StorageTek Enterprise Library Software

Configuring and Managing SMC

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Preface

This publication provides configuration and administration information for Oracle's StorageTek Storage Management Component (SMC) software, part of Oracle's StorageTek Enterprise Library Software (ELS).

This software solution consists of the following software:

Base software:

- Oracle's StorageTek Storage Management Component (SMC)

  (includes the product formerly known as StorageTek HTTP Server)

- Oracle's StorageTek Host Software Component (HSC)

- Oracle's StorageTek Virtual Tape Control Software (VTCS)

- Oracle's StorageTek Concurrent Disaster Recovery Test (CDRT)

Audience

This document is intended for storage administrators, system programmers and operators responsible for configuring and maintaining SMC.

To perform the tasks described in this publication, you should already understand the following:

- MSP/EX operating system

- JES

- Enterprise Library Software (ELS)

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Related Documents

Visit the Oracle Technical Network (OTN) at the following URL to access related documentation for StorageTek libraries, tape drives, and associated software and hardware:

http://docs.oracle.com

Conventions

The following text conventions are used in this document:

Typographic Conventions

Typographic conventions include the following:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Syntax Conventions

Syntax flow diagramming conventions include the following:

Flow Lines

Syntax diagrams consist of a horizontal base line, horizontal and vertical branch lines, and the text for a command, control statement, macro, or utility. Diagrams are read left to right, and top to bottom. Arrows indicate flow and direction. For example:

```
►►─COMMAND/MACRO/UTILITY──┬─Item 1──────────────────────────────────►◄
                          ├─Item 2─┤
                          └─Item 3─┘
```
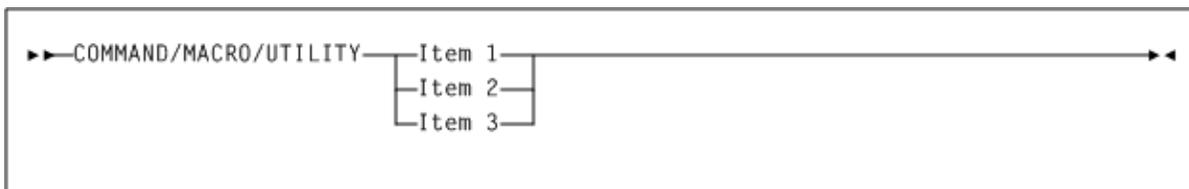
Single Required Choice

Branch lines (without repeat arrows) indicate that a single choice must be made. If one of the items to choose from is positioned on the baseline of the diagram, one item must be selected. For example:

```
►►─┬─Item 1─┬──────────────────────────────────────────────────────►◄
   ├─Item 2─┤
   └─Item 3─┘
```

Single Optional Choice

If the first item is positioned on the line below the baseline, one item may be optionally selected. For example:

```
 ►►─┬───────┬────────────────────────────────────────────►◄
    ├─Item 1─┤
    ├─Item 2─┤
    └─Item 3─┘
```

Defaults

Default values and parameters appear above the baseline. For example:

```
        ┌─Default─┐
 ►►─────┴─────────┴──────────────────────────────────────►◄
```

Some keyword parameters provide a choice of values in a stack. When the stack contains a default value, the keyword and the value choices are placed below the base line to indicate that they are optional, and the default value appears above the keyword line. For example:

```
 ►►─┬─────────────────────────┬──────────────────────────►◄
    │         ┌─Default Value─┐│
    └─Keyword─┼─Value2────────┤
              └─Value3────────┘
```

Repeat

A repeat symbol indicates that more than one choice can be made or that a single choice can be made more than once. The following example indicates that a comma is required as the repeat delimiter. For example:

```
       ┌─,────────┐
 ►►────▼─variable─┴──────────────────────────────────────►◄
```

Keywords

All command keywords are shown in all upper case or in mixed case. When commands are not case sensitive, mixed case implies that the lowercase letters may be omitted to form an abbreviation.

Variables

Italic type indicates a variable.

Alternatives

A bar (|) separates alternative parameter values.

Optional

Brackets [ ] indicate that a command parameter is optional.

Delimiters

If a comma (,), a semicolon (;), or other delimiter is shown with an element of the syntax diagram, it must be entered as part of the statement.

Ranges

An inclusive range is indicated by a pair of elements of the same length and data type, joined by a dash. The first element must be strictly less than the second element.

