATP01 3490 D(01) 00124000 00000009 001 YES NO *NONE* *NONE* 001 NO *NONE* *NO LIB* **NO SG*
*** ARC0378I TTOC RECORD AND TAPE MEDIA CONTENTS ARE INCONSISTENT ON TAPE VOLUME BATP01 ***
*** REUSE CAPACITY, VALID BLOCKS, PCT VALID, AND NUM REC DO NOT CONTAIN VALUES ***
*** CONSISTENT WITH THE TAPE MEDIA ***
M2TP01 3480X ML2 00031000 00000014 001 YES NO *NONE* *NONE* 001 NO *NONE* *NO LIB* **NO SG*
*** ARC0378I TTOC RECORD AND TAPE MEDIA CONTENTS ARE INCONSISTENT ON TAPE VOLUME M2TP01 ***
*** REUSE CAPACITY, VALID BLOCKS, PCT VALID, AND NUM REC DO NOT CONTAIN VALUES ***
*** CONSISTENT WITH THE TAPE MEDIA ***
----- END OF - FAILED CREATE - LISTING -----
```

*Figure 53. Sample Printer List when You Specify TAPETABLEOFCOMENTS and FAILEDCREATE*

Figure 54 is a sample printer list for the EXCESSIVEVOLUMES parameter.

```
----- DFSMSshm CONTROL DATASET - EXCESSIVE VOLUMES - LISTING - AT 23:06:33 ON 94/05/03 FOR SYSTEM=381A
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
  NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
BATP01 3490 D(01) 00124000 00000783 001 FULL NO *NONE* BATP02 001 NO *NONE* *NO LIB* **NO SG*
BATP02 3490 D(01) 00124000 00000783 001 FULL NO BATP01 BATP03 001 NO *NONE* *NO LIB* **NO SG*
BATP03 3490 D(01) 00124000 00000783 001 FULL NO BATP02 BATP04 001 NO *NONE* *NO LIB* **NO SG*
BATP04 3490 D(01) 00124000 00000783 001 FULL NO BATP03 BATP05 001 NO *NONE* *NO LIB* **NO SG*
BATP05 3490 D(01) 00124000 00000783 001 PART NO BATP04 BATP06 001 NO *NONE* *NO LIB* **NO SG*
-----END OF - EXCESSIVE VOLUMES - LISTING --- --
```

*Figure 54. Sample Printer List when You Specify EXCESSIVEVOLUMES*

Figure 55 is a sample printer list for the SELECT(NOTASSOCIATED) parameter.

```
----- DFSMSshm CONTROL DATASET - TAPE VOLUME TTOC - LISTING - AT 10:32:53 ON 98/04/17 FOR SYSTEM=BLK1
VOLSER UNIT VOL REUSE VALID PCT VOL RACF PREV SUCC NUM ONE ALT LIB STORAGE
  NAME TYPE CAPACITY BLKS VALID STATUS VOL VOL REC FILE VOL GROUP
100058 3590 ML2 02464400 01125520 046 PART NO *NONE* *NONE* 009 YES 100071 LIB01 ATLSTRGP
100459 3590 ML2 02464400 00880269 036 PART NO 100778 *NONE* 004 YES 100503 LIB01 ATLSTRGP
100511 3590 ML2 02464400 01215931 050 PART NO 101812 *NONE* 008 YES 100638 LIB01 ATLSTRGP
100855 3590 ML2 02464400 02410026 098 PART NO *NONE* *NONE* 022 YES 100885 LIB01 ATLSTRGP
101916 3590 ML2 02464400 01856704 076 PART NO *NONE* *NONE* 038 YES 101967 LIB01 ATLSTRGP
102409 3590 ML2 02464400 00474331 020 PART NO *NONE* *NONE* 008 YES 102490 LIB01 ATLSTRGP
102563 3590 ML2 02464400 02725093 100 PART NO 101714 *NONE* 014 YES 102620 LIB01 ATLSTRGP
-----END OF - TAPE VOLUME TTOC - LISTING --- --
```

*Figure 55. Sample Printer List when You Specify SELECT(NOTASSOCIATED)*

### Requesting Information for All User Entries or a Specific User Entry

To get a list of the information for all user entries, specify the LIST command with the USER parameter. User entries exist only for those users who have been, or are currently, authorized. The output is in alphanumeric sequence by user identification. To get a list of the information for a specific user entry, specify the LIST command with the USER(*userid*) parameter. The list for all the users or a specific user includes the user identity and authorization.

The last line of this output specifies whether DFSMShsm commands are protected by RACF Facility Class profiles or by the DFSMShsm AUTH command. Use this information to determine whether the user IDs listed with the LIST USER command are to be used for authorization to storage administrator commands.

Figure 56 is a sample printer list of user entries when you specify USER.

```
- DFSMSHSM CONTROL DATASET - USER-- LISTING ----- AT 08:49:11 ON 02/08/20 FOR SYSTEM 3090
USERID    AUTH
HSMDBA1   CNTL
HSMDBA2   CNTL
HSMUSR1   USER
HSMUSR2   USER
HSMUSR3   USER
$20274   USER
#61175   USER
@818181  USER
ARC1700I DFSMSHSM COMMANDS ARE RACF PROTECTED
----- END OF - USER - LISTING -----
```

Figure 56. Sample Printer List of User Entries when You Specify USER

---

## Appendix C. Using the QUERY Command

You use the QUERY command to determine what values you specified with the DFSMShsm commands, to list DFSMShsm statistics, or to list the status of pending requests.

When you issue the QUERY command, the information you have requested is printed as a message at your terminal and is sent to the DFSMShsm log. Table 28 shows the messages, arranged by parameter name, associated with the QUERY command.

**Notes:**

1. Paired braces { } mean that only one of the items within the braces will appear in the actual message text.
2. Paired brackets [ ] mean that the item within the brackets may or may not appear in the actual message text.
3. A vertical bar (|) separates alternative choices.

Table 28. Messages Associated with the QUERY Command by Parameter Name

Parameter Name	Message ID / Text
ABARS	ARC0101I QUERY ABARS COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC6008I APPLICATION BACKUP/RECOVERY PROCNAME = <i>procname</i>
	ARC6009I APPLICATION BACKUP/RECOVERY MAXADDRESSSPACE = <i>number</i>
	ARC6033I AGGREGATE RECOVERY UNIT NAME = <i>unittype</i>
	ARC6036I AGGREGATE BACKUP OPTIMIZE = {1   2   3   4}
	ARC6036I AGGREGATE RECOVERY TGTGDS = {DEFERRED   ACTIVE   ROLLEDOFF   SOURCE}
	ARC6036I AGGREGATE RECOVERY ABARSVOLCOUNT = {"NONE"   ANY}
	ARC6036I AGGREGATE RECOVERY PERCENTUTILIZED = <i>percent</i>
	ARC6036I AGGREGATE BACKUP/RECOVERY ABARDELETEACTIVITY = {YES   NO}
	ARC6036I AGGREGATE BACKUP/RECOVERY ABARSTAPES = {STACK   NOSTACK}
	ARC6366I AGGREGATE BACKUP/RECOVERY UNIT NAME = UNITNAME
	ARC6367I AGGREGATE BACKUP/RECOVERY EXITS = {NONE   EXITNAME}
	ARC6368I AGGREGATE BACKUP/RECOVERY ACTIVITY LOG MESSAGE LEVEL IS {FULL   REDUCED}
	ARC6371I AGGREGATE RECOVERY ML2 TAPE UNIT NAME = UNITNAME
	ARC6372I NUMBER OF ABARS I/O BUFFERS = NUMBER
	ARC6373I ABARS ACTIVITY LOG OUTPUT TYPE = {SYSOUT{{CLASS}}   DASD}

Table 28. Messages Associated with the QUERY Command by Parameter Name (continued)

Parameter Name	Message ID / Text
ACTIVE	ARC010II QUERY ACTIVE COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i> ARC0142I {BACKUP OF MCDS   BACKUP OF BCDS   BACKUP OF OCDS   BACKUP OF JRNL   MOVEMENT OF BACKUP VERSIONS   BACKUP OF MIGRATED DATA SETS   MIGRATION CLEANUP   LEVEL 1 TO LEVEL 2 MIGRATION   CDS BACKUP} CURRENTLY IN PROCESS ARC0144I AUDIT={HELD   NOT HELD} AND {ACTIVE   INACTIVE}, LIST={HELD   NOT HELD} AND {ACTIVE   INACTIVE}, RECYCLE={HELD   NOT HELD} AND {ACTIVE   INACTIVE}, REPORT={HELD   NOT HELD} AND {ACTIVE   INACTIVE} ARC0160I MIGRATION={NOT HELD   HELD AT END OF VOLUME   LIMITED   HELD}, AUTOMIGRATION={NOT HELD   HELD AT END OF VOLUME   LIMITED   HELD}, RECALL={TOTALLY HELD   PARTIALLY HELD   NOT HELD}, TAPERECALL={TOTALLY HELD   TSO HELD   NOT HELD}, DATA SET MIGRATION={ACTIVE   INACTIVE}, VOLUME MIGRATION={ACTIVE   INACTIVE}, DATA SET RECALL={ACTIVE   INACTIVE} ARC0161I {MIGRATING   BACKING UP   RECOVERING   RECYCLING   AUDITING   DUMPING   RESTORING} VOLUME <i>volser</i> SGROUP= <i>sg</i> FOR USER <i>userid</i>   **AUTO** REQUEST { <i>request</i>   NONE} ARC0162I {MIGRATING   BACKING UP   RECALLING   RECOVERING   DELETING   RESTORING} DATA SET <i>dsname</i> FOR USER <i>userid</i> , REQUEST <i>request</i> ON HOST <i>hostid</i> ARC0163I BACKUP={NOT HELD   HELD AT END OF VOLUME   HELD}, AUTOBACKUP={NOT HELD   HELD AT END OF VOLUME   HELD}, RECOVERY={NOT HELD   HELD AT END OF VOLUME   HELD}, TAPEDATASETRECOVERY= {HELD   NOT HELD}, DATA SET BACKUP= {HELD   NOTHELD   TAPEHELD   DASDHELD}, DATA SET BACKUP= {ACTIVE   INACTIVE   DASDACTIVE   TAPEACTIVE}, DATA SET BACKUP ACTUAL IDLETASKS= (ALLOC=ALLOCATED, MAX=MAXIMUM), DATA SET RECOVERY= {ACTIVE   INACTIVE}, VOLUME BACKUP= {ACTIVE   INACTIVE}, VOLUME RECOVERY= {ACTIVE   INACTIVE} ARC0460I {PRIVATE   EXTENDED PRIVATE} AREA LIMIT= <i>limit</i> UNALLOCATED= <i>unallocated</i> LARGEST FREE AREAS= <i>first, second</i> ARC0415I EXPIREBV={HELD   NOT HELD} AND {ACTIVE   INACTIVE}, LAST STORED BACKUP VERSION KEY = <i>bcds-key</i> , LAST STORED ABARS VERSION KEY = <i>abars-key</i> , LAST PLANNED END KEY = <i>last-planned-end-key</i> ARC0437I {TAPECOPY   TAPEREPL} {HELD   NOT HELD} AND {ACTIVE   INACTIVE } ARC0642I DUMP={NOT HELD   HELD AT END OF VOLUME   HELD}, AUTODUMP={NOT HELD   HELD AT END OF VOLUME   HELD}, VOLUME DUMP={ACTIVE   INACTIVE}, VOLUME RESTORE={ACTIVE   INACTIVE}, DATA SET RESTORE={ACTIVE   INACTIVE} ARC0841I RECYCLED NET <i>number category</i> VOLUMES TOWARD A LIMIT OF <i>limit</i> ARC1540I COMMON RECALL QUEUE PLACEMENT FACTORS: CONNECTION STATUS={CONNECTING   CONNECTED   DISCONNECTING   UNCONNECTED   RETRY   FAILED}, CRQPLEX HOLD STATUS={NONE   ALL   RECALL(TAPE)   RECALL(TAPE(TSO))}, HOST COMMONQUEUE HOLD STATUS={NONE   CQ   CQ(RECALL)   CQ(RECALL(PLACEMENT))}, STRUCTURE ENTRIES= <i>ent%</i> FULL, STRUCTURE ELEMENTS= <i>elem%</i> FULL ARC1541I COMMON RECALL QUEUE SELECTION FACTORS: CONNECTION STATUS={CONNECTING   CONNECTED   DISCONNECTING   UNCONNECTED   RETRY   FAILED}, HOST RECALL HOLD STATUS={NONE   ALL   RECALL(TAPE)   RECALL(TAPE(TSO))}, HOST COMMONQUEUE HOLD STATUS={NONE   CQ   CQ(RECALL)   CQ(RECALL(SELECTION))} ARC1822I {FRBACKUP   FRRECOV} OF COPY POOL <i>cname</i> FOR USER <i>userid</i> , REQUEST <i>request-number</i> ON HOST <i>host_id</i> IS IN PROGRESS ARC1826I FRBACKUP = {HELD   NOT HELD} AND {ACTIVE   INACTIVE}, FRRECOV = {HELD   NOT HELD} AND {ACTIVE   INACTIVE} ARC6018I AGGREGATE BACKUP/RECOVERY = {ACTIVE   INACTIVE   DISABLED} ARC6019I AGGREGATE BACKUP = {HELD   HELD EOD   NOT HELD}, AGGREGATE RECOVERY = {HELD   HELD EOD   NOT HELD} ARC6020I {BACKING UP   RECOVERING} {AGGREGATE GROUP <i>agname</i>   CONTROL FILE <i>dsname</i> } FOR USER <i>userid</i> REQUEST <i>request number</i> ARC6380I AGGREGATE BACKUP{AGNAME} = {HELD   HELD EOD}, AGGREGATE RECOVERY {DATASETNAME <i>datasetname</i>   AGGREGATE <i>agname</i> } = {HELD   HELD EOD}
ARPOOL	ARC010II QUERY ARPOOL COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i> ARC0230I NO {DATA SET   VOLUME   AGGREGATE RECOVERY} POOLS DEFINED ARC6015I ARPOOL NAME = <i>agname</i> ML1VOLS = <i>volser1 ... volsrn</i> L0VOLS = <i>volser1 ... volsrn</i> ARC6363I ALL   ML1VOLS{*}   L0VOLS{*} USED IN DEFINE

Table 28. Messages Associated with the QUERY Command by Parameter Name (continued)

Parameter Name	Message ID / Text
AUTOPROGRESS	ARC0101I QUERY AUTOPROGRESS COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0246I SMS VOLUMES RESTRICTED TO PROCESSING BY THIS PROCESSING UNIT: NOT PROCESSED = <i>number of volumes</i> , TOTAL = <i>number of volumes</i> SMS VOLUMES NOT RESTRICTED TO PROCESSING BY ANY PROCESSING UNIT: NOT PROCESSED = <i>number of volumes</i> , TOTAL = <i>number of volumes</i> NON-SMS VOLUMES: NOT PROCESSED = <i>number of volumes</i> , TOTAL = <i>number of volumes</i>
	ARC0247I {AUTO BACKUP   AUTO DUMP   PRIMARY SPACE MANAGEMENT   INTERVAL MIGRATION   NO AUTOMATIC FUNCTION} IS CURRENTLY PROCESSING DFSMSHSM MANAGED VOLUMES