A hexadecimal range consists of a pair of hexadecimal numbers (for example, 0A2-0AD, or 000-0FC).

A decimal range consists of a pair of decimal numbers (that is, 1-9, or 010-094). Leading zeros are not required. The decimal portion is an incremental range. The character positions of the incremental portion of both range elements must match, and the non incremental characters of the first element must be identical to those of the second element.

A numeric VOLSER range (vol-range) consists of a pair of VOLSER elements containing a decimal numeric portion of 1 to 6 digits (for example, ABC012-ABC025, or X123CB-X277CB). The decimal portion is an incremental range. The following additional restrictions apply:

- The character positions of the incremental portion of both range elements must match.

- The non incremental characters of the first element must be identical to those of the second element.

- You cannot increment two portions of a range element. If 111AAA is the first element, you cannot specify 112AAB for the second element.

- If a VOLSER range contains more than one decimal portion, any portion is valid as the incremental range. For example:

  - A<u>00</u>B<u>00</u> - The largest range that can be specified is A00B00 through A99B99.

  - A<u>0</u>B<u>0</u>CC - The largest range that can be specified is A0B0CC through A9B9CC.

  - <u>000</u>XXX - The largest range that can be specified is 000XXX through 999XXX.

An alphabetic VOLSER range (vol-range) consists of a pair of VOLSER elements containing an incremental portion of 1 to 6 characters (for example, 000<u>AAA</u>-000<u>ZZZ</u>, or 9<u>AAA</u>55-9<u>ZZZ</u>55). This portion is an incremental range. The following additional restrictions apply:

- The character positions of the incremental portion of both range elements must match.

- The non incremental characters of the first element must be identical to those of the second element.

- You cannot increment two portions of a range element. If 11<u>1</u>AA<u>A</u> is the first element, you cannot specify 11<u>2</u>AA<u>B</u> for the second element.

- The alphabetic portion of the VOLSER range is defined as being from character A to Z. To increment multi-character sequences, each character increments to Z. For instance, ACZ is part of the AAA-AMM range. Examples are:

  - A<u>00</u>A0-A<u>99</u>A0

    increments VOLSERs A00A0 through A09A0, then A10A0 through A99A0.

  - 9<u>AA</u>9A-9<u>ZZ</u>9A

increments VOLSERs 9AA9A through 9AZ9A, then 9BA9A through 9ZZ9A.

- 111<u>AAA</u>-111<u>ZZZ</u>

  increments VOLSERs 111AAA through 111AAZ, then 111ABA through 111ZZZ

- 999<u>AM</u>8-999<u>CM</u>8

  increments VOLSERs 999AM8 through 999AZ8, then 999BA8 through 999CM8

- A3<u>BZZ</u>9-A3<u>CDE</u>9

  increments VOLSERs A3BZZ9 through A3CAA9, then A3CAB9 through A3CDE9

- <u>AAAAAA</u>-<u>AAACCC</u>

  increments VOLSERs AAAAAA through AAAAAZ, then AAAABA through AAACCC

- <u>CCCNNN</u>-<u>DDDNNN</u>

  increments VOLSERs CCCNNN through CCCNNZ, then CCCNOA through DDDNNN. This is a very large range.

The number of volumes in an alphabetic VOLSER range depends on the number of elements in the incrementing portion of the VOLSER range. For an A to Z range in each character position, the number of volumes can be calculated by 26 to the power of the number of positions that are being incremented.

- A-Z is equivalent to 26^1 or 26 volumes.

- AA-ZZ is equivalent to 26^2 or 676 volumes.

- AAA-ZZZ is equivalent to 26^3 or 17,576 volumes.

- AAAA-ZZZZ is equivalent to 26^4 or 456,976 volumes.

- AAAAA-ZZZZZ is equivalent to 26^5 or 11,881,376 volumes.

- AAAAAA-ZZZZZZ is equivalent to 26^6 or 308,915,776 volumes.

Lists

A list consists of one or more elements. If more than one element is specified, the elements must be separated by a comma or a blank space, and the entire list must be enclosed in parentheses.

Blanks

Keyword parameters and values may be separated by any number of blanks.

Control Statement Conventions

The standard syntax conventions for control statements are as follows:

- The only valid control statement information area is from column 1 to column 72. Columns 73-80 are ignored.