BACKUP	ARC0101I QUERY BACKUP COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0154I MAXBACKUPTASKS={ <i>tasks</i> }, ABSTART={( <i>time1 time2 time3</i> )}, VERSIONS={ <i>versions</i> }, FREQUENCY={ <i>days</i> }, SKIPABPRIMARY={YES   NO}, BACKUP PREFIX={ <i>bprefix</i> }, INCREMENTALBACKUP={CHANGEDONLY   ORIGINAL}, PROFILEBACKUP={YES   NO}, INUSE={YES   NO}, DELAY={ <i>min</i> }, SERIALIZATION=REQUIRED   PREFERRED}
	ARC0164I DAY={ <i>day</i> }   SPILL   UNASSIGNED VOLs={ <i>volser-flag</i> , ...}
	ARC0269I DATA SET DASD BACKUP TASKS={ <i>number of tasks</i> }, DATA SET TAPE BACKUP TASKS={ <i>number of tasks</i> }, DEMOUNTDELAY MINUTES={ <i>delay minutes</i> }, MAXIDLETASKS={ <i>number idle drives</i> }, DATA SET BACKUP MAXIMUM DASD SIZE={ <i>kbytes</i> }, DATA SET BACKUP STANDARD DASD SIZE={ <i>kbytes</i> }, SWITCHTAPES TIME={ <i>time to demount idle tapes</i> }, PARTIALTAPE OPTION={MARKFULL   SETSYS   REUSE}
	ARC0271I BACKUP CYCLE LENGTH={ <i>nday(s)</i> }, TODAY IS DAY={**   <i>n</i> }, CYCLE START DATE={ <i>yy/mm/dd</i> }, VOLUME LIMIT/DAY={ <i>limit</i> }, AVAILABLE BACKUP VOLUMES={ <i>total</i> }
	ARC0273I DUMP CYCLE LENGTH={ <i>ndays</i> DAYS}, CYCLE={*NONE*   <i>string</i> }, TODAY IS DAY = {**   <i>n</i> } CYCLE START DATE = { <i>yy/mm/dd</i>   *NONE*} {LEVEL   AUTODUMP   AUTODUMP   LEVEL} FUNCTIONS {ELIGIBLE   NOT ELIGIBLE} TO BE {STARTED   RE-STARTED} {DUMP CYCLE NOT DEFINED   CYCLE START TIME NOT SPECIFIED}
	ARC0274I BACKUP={YES{ANY   DASD   TAPE {{ <i>unittype</i> }}}}   NO}, SPILL={YES{ANY   DASD   TAPE {{ <i>unittype</i> }}}}   NO}, MAXDSRECOVERTASKS={ <i>nn</i> }
CDSVERSIONBACKUP	ARC0101I QUERY CDSVERSIONBACKUP COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0375I CDSVERSIONBACKUP,{MCDSBACKUPDSN={ <i>dsname1</i> }, BCDSBACKUPDSN={ <i>dsname2</i> }, OCDSBACKUPDSN={ <i>dsname3</i> }, JRNLBACKUPDSN={ <i>dsname4</i> }}
	ARC0376I BACKUPCOPIES={ <i>backupcopies</i> }, BACKUPDEVICECATEGORY={DASD   TAPE {UNITNAME={ <i>unitname</i> }, DENSITY={ <i>density</i> }, {RETPD={ <i>retentionperiod</i> }   EXPDT={ <i>expirationdate</i> } } {PARALLEL   NOPARALLEL}}}, LATESTFINALQUALIFIER={ <i>Xnnnnnnn</i> }, DATAMOVER = {HSM   DSS}
COMMONQUEUE	ARC1543I <i>type</i> MWE FOR DATASET <i>name</i> , FOR USER <i>userid</i> , REQUEST <i>request-number</i> , WAITING TO BE PROCESSED ON A COMMON QUEUE, <i>nmwe</i> MWES AHEAD OF THIS ONE
	ARC1545I COMMON QUEUE STRUCTURE FULLNESS: COMMON RECALL QUEUE: STRUCTURE ENTRIES={ <i>crg_ent</i> % FULL, STRUCTURE ELEMENTS={ <i>crg_elem</i> % FULL}
CONTROLDATASETS	ARC0101I QUERY CONTROLDATASETS COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0947I CDS SERIALIZATION TECHNIQUE IS <i>technique</i>
	ARC0148I {MCDS   BCDS   OCDS   JOURNAL} TOTAL SPACE = <i>k-bytes</i> K-BYTES, CURRENTLY ABOUT <i>percent</i> % FULL, WARNING THRESHOLD = <i>thresh</i> %, TOTAL FREESPACE = <i>percent</i> %, EA={YES   NO}, CANDIDATE VOLUMES = <i>numvols</i>
	ARC0948I {MCDS   BCDS   OCDS} INDEX TOTAL SPACE = <i>kbytes</i> KBYTES, CURRENTLY ABOUT <i>percent</i> % FULL, WARNING THRESHOLD = <i>thresh</i> %, CANDIDATE VOLUMES={ <i>numvols</i> }
	ARC0946I {MCDS   BCDS} {Low Key   High Key} = { <i>low key</i> / <i>high key</i> }
COPYPOOL	ARC1820I THE FOLLOWING VOLUMES IN COPY POOL <i>cpname</i> ARE IN AN ACTIVE FLASHCOPY RELATIONSHIP
	ARC1821I NONE OF THE VOLUMES IN COPY POOL <i>cpname</i> ARE IN AN ACTIVE FLASHCOPY RELATIONSHIP
CSALIMITS	ARC0101I QUERY CSALIMITS COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0203I CSALIMITS={NO   YES}, CSA CURRENTLY USED={ <i>nnnnnn</i> BYTES, MWE={ <i>www</i> . MAXIMUM={ <i>xxxxxx</i> K BYTES, ACTIVE={ <i>yyy</i> %, INACTIVE={ <i>zzz</i> %}}

Table 28. Messages Associated with the QUERY Command by Parameter Name (continued)

Parameter Name	Message ID / Text
DATASETNAME (dsname)	ARC010II QUERY {DATASETNAME   USER   REQUEST}COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= x
	ARC016II {MIGRATING   BACKING UP   RECOVERING   RECYCLING   AUDITING   DUMPING   RESTORING} VOLUME volser FOR USER {userid   **AUTO**} REQUEST {request   NONE}
	ARC0162I {MIGRATING   BACKING UP   RECALLING   RECOVERING   DELETING   RESTORING } DATA SET dsname FOR USER userid, REQUEST request ON HOST hostid
	ARC0165I USER NOT AUTHORIZED TO QUERY REQUESTS FOR OTHER USERIDS OR REQNUM MISSING
	ARC0166I NO DFSMSHSM REQUEST FOUND FOR QUERY
	ARC0167I type MWE FOR {VOLUME   DATA SET   COMMAND   AGGREGATE GROUP   CONTROL FILE DATA SET   COPY POOL} name SGROUP=sg FOR USER userid REQUEST reqnum WAITING TO BE PROCESSED, nmwe MWES AHEAD OF THIS ONE
	ARC1543I type MWE FOR DATASET name, FOR USER userid, REQUEST request-number, WAITING TO BE PROCESSED ON A COMMON QUEUE, nmwe MWES AHEAD OF THIS ONE
IMAGE	ARC010II QUERY IMAGE COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= x
	ARC0250I HOST PROCNAMES JOBID ASID MODE
	ARC0250I host procname jobid asid {MAIN   AUX}
MIGRATIONLEVEL2	ARC010II QUERY MIGRATIONLEVEL2 COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= x
	ARC0224I LOW KEY HIGH KEY VOLSER
	ARC0225I lowkey highkey {volser   *NONE*}
	ARC0226I MIGRATION LEVEL 2 UNDEFINED
	ARC0227I ML2 TAPE TARGET VOLS: DSMIG = {volserA   *NONE*}, VOLMIG=(T01={volser1   *NONE*}, T02={volser2   *NONE*}, T03={volser3   *NONE*}, T04={volser4   *NONE*}, T05={volser5   *NONE*}, T06={volser6   *NONE*}, T07={volser7   *NONE*}, T08={volser8   *NONE*}, T09={volser9   *NONE*}, T10={volser10   *NONE*}, T11={volser11   *NONE*}, T12={volser12   *NONE*}, T13={volser13   *NONE*}, T14={volser14   *NONE*}, T15={volser15   *NONE*}, T16={volser16   *NONE*})   SSMMIG=(S01={volser1   *NONE*}, S02={volser2   *NONE*}, S03={volser3   *NONE*}, S04={volser4   *NONE*}, S05={volser5   *NONE*}, S06={volser6   *NONE*}, S07={volser7   *NONE*}, S08={volser8   *NONE*}, S09={volser9   *NONE*}, S10={volser10   *NONE*}, S11={volser11   *NONE*}, S12={volser12   *NONE*}, S13={volser13   *NONE*}, S14={volser14   *NONE*}, S15={volser15   *NONE*}   *NONE*)
	POOL
	ARC010II QUERY {POOL   VOLUMEPOOL} COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= x
	ARC0230I NO {DATA SET   VOLUME   APPLICATION RECOVERY} POOLS DEFINED
REQUEST	ARC010II QUERY {DATASETNAME   USER   REQUEST}COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= x
	ARC016II {MIGRATING   BACKING UP   RECOVERING   RECYCLING   AUDITING   DUMPING   RESTORING} VOLUME volser FOR USER {userid   **AUTO**} REQUEST {request   NONE}
	ARC0162I {MIGRATING   BACKING UP   RECALLING   RECOVERING   DELETING   RESTORING } DATA SET dsname FOR USER userid, REQUEST request ON HOST hostid
	ARC0165I USER NOT AUTHORIZED TO QUERY REQUESTS FOR OTHER USERIDS OR REQNUM MISSING
	ARC0166I NO DFSMSHSM REQUEST FOUND FOR QUERY
	ARC0167I type MWE FOR {VOLUME   DATA SET   COMMAND   AGGREGATE GROUP   CONTROL FILE DATA SET   COPY POOL} name, SGROUP = sg FOR USER userid REQUEST reqnum WAITING TO BE PROCESSED, nmwe MWES AHEAD OF THIS ONE
	ARC1543I type MWE FOR DATASET name, FOR USER userid, REQUEST request-number, WAITING TO BE PROCESSED ON A COMMON QUEUE, nmwe MWES AHEAD OF THIS ONE
RETAIN	ARC1822I {FRBACKUP   FRRECOV} OF COPY POOL cname FOR USER userid, REQUEST request-number ON HOST host_id IS IN PROGRESS
	ARC010II QUERY RETAIN COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= x
	ARC0174I NO RETAIN LEVEL ENTRIES
	ARC0175I LEVEL QUALIFIER AND MIGRATION RESTRICTION TYPE
SECURITY	ARC0176I QUALIFIER=qualifier RESTRICTION TYPE=type
	ARC1700I DFSMSHSM COMMANDS ARE {RACF   AUTH} PROTECTED

Table 28. Messages Associated with the QUERY Command by Parameter Name (continued)

Parameter Name	Message ID / Text
SETSYS	ARC0101I QUERY SETSYS COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i> ARC0139I MAXINTERVALTASKS = <i>xx</i> , MAXSSMTASKS(TAPEMOVEMENT= <i>mm</i> , CLEANUP= <i>nn</i> ) ARC0147I BU DENSITY= <i>density</i> , BU UNIT= <i>unittype</i> , BU RECYCLE PERCENTAGE= <i>percent%</i> , MOUNT WAIT TIME= <i>min</i> MINUTE(S), TAPESPANSIZE( <i>size</i> ) ARC0149I MONITOR({STARTUP   NOSTARTUP}, {SPACE   NOSPACE}, {VOLUME   NOVOLUME}), MCDS( <i>thresh</i> ), BCDS( <i>thresh</i> ), OCDS( <i>thresh</i> ), JOURNAL( <i>thresh</i> ) ARC0150I JOURNAL={NONE   SPEED   RECOVERY}, LOG={YES   NO   HELD}, TRACE={YES   NO}SMFID={ <i>smfid</i>   NONE}, DEBUG={YES   NO}, EMERG={YES   NO}, JES={2   3}, SYS1DUMP={YES   NO}, RACFIND={YES   NO}, ERASEONSCRATCH {YES   NO} ARC0151II DAYS= <i>days1</i> , ML1DAYS= <i>days2</i> , PRIMARYSPGMGMTSTART=( <i>time1 time2</i>   NONE), MAXMIGRATIONTASKS= <i>nn</i> , INTERVALMIGRATION={YES   NO}, MIGRATIONCLEANUPDAYS= ( <i>days3, days4, days5</i> ), SDSP={ <i>number</i> KB   NONE}, MIGRATION PREFIX= <i>mprefix</i> , SCRATCH EXPIRED DATA SETS={YES   NO}, SECONDARYSPGMGMTSTART=( <i>time1 time2</i>   NONE) ARC0152I MAXRECALLTASKS= <i>tasks</i> , RECALL={ANYSTORAGEVOLUME(LIKE   UNLIKE)   PRIVATEVOLUME(LIKE   UNLIKE)}, MAXEXTENTS= <i>extents</i> , CONVERSION={NO   REBLOCKBASE   REBLOCKTOANY   REBLOCKTOUNLIKE}, VOLCOUNT ={*NONE*   ANY} TAPERECALLLIMITS(TASK= <i>time1</i> , TAPE= <i>time2</i> ) ARC0153I SCRATCHFREQ= <i>days</i> , SYSOUT(CLASS= <i>class</i> , COPIES= <i>number</i> , SPECIAL FORMS=[ <i>form</i>   NONE]), SWAP={YES   NO}, PERMISSION={YES   NO}, EXITS={NONE   <i>exits</i> }, UNLOAD={YES   NO}, DATASETSERIALIZATION={USER   DFHSM} ARC0154I MAXBACKUPTASKS= <i>tasks</i> , ABSTART=( <i>time1 time2 time3</i> ), VERSIONS= <i>versions</i> , FREQUENCY= <i>days</i> , SKIPABPRIMARY={YES   NO}, BACKUP PREFIX= <i>bprefix</i> , INCREMENTALBACKUP={CHANGEDONLY   ORIGINAL}, PROFILEBACKUP={YES   NO}, INUSE={YES   NO, DELAY= <i>min</i> , SERIALIZATION=REQUIRED   PREFERRED} ARC0169I USER UNIT NAMES= <i>unitname(s)</i> ARC0203I CSALIMITS={NO   YES}, CSA CURRENTLY USED= <i>nnnnnn</i> BYTES, MWE= <i>www. www. www. www.</i> MAXIMUM= <i>xxxxxxK</i> BYTES, ACTIVE= <i>yyy%</i> , INACTIVE= <i>zzz%</i> ARC0269I DATA SET DASD BACKUP TASKS={ <i>number of tasks</i> }, DATA SET TAPE BACKUP TASKS={ <i>number of tasks</i> }, DEMOUNTDELAY MINUTES={ <i>delay minutes</i> }, MAXIDLETASKS={ <i>number idle drives</i> }, DATA SET BACKUP MAXIMUM DASD SIZE={ <i>kbytes</i> }, DATA SET BACKUP STANDARD DASD SIZE={ <i>kbytes</i> }, SWITCHTAPES TIME={ <i>time to demount idle tapes</i> }, PARTIALTAPE OPTION={MARKFULL   SETSYS   REUSE} ARC0272I PRIMARY SPACE MGMT CYCLE LENGTH= <i>ndays</i> DAY(S), CYCLE={*NONE*   <i>string</i> }, TODAY IS DAY= <i>n</i> , CYCLE START DATE= <i>yy/mm/dd</i> SECONDARY SPACE MANAGEMENT CYCLE LENGTH= <i>ndays</i> DAY(S), CYCLE={*NONE*   <i>string</i> }, TODAY IS DAY= <i>n</i> , CYCLE START DATE= <i>yy/mm/dd</i> ARC0274I BACKUP={YES({ANY   DASD   TAPE {{(unittype)}}})   NO}, SPILL={YES({ANY   DASD   TAPE {{(unittype)}}})   NO}, MAXDSRECOVERTASKS= <i>nn</i> ARC0339I OPTIMUMDASDBLOCKING = {2KB   OPTIMAL   NO}, LOGGING LEVEL = {FULL   REDUCED   EXCEPTIONONLY}, LOG TYPE = {SYSOUT( <i>sysout-class</i> )   DASD} ARC0340I COMPACT OPTIONS ARE: TAPEMIGRATION=[YES   NO], DASDMIGRATION=[YES   NO], TAPEBACKUP=[YES   NO], DASDBACKUP=[YES   NO], TAPEHARDWARECOMPACT=[YES   NO] ARC0341I COMPACT PERCENT IS <i>percent%</i> ARC0342I {SOURCENAMES   OBJECTNAMES}: <i>name(s)</i> ARC0374I ACCEPTPSCBUSERID={YES   NO} ARC0375I CDSVERSIONBACKUP,{MCDSBACKUPDSN= <i>dsname1</i> , BCDSBACKUPDSN= <i>dsname2</i> , OCDSBACKUPDSN= <i>dsname3</i> , JRNLBACKUPDSN= <i>dsname4</i> } ARC0376I BACKUPCOPIES= <i>backupcopies</i> , BACKUPDEVICECATEGORY={DASD   TAPE (UNITNAME= <i>unitname</i> , DENSITY= <i>density</i> , {RETPD= <i>retentionperiod</i>   EXPDT= <i>expirationdate</i> } {PARALLEL   NOPARALLEL})}, LATESTFINALQUALIFIER=X <i>nnnnnnn</i> DATAMOVER = {HSM   DSS}