- Parameters may be separated by one or more blanks or a comma.

- A value is associated with a parameter by an equal (=) sign or by enclosing the value in parentheses, and concatenating it immediately after the parameter.

- Case (upper or lower) is ignored in actual control statements.

- Continuations are supported by including a plus (+) sign at the end of the line to be continued. A control statement is terminated if the statement is not continued.

- Use /* and */ to enclose comments in the job stream. HSC PARMLIB members and definition data sets must specify comments in this format.

  – A comment is not required as the first control statement of any PARMLIB member.

  – Comments can be continued over multiple lines, but cannot be nested.

- The maximum length for any control statement is 1024 characters.

What's New?

This revision includes the following updates:

SMC 7.3 introduces a new XAPI security feature for client/server communication, enabled as a default in the SMC HTTP server.

- See "XAPI Security for Client/Server Communication" for more information about using this feature.

- Refer to the *ELS Command, Control Statement, and Utility Reference* for information about the following SMC facilities used to enable or diable this feature:

    - SMC `XCLIENT` command

    - SMC `XUDB` command

    - SMC `XUDB` Dataset

    WARNING: **To use SMC 7.3 as a remote client, you must perform the required setup tasks for both SMC clients and server. The SMC 7.3 XAPI security feature may be disabled at the server for all clients or for specific clients. However, SMC TCP/IP client/server communication will not function if you use the SMC startup parameters from a prior SMC release with SMC 7.3.**

- SMC now supports an XAPI client interface to an ACSLS server (Release 8.4 or later) with the XAPI service enabled.

    See "XAPI Client Interface to ACSLS Server" for more information. Also, refer to the ELS publication *XAPI Client Interface to ACSLS Server Reference*.

- Updated the SMC START procedure example to indicate REGION SIZE=0.

    See "Creating the SMC START Procedure."

1

Introduction

Storage Management Component (SMC) is the interface between Fujitsu's MSP/EX operating system and Oracle's StorageTek automated library control systems, HSC.

SMC resides on every MSP host that accesses StorageTek real and virtual tape hardware. It operates on JES systems and is a required ELS component.

SMC primary functions include:

- Influencing tape allocation according to hardware requirements and customer policies to ensure that appropriate tape drives are selected

- Intercepting tape management and operating system mount, dismount, and swap messages and translating them in order to request the required tape hardware functions from the appropriate ELS automated library control system

- Coordinating requests among multiple StorageTek *TapePlexes*

A *TapePlex* is a single StorageTek hardware configuration, normally represented by a single HSC Control Data Set (CDS). A TapePlex may contain multiple Automated Cartridge Systems (ACSs) and Virtual Tape Storage Subsystems (VTSSs).

SMC may communicate with any number of TapePlexes, using cross address space facilities to communicate with HSC running on the same host, and TCP/IP to communicate with HSC systems executing on other hosts.

> **Note:** For the purposes of this publication, HSC refers to the MSP implementation of HSC. The VM implementation of HSC is not supported by SMC.

2

Starting the SMC

SMC manages all interfaces with MSP for allocation and message handling, and therefore must be started as a task on every MSP host where tape processing occurs.

SMC calls on HSC for volume and drive information. Therefore, HSC can be active on the same host as the SMC, or a local SMC can interact with an HSC operating on a remote host if the SMC HTTP server is also enabled on that remote host.

Oracle recommends that you start HSC and SMC in the following order:

- Start HSC.

- *Immediately* start SMC, as HSC initialization begins.

This is recommended for the following reasons:

- TapePlexes and associated HSC/VTCS servers are defined in the SMCCMDS data set. During initialization, SMC attempts to establish a communication binding with one server for each TapePlex by contacting individual HSC/VTCS servers in order as defined in the SMCCMDS data set. SMC binds to the first active server encountered for each TapePlex during this process. For each TapePlex with no active servers, SMC displays persistent message SMC0260 for each server defined for that TapePlex. SMC removes these messages when a server becomes active and SMC automatically binds to it. To avoid TapePlex communication binding delays at SMC startup:

  - Ensure hosts referenced by SMC SERVER statements are IPLed and TCP/IP is fully initialized for communications on these hosts before starting SMC.

  - For hosts referenced by SMC SERVER statements, issue the `HTTP START` command as part of the SMC startup parameters for those hosts, in SMCPARMS or SMCCMDS.