Table 28. Messages Associated with the QUERY Command by Parameter Name (continued)

Parameter Name	Message ID / Text
SETSYS	ARC0408I INPUT TAPE ALLOCATION=(WAIT   NOWAIT), OUTPUT TAPE ALLOCATION=(WAIT   NOWAIT), RECYCLE TAPE ALLOCATION=(WAIT   NOWAIT), TAPEFORMAT={SINGLEFILE,   MULTIFILE}
	ARC0410I TAPEMIGRATION={DIRECT(TAPE(ANY   <i>unitname</i> )) NONE={ROUTETOTAPE(ANY   <i>unitname</i> )}, MIGDENSITY= <i>density</i> , MIGUNIT= <i>unittype</i> , ML2 RECYCLE PERCENTAGE= <i>percent</i> %, TAPEMAXRECALLTASKS= <i>tasks</i> , ML2PARTIALSNOTASSOCIATED GOAL=( <i>nnn</i>   NOLIMIT), RECONNECT(NONE   ALL   ML2DIRECTEDONLY)}
	ARC0411I TAPESECURITY={RACF   RACFINCLUDE} {PASSWORD} {EXPIRATION   EXPIRATIONINCLUDE}, {DEFERMOUNT   NODEFERMOUNT}
	ARC0412I RECYCLEOUTPUT BACKUP={ <i>unittype</i>   **NONE**}, MIGRATION={ <i>unittype</i>   **NONE**}
	ARC0417I TAPE INPUT PROMPT FOR BACKUPTAPES   DUMPTAPES   MIGRATION TAPES = {Y   N}
	ARC0418I TAPEUTILIZATION PERCENT = ( <i>pct</i>   NOLIMIT), UNIT = <i>unit</i>   LIBRARYMIGRATION   LIBRARYBACKUP, CAPACITYMODE = COMPATIBILITY   EXTENDED   **NONE**
	ARC0419I SELECTVOLUME={SPECIFIC   SCRATCH   SPECIFIC FOR <i>func[,func]</i> , SCRATCH FOR <i>func[,func]</i> }, TAPEDELETION={SCRATCHTAPE   HSMTAPE   SCRATCHTAPE FOR <i>func[,func]</i> ,HSMTAPE FOR <i>func[,func]</i> }, PARTIALTAPE={MARKFULL   REUSE   MARKFULL FOR <i>func</i> ,REUSE FOR <i>func</i> },DISASTERMODE = {YES   NO}
	ARC0442I TAPE OUTPUT PROMPT FOR TAPECOPY = {YES   NO}, DUPLEX BACKUP TAPES = {YES   NO} DUPLEX MIGRATION TAPES = {YES   NO}
	ARC0468I EXTENDEDTTOC = {Y   N}
	ARC0638I MAXDUMPTASKS= <i>dtasks</i> , ADSTART=( <i>time1 time2 time3</i> ), DUMPIO=( <i>n,m</i> ), VOLUMEDUMP=(CC   NOCC)
	ARC0840I MAXRECYCLETASKS = <i>ytasks</i> , RECYCLE INPUT DEALLOCATION FREQUENCY BACKUP= <i>bfreq</i> , MIGRATION= <i>mfreq</i>
	ARC1500I PLEXNAME = HSMplex_name, PROMOTE PRIMARYHOST = {YES   NO}, PROMOTE SSM = {YES   NO}, COMMONQUEUE RECALL BASE NAME = { <i>basename</i>   ****}
	ARC1823I MAXCOPYPOOL (FRBACKUP TASKS = <i>backup_tasks</i> , FRRECOV TASKS = <i>recover_tasks</i> , DSS TASKS = <i>dss_tasks</i>
	ARC6008I APPLICATION BACKUP/RECOVERY PROCNAME = <i>procname</i>
	ARC6009I APPLICATION BACKUP/RECOVERY MAXADDRESSSPACE = <i>number</i>
	ARC6011I {REPLACE   NOREPLACE} ISSUED FOR APPLICATION RECOVERY
	ARC6033I APPLICATION RECOVERY UNIT NAME = <i>unittype</i>
	ARC6036I AGGREGATE BACKUP OPTIMIZE = {1   2   3   4}
	ARC6036I AGGREGATE RECOVERY TGTGDS = {DEFERRED   ACTIVE   ROLLEDOFF   SOURCE}
	ARC6036I AGGREGATE RECOVERY ABARSVOLCOUNT = {*NONE*   ANY}
	ARC6036I AGGREGATE RECOVERY PERCENTUTILIZED = <i>percent</i> ,
	ARC6036I AGGREGATE BACKUP/RECOVERY ABARSDELETEACTIVITY = {YES   NO}
	ARC6036I AGGREGATE BACKUP/RECOVERY ABARSTAPES = {STACK   NOSTACK}
	ARC6036I AGGREGATE BACKUP/RECOVERY ABARSKIP = {PPRC   NOPPRC, XRC   NOXRC}
	ARC6366I AGGREGATE BACKUP/RECOVERY UNIT NAME = UNITNAME
	ARC6368I AGGREGATE BACKUP/RECOVERY ACTIVITY LOG MESSAGE LEVEL IS {FULL   REDUCED}
	ARC6371I AGGREGATE RECOVERY ML2 TAPE UNIT NAME = UNITNAME
	ARC6372I NUMBER OF ABARS I/O BUFFERS = NUMBER
ARC6373I ABARS ACTIVITY LOG OUTPUT TYPE = {SYSOUT{{CLASS}}   DASD}	
SPACE	ARC0400I VOLUME <i>volser</i> IS <i>percent</i> % FREE, <i>tracks</i> FREE TRACKS, <i>cylinders</i> FREE CYLS, FRAG <i>fragx</i>
	ARC0401I LARGEST EXTENTS ARE CYLINDERS <i>cylinders</i> , TRACKS <i>tracks</i>
	ARC0402I VTOC IS <i>tracks</i> TRACKS( <i>totdscbs</i> DSCBS), <i>free</i> FREE DSCBS( <i>percent</i> % OF TOTAL), <i>format5</i> FORMAT 5 DSCBS
	ARC0406I SPACE PARAMETER ON QUERY COMMAND ONLY VALID WHEN ENTERED BY CONSOLE OPERATOR OR AUTHORIZED USER
	ARC0407I QUERY SPACE FAILED, {VOLUME <i>volser</i> NOT   NO PRIMARY OR MIGRATION LEVEL 1 VOLUMES} CURRENTLY MANAGED BY DFSMSHSM
	ARC0413I QUERY SPACE FOR VOLUME <i>volser</i> ALREADY ACTIVE - RETRY THIS VOLUME AGAIN

Table 28. Messages Associated with the QUERY Command by Parameter Name (continued)

Parameter Name	Message ID / Text
STARTUP	ARC0101I QUERY STARTUP COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0143I PARMLIB MEMBER=ARCCMD <i>xx</i> , DFSMSHSM AUTHORIZED USERID= <i>userid</i> , HOSTID= <i>hostid</i> , PRIMARY HOST={YES   NO}, LOGSW={YES   NO}, STARTUP={YES   NO}, EMERGENCY={YES   NO}, CDSQ={YES   NO}, CDSR={YES   NO}, PDA={YES   NO}, RESTART = {IS SPECIFIED   NOT SPECIFIED}, CDSSHR = {YES   NO   RLS}, RNAMEDSN={YES   NO}, STARTUP PARMLIB MEMBER = {ARCSTR <i>yy</i>   NONE}
	ARC0249I CELLS=(a,b,c,d,e), HOSTMODE={MAIN   AUX}
STATISTICS	ARC0101I QUERY STATISTICS COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0145I DS DELETED= <i>datasets</i> , DS DELETE FAILED= <i>fails</i>
	ARC0146I RECYCLED {BACKUP   MIGRATION} VOLUMES= <i>volumes</i> , DS= <i>datasets</i> , BLOCKS= <i>blocks</i>
	ARC0155I DFSMSHSM STATISTICS FOR <i>date</i>
	ARC0156I STARTUPS= <i>starts</i> , SHUTDOWNS= <i>stops</i> , ABENDS= <i>abends</i> , MWES= <i>requests</i> , CPU TIME= <i>time</i> SECONDS
	ARC0157I DS MIGRATE L1= <i>nlev1</i> , DS MIGRATE L2= <i>nlev2</i> , DS EXTENT REDUCTIONS= <i>exts</i> DS MIGRATE FAIL= <i>fails</i> , TRKS MIGRATE= <i>tracks</i> , {KBYTES   MBYTES   GBYTES   TBYTES}, MIGRATE= <i>nbytes</i>
	ARC0158I DS RECALL L1= <i>ndatasets1</i> , DS RECALL L2= <i>ndatasets2</i> , DS RECALL FAIL= <i>fails</i> , {KBYTES   MBYTES   GBYTES   TBYTES}, RECALL= <i>nbytes</i> , RECALL MOUNTS AVOIDED= <i>avoided</i> , EXTRA ABACKUP MOUNTS= <i>extras</i>
	ARC0159I DS BACKUP= <i>ndatasets1</i> , DS BACKUP FAIL= <i>fails1</i> , DS RECOVER= <i>ndatasets2</i> , DS RECOVER FAIL= <i>fails2</i> , RECOVER MOUNTS SAVED= <i>saved</i>
	ARC0641I VOL DUMP= <i>nvol1</i> , VOL DUMP FAIL= <i>fails3</i> , VOL RESTORE= <i>nvol2</i> , VOL RESTORE FAIL= <i>fails4</i> , DS RESTORE= <i>ndatasets</i> , DS RESTORE FAIL= <i>fails5</i>
TRAPS	ARC0101I QUERY TRAPS COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0204I NO ACTIVE TRAP ENTRIES
	ARC0205I TRAP IN MODULE <i>modname</i> FOR CODE <i>errcode</i> , TIMES= <i>errtimes</i> , TYPE={LOG ALWAYS   BY OCCURRENCE   SNAP {ALWAYS   ONCE   NEVER}   ABEND {ALWAYS   ONCE   NEVER}}
USER	ARC0101I QUERY {DATASETNAME   USER   REQUEST}COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0161I {MIGRATING   BACKING UP   RECOVERING   RECYCLING   AUDITING   DUMPING   RESTORING} VOLUME <i>volser</i> FOR USER <i>userid</i>   **AUTO** REQUEST { <i>request</i>   NONE}
	ARC0162I {MIGRATING   BACKING UP   RECALLING   RECOVERING   DELETING   RESTORING } DATA SET <i>dsname</i> FOR USER <i>userid</i> , REQUEST <i>request</i> ON HOST <i>hostid</i>
	ARC0165I USER NOT AUTHORIZED TO QUERY REQUESTS FOR OTHER USERIDS OR REQNUM MISSING
	ARC0166I NO DFSMSHSM REQUEST FOUND FOR QUERY
	ARC0167I <i>type</i> MWE FOR {VOLUME   DATA SET   COMMAND   AGGREGATE GROUP   CONTROL FILE DATA SET   COPY POOL} <i>name</i> , SGROUP = <i>sg</i> FOR USER <i>userid</i> REQUEST <i>reqnum</i> WAITING TO BE PROCESSED, <i>nmwe</i> MWES AHEAD OF THIS ONE
	ARC1543I <i>type</i> MWE FOR DATASET <i>name</i> , FOR USER <i>userid</i> , REQUEST <i>request-number</i> , WAITING TO BE PROCESSED ON A COMMON QUEUE, <i>nmwe</i> MWES AHEAD OF THIS ONE
	ARC1822I {FRBACKUP   FRRECOV} OF COPY POOL <i>cpname</i> FOR USER <i>userid</i> , REQUEST <i>request-number</i> ON HOST <i>host_id</i> IS IN PROGRESS
	ARC0101I QUERY {POOL   VOLUMEPOOL} COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
VOLUMEPOOL	ARC0230I NO {DATA SET   VOLUME   APPLICATION RECOVERY} POOLS DEFINED
	ARC0232I {DATA SET   VOLUME} POOLS={ <i>char</i>   <i>poolid</i> } VOLs= <i>volser</i> { <i>volser</i> ... <i>volser</i> }
WAITING	ARC0101I QUERY WAITING COMMAND {STARTING   COMPLETED   IGNORED} ON HOST= <i>x</i>
	ARC0168I WAITING MWES: MIGRATE= <i>nmigrate</i> , RECALL= <i>nrecall</i> , DELETE= <i>ndelete</i> , BACKUP= <i>nbackup</i> , RECOVER= <i>nrecover</i> , COMMAND= <i>ncmd</i> , ABACKUP= <i>nabackup</i> , ARECOVER= <i>narcovr</i> , FRBACKUP= <i>nfrbackup</i> , FRRECOV= <i>nfrrecov</i> , TOTAL= <i>ntotal</i>
	ARC1542I WAITING MWES ON COMMON QUEUES: COMMON RECALL QUEUE= <i>recall_mwes</i> , TOTAL= <i>total_mwes</i>

For more information about the messages you receive when you use QUERY command, use LookAt or see *MVS System Messages*. For a description of LookAt, see “Using LookAt to look up message explanations” on page xxvi.



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## Appendix D. Using the REPORT Command

You use the REPORT command to generate reports based on the DFSMShsm statistics records in the MCDS.

When you request a statistics report, you can specify the DELETE parameter to scratch the statistics records used as input to the report after the REPORT command finishes its processing. This parameter is not related to the DELETE subparameter of the FUNCTION parameter. You can also have the output from the REPORT command sent either to the SYSOUT class or to an alternative output data set.

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### Requesting a Report of the Daily Statistics for All Functions

You specify REPORT DAILY to get a report of the daily statistics. Table 29 shows the output headings for the daily statistics report.

**Note:** If you specify selected functions such as REPORT DAILY FUNCTION BACKUP or REPORT DAILY FUNCTION RECOVER, then line 5 is output only if BACKUP is requested and line 6 is output only if RECOVER is requested.

*Table 29. Headings of Output When You Request a Daily Statistics Report*

Line Number	Daily Statistics Output Heading	Description
1	DAILY STATISTICS REPORT FOR YY/MM/DD	When you specify REPORT DAILY, this line contains todays date. When you specify REPORT DAILY FROMDATE(yyyy/mm/dd) TODATE(yyyy/mm/dd), this line contains the first date you specify. DFSMShsm reports all statistics for the first date, then reports the daily statistics for the second day, and so forth.
2	STARTUPS=xxx	This field shows how many times DFSMShsm was started on the specified day.
2	SHUTDOWNs=xxx	This field shows how many times DFSMShsm was stopped on the specified day.
2	ABENDS=xxx	This field shows how many times DFSMShsm abnormally ended for the specified day.
2	WORK ELEMENTS PROCESSED=xxxxxx	This field shows how many management work elements DFSMShsm processed for the specified day. If DFSMShsm is reporting daily statistics for all functions, this field means how many management work elements DFSMShsm processed.
2	BKUP VOL RECYCLED=xxxxx	This field shows how many tape backup volumes DFSMShsm recycled for the specified day.
2	MIG VOL RECYCLED=xxxxx	This field shows how many tape migration level 2 volumes DFSMShsm recycled for the specified day.
3	DATA SET MIGRATIONS BY VOLUME REQUEST=xxxxxx	This field shows how many data sets were processed during automatic and command volume migration.
3	DATA SET MIGRATIONS BY DATA SET REQUEST=xxxx	This field shows how many data sets were processed by the DATASETNAME parameter of the MIGRATE command

Table 29. Headings of Output When You Request a Daily Statistics Report (continued)

Line Number	Daily Statistics Output Heading	Description
3	BACKUP REQUESTS=xxxxxx	This field shows how many data sets were backed up during automatic and command backup processing.
4	EXTENT REDUCTIONS=xxxxxx	This field shows the number of extent reductions performed each day.
4	RECALL MOUNTS SAVED=xxxxxx	This field shows how many times a recall request was satisfied by a tape already mounted.
4	RECOVER MOUNTS SAVED=xxxxxx	This field shows how many times a recover request was satisfied by a tape already mounted.
5	FULL VOLUME DUMPS = xxxx REQUESTED	This field shows how many full-volume dumps were requested.
5	xxxxx FAILED	This field shows how many of the full-volume dumps failed.
5	DUMP COPIES=xxxxx REQUESTED	This field shows how many dump copies were requested.
5	xxxxx FAILED	This field shows how many of the dump copies failed. <b>Note:</b> You get this version of line 5 only when you issue the command REPORT DAILY FUNCTION BACKUP.
6	FULL VOLUME RESTORES = xxxx REQUESTED	This field shows how many full-volume restores were requested.
6	xxxxx FAILED	This field shows how many of the full-volume restores failed.
6	DATASET RESTORES = xxxx REQUESTED	This field shows how many data set restores were requested.
6	xxxxx FAILED	This field shows how many of the data set restores failed. <b>Note:</b> You get this version of line 4 only when you issue the command REPORT DAILY FUNCTION RECOVER.
7	ABACKUPS=xxxx REQUESTED	This field shows how many aggregate backups were requested.
7	xxxxx FAILED	This field shows how many of the aggregate backups failed.
7	EXTRA ABACKUP MOUNTS=xxxx	This field shows how many times ABACKUP had to remount an ML2 tape taken away by recall.
8	DATA SET MIGRATIONS BY RECONNECTION=xxxx	This field shows the number of data sets reconnected.
8	NUMBER OF TRACKS RECONNECTED TO TAPE=xxxx	This field shows the number of tracks on level 0 volumes that were freed by reconnection.
9	FAST REPLICATION VOLUME BACKUP=xxxxxxxx REQUESTED, xxxxxxxx FAILED	This field shows the number of fast replication backup versions that were requested and how many of the fast replication backups failed.
10	FAST REPLICATION VOLUME RECOVER=xxxxxxxx REQUESTED, xxxxxxxx FAILED	This field shows the number of fast replication recoveries that were requested and how many of the fast replication recoveries failed.

Table 29. Headings of Output When You Request a Daily Statistics Report (continued)

Line Number	Daily Statistics Output Heading	Description
11 and 12	HSM FUNCTION	<p>This field contains the names of the functions DFSMShsm processed. When you specify REPORT DAILY FUNCTION, DFSMShsm reports the daily statistics in the following order:</p> <ol style="list-style-type: none"> <li>1. MIGRATION The category SUBSEQUENT MIGS reflects all movements of data sets from ML1 to ML1, ML1 to ML2, and ML2 to ML2. This includes FREEVOL moves but does not include RECYCLE moves. The PRIMARY to LEVEL2 category includes data set migrations by reconnection.</li> <li>2. RECALL</li> <li>3. DELETE Deletion of migrated data sets include only those deleted by the DELETEBYAGE (DBA) or DELETEBACKEDUP (DBU) functions from migration volumes, generation data sets that have been rolled-off from migration volumes, and migrated data sets that have expired by date or MCLASS attributes.</li> <li>4. BACKUP Deletion of primary data sets include only those deleted by the DELETEBYAGE (DBA) or DELETEBACKEDUP (DBU) functions, generation data sets that have been rolled-off from primary volumes, and primary data sets that have expired by date or MCLASS attributes. The DBA and DBU functions apply only to non-SMS data sets.</li> <li>5. RECOVER</li> <li>6. RECYCLE SUBSEQUENT BACKUP results from command backup, daily backup, FREEVOL processing and is the combined total of the following: <ul style="list-style-type: none"> <li>• Data sets moved from backup volumes to spill volumes</li> <li>• Data sets moved from ML1 volumes to backup volumes</li> </ul> DELETE BACKUP results from command backup, daily backup, BDELETE and EXPIREBV processing and is the combined total of the following: <ul style="list-style-type: none"> <li>• Backup volumes deleted after DFSMShsm processes the EXPIREBV command</li> <li>• Deletion of excessive incremental backups</li> <li>• Data sets deleted after DFSMShsm processes the BDELETE command</li> </ul> </li> </ol> <p>You can also choose to ask DFSMShsm to report statistics for specific DFSMShsm functions. For example, when you specify REPORT DAILY FUNCTION RECYCLE(ALL), DFSMShsm prints a daily statistics report of the number of tape backup and ML2 volumes DFSMShsm recycled during the time period you specified.</p> <p><b>Note:</b> MIGRATION and RECALL statistics do not include amounts for extent reductions.</p>
11 and 12	NUMBER DATASETS	This field shows how many data sets DFSMShsm processed for each function.

*Table 29. Headings of Output When You Request a Daily Statistics Report (continued)*

Line Number	Daily Statistics Output Heading	Description
11 and 12	-----READ----- TRK/BLK BYTES	This field shows how many tracks or blocks DFSMShsm read when processing the specific function. For data movement involving DASD, the first part of the field contains the number of tracks. For recycle, the first part of the field contains the number of 16K tape blocks. The last part of the field contains the number of kilobytes DFSMShsm read when processing the specific function.
11 and 12	-----WRITTEN----- TRK/BLK BYTES	This field shows how many tracks or blocks DFSMShsm wrote when processing the specific DFSMShsm function. For data movement involving DASD, the first part of the field contains the number of tracks. For recycle, the first part of the field contains the number of 16K tape blocks. The last part of the field contains the number of kilobytes DFSMShsm wrote when processing the specific function.
11 and 12	-----REQUESTS----- SYSTEM USER FAILED	This field shows how many requests came from DFSMShsm during its automatic processing, how many came from the user, and how many of the total requests failed.
11 and 12	AVERAGE AGE	This field contains the average age of the data sets that each function processed. For the MIGRATION and DELETE functions, this is the age of the average data set since it was last referred to. It is calculated by subtracting the date last referred to from the age of migration and dividing the result by the total number of data sets processed. For the RECALL function, this age is how long the average data set has been migrated. For the BACKUP, SPILL, and RECOVER functions, this age is the last time DFSMShsm made a backup version of the data set. The average age does not apply to the RECYCLE function.
11 and 12	-----AVERAGE TIME----- QUEUED WAIT PROCESS TOTAL	This field shows the average time in seconds that the request for each data set was waiting to be processed, the time spent allocating and opening each data set, and the time spent processing each data set. TOTAL shows the average time it took DFSMShsm to process each data set request. For the SUMMARY, the time for each day is accumulated prior to calculating the daily average. The AVERAGE TIME field is the total time for all days divided by the total number of data sets, giving the average time per data set.

If you specify the FROMDATE and TODATE parameters, DFSMShsm prints a summary of all the daily statistics after it prints the daily statistics for each day you specified. If you have requested statistics for specific functions, the report contains statistics for only those functions.

**Note:** If the letter K, M, G, or T follows any field, then the reported number is represented to the nearest kilobyte, megabyte, gigabyte, or terabyte, respectively. All output will be reported to the smallest possible unit measure. For example:

1 KILOBYTE = 1024 bytes  
1 MEGABYTE = 1,048,576 bytes  
1 GIGABYTE = 1,073,741,824 bytes  
1 TERABYTE = 1,099,511,627,776 bytes.

999,945,993,123 will be represented as 976509759K.  
103,999,945,993,123 will be represented as 99182077M.  
112,103,999,945,993,123 will be represented as 104404986G.  
4,112,103,999,945,993,123 will be represented as 3739937T.

The maximum reportable number is 4 611 686 018 427 387 904 or 4194304T. After this value is exceeded, the output reported resets and begins at zero. If it is suspected that this condition exists, rerun the report with a closer specified FROMDATE/TODATE.

Figure 57 is a sample of a daily statistics report that you get when you specify REPORT DAILY FUNCTION FROMDATE(2002/08/19) TODATE(2002/08/20). Therefore, you have the daily statistics for each day and then you have a summary report for the two days.

--DFSMShsm Statistics Report ----- AT 15:07:26 ON 2002/08/20 FOR SYSTEM=MVS4

DAILY STATISTICS REPORT FOR 02/08/19

STARTUPS=000, SHUTDOWNS=001, ABENDS=000, WORK ELEMENTS PROCESSED=000544, BKUP VOL RECYCLED=00000, MIG VOL RECYCLED=00000  
 DATA SET MIGRATIONS BY VOLUME REQUEST= 0000446, DATA SET MIGRATIONS BY DATA SET REQUEST= 00091, BACKUP REQUESTS= 0000364  
 EXTENT REDUCTIONS= 0000000 RECALL MOUNTS AVOIDED= 00101 RECOVER MOUNTS AVOIDED= 00000  
 FULL VOLUME DUMPS= 000034 REQUESTED, 00000 FAILED; DUMP COPIES= 000034 REQUESTED, 00000 FAILED  
 FULL VOLUME RESTORES= 000000 REQUESTED, 00000 FAILED; DATASET RESTORES= 000000 REQUESTED, 00000 FAILED  
 ABACKUPS= 00009 REQUESTED,00000 FAILED; EXTRA ABACKUP MOUNTS=00000  
 DATA SET MIGRATIONS BY RECONNECTION = 0000000, NUMBER OF TRACKS RECONNECTED TO TAPE = 00000000  
 FAST REPPLICATION VOLUME BACKUP = 000000012 REQUESTED, 0000000 FAILED  
 FAST REPPLICATION VOLUME RECOVER = 00000003 REQUESTED, 0000001 FAILED

HSM FUNCTION	NUMBER DATASETS	-----READ-----	-----WRITTEN-----	-----REQUESTS-----	SYSTEM	USER	FAILED	AGE	QUEUED	WAIT	PROCESS	TOTAL
<b>Migration</b>												
PRIMARY - LEVEL 1	0000069	00028656	000986175K	00023524	000986498K	000025	00046	00002	0002	00000	00001	00003
SUBSEQUENT MIGS	0000291	00428038	017973894K	00000000	017976272K	000361	00000	00070	00022	00000	00000	00015
PRIMARY - LEVEL 2	0000177	00252337	011726247K	00000000	011731648K	000151	00045	00019	00006	00001	00000	00013
<b>Recall</b>												
LEVEL 1 - PRIMARY	0000085	00021181	000887920K	00017263	000887577K	000000	00088	00003	00004	0001	00000	00002
LEVEL 2 - PRIMARY	0000139	00000000	007242288K	00137149	007239717K	000000	00139	00000	00018	0146	00020	00009
<b>Delete</b>												
MIGRATE DATA SETS	0000152	00006850	000497014K	00000000	000000000	000000	00152	00000	00067	0000	00000	00000
PRIMARY DATA SETS	0000035	00002629	000000000	000000000	000000000	000598	00047	00610	00011	0000	00000	00000
<b>Backup</b>												
DAILY BACKUP	0000364	00096278	004511279K	00000000	004549328K	000798	00003	00437	00023	0001	00002	00024
SUBSEQUENT BACKUP	0000000	000000000	000000000	000000000	000000000	000000	00000	00000	00000	00000	00000	00000
DELETE BACKUPS	0000293	00000000	000000000	000000000	000000000	000293	00000	00000	00002	00000	00000	00000
<b>Recover</b>												
BACKUP - PRIMARY	0000000	000000000	000000000	000000000	000000000	000000	00000	00000	00000	00000	00000	00000
<b>Recycle</b>												
BACKUP - SPILL	0000000	00000000	00000000	00000000	00000000	000000	00000	00000	00000	00000	00000	00000
MIG L2 - MIG L2	0000000	00000000	00000000	00000000	00000000	000000	00000	00000	00000	00000	00000	00000

DAILY STATISTICS REPORT FOR 02/08/20

STARTUPS=003, SHUTDOWNS=002, ABENDS=000, WORK ELEMENTS PROCESSED=000105, BKUP VOL RECYCLED=00000, MIG VOL RECYCLED=00000  
 DATA SET MIGRATIONS BY VOLUME REQUEST= 0000012, DATA SET MIGRATIONS BY DATA SET REQUEST= 00000, BACKUP REQUESTS= 0000723  
 EXTENT REDUCTIONS= 0000000 RECALL MOUNTS AVOIDED= 00028 RECOVER MOUNTS AVOIDED= 00000  
 FULL VOLUME DUMPS= 000023 REQUESTED, 00000 FAILED; DUMP COPIES= 000023 REQUESTED, 00000 FAILED  
 FULL VOLUME RESTORES= 000000 REQUESTED, 00000 FAILED; DATASET RESTORES= 000000 REQUESTED, 00000 FAILED  
 ABACKUPS= 00000 REQUESTED,00000 FAILED; EXTRA ABACKUP MOUNTS=00000  
 DATA SET MIGRATIONS BY RECONNECTION = 0000000, NUMBER OF TRACKS RECONNECTED TO TAPE = 00000000  
 FAST REPPLICATION VOLUME BACKUP = 000000012 REQUESTED, 0000000 FAILED  
 FAST REPPLICATION VOLUME RECOVER = 00000000 REQUESTED, 0000000 FAILED

HSM FUNCTION	NUMBER DATASETS	-----READ-----	-----WRITTEN-----	-----REQUESTS-----	SYSTEM	USER	FAILED	AGE	AVGQUEUED	AVGWAIT	PROCESSTOTAL
<b>Migration</b>											
PRIMARY - LEVEL 1	0000006	00000050	000001838K	00000046	000001846K	000006	00000	00000	00004	0001	00000
SUBSEQUENT MIGS	0000000	00000000	000000000	000000000	000000000	000000	00000	00000	00000	00000	00000
PRIMARY - LEVEL 2	0000006	00003810	000124905K	00000000	000124992K	000008	00000	00002	00004	0000	00000
<b>Recall</b>											
LEVEL 1 - PRIMARY	0000002	00001059	000044410K	00002496	000044396K	000000	00002	00000	00001	0000	00000
LEVEL 2 - PRIMARY	00000061	00000000	004880544K	00139930	004878598K	000000	00068	00007	00025	0354	00055
<b>Delete</b>											
MIGRATE DATA SETS	0000017	00000118	000000000	000000000	000000000	000000	00017	00000	00298	0000	00000
PRIMARY DATA SETS	0000005	00000645	000000000	000000000	000000000	000567	00047	00609	00007	0000	00000
<b>Backup</b>											
DAILY BACKUP	0000723	00383775	017124106K	00000000	017173664K	001170	00000	00447	00029	0000	00003
SUBSEQUENT BACKUP	0000000	00000000	000000000	000000000	000000000	000000	00000	00000	00000	00000	00000
DELETE BACKUPS	0001764	00000000	000000000	000000000	000000000	001764	00000	00025	00175	0000	00000
<b>Recover</b>											
BACKUP - PRIMARY	0000000	00000000	000000000	000000000	000000000	000000	00000	00000	00000	00000	00000
<b>Recycle</b>											
BACKUP - SPILL	0000000	00000000	000000000	000000000	000000000	000000	00000	00000	00000	00000	00000
MIG L2 - MIG L2	0000000	00000000	000000000	000000000	000000000	000000	00000	00000	00000	00000	00000

Figure 57. Sample Report of Daily Statistics by Function

## Requesting a Report of the Volume Statistics for All Functions

You specify REPORT VOLUMES to get a report of the volume statistics for all volumes managed by DFSMShsm. You specify VOLUMES with a volume serial number to get a statistics report for a specific volume.

**Note:** REPORT VOLUMES shows only the last full-volume dump and full-volume restore of each source volume for each day. It will not show multiple dumps or restores of a given source volume on a given day. To find out the total number of full-volume dumps and full-volume restores on a given day, issue the REPORT DAILY command.

Table 30 contains the volume statistics report for all the functions.