  - For each TapePlex, start HSC/VTCS and SMC on at least one host referenced by an SMC SERVER statement for that TapePlex.

- If your configuration includes VTCS with a VLE system, VTCS uses SMC communication services to communicate with VLE. If you start SMC immediately after HSC initialization begins, you can ensure that these services are available to VTCS when it attempts to communicate with the VLE.

Implementing these steps will allow SMC startup processing to bind with each TapePlex as quickly as possible.

To start SMC, you must create and execute the SMC START procedure. This chapter describes these tasks.

Note the following:

- Refer to the publication *Installing ELS* for information about SMC installation and postinstallation tasks.

- The SMC HTTP server component is enabled using the SMC HTTP command. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about this command.

Creating the SMC START Procedure

The SMC START procedure specifies SMC startup parameter settings. You create this procedure in the procedure library of the host system.

The MSP START command executes this catalogued procedure, thus activating the SMC with the specified parameter settings.

The following example illustrates a sample SMC START procedure, which includes EXEC, STEPLIB, SMCPARMS, SMCCMDS, SMCLOG, and SYSTCPD DD statements.

Example 2–1   SMC START Procedure

```
//yourprocname   PROC PRM='WARM'
//*
//* Run LOADHOST to initialize the IP environment for
//* SMC IP communications
//*
//stepname EXEC PGM=LOADHOST
//STEPLIB DD DISP=SHR,DSN= your.els.sea7x0.sealink
//STKHSTDF DD DISP=SHR,DSN=your.host.ip.network.definitions
//STKIFCDF DD DISP=SHR,DSN=your.host.ip.init.definition
//STKIFIDF DD DISP=SHR,DSN=your.host.osa.definition
//STKOWNDF DD DISP=SHR,DSN=your.host.name
//SYSPRINT DD SYSOUT=*
//STDOUT DD SYSOUT=*
//STDERR DD SYSOUT=*
//*
//stepname  EXEC PGM=SMCBINT,REGION=0M,TIME=1440,
//          PARM='&PRM'
//*
//STEPLIB   DD DISP=SHR,DSN=your.els.exitlib
//          DD DISP=SHR,DSN=your.els.sea700.sealink
//*
//* The following dataset is optional
//*
//SMCPARMS  DD DISP=SHR,DSN=parmlib_name(parm_member_name)
//*
//* The following dataset is optional but recommended
//*
//SMCCMDS   DD DISP=SHR,DSN=cmdlib_name(cmd_member_name)
//*
//* The following datasets are optional
//*
//SMCLOG    DD DSN=log.file.name,UNIT=unit,RECFM=FB,
//             SPACE=(CYL,(primary-qty,secondary-qty)),
//             DISP=(NEW,CATLG,CATLG)
//*
//TISPAPPL DD DSN=ddd.eee.fff(anyname) /* Mandatory TISP parms) */
```

The first four characters of *yourprocname* specify the SMC subsystem name (unless the SSYS startup parameter is specified). The recommended value is SMC*x*, where *x* is any valid jobname character.

SMC EXEC Statement

The EXEC statement defines general SMC startup parameter settings.

Syntax

The following figure shows the SMC EXEC statement syntax:

Figure 2–1   SMC EXEC Statement syntax
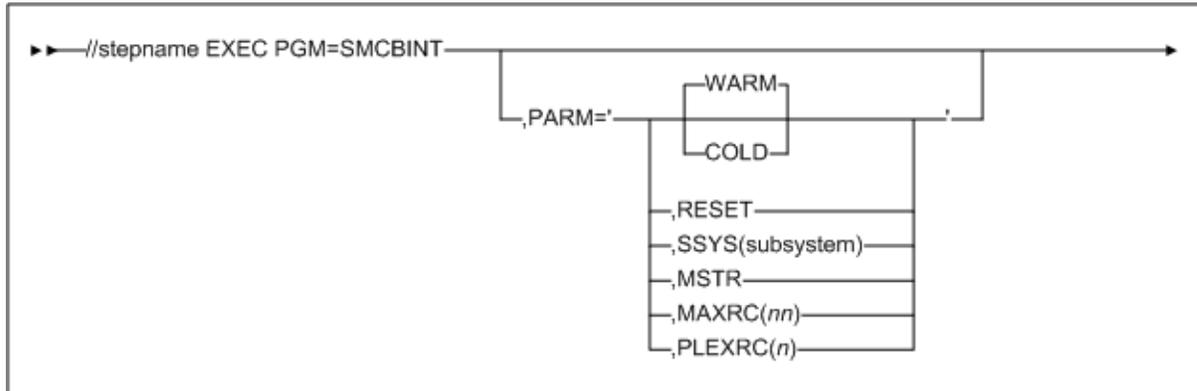
Parameters

PARM=

defines the list of parameters passed to the SMC initialization routine.