*Table 30. Headings of Output When You Request a Volume Statistics Report*

Line Number	Volume Statistics Output Heading	Description
1	VOLUME STATISTICS REPORT FOR VOLUME volser FOR YY/MM/DD	When you specify REPORT VOLUMES, this line contains todays date. When you specify REPORT VOLUMES FROMDATE(yyyy/mm/dd) TODATE(yyyy/mm/dd), this line contains the first date you specify. DFSMShsm reports all volume statistics for the first date, then reports the volume statistics for the second day, and so forth. This line also shows the volume serial number of the volume whose statistics are being reported.
2	UNIT TYPE= unitype	This field shows the type of unit where the volume is mounted. <b>Note:</b> These fields will have 'U' to represent an L0 non-DFSMShsm volume.
2	HSM VOLUME TYPE= voltype	This field shows the type of volume whose statistics are being reported. The types of volumes are: PRIMARY, ML1, ML2, DAILY, SPILL and BACKUP.
3	MIGRATED DATA SETS BY VOLUME REQUEST= xxxx	This field shows how many data sets were processed during automatic and command volume migration.
3	DATA SET MIGRATIONS BY DATA SET REQUEST= xxxx	This field shows how many data sets were processed by the DATASETNAME PARAMETER of the MIGRATE command.
3	DATA SETS ON VOLUME= xxxxx	This field contains the number of non-VSAM data sets that DFSMShsm has processed. When DFSMShsm generates a report for primary volumes, this field contains N/A. This field also contains N/A for the summary reports.
4	MINIMUM AGE= xxx	This field contains the age of the youngest data set that migrated from the volume the last time DFSMShsm did volume migration.
4	TOTAL TRACKS= xxxxxxxx	This field shows the total number of allocated tracks on the volume as of the last free space check prior to the creation of this VSR.
4	FREE TRACKS= xxxxxxxx	This field shows the total number of free tracks available for allocation for new data sets other than suballocated VSAM data sets. This value is accurate as of the last free space check prior to the creation of this VSR.
4	FRAGMENT INDEX= xxx	This field shows the fragmentation index for the volume.

Table 30. Headings of Output When You Request a Volume Statistics Report (continued)

Line Number	Volume Statistics Output Heading	Description
5	VOLUME DUMP= xxxxxxxx;	This field shows the status of the volume dump. The status xxxxxxxx may be one of the following: <ul style="list-style-type: none"> <li>• DONE</li> <li>• NOT DONE</li> <li>• FAILED</li> </ul>
5	DUMP COPIES=xxx REQUESTED	This field shows the number of dump copies requested.
5	FAILED=xxx	This field shows the number of dump copies that failed. <b>Note:</b> You get this version of line 3 only when you issue the command REPORT VOLUMES FUNCTION BACKUP.
6	VOLUME RESTORE= xxxxxxxx;	This field shows the status of the volume restore. The status xxxxxxxx may be one of the following: <ul style="list-style-type: none"> <li>• DONE</li> <li>• NOT DONE</li> <li>• FAILED</li> </ul>
6	DATASET RESTORES = xxxxx REQUESTED	This field shows the number of data sets requested to be restored.
6	FAILED=xxxxxx	This field shows the number of data sets that failed restoration. <b>Note:</b> You get this version of line 6 only when you issue the command REPORT VOLUMES FUNCTION RECOVER.
7	DATA SET MIGRATIONS BY RECONNECTION=xxxx	This field shows the number of data sets reconnected.
7	NUMBER OF TRACKS RECONNECTED TO TAPE=xxxx	This field shows the number of tracks on level 0 volumes that were freed by reconnection.
8	FAST REPLICATION BACKUP=xxxx REQUESTED, xxxx FAILED	This field shows the number of times that a fast replication backup was attempted for the volume and the number of failed attempts for that volume.
9	FAST REPLICATION RECOVER=xxxx REQUESTED, xxxx FAILED	This field shows the number of times that a fast replication recovery was attempted for the volume and the number of failed attempts for that volume.

Table 30. Headings of Output When You Request a Volume Statistics Report (continued)

Line Number	Volume Statistics Output Heading	Description
10 and 11	HSM FUNCTION	<p>This field contains the names of the functions DFSMShsm processed. When you specify REPORT VOLUMES FUNCTION, DFSMShsm reports the volume statistics in the following order:</p> <ol style="list-style-type: none"> <li>1. MIGRATION           <p>The category SUBSEQUENT MIGS reflects all movement of data sets from ML1 to ML1, ML1 to ML2, and ML2 to ML2. This includes FREEVOL moves but does not include RECYCLE moves. The PRIMARY to LEVEL2 category includes data set migrations by reconnection.</p> </li> <li>2. RECALL</li> <li>3. DELETE           <p>Deletion of migrated data sets include only those deleted by the DELETEBYAGE (DBA) or DELETEBACKEDUP (DBU) functions from migration volumes, generation data sets that have been rolled-off from migration volumes, and migrated data sets that have expired by date or MCLASS attributes.</p> <p>Deletion of primary data sets include only those deleted by the DELETEBYAGE (DBA) or DELETEBACKEDUP (DBU) functions, generation data sets that have been rolled-off from primary volumes, and primary data sets that have expired by date or MCLASS attributes.</p> <p>The DBA and DBU functions apply only to non-SMS data sets.</p> </li> <li>4. BACKUP           <p>SUBSEQUENT BACKUP results from command backup, daily backup, FREEVOL processing and is the combined total of the following:</p> <ul style="list-style-type: none"> <li>• Data sets moved from backup volumes to spill volumes</li> <li>• Data sets moved from ML1 volumes to backup volumes</li> </ul> <p>DELETE BACKUP results from command backup, daily backup, BDELETE and EXPIREBV processing and is the combined total of the following:</p> <ul style="list-style-type: none"> <li>• Backup volumes deleted after DFSMShsm processes the EXPIREBV command</li> <li>• Deletion of excessive incremental backups</li> <li>• Data sets deleted after DFSMShsm processes the BDELETE command</li> </ul> </li> <li>5. RECOVER</li> <li>6. RECYCLE</li> </ol> <p>You can also choose to ask DFSMShsm to report statistics for specific DFSMShsm functions. For example, when you specify REPORT VOLUME FUNCTION RECOVER, DFSMShsm prints a volume statistics report of the number of data sets DFSMShsm recovered during the time period you specified.</p> <p><b>Note:</b> MIGRATION and RECALL statistics do not include amounts for extent reductions.</p>
10 and 11	NUMBER DATASETS	This field shows how many data sets DFSMShsm processed for each function.

*Table 30. Headings of Output When You Request a Volume Statistics Report (continued)*

Line Number	Volume Statistics Output Heading	Description
10 and 11	----READ---- TRK/BLK K-BYTES	This field is not applicable.
10 and 11	----WRITTEN---- TRK/BLK K-BYTES	This field is not applicable.
10 and 11	----REQUESTS---- SYSTEM USER FAILED	This field shows how many requests came from DFSMShsm during its automatic processing, how many came from the user, and how many of the total requests failed.
10 and 11	AVERAGE AGE	This field contains the average age of the data sets that each function processed. For the MIGRATION and DELETE functions, this is the age of the average data set since it was last referred to. It is calculated by subtracting the date last referred to from the age of migration and dividing the result by the total amount of data sets processed. For the RECALL function, this age is how long the average data set has been migrated. For the BACKUP, SPILL, and RECOVER functions, this age is the last time DFSMShsm made a backup version of the data set. The average age does not apply to the RECYCLE function.
10 and 11	AVERAGE TIME QUEUED WAIT PROCESS TOTAL	This field shows the average time in seconds that the request for each data set was waiting to be processed, the time spent allocating and opening each data set, and the time spent processing each data set. TOTAL shows the average time it took DFSMShsm to process each data set request.

If you specify the FROMDATE and TODATE parameters, DFSMShsm prints a summary of all the volume statistics after it prints the volume statistics for each day you specified. If you have requested statistics for specified functions, the report contains statistics for only those functions.

Figure 58 is a sample of a volume statistics report you get when you specify  
REPORT VOLUMES FUNCTION FROMDATE(2002/08/16)  
TODATE(2002/08/175). Therefore, you have the volume statistics for all volumes  
for each day and then you have a summary report for two days.

--DFSMSHSM STATISTICS REPORT ----- AT 15:10:12 ON 2002/08/20 FOR SYSTEM=MVS4

VOLUME STATISTICS REPORT FOR VOLUME MIG410 FOR 02/08/16

UNIT TYPE = 3390 , HSM VOLUME TYPE = LEVEL 1  
MIGRATED DATA SETS BY VOLUME REQUEST=000000, DATA SET MIGRATIONS BY DATA SET REQUEST=000045, DATA SETS PROCESSED=0000216  
MINIMUM AGE = 000, TOTAL TRACKS = 00056381, FREE TRACKS = 00057619, FRAGMENT INDEX = .021  
VOLUME DUMP= NOT DONE; DUMP COPIES=000000 REQUESTED, FAILED=000000  
VOLUME RESTORE= NOT DONE; DATASET RESTORES=000000 REQUESTED, FAILED=000000  
DATA SET MIGRATIONS BY RECONNECTION = 000000 , NUMBER OF TRACKS RECONNECTED TO TAPE =00000000  
FAST REPPLICATION BACKUP = 00001 REQUESTED, 00000 FAILED  
FAST REPPLICATION RECOVER = 00000 REQUESTED, 00000 FAILED

HSM FUNCTION	NUMBER DATASETS	-----READ----- TRK/BLK	K-BYTES	-----WRITTEN----- TRK/BLK	K-BYTES	-----REQUESTS---- SYSTEM USER FAILED	AVERAGE AGE	-----AVERAGE TIME----- QUEUED WAIT PROCESS TOTAL
<b>MIGRATION</b>								
PRIMARY - LEVEL 1	0000045	00000000	0000000000	00006687	000279848	000000 00045 00000	00000 0005 00001	00001 00001 00007
SUBSEQUENT MIGS	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
PRIMARY - LEVEL 2	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>RECALL</b>								
LEVEL 1 - PRIMARY	0000125	00018700	000782550	00000000	0000000000	000000 00125 00000	00000 0000 00000	00000 00002 00002
LEVEL 2 - PRIMARY	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>DELETE</b>								
MIGRATE DATA SETS	0000046	00006746	000279848	00000000	0000000000	000000 00046 00000	00000 0000 00000	00000 00000 00000
PRIMARY DATA SETS	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>BACKUP</b>								
DAILY BACKUP	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
SUBSEQUENT BACKUP	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
DELETE BACKUPS	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>RECOVER</b>								
BACKUP - PRIMARY	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>RECycle</b>								
BACKUP - SPILL	0000000	00000000		00000000		000000 00000 00000	00000 0000 00000	00000 00000 00000
MIG L2 - MIG L2	0000000	00000000		00000000		000000 00000 00000	00000 0000 00000	00000 00000 00000

VOLUME STATISTICS REPORT FOR VOLUME MIG410 FOR 02/08/17

UNIT TYPE = 3390 , HSM VOLUME TYPE = LEVEL 1  
MIGRATED DATA SETS BY VOLUME REQUEST=000000, DATA SET MIGRATIONS BY DATA SET REQUEST=000035, DATA SETS PROCESSED=0000155  
MINIMUM AGE = 000, TOTAL TRACKS = 00056749, FREE TRACKS = 00057251, FRAGMENT INDEX = .021  
VOLUME DUMP= NOT DONE; DUMP COPIES=000000 REQUESTED, FAILED=000000  
VOLUME RESTORE= NOT DONE; DATASET RESTORES=000000 REQUESTED, FAILED=000000  
DATA SET MIGRATIONS BY RECONNECTION = 000000 , NUMBER OF TRACKS RECONNECTED TO TAPE =00000000  
FAST REPPLICATION BACKUP = 00001 REQUESTED, 00000 FAILED  
FAST REPPLICATION RECOVER = 00001 REQUESTED, 00000 FAILED

HSM FUNCTION	NUMBER DATASETS	-----READ----- TRK/BLK	K-BYTES	-----WRITTEN----- TRK/BLK	K-BYTES	-----REQUESTS---- SYSTEM USER FAILED	AVERAGE AGE	-----AVERAGE TIME----- QUEUED WAIT PROCESS TOTAL
<b>MIGRATION</b>								
PRIMARY - LEVEL 1	0000035	00000000	0000000000	00004959	000207462	000000 00035 00000	00000 0001 00001	00001 00002 00004
SUBSEQUENT MIGS	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
PRIMARY - LEVEL 2	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>RECALL</b>								
LEVEL 1 - PRIMARY	0000085	00012716	000532134	00000000	0000000000	000000 00085 00000	00000 0000 00000	00000 00002 00002
LEVEL 2 - PRIMARY	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>DELETE</b>								
MIGRATE DATA SETS	0000035	00004959	000207462	00000000	0000000000	000000 00035 00000	00000 0000 00000	00000 00000 00000
PRIMARY DATA SETS	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>BACKUP</b>								
DAILY BACKUP	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
SUBSEQUENT BACKUP	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
DELETE BACKUPS	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>RECOVER</b>								
BACKUP - PRIMARY	0000000	00000000	0000000000	00000000	0000000000	000000 00000 00000	00000 0000 00000	00000 00000 00000
<b>RECycle</b>								
BACKUP - SPILL	0000000	00000000		00000000		000000 00000 00000	00000 0000 00000	00000 00000 00000
MIG L2 - MIG L2	0000000	00000000		00000000		000000 00000 00000	00000 0000 00000	00000 00000 00000

Figure 58. Sample Report of Volume Statistics by Function

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## Requesting a Summary of the Daily or Volume Statistics

You specify REPORT DAILY FUNCTION SUMMARY to get the summary totals of the daily statistics for all functions. You specify REPORT VOLUME FUNCTION SUMMARY to get the summary totals of the volume statistics for all volumes and all functions. You specify the VOLUMES parameter with a volume serial number to get summary statistics for only one volume. If you request a summary of specified functions, the summary contains the statistics totals for only the specified functions.

When you specify SUMMARY, you get only the summary report. If you do not specify SUMMARY, you get the statistics report you requested and a summary at the end of the report if DFSMShsm reports the statistics for more than one day. A sample of the summary statistics report is not shown because the information is in the same format as the summary information shown in Figure 57 on page 642 and Figure 58.

**Note:** For an equivalent time period, it is possible that the number of data sets reported by the REPORT VOLUME command and the number of data sets reported by the REPORT DAILY command will not be the same on the summary page, under the heading “Number Datasets”. Some functions (such as MIGRATION, RECALL, BACKUP, RECOVER, and SPILL) involve two volumes, while other functions do not. As each volume counts each data set action, some data set actions will be counted more than once.



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## Appendix E. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

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### Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

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### Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Vol I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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### z/OS information

z/OS information is accessible using screen readers with the BookServer/Library Server versions of z/OS books in the Internet library at:

[www.ibm.com/servers/eserver/zseries/zos/bkserv/](http://www.ibm.com/servers/eserver/zseries/zos/bkserv/)



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## Programming interface information

This Storage Administration Reference is intended to help customers use standard DFSMShsm commands to operate and customize DFSMShsm to meet their system requirements.

This Storage Administration Reference also documents Diagnosis, Modification or Tuning Information, which is provided to help the customer to do diagnosis, modification or tuning of DFSMShsm.

**Attention:** Do not use this Diagnosis, Modification or Tuning Information as a programming interface.

Diagnosis, Modification or Tuning Information is identified where it occurs by an introductory statement to a chapter or section.

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## Glossary

This glossary defines technical terms and abbreviations used in DFSMShsm documentation. If you do not find the term you are looking for, refer to the index of the appropriate DFSMShsm manual or view *IBM Glossary of Computing Terms*, located at <http://www.ibm.com/ibm/terminology>.

This glossary includes terms and definitions from:

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## Numerics

**3480.** An IBM 3480 Magnetic Tape Subsystem device that is capable of recording data only in the 3480 format.

**3480X.** A 3480 XF device or an IBM 3490 Magnetic Tape Subsystem device that is capable of recording data in either the 3480 format or the 3480 XF (IDRC) format. DFSMShsm can, at the user's option, select either IDRC or non-IDRC recording.