Execution parameters must be separated with commas. Separating parameters with blanks results in a syntax error.

WARM

specifies that the SMC main control block is not rebuilt. This is the default setting for normal operation.

COLD

specifies that all SMC control blocks are rebuilt. This parameter is mutually exclusive with WARM.

> **Caution:**   Do not use this parameter unless the SMC has terminated abnormally and cannot be restarted.

RESET

specifies that the active subsystem status flag in the MSP Subsystem Communications Vector Table (SSCVT) for the SMC is reset. This parameter may correct a situation in which the SMC was terminated abnormally. It can be specified with WARM or COLD.

Using this parameter when an SMC subsystem is active and functional causes unpredictable results.

SSYS

specifies a *subsystem* ID that is different from the first four characters of the SMC START procedure. The SMC searches for this subsystem ID during initialization.

subsystem must be one to four characters in length.

MSTR

specifies that the SMC start under the MSTR subsystem instead of under JES.

When specifying this parameter, you must also perform one of the following actions:

■   Start the SMC subsystem using SUB=MSTR on the MSP `Start` command.

■   Add the SMC subsystem to the IEFSSNxx subsystem table using the keyword format.

Note the following:

■   If you want to run the SMC under the master MSP subsystem, the PROCLIB containing the SMC START procedure must be present in the PROCLIB concatenation for the master address space. This concatenation is defined in SYS1.PARMLIB(MSTJCLxx), under DD IEFPDSI.

MAXRC

specifies whether SMC subsystem initialization is to be terminated when the specified command return code is exceeded. If MAXRC is not specified, then the SMC subsystem always attempts to complete its initialization regardless of any startup command failure(s). This is the default behavior.

nn specifies the highest allowed return code. If an SMC command executed from the SMCPARMS or SMCCMDS data set exceeds this value, then SMC0236 and SMC0237 messages are produced, and the SMC terminates. Allowable values are 0, 4, 8, and 12.

PLEXRC

specifies whether SMC subsystem initialization is to be terminated based on the status of TapePlexes returned from the automatically issued `RESYNC` command.

If PLEXRC is not specified, then the SMC subsystem will complete its initialization regardless of the outcome of the `RESYNC` command. This is the default behavior.

n specifies the highest allowed return code from the `RESYNC` command. Valid values are 0 and 4.

The SMC `RESYNC` command sets a return code of 8 if SMC cannot communicate with any defined TapePlex, and a return code of 4 if SMC is can communicate with one or more, but not all, defined TapePlexes.

SMCPARMS and SMCCMDS Data Sets

Specify SMCCMDS and SMCPARMS DD statements in your SMC START procedure to identify data sets that include SMC command settings you want to have processed at SMC startup.

At minimum, you *must* include SMC `TAPEPlex` commands in *either* the SMCCMDS or SMCPARMS data set to define your TapePlexes. If no `TAPEPlex` commands are found at SMC startup, then the SMC subsystem terminates and an error message is produced.

When SMC first communicates with an HSC host, this host adopts the TapePlex name specified in the SMCCMDS or SMCPARMS data set and stores it in the CDS. The CDS retains this name unless it is later changed by an SMC `Set TapePlex` utility command.

SMCCMDS

It is recommended that you use the SMCCMDS data set to specify settings for SMC commands that can be reprocessed after startup.

You can issue the SMC `READ` command from the console to reprocess this data set at any time.

SMCPARMS

It is recommended that you use the SMCPARMS data set to specify settings for SMC commands that can only be processed at startup. These commands are `CMDDef` and `USERMsg`.

You can include additional commands in this data set, however, these commands cannot be reprocessed by the SMC `READ` command.

Note the following:

- Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the HSC Set `TAPEPlex` command and SMC `READ` command.

- Use of the `POLicy` command requires that `TAPEPlex` and `SERVer` commands be processed before `POLicy` commands (which must be processed before TAPEREQ control statements).

- TIME=1440 must be coded to ensure that the SMC does not time out and terminate.

SMCLOG Data Set

Specify the SMCLOG DD statement in your SMC START procedure to define the SMCLOG data set used for SMC communication and command logging.

This statement is required *only* when the SMC `LOG START` command is entered, and is written to *only* when the SMC `LOG TYPE` command is entered to select the specific types of events the SMC will log.

The SMC logging facility is intended to gather diagnostic information for certain types of errors that are not easily reproducible. As a diagnostic gathering technique, it gathers less information, but consumes far less resources than the SMC `TRACE` command. Therefore, it is better suited for gathering diagnostic information for all communications tasks over a longer period, then the SMC TRACE facility which is intended to be directed at a single job or step for a shorter period. The SMC `LOG` command should only be executed at the direction of StorageTek support personnel. Depending upon the number and types of SMC LOG TYPE(s) selected, use of the SMC logging facility will result in slight degradation of SMC communications and subsystem performance.

TISPAPPL Data Set

Specify the TISPAPPL DD statement in your SMC START procedure to define the TISP APPL name for the SMC job.

This DD statement identifies the data set used to obtain the APPL name the SMC registers with TISP for TCP/IP socket services. The member pointed to by the TISPAPPL statement must contain a statement such as:

```
TCPAPPLNAME=STKHAPPL
```

where the applname (in this example, STKHAPPL) must match that defined in your VTAM-G TISP TAPPL NODESET.

Refer to the Fujitsu OS IV VTAM-G TISP Handbook for more information.

Executing the SMC START Procedure

This section describes how to execute the SMC START procedure to start the SMC software.

MSP START Command

Issue the MSP START command to execute your SMC START procedure and start the SMC software. This command invokes the SMC subsystem initialization routine. This routine determines which parameters are in effect, performs any cleanup necessary, and initiates normal SMC processing.

Parameters associated with PARM= on the EXEC statement of the SMC Start Procedure can also be supplied through PARM= on the MSP START command. The PARM= specification on the MSP START command overrides the PARM= specification in the SMC Start Procedure. See "Parameters" for parameter descriptions.

Syntax

The following figure shows the MSP START command syntax:

Figure 2–2   MSP START Command syntax

```
►►──START──smc-proc-name───────────────────────────────────────►◄
```

Parameters

START or **S**

initiates the MSP START command

smc-proc-name

indicates the name of the SMC START procedure member.

3

SMC and StorageTek TapePlex Management

SMC includes several facilities used to configure and manage your StorageTek TapePlex environment, and may be configured on a shared host, or on multiple hosts using the SMC client/server feature.

SMC and the Library Control Server

SMC provides the interface between Fujitsu's MSP/EX operating system and StorageTek library control systems, HSC.

- SMC can operate with the HSC directly on the same host or remotely with an HSC on a different host, using TCP/IP and the SMC HTTP server component.

- SMC can communicate with an ACSLS server with XAPI support enabled (without requiring MVS/CSC). See "XAPI Client Interface to ACSLS Server" for more information.

Defining TapePlexes for SMC

A *TapePlex* is a single StorageTek hardware configuration, normally represented by a single HSC Control Data Set (CDS). A TapePlex may contain multiple Automated Cartridge Systems (ACSs) and Virtual Tape Storage Subsystems (VTSSs).

It is recommended that you use the SMC TAPEPlex command to explicitly define all tapeplexes to be accessed by an SMC subsystem.

Refer to the *ELS Command, Control Statement and Utility Reference* for more information about the SMC TAPEPlex command.

Using the SMC Client/Server Feature

The SMC Client/Server feature allows SMC to communicate with HSC systems that are not on the same host as the SMC. This feature enables you to do the following:

- Reduce the number of hosts on which HSC is started.

  It is recommended that you execute HSC on only two hosts, with the second as a backup. Executing HSC on only one or two hosts reduces CDS contention and eliminates the need to manage multiple MSP syslog files.

- Communicate with multiple HSC TapePlexes representing physically different hardware configurations.

- Reduce tape processing outages by providing a second HSC instance for failover.