**3490.** An IBM 3490 Magnetic Tape Subsystem device that records data in the 3480-2 XF format. DFSMShsm always requests IDRC recording.

**3490E.** See 3490.

**3590.** An IBM TotalStorage Enterprise Tape Drive 3590 that operates as a 3590-B1x. See 3590-B1x, 3590-E1x and 3590-H1x.

**3590B1x.** An IBM TotalStorage Enterprise Tape Drive 3590 Model B1x that uses the 3590 High Performance Cartridge, writes in 128-track format, and can emulate the 3490 Magnetic Tape Subsystem.

**3590E1x.** An IBM TotalStorage Enterprise Tape Drive 3590 Model E1x that uses the 3590 High Performance Cartridge, can read 128- or 256-track format tapes, and writes in 256-track format. This drive emulates either the IBM 3490 magnetic tape drive or the IBM TotalStorage Enterprise Tape Drive 3590 Model B1x.

**3590H1x.** An IBM TotalStorage Enterprise Tape Drive 3590 Model H1x that uses the 3590 High Performance Cartridge, can read 128-, 256-, or 384-track format tapes, and writes in 384-track format. This drive emulates either the IBM 3490 magnetic tape drive or the IBM TotalStorage Enterprise Tape Drive 3590 Model B1x or Model E1x.

**3592J1A.** IBM TotalStorage Enterprise Tape Drive 3592 that uses the 3592 Enterprise Tape Cartridge and writes in enterprise format 1 (EFMT1). This drive emulates either the IBM 3490 magnetic tape drive or the IBM Total Storage Enterprise Tape Drive 3590 Model B1x.

## A

**ABARS.** Aggregate backup and recovery support.

**ABEND.** Abnormal end.

**ABR.** Aggregate backup and recovery record.

**ACB.** Access control block.

**accompany data set.** In aggregate backup and recovery processing, a data set that is physically transported from the backup site to the recovery site instead of being copied to the aggregate data tape. It is cataloged during recovery.

**ACCOMPANY keyword.** The keyword used in the selection data set to create an accompany list.

**accompany list.** An optional list in the selection data set that identifies the accompany data sets.

**ACEE.** Access control environment element.

**ACS.** Automatic class selection.

**active data.** Data that is frequently accessed by users and that resides on level 0 volumes.

**activity log.** In DFSMShsm, a SYSOUT or DASD-type data set used to record activity and errors that occurred during DFSMShsm processing.

**AG.** Aggregate group.

**aggregate backup.** The process of copying the data sets and control information of a user-defined group of data sets so that they may be recovered later as an entity by an aggregate recovery process.

**aggregate data sets.** In aggregate backup and recovery processing, data sets that have been defined in an aggregate group as being related.

**aggregate group.** A Storage Management Subsystem class that defines control information and identifies the data sets to be backed up by a specific aggregate backup.

**aggregate recovery.** The process of recovering a user-defined group of data sets that were backed up by aggregate backup.

**AIX.** Alternate index.

**allocate data set.** In aggregate backup and recovery processing, a data set name that is listed in the selection data set. The space for this data set is allocated and the data set is cataloged at the recovery location, but the actual data is not restored.

**ALLOCATE keyword.** The keyword used in the selection data set to create an allocate list.

**allocate list.** An optional list in the selection data set that identifies the allocate data sets.

**alternate index.** In systems with VSAM, a collection of index entries related to a given base cluster and organized by an alternate key, that is, a key other than the prime key of the associated base cluster data records. Its function is to provide an alternate directory for locating records in the data component of a base cluster. See also *path*.

**alternate index cluster.** In VSAM, the data and index components of an alternate index.

**alternate tape volume reference.** In DFSMShsm, additional fields in the TTOC record that record information about the alternate tape volume. These fields provide DFSMShsm with the necessary information to refer to the alternate tape volume.

**alternate tape volumes.** In DFSMShsm, copies of original tape volumes created during tape copy processing. The volumes can either be stored on-site or off-site for use later in the event of a disaster. During the tape replace processing, these volumes can replace the original volumes that may be lost.

**APAR.** Authorized program analysis report.

**APF.** Authorized program facility.

**ASID.** Address space identifier.

**ATL.** Automated tape library.

**audit.** A DFSMShsm process that detects discrepancies between data set information in the VTOCs, the computing system catalog, the MCDS, BCDS, and OCDS.

**AUTH.** The DFSMShsm command used to identify an authorized user who can issue DFSMShsm system programmer and storage administrator commands.

**authorized user.** In DFSMShsm, the person or persons who are authorized through the DFSMShsm AUTH command to issue DFSMShsm system programmer, storage administrator, and operator commands.

**automated tape library.** A device consisting of robotic components, cartridge storage frames, tape subsystems, and controlling hardware and software, together with the set of volumes which reside in the library and may be mounted on the library tape drives.

**automatic backup.** In DFSMShsm, the process of automatically copying eligible data sets from DFSMShsm-managed volumes or migration volumes to backup volumes during a specified backup cycle.

**automatic cartridge loader feature.** A feature of the 3480 Magnetic Tape Subsystem providing the operator with the capability of preloading multiple tapes to be used as migration, backup, or dump tapes.

**automatic class selection (ACS).** A mechanism for assigning SMS classes and storage groups.

**automatic dump.** In DFSMShsm, the process of using DFSMSdss to automatically do a full volume dump of all allocated space on DFSMShsm-managed volumes to designated tape dump volumes.

**automatic interval migration.** In DFSMShsm, automatic migration that occurs periodically when a threshold level of occupancy is reached or exceeded on a DFSMShsm-managed volume during a specified time interval. Data sets are moved from the volume, largest eligible data set first, until the low threshold of occupancy is reached.

**automatic primary space management.** In DFSMShsm, the process of automatically deleting expired data sets, deleting temporary data sets, releasing unused overallocated space, and migrating data sets from DFSMShsm-managed volumes.

**automatic secondary space management.** In DFSMShsm, the process of automatically deleting expired migrated data sets from the migration volumes, deleting expired records from the migration control data set, and migrating eligible data sets from level 1 volumes to level 2 volumes.

**automatic space management.** In DFSMShsm, includes automatic volume space management, automatic secondary space management, and automatic recall.

**automatic volume space management.** In DFSMShsm, includes automatic primary space management and automatic interval migration.

**availability management.** In DFSMShsm, the process of ensuring that a current version (backup copy) of the installation's data sets resides on tape or DASD.

## B

**backup.** In DFSMShsm, the process of copying a data set residing on a level 0 volume, a level 1 volume, or a volume not managed by DFSMShsm to a backup volume. See *automatic backup*, *incremental backup*.

**backup control data set (BCDS).** A VSAM, key-sequenced data set that contains information about backup versions of data sets, backup volumes, dump volumes, and volumes under control of the backup and dump functions of DFSMShsm.

**backup copy.** In DFSMShsm, a copy of a data set that is kept for reference in case the original data set is destroyed.

**backup cycle.** In DFSMShsm, a period of days for which a pattern is used to specify the days in the cycle on which automatic backup is scheduled to take place.

**backup frequency.** In DFSMShsm, the number of days that must elapse since the last backup version of a data set was made until a changed data set is again eligible for backup.

**backup profile.** In DFSMShsm, a RACF discrete data set profile associated with the backup version of a cataloged data set that is protected by a RACF discrete data set profile.

**backup version.** Synonym for backup copy.

**backup volume.** A volume managed by DFSMShsm to which backup versions of data sets are written.

**backup volume cleanup process.** A DFSMShsm process that scratches data set backup versions that are no longer needed on DASD.

**backup VTOC copy data set.** In DFSMShsm, a copy of the VTOC of a volume that was backed up by DFSMShsm. This VTOC data set contains only part of the data set VTOC entry for each data set from the original data set. This data set is written on a migration level 1 volume.

**base cluster.** In systems with VSAM, a key-sequenced or entry-sequenced file over which one or more alternate indexes are built. See also *cluster*.

**base data component.** In VSAM, a component of the base cluster containing data of a data set.

**base sysplex.** A base (or basic) sysplex is the set of one or more MVS systems that is given a cross-system coupling facility (XCF) name and in which the authorized programs can then use XCF coupling services. A base system does not include a coupling facility. See also *parallel sysplex* and *sysplex*.

**basic format.** The format of a data set that has a data set name type (DSNTYPE) of BASIC. A basic format data set is a sequential data set that is specified to be neither large format nor extended format. The size of a basic format data set cannot exceed 65 535 tracks on each volume.

**BCDS.** Backup control data set.

**BCR.** Backup control record.

**BDAM.** Basic direct access method.

**BSAM.** Basic sequential access method.

**BVR.** Backup cycle volume record.

## C

**catalog.** (1) A directory of files and libraries, with reference to their locations. A catalog may contain other information such as the types of devices in which the files are stored, passwords, blocking factors. (A) (ISO) (2) To enter information about a file or a library into a catalog. (A) (ISO) (3) The collection of all data set indexes that are used by the control program to locate a volume containing a specific data set. (4) To include the volume identification of a data set in the catalog. (5) See *VSAM master catalog*, *VSAM user catalog*.

**CDD.** Common data set descriptor record.

**CDS.** Control data set.

**CDSQ serialization.** A technique that serializes DFSMShsm CDSs with a global enqueue product (such as GRS).

**CDSR serialization.** A technique that serializes DFSMShsm CDSs with volume reserves.

**CDT.** Class descriptor table.

**CF.** Coupling facility.

**changed data set.** In DFSMShsm, a data set that has been opened for other than read-only access.

**CLIST.** Command list.

**cluster.** In systems with VSAM, a named structure consisting of a group of related components, for example, a data component with its index component. See also *base cluster*.

**command list.** A command procedure containing executable sequences of TSO commands, subcommands, and command procedure statements.

**command procedure.** In TSO, a data set or a member of a partitioned data set containing TSO commands to be performed sequentially by the EXEC command. See also *command list*.

**common data set descriptor record.** The record that precedes a user's data set on a DFMSHsm-owned volume and that is used to return the data set to the user's format.

**common filter services.** A subcomponent of DFP common services. Common filter services compares data items with filter keys and indicates which data items match the keys and how many matches have been found.

**common recall queue (CRQ).** A single recall queue shared by multiple DFMSHsm hosts that enables the recall workload to be balanced across each of those hosts.

**common service area (CSA).** In OS/VS2, a part of the common area that contains data areas addressable by all address spaces, but protected during its use by the key of the requester.

**compaction.** In DFMSHsm, a method of compressing and encoding data that is migrated or backed up.

**comprehensive command authority.** In DFMSHsm, allowing a user to issue the ABACKUP command for all aggregate groups.

**compress.** In DFMSHsm, to release unused space in a partitioned data set during the migrate/recall and backup/recovery processes.

**computing system catalog.** In DFMSHsm, the master catalog and any associated user catalogs used as sources during the audit process.

**concurrent copy.** A function to increase the accessibility of data by enabling you to make a consistent backup or copy of data concurrent with the usual application program processing.

**connected set.** A group of tapes volumes that are related to each other because one or more data sets span the physical tape volumes. Or, a single tape volume with a data set or data sets that do not span to any other volumes.

**contiguous space.** An unbroken consecutive series of storage locations.

**control data set.** In DFMSHsm, one of three data sets (BCDS, MCDS, and OCDS) that contain records used in DFMSHsm processing.

**control file.** In aggregate backup and recovery processing, one of three aggregate files generated by the aggregate backup process. It contains the catalog, allocation, volume, and related information necessary to perform aggregate recovery.

**converter/interpreter processing.** The job segment that converts and interprets JCL for MVS.

**copy pool.** A named set of storage groups that contains data to be copied and recovered collectively.

**copy pool backup storage group.** A type of SMS storage group that contains all of the volumes that DFMSHsm might select as the target of a fast replication.

**coupling facility.** A special logical partition that provides high-speed caching, list processing, and locking functions in a sysplex.

**cross-system coupling facility (XCF).** A component of MVS that provides functions to support cooperation between authorized programs running within a sysplex.

**CRQ.** Common recall queue.

**CRQplex.** One or more DFMSHsm hosts that are connected to the same CRQ. There may be multiple CRQplexes within a single HSMplex.

**CSA.** Common service area.

**CSECT.** Control section.

**CTC.** Channel-to-channel.

**current backup version.** In DFMSHsm, a backup copy of the data set that was created on a date after the data set was last updated.

**CVT.** Communications vector table.

**cycle start date.** In DFMSHsm, the date a backup cycle, dump cycle, or migration cleanup cycle is started.

## D

**DADSM.** Direct Access Device Space Management.

**DAE.** Dump analysis elimination.

**daily backup volume.** In DFMSHsm, a volume associated with a given day in the backup cycle and assigned to contain backup versions created on that cycle day.

**DAIR.** Dynamic allocation interface return code.

**DASD.** Direct access storage device.

**DASD calculation services (DCS).** A subcomponent of DFP common services. DCS retrieves and calculates data set information for both VSAM and non-VSAM data sets based on the user's input request.

**data class.** A list of allocation attributes that the system uses for the creation of data sets.

**data control block (DCB).** A control block used by access method routines in storing and retrieving data.

**data file.** In aggregate backup and recovery processing, one of three aggregate files generated by the aggregate backup process. It contains the backup copies of the data sets to be recovered.

**data migration.** See *migration*.

**data set change indicator.** A bit in the Format 1 data set VTOC entry that indicates whether the data set has been opened for output.

**data set deletion.** In DFSMShsm, the space management technique of deleting non-SMS-managed data sets that have not been used for a specified number of days and that do not have expiration date protection.

**data set group.** Data sets that have the same set of initial characters in their names.

**data set organization.** The type of arrangement of data in a data set. Examples are sequential organization or partitioned organization.

**data set pool.** One or more volumes managed by DFSMShsm to which data sets that have migrated can be recalled, depending on the set of initial characters of the data set name.

**data set retirement.** In DFSMShsm, the space management technique of deleting non-SMS-managed data sets that have not been referred to for a specified number of days, and that have a backup version. See also *delete-if-backed-up*.

**date last referred to.** In DFSMShsm, the last date when a data set was opened.

**DBA.** Delete-by-age.

**DBU.** Delete-if-backed-up.

**DCB.** Data control block.

**DCL.** Dump class record.

**DCR.** Dump control record.

**DCS.** DASD calculation services.

**debug mode.** In DFSMShsm, the method of operation that projects the changes that would occur in normal operation but in which no user data moves.

**decompaction.** In DFSMShsm, the process of decoding and expanding data that was compacted during daily space management or backup.

**delete-by-age (DBA).** In DFSMShsm, the space management technique of deleting non-SMS-managed data sets that have not been opened for a specified number of days.

**delete-if-backed-up (DBU).** In DFSMShsm, the space management technique of deleting non-SMS-managed data sets that have not been opened for a specified number of days, and that have a current backup version. See also *data set retirement*.

**demotion.** The process of one host losing level functions to another. Both original and promoted hosts can go through the demotion process. See also *promotion*.

**DFP.** Data Facility Product.

**DFP common services.** A component of DFP that contains three subcomponents: common filter services (CFS), DASD calculation services (DCS), and device information services (DIS).

**DFSMS.** Data Facility Storage Management Subsystem.

**DFSMSdss.** A functional component of DFSMS/MVS used to copy, dump, move, and restore data sets and volumes.

**DFSMShsm.** A functional component of DFSMS/MVS used to manage volumes and data sets.

**DFSMShsm-authorized user.** In DFSMShsm, the person or persons who are authorized through the DFSMShsm AUTH command to issue system programmer and storage administrator commands.

**DFSMShsm log.** In DFSMShsm, a pair of sequential data sets, X and Y, containing a chronological list of transactions and statistics occurring in DFSMShsm.

**DFSMSdfp.** A functional component of DFSMS/MVS used to manage programs, devices, and data.

**DFSMShsm-managed volume.** A volume managed by DFSMShsm containing data sets that are directly accessible to the user.

**DFSMShsm-owned volumes.** Storage volumes on which DFSMShsm stores backup versions, dump copies, or migrated data sets.

**DFSMShsm secondary address space.** A separate address space started and controlled by DFSMShsm to perform aggregate backup or aggregate recovery processing.

**DFSORT.** An IBM licensed program that serves as a high-speed data processing utility. DFSORT provides an efficient and flexible way to handle sorting, merging, copying and reporting operations as well as versatile data manipulation at the record, field and bit level.

**DGN.** Dump generation record.

**direct access storage device (DASD).** A device in which the access time is effectively independent of the location of data.

**directed recall.** Moving a migrated data set from a level 1 or a level 2 volume to a level 0 volume and specifying the target volume and unit name where the data set can be allocated.

**disaster.** An unplanned occurrence that keeps a company or organization from conducting its normal business for some time period.

**disaster backup.** A means to protect a computing system complex against data loss in the event of a disaster.

**disaster recovery.** A means to replace lost data at another location with sufficient resources in order to resume operation.

**discrete backup profile.** A RACF profile created when DFSMShsm backs up a cataloged, RACF-indicated data set.

**discrete profile.** A RACF profile that contains security information about a specific data set on a particular volume.

**disposition processing.** In OS/VS, a function performed by the initiator at the end of a job step to keep, delete, catalog, or uncatalog data sets, or to pass them to a subsequent job step, depending on the data set status of the disposition specified in the DISP parameter of the DD statement.

**Distributed System License Option (DSLO).** A license option available to IBM customers with a basic license that permits them to copy certain IBM-licensed materials for the purpose of installing multiple systems.

**DSLO.** Distributed Systems License Option.

**DSR.** Daily statistics record.

**dump.** See *full volume dump*.

**dump class.** A DFSMShsm-named set of characteristics that describe how volume dumps are managed.

**dump copy.** In DFSMShsm, a copy of the volume image produced by the DFMSDss full volume dump function.

**dump cycle.** In DFSMShsm, a period of days for which a pattern is used to specify the days in the cycle on which automatic full volume dump is scheduled to take place.

**dump generation.** A successful full volume dump of a volume that may contain one to five identical dump copies.

**dump VTOC copy data set.** In DFSMShsm, a copy of the VTOC of a volume dumped by DFSMShsm. This VTOC data set contains only part of the data set VTOC entry for each data set from the original data set. This data set is written on a migration level 1 volume.

**DVL.** Dump volume record.

**DVT.** Device vector table.

## E

**EA.** Extended addressability.

**EBCDIC.** Extended Binary Coded Decimal Interchange Code.

**ECB.** Event control block.

**eligibility age.** The number of days since a data set met its criteria to be migrated.

**emergency mode.** In DFSMShsm, the method of operation that prevents data set movement and deletion in space management, backup, and recovery processes.

**encode.** (T) To convert data by the use of a code in such a manner that reconversion to the original form is possible.

**erase-on-scratch.** A RACF and DFP/XA function that overwrites the space occupied by a data set when the data set is scratched from a DASD device supported by MVS/XA.

**ESDS.** Entry-sequenced data set.

**esoteric unit names.** The names a user assigns to I/O devices that have the same device type. When the user specifies the assigned unit name to DFSMShsm, DFSMShsm associates the unit name to its device type.

**ESTAE.** Extended subtask ABEND exit.

**ESTAI.** Extended subtask ABEND intercept.

**exclude data set.** In aggregate backup and recovery processing, a data set in the selection data set exclude

list. This data set is to be excluded from being processed by aggregate backup.

**EXCLUDE keyword.** The keyword used in the selection data set to create an exclude list.

**exclude list.** An optional list in the selection data set that identifies those data sets that are to be excluded from being processed by aggregate backup.

**expiration.** The removal of a user data set from either a user (non-DFSMShsm-owned) volume, or from a DFSMShsm-owned volume when the user data set has been migrated. If there is an explicit expiration date, it is found in the data set VTOC entry for a nonmigrated data set, or in the MCD record for a migrated data set. If there is no explicit expiration date, the management class attributes are checked to determine an implicit expiration date.

**extended addressability.** A type of extended format VSAM data set that allows greater than 4GB of data storage.

**extended format compressed data set.** A SAM or VSAM data set whose processing detects errors caused by an incomplete transfer of a physical block of data to a physical record in the data set. Each physical record is ended by a “hidden” suffix. SAM or VSAM processing determines, by examining these suffixes, if a data transfer to a physical record has ended prematurely.

**extended remote copy (XRC).** A hardware- and software-based remote copy service option that provides an asynchronous volume copy across storage subsystems for disaster recovery, device migration, and workload migration.

**extent reduction.** In DFSMShsm, the releasing of unused space, reducing the number of extents, and compressing partitioned data sets.

**extents.** A continuous space on a direct access storage volume, occupied by or reserved for a particular data set, data space, or file.

## F

**facility class profile.** A way that RACF protects all DFSMShsm command access. An active RACF facility class establishes the security environment.

**fallback.** Pertaining to returning to use of an earlier release of a program after a later release has been installed and used.

**fast replication.** A general term to describe the functions that create an instant data copy. The Enterprise Storage Server FlashCopy function is an example of fast replication.

**fast replication target volume.** A DFSMShsm-owned volume that contains the fast replication backup copy of a DFSMShsm-managed volume. Fast replication target volumes are contained within SMS copy pool backup storage groups.

**FBA.** Fixed-block architecture.

**FIFO.** First in, first out.

**fixed-block architecture.** Data stored in blocks of fixed size; these blocks are addressed by block number relative to the beginning of the particular file.

**FMID.** Function modification identifier.

**fragmentation index.** The qualitative measure of the scattered free space on a volume.

**FSR.** Functional statistics record.

**full volume dump.** In DFSMShsm, the process of using a DFSMSdss function that backs up the entire allocated space on a volume.

**full volume restore.** In DFSMShsm, the process of using a DFSMSdss function that restores the entire volume image.

**functional statistics record.** A record that is created each time a DFSMShsm function is processed. It contains a log of system activity and is written to the system management facilities (SMF) data set.

**functional verification procedure.** A procedure distributed with DFSMShsm that tests to verify that all basic DFSMShsm functions are working correctly.

## G

**GDG.** Generation data group.

**GDS.** Generation data set.

**general pool.** In a DFSMShsm environment with JES3, the collection of all DFSMShsm primary volumes added to that processor that have a mount status of permanently-resident or reserved, that have the automatic recall attribute specified, and that have a mount attribute of storage or private.

**generation data group.** A collection of data sets with the same base name, such as PAYROLL, that are kept in chronological order. Each data set is called a generation data set.

**generic profile.** A RACF profile that contains security information about multiple data sets, users, or resources that may have similar characteristics and require a similar level of protection.

**global scratch pool.** A group of empty tapes that do not have unique serial numbers and are not known

individually to DFSMShsm. The tapes are not associated with a specific device. Contrast with *specific scratch pools*.

**GRS.** Global resource serialization.

**GRSples.** One or more MVS systems using global serialization to serialize access to shared resources.

**GTF.** Generalized trace facility.

## H

**hardware/software compression facility.** A function for both SAM and VSAM extended format compressed data sets that has the ability to utilize either hardware data compression for best performance, or software data compression for DASD space considerations.

**high threshold of occupancy.** In DFSMShsm, the upper limit of space to be occupied on a volume managed by DFSMShsm. Contrast with *low threshold of occupancy*.

**HMT.** HSM Monitor/Tuner.

**HSMplex.** One or more DFSMShsm hosts that share a set of control data sets. The hosts may be on single or multiple z/OS images.

**ICETOOL.** DFSORT's multipurpose data processing and reporting utility.

**IDRC.** Improved data recording capability.

**improved data recording capability.** An improved data recording mode that, depending on data set characteristics and machine model, may allow a significant increase in effective cartridge data capacity and performance.

**inactive age.** In DFSMShsm, the number of days since the data set was last referred to.

**inactive data.** Copies of active or low-activity data that reside on DFSMShsm-owned dump and incremental backup volumes. See also *low-activity data*.

**include data set.** In aggregate backup and recovery processing, a data set in the selection data set include list. This data set is processed by aggregate backup.

**INCLUDE keyword.** The keyword used in the selection data set to create an include list.

**include list.** In the selection data set, the list of include data sets that are to be processed by aggregate backup.

**incremental backup.** In DFSMShsm, the process of copying a data set that has been opened for other than

read-only access since the last backup version was created, and that has met the backup frequency criteria.

**incremental recovery.** Recovery of the latest backup copy of a data set or data sets made by incremental backup.

**inline backup.** The process of copying a specific data set to a migration level 1 volume from a batch environment. This process allows you to back up data sets in the middle of a job.

**installation verification procedure (IVP).** A procedure distributed with DFSMShsm that tests to verify that the basic facilities of DFSMShsm are functioning correctly.

**installation exit.** A means specified by an IBM software product by which a customer's system programmers may modify or extend the functions of the IBM software product. Such modifications or extensions consist of exit routines written to replace an existing module of an IBM software product, or to add one or more modules or subroutines to an IBM software product for the purpose of modifying the functions of the IBM software product.

**instruction data set.** In aggregate backup and recovery processing, a data set that contains instructions, commands, or any data the aggregate backup site defines as needed for aggregate recovery at the recovery site.

**instruction file.** In aggregate backup and recovery processing, one of three aggregate files generated by the aggregate backup process. It contains the instruction data set.

**Interactive Storage Management Facility (ISMF).** The interactive panels of DFSMSdfp that allow users and storage administrators access to the storage management functions of DFSMSdss and DFSMShsm.

**Interactive System Productivity Facility (ISPF).** An IBM licensed program used to develop, test, and run application programs interactively. ISPF is the interactive access method for all storage management functions.

**interval migration.** In DFSMShsm, automatic migration that occurs periodically when a threshold level of occupancy is reached or exceeded on a DFSMShsm-managed volume during a specified time interval. Data sets are moved from the volume, largest eligible data set first, until the low threshold of occupancy is reached.

**IPCS.** Interactive problem control system.

**ISMF.** Interactive Storage Management Facility.

**ISPF.** Interactive System Productivity Facility.

**ISPF/PDF.** Interactive System Productivity Facility/Program Development Facility.

**IVP.** Installation verification procedure.

## J

**JCL.** Job control language.

**JES.** Job entry subsystem.

**JES2.** Job entry subsystem 2.

**JES3.** Job entry subsystem 3.

**JFCB.** Job file control block.

**journal data set.** In DFMSHsm, a sequential data set used by DFMSHsm for recovery of the MCDS, BCDS, and OCDS. The journal contains a duplicate of each record in the control data sets that has changed since the MCDS, BCDS, and OCDS were last backed up.

## K

**KB.** Kilobyte; 1024 bytes.

**key-range data set.** A key-sequenced data set that is defined with one or more KEYRANGE groups.

**KSDS.** Key-sequenced data set.

## L

**L2CR.** Migration level-2 control record.

**large format.** The format of a data set that has a data set name type (DSNTYPE) of LARGE. A large format data set has the same characteristics as a sequential (non-extended format) data set, but its size on each volume can exceed 65 535 tracks. There is no minimum size requirement for a large format data set.

**LE.** Logical end.

**level functions.** (1) Functions that must be performed but need be performed by only one processing unit. Level functions include backing up the control data sets, backing up migrated data sets, deleting expired dump copies, moving backup versions from level 1 volumes to backup volumes, migration cleanup and level-1-to-level-2 migration. (2) See *primary-processing-unit functions*.

**level 0 volume.** A volume that contains data sets directly accessible by the user. The volume may be either DFMSHsm-managed or non-DFMSHsm-managed.

**level 1 volume.** A volume owned by DFMSHsm containing data sets that migrated from a level 0 volume.

**level 2 volume.** A volume under control of DFMSHsm containing data sets that migrated from a level 0 volume, from a level 1 volume, or from a volume not managed by DFMSHsm.

**like device.** Pertaining to (DASD) devices with identical geometry: that is, the same number of bytes per track, the same number of tracks per cylinder, and the same number of cylinders per actuator.

**linear data set.** In VSAM, a named linear string of data, stored in such a way that it can be retrieved or updated in 4096-byte units.

**logical end (LE).** Signifies that a concurrent copy environment has been successfully initialized. After logical end, the data is again available for unrestricted application access. Actual movement of data begins after logical end. Contrast with *physical end*.

**low-activity data.** Data that is infrequently accessed by users and is eligible to be moved or has been moved to DFMSHsm-owned migration volumes.

**low threshold of occupancy.** The lower limit of space to be occupied on a volume managed by DFMSHsm. Contrast with *high threshold of occupancy*.

## M

**managed volume.** See *DFMSHsm-managed volume* and *primary volume*.

**management class.** A list of data set migration, backup, and retention attributes that DFMSHsm uses to manage storage at the data set level.

**management work element (MWE).** A control block containing the necessary information to direct DFMSHsm functions.

**manual tape library.** A set of tape drives defined as a logical unit by the installation together with the set of system-managed volumes which may be mounted on those drives.

**master catalog.** A key-sequenced data set or file with an index containing extensive data set and volume information that VSAM requires to locate data sets or files, to allocate and deallocate storage space, to verify the authorization of a program or operator to gain access to a data set or file, and to accumulate usage statistics for data sets or files.

**MB.** Megabyte; 1 048 576 bytes.

**MC1.** Migration level-1 free space record.

**MCA.** Migration control data set alias entry record.

**MCB.** BCDS data set record.

**MCC.** Backup version record.

**MCD.** MCDS data set record.

**MCDS.** Migration control data set.

**MCL.** Backup CDS backup changed migrated data set record.

**MCM.** Backup CDS move backup version record.

**MCO.** Migrated CDS VSAM associations record.

**MCP.** Eligible volume record.

**MCR.** Management control record.

**MCT.** Backup volume record.

**MCU.** Migration CDS user record.

**MCV.** Primary and migration volume record.

**MCVT.** Management communication vector table.

**MHCR.** Multiple-processing-unit control record.

**migration.** In DFSMShsm, the process of moving a cataloged data set from a DFSMShsm-managed volume to a migration level 1 or migration level 2 volume, from a migration level 1 volume to a migration level 2 volume, or from a volume not managed by DFSMShsm to a migration level 1 or migration level 2 volume.

**migration cleanup.** In DFSMShsm, a process of automatic secondary space management that deletes unnecessary records or migration copies.

**migration control data set (MCDS).** A VSAM, key-sequenced data set that contains statistics records, control records, user records, records for data sets that have migrated, and records for volumes under migration control of DFSMShsm.

**migration level 1 volume.** Level 1 volume.

**migration level 2 volume.** Level 2 volume.

**migration volume.** A volume, under control of DFSMShsm, that contains migrated data sets.

**minimal discrete profile.** A profile with no access list or model profile. The minimal discrete profile is used when recovering a RACF-indicated data set whose original profile or backup profile no longer exists.

**minimum migration age.** In DFSMShsm, the number of days a data set must remain unopened before DFSMShsm can select it to migrate from a volume.

**MIPS.** Million instructions per second.

**ML1.** Migration level 1. Synonym for level 1 volume.

**ML2.** Migration level 2. Synonym for level 2 volume.

**model entity.** A model data set name that defines a discrete data set profile for RACF protection.

**MSS.** Mass Storage System.

**MTL.** Manual tape library.

**multicluster, key-range control data set.** A control data set (MCDS or BCDS) that is represented by two or more key-sequenced data set (KSDS) clusters. Each cluster is a single key range. Contrast with *single-cluster, key range control data set*.