Defining Server Paths

For any HSC TapePlex that resides on a different host than the SMC, you must issue the SMC SERVer command. This command defines a named path to the HSC library control system, or server, on a different MSP host.

The first server you define is considered to be the primary server. Additional servers are secondary servers. If a communication error occurs on the primary server during allocation or mount processing, SMC automatically switches communication to the first available secondary server. If a communication error occurs on this secondary server, the SMC automatically switches to the next available secondary server.

Refer to the *ELS Command, Control Statement and Utility Reference* for more information about the SMC SERVer command.

SMC Monitor Functions

SMC provides several monitor functions which ensure that the SMC subsystem and all client/server communications are operating correctly. See Chapter 7, "Monitor Functions and Recovery Procedures.".

Using the SMC HTTP Server Component

The SMC HTTP server component provides the ability for communication between the SMC (client) and an HSC on another host (server). It executes under the SMC address space on the host where HSC executes as a server. It is not required on a host where only the SMC executes.

Starting and Stopping the SMC HTTP Server

The SMC HTTP server component is not automatically started during SMC initialization.

To start the SMC HTTP server, you must include the SMC HTTP STArt command in either the SMCPARMS or SMCCMDS data set.

Once the SMC HTTP server is active, you can issue the SMC HTTP command from the console to stop or restart the HTTP server at any time.

> **Note:** Refer to the *ELS Command, Control Statement and Utility Reference* for more information about the SMC HTTP command.

Displaying SMC HTTP Server Status

Issue the SMC HTTP command with the LIst parameter to display SMC HTTP server status information and interval statistics.

Include the DETail parameter to display additional information including I/O, error, accept and reject counts, and CGI use count.

> **Note:** Refer to the publication *ELS Messages and Codes* for a listing of SMC HTTP server messages.

Region Size Considerations with SMC HTTP Server UUI Requests

When an SMC client directs UUI requests to the SMC HTTP server, some or all of these requests will execute in the SMC address space where the HTTP server is executing. If

you attempt to execute several requests simultaneously, SMC storage shortage abends may occur.

UUI functions that may consume a large amount of virtual storage include VTCS EXPORT and reports that use the SORT feature, including VOLRPT, VTVRPT, and MVCRPT.

It is recommended that you allocate the maximum region size (0M) to the SMC running the HTTP server.

XAPI Security for Client/Server Communication

SMC 7.3 introduces a new XAPI security feature for client/server communication, enabled as a default in the SMC HTTP server.

The preferred method for securing XAPI transactions for TapePlexes that host ELS client applications only (SMC and VM Client) is to use the AT/TLS facilities as described in the *StorageTek Enterprise Library Software Security Guide*. AT/TLS is a transport layer facility that is external and transparent to ELS.

Use the ELS 7.3 XAPI security feature to secure TapePlexes that host non-ELS clients (open systems clients) or a mixture of ELS clients (SMC and VM Client) and non-ELS clients. AT-TLS can be used in these environments in addition to the ELS 7.3 XAPI security feature. However, it will not secure XAPI transactions for non-ELS clients.

ELS 7.3 provides additional user authentication facilities as part of its XAPI protocol that is internal to and wholly contained within ELS. ELS 7.3 implements a challenge-response protocol to authenticate individual XAPI client/server transactions. This protocol requires you to use the new SMC XUDB command to define userids and passwords for clients and servers. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about this command. Note that operational login challenge and response is completely transparent, and requires no additional user or operator intervention. XAPI login is required for each TapePlex operation (mount, dismount, lookup, scratch, and so forth). Userids and passwords are never saved or cached by server on behalf of the client.

ELS 7.3 requires XAPI security as its default. However, ELS provides facilities that enable you to control security for each client.

- You can use the SMC XCLIENT command to enable an ELS 7.3 server to "exempt" individual clients from using the XAPI security protocol. Back level ELS clients (for example a 7.2 client communicating with a 7.3 server) require an ELS 7.3 XCLIENT command definition to allow them to request services from the ELS 7.3 server without an XAPI login.

- You can use the HTTP command with the XSECurity (OFF) parameter to globally disable the XAPI security protocol. When HTTP XSECurity(OFF) is specified, the ELS 7.3 XAPI protocol will operate identically to the ELS 7.2 XAPI protocol (with no user authentication).

Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about these commands.