**multiple-file format.** In DFSMShsm, a 3480 tape format, or the equivalent, that requires a unique standard label data set for each user data set written. When DFSMShsm writes in multiple-file format, it writes one tape data set for every user data set to all 3480 migration and backup volumes.

**multiple DFSMShsm-host environment.** Any environment in which two or more DFSMShsm hosts share a common set of control data sets.

**mutually exclusive parameters.** A set of parameters of which only one can be used. If more than one parameter is specified, only the last parameter specified is used.

**MVS/Enterprise Systems Architecture (MVS/ESA).** An MVS operating system environment that supports accessing of virtual storage in multiple address spaces and data spaces.

**MVS/ESA.** MVS/Enterprise Systems Architecture.

**MVS/Extended Architecture (MVS/XA).** An MVS operating system environment that supports 31-bit real and virtual storage addressing, increasing the size of addressable real and virtual storage from 16 megabytes to 2 gigabytes.

**MVS/SP™.** An IBM licensed program used to control the MVS operating system and to establish a base for an MVS/XA or MVS/370 environment.

**MVT.** Mounted volume table.

**MWE.** Management work element.

## N

**non-DFSMShsm-managed volume.** A volume not defined to DFSMShsm containing data sets that are directly accessible to users.

## O

**OCDS.** Offline control data set.

**O/C/EOV.** Open/close/end-of-volume.

**OCO.** Object code only.

**offline control data set (OCDS).** In DFSMShsm, a VSAM, key-sequenced data set that contains information about tape backup volumes and tape migration level 2 volumes.

**online.** (1) Pertaining to the operation of a functional unit when under the direct control of a computer. (A) (ISO) (2) Pertaining to a user's ability to interact with a computer. (A) (3) Pertaining to a user's access to a computer via a terminal. (A) (4) Controlled by, or communicating with, a computer.

**original tape volume.** In DFSMShsm, a 3480 or 3490 single-file tape volume, or the equivalent, used to store data during migration or backup processing, and from which a copy (called the alternate volume) is made for disaster recovery.

**OS/VS2.** A virtual storage operating system that is an extension of OS/MVT.

**owned space.** The storage space on a set of volumes to which DFSMShsm allocates migrated data sets and backup versions, but to which user jobs should not allocate. Included in this set are migration level 1, migration level 2, and backup volumes.

**owned volume.** A volume on which DFSMShsm writes dump, migration, or backup data sets.

## P

**parallel sysplex.** A sysplex with one or more coupling facilities. See also *base sysplex* and *sysplex*.

**partitioned data set (PDS).** A data set in DASD that is divided into partitions, called members, each of which can contain a program, part of a program, or data.

**partitioned data set extended (PDSE).** A DFP library structure that is an enhanced replacement for a partitioned data set.

**path.** (1) (T) In a network, any route between any two nodes. (2) In a data base, a sequence of segment occurrences from the root segment to an individual segment. (3) In VSAM, a named, logical entity providing access to the records of a base cluster either directly or through an alternate index. (4) In an online IMS/VS system, the route a message takes from the time it is originated through processing; in a multisystem environment, the route can include more than one IMS/VS system.

**PCDD.** Pseudo common data set descriptor (CDD) record.

**PDA.** Problem Determination Aid.

**PDF.** Program Development Facility.

**PDS.** Partitioned data set.

**PDSE.** Partitioned data set extended.

**PE.** Physical end.

**peer-to-peer remote copy (PPRC).** A hardware-based remote copy option that provides a synchronous volume copy across storage subsystems for disaster recovery, device migration, and workload migration.

**performance scaling.** Formatting a tape so that less than its full capacity is used. Formatting a tape to its optimal performance capacity decreases the amount of time required to access the data on the tape. A tape that is formatted to its optimal performance capacity can later be reused and formatted to its full capacity.

**physical data set restore.** In DFSMShsm, the process of using a DFMSdss function to restore one data set from a dump copy created by using the DFSMShsm full volume dump function.

**physical end (PE).** Signifies that the concurrent copy process has finished copying the data to the output device. Contrast with *logical end*.

**physical sequential.** See *sequential data set*.

**pool of volumes.** See *data set pool*, *general pool*, and *volume pool*.

**PPRC.** Peer-to-peer remote copy.

**primary processing unit.** In a multiple processing-unit-environment, the processing unit assigned to do level functions for backup and dump. Level functions for backup are: backup of CDS, move backup versions, and backup of migrated data sets. Level functions for dump are: delete expired dump copies, and delete excess dump VTOC copy data sets.

**primary-processing-unit functions.** (1) The level functions (backing up migrated data sets, deleting expired dump copies, and moving backup versions from level 1 volumes backup volumes) that must be performed by the primary processing unit. (2) See *level functions*.

**primary volume.** A non-SMS volume managed by DFSMShsm containing data sets that are directly accessible to the user.

**problem determination aid trace.** This data set is used to gather information about DFHSM processing.

**promotion.** The process of one host taking over level functions for another. See also *demotion*.

**PSCB.** Protected step control block.

**PSP.** Preventive service planning.

**PSW.** Program status word.

**PTF.** Program temporary fix.

## Q

**quiesce time.** A time of day after which an automatic function does not start processing any more volumes.

## R

**RACF.** Resource Access Control Facility.

**recall.** The process of moving a migrated data set from a level 1 or level 2 volume to a DFSMShsm-managed volume or to a volume not managed by DFSMShsm.

**reconnection.** In DFSMShsm, the process by which an unchanged data set recalled from a migration Level 2 tape is space managed by reestablishing access to the migration copy from which it was recalled, rather than by moving the data set and creating a new migration copy.

**record-level sharing (RLS).** An extension to VSAM that provides direct shared access to a VSAM data set from multiple systems using cross-system locking.

**recovery.** In DFSMShsm, the process of copying a backup version of a data set from a backup volume to a specified volume or to the volume from which the backup version was created.

**recycle process.** A DFSMShsm process that, based on the percentage of valid data on a tape backup or migration level 2 volume, copies all valid data on the tape to a tape spill backup or migration level 2 volume.

**reentrant.** The attribute of a program or routine that allows the same copy of that program or routine to be used concurrently by two or more tasks.

**Resource Access Control Facility (RACF).** An IBM licensed program that provides access control by identifying and by verifying users to the system. RACF authorizes access to protected resources, logs unauthorized access attempts, and logs accesses to protected data sets.

**restart data set.** A data set created by DFSMShsm if aggregate recovery fails. It contains a list of all the data sets successfully restored during the aggregate recovery and allows the user to restart the aggregate recovery after the cause of the failure has been resolved.

**restore.** In DFSMShsm, the process of invoking DFSMSdss to perform the program's recover function. In general, it is to return to an original value or image, for example, to restore data in main storage from auxiliary storage.

**restricted command authority.** In DFSMShsm, allowing a user having at least read authority to each data set within an aggregate group to process ABACKUP or ARECOVER.

**retired version.** In DFSMShsm, a specially marked backup version that DFSMShsm created before it deleted the non-SMS-managed original data set during data set retirement.

**retirement.** See *data set retirement*.

**REXX.** Restructured extended executor.

**RLS.** Record level sharing.

**roll off.** When a new backup, dump, or generation data set copy is created, the oldest copy becomes a candidate for deletion, to maintain a customer-specified limit.

**RPL.** Request parameter list. Part of VSAM control block.

**RRDS.** Relative record data set.

## S

**SAF.** System authorization facility.

**SAQ.** Supplement for additional quantities.

**SCP.** System control programming.

**SDSP.** Small data set packing.

**secondary address space.** Synonym for DFSMShsm secondary address space.

**selection data set.** In aggregate backup and recovery processing, a sequential data set or a member of a partitioned data set used to define the data sets that compose the input to the aggregate backup function. It contains any include, exclude, accompany, or allocate lists.

**sequential data set.** A data set whose records are organized on the basis of their successive physical positions, such as on magnetic tape.

**similar device.** A (DASD) device with the same number of bytes per track and tracks per cylinder.

**single-cluster control data set.** A control data set (MCDS or BCDS) that is represented by a single VSAM key-sequenced data set (KSDS) cluster. This can be a key-range or non-key-range cluster.

**single-file format.** In DFSMShsm, a 3480 or 3490 format, or the equivalent, consisting of one standard-label data set that spans up to 255 tape volumes.

**single DFSMShsm-host environment.** Any environment in which a single DFSMShsm host has exclusive use of a set of control data sets.

**small data set packing (SDSP).** In DFSMShsm, the process used to migrate data sets that contain equal to

or less than a specified amount of actual data. The data sets are written as one or more records into a VSAM data set on a migration level 1 volume.

**small-data-set-packing data set.** In DFSMShsm, a VSAM key-sequenced data set allocated on a migration level 1 volume and containing small data sets that have migrated.

**SMF.** System Management Facilities.

**SMP.** System Modification Program.

**SMP/E.** System Modification Program Extended.

**SMS.** Storage Management Subsystem.

**SMS class.** A list of attributes that SMS applies to data sets having similar allocation (data class), performance (storage class), or availability (management class) needs.

**SMS-managed data set.** A data set that has been assigned a storage class.

**space manager.** Synonym for storage administrator.

**space management.** In DFSMShsm, the process of managing aged data sets on DFSMShsm-managed and migration volumes. The three types of space management are: migration, deletion, and retirement.

**spanning data sets.** Data sets that span one or more tape volumes. The tape volumes that are spanned are part of a connected set. See also *connected set*.

**specific scratch pool.** A group of empty tapes with unique serial numbers that are known to DFSMShsm as a result of being defined to DFSMShsm with the ADDVOL command.

**spill backup volume.** A volume owned by DFSMShsm to which all but the latest backup version of a data set are moved when more space is needed on a DASD daily backup volume or all valid versions are moved when a tape backup volume is recycled.

**spill process.** A DFSMShsm process that moves all but the latest backup version of a data set from a DASD daily backup volume to a spill backup volume.

**SSF.** Software Support Facility.

**SSI.** Subsystem interface.

**SSM.** Secondary space management.

**SSSA.** Subsystem option block extension for SMS.

**storage administrator.** In DFSMShsm, the person who is authorized through the DFSMShsm AUTH command to issue DFSMShsm system programmer and storage administrator commands, who can affect the authority

of other DFSMShsm userq, and who contrmls the ways DFS Shsm manages DASD space.

**storage class.** A named list of data set storage service attributes that identifies perfmrance and availability requirements. SMS uses these attributes to control data placement.

**storage group.** (1) A named list of DASD volumes used for allocation of new SMS-managed data sets, or a dummy storage group, or a VIO storage group. (2) A list of real DASD volumes, or a list of serial numbers of volumes that no longer reside on a system but that end users continue to refer to in their JCL.

**storage hierarchy.** An arrangement in which data may be stored in several types of storage devices that have different characteristics such as capacity and speed of access.

**Storage Management Subsystem (SMS).** An operating environment that helps automate and centralize the management of storage. To manage storage, SMS provides the storage administrator with control over data class, storage class, management class, storage group, and ACS routine definitions.

**suballocated file.** A VSAM file that occupies a portion of an already defined data space. The data space may contain other files. Contrast with *unique file*.

**subsystem interface (SSI).** The means by which system routines request services of the master subsystem, a job entry subsystem, or other subsystems defined to the subsystem interface.

**SVC.** Supervisor call instruction.

**sysplex.** A set of MVS or z/OS systems communicating and cooperating with each other through certain multisystem hardware components and software services to process customer workloads. This term is derived from *system complex*. See also *base sysplex* and *parallel sysplex*.

**sysplex timer.** An IBM unit that synchronizes the time-of-day (TOD) clocks in multiple processors or processor sides.

**system-managed storage.** An approach to storage management in which the system determines data placement and an automatic data manager handles data backup, movement, space, and security.

## T

**take back.** Process performed by a demoted host to take back the level functions that have been taken over by a promoted host.

**TCB.** Task control block.

**threshold of occupancy.** A limit of occupied space on a volume managed by DFSMShsm.

**time sharing option (TSO).** An option on the operating system for a System/370 that provides interactive time sharing from remote terminals.

**TIOT.** Task input/output table.

**TMP.** Terminal monitoring program.

**TOD.** Time of day.

**trace.** (1) A record of the execution of a computer program that exhibits the sequence in which the instructions were executed. (2) To record a series of events as they occur.

**TSN.** Time sharing option.

**TSO/E.** Tile sharing option/extended.

**TTOC.** Tape table of contents record.

**TVT.** Tape volume table.

## U

**UCB.** Unit control block.

**UID.** The DFSMShsm authorized-user identification in 1 to 7 characters.

**undirected recall.** In DFSMShsm, moving a migrated data set from a level 1 or level 2 volume to a level 0 volume without specifying the target volume or unit where the volume can be allocated. Undirected recall can be automatic or by command.

**unique file.** A VSAM file that occupies a data space of its own. The data space is defined at the same time as the file and cannot contain any other file. Contrast with *suballocated file*.

**unlike device.** A DASD device with a different number of bytes per track and tracks per cylinder, or both.

**user catalog.** An optional catalog used in the same way as the master catalog and pointed to by the master catalog. Use of user catalogs lessens the contention for the master catalog and facilitates volume portability.

**user exit.** A programming service provided by an IBM software product that may be requested during the execution of an application program that transfers control back to the application program upon the later occurrence of a user-specified event.

## V

**VAC.** Volume activity count record.

**virtual DASD.** In DFSMShsm, this refers to the 3850 Mass Storage System (MSS).

**virtual storage access method (VSAM).** An access method for indexed or sequential processing of fixed and variable-length records on direct access devices. The records in a VSAM data set or file can be organized in logical sequence by a key field (key sequence), in the physical sequence in which they are written on the data set or file (entry-sequence), or by relative-record number.

**virtual storage constraint relief (VSCR).** A function that increases the amount of storage available for the user's application program.

**volume.** (1) A certain portion of data, together with its data carrier, that can be handled conveniently as a unit. (ISO) (2) A data carrier that is mounted and demounted as a unit, for example, a reel of magnetic tape, a disk pack. (ISO) (3) That portion of a single unit of storage that is accessible to a single read/write mechanism, for example, a drum, a disk pack, or part of a disk storage module. (4) A storage medium that is mounted and demounted as a unit; for example, magnetic tape or diskette.

**volume pool.** In DFSMShsm, a set of related primary volumes. When a data set is recalled, if the original volume that it was on is in a defined volume pool, the data set can be recalled to one of the volumes in the pool.

**volume serial number.** An identification number in a volume label that is assigned when a volume is prepared for use in the system.

**volume table of contents (VTOC).** (1) A table on a direct access volume that describes each data set on the volume. (2) An area on a disk or diskette that describes the location, size, and other characteristics of each file and library on the disk or diskette.

**VSA.** VSAM data set allocation control block.

**VSAM.** Virtual storage access method.

**VSAM sphere.** A sphere containing the following eight components: base cluster, base data object, base index object, base path, alternate index, alternate index data object, alternate index index object, and alternate index path.

**VSCR.** Virtual storage constraint relief.

**VSR.** Volume statistics record.

**VTOC.** Volume table of contents.

**VTOC copy data set.** A data set that contains a copy of the VTOC entry for each data set that DFSMShsm backs up or dumps.

**VTS.** Virtual tape server.

**VVDS.** VSAM volume data set.

## W

**WPCDD.** ABACKUP/ARECOVER pseudo CDD parameter list.

**WWFSR.** ABACKUP/ARECOVER backup and recovery record.

## X

**XCF.** Cross-system coupling facility.

**XRC.** Extended remote copy.



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Cut or Fold  
Along Line

Fold and Tape

Please do not staple

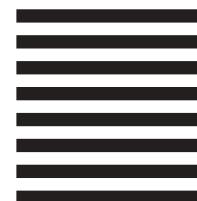
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Fold and Tape

Please do not staple

Fold and Tape

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