XAPI Client Interface to ACSLS Server

The XML API (XAPI) is Oracle's StorageTek API that enables StorageTek clients and servers to communicate using a common protocol over TCP/IP.

With the introduction of this XAPI, clients who were previously required to use an MVS based server (Oracle's StorageTek Host software Component) for real tape processing can now use ACSLS 8.4 or later (with XAPI support enabled) as follows:

- An SMC client on MVS can now request real tape requests from an ACSLS server with XAPI support enabled (without requiring MVS/CSC).

- A VM Client can now request real tape services from an ACSLS server with XAPI support enabled.

If you are using an SMC or VM Client to connect to an ACSLS server with XAPI support enabled, you must use SMC or VM Client TAPEPlex and SERVer commands to define the ACSLS application as a TapePlex and define the TCP/IP control path between the client and server. Refer to the *ELS Commands, Control Statement, and Utility Reference* for information about these commands.

The majority of client-server interaction between SMC and VM Clients, and an ACSLS server with XAPI are transparent to the end user. Requests for volume information, mounts, and dismounts are generated automatically by the SMC and VM Client and are processed without operator intervention.

In addition to these automatic interactions, the ACSLS server with XAPI provides additional administrator, configuration, and operator commands that enable you to manage the XAPI component. Refer to the ELS publication *XAPI Client Interface to ACSLS Server Reference* for information about these commands.

SMC Configuration Scenarios

This section describes the following common SMC configuration scenarios:

- Scenario 1: Single TapePlex with SMC and HSC on the Same Host
- Scenario 2: Single TapePlex using the SMC Client/Server Feature
- Scenario 3: Two TapePlexes Accessed by a Single SMC

These scenarios are not intended to be an exhaustive list of client/server scenarios. The SMC does not limit the number of TapePlex(es), or communications paths that can be defined.

In a configuration with multiple StorageTek TapePlexes (as illustrated in Scenario 3), SMC directs allocation of each DD statement to the appropriate TapePlex based on TAPEREQ statements and POLicy commands, specific volume locations, and available scratch volumes.

Scenario 1: Single TapePlex with SMC and HSC on the Same Host

In this scenario, SMC and HSC execute on the same MSP host connected to a single TapePlex (represented by a single CDS).

The following figure illustrates this scenario:

Figure 3–1   Single TapePlex with SMC and HSC on the Same Host
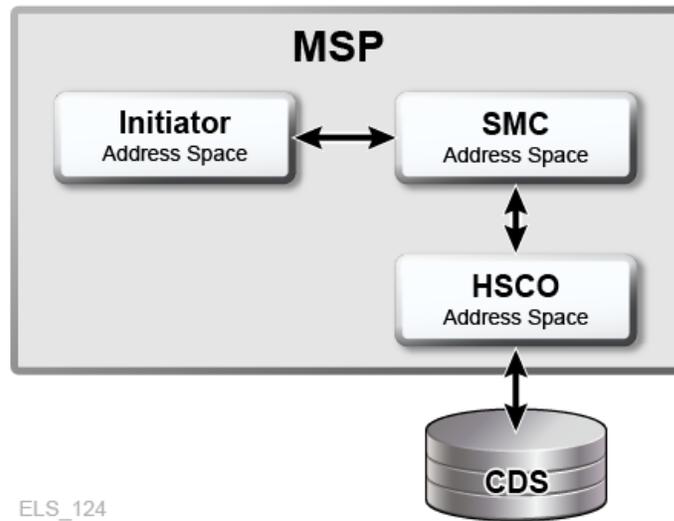
This configuration utilizes three address spaces:

- Initiator Address Space, from which allocation and mount events originate

- SMC Address Space, which intercepts those events

- HSC Address Space, to which SMC sends requests for drive and volume data, and mount requests

The following `TAPEPlex` command defines the local HSC TapePlex:

```
TAPEPLEX NAME(PLEX1) LOCSUBSYS(HSC0)
```

PLEX1 is the name of the local TapePlex, and HSC0 is the local MSP subsystem name for the HSC.

Scenario 2: Single TapePlex using the SMC Client/Server Feature

In this scenario, SMC executes on a client host without HSC, with multiple paths to a remote TapePlex (represented by a single CDS) and HSC running on multiple hosts.

The following figure illustrates this scenario:

Figure 3–2   Single TapePlex using the SMC Client/Server Feature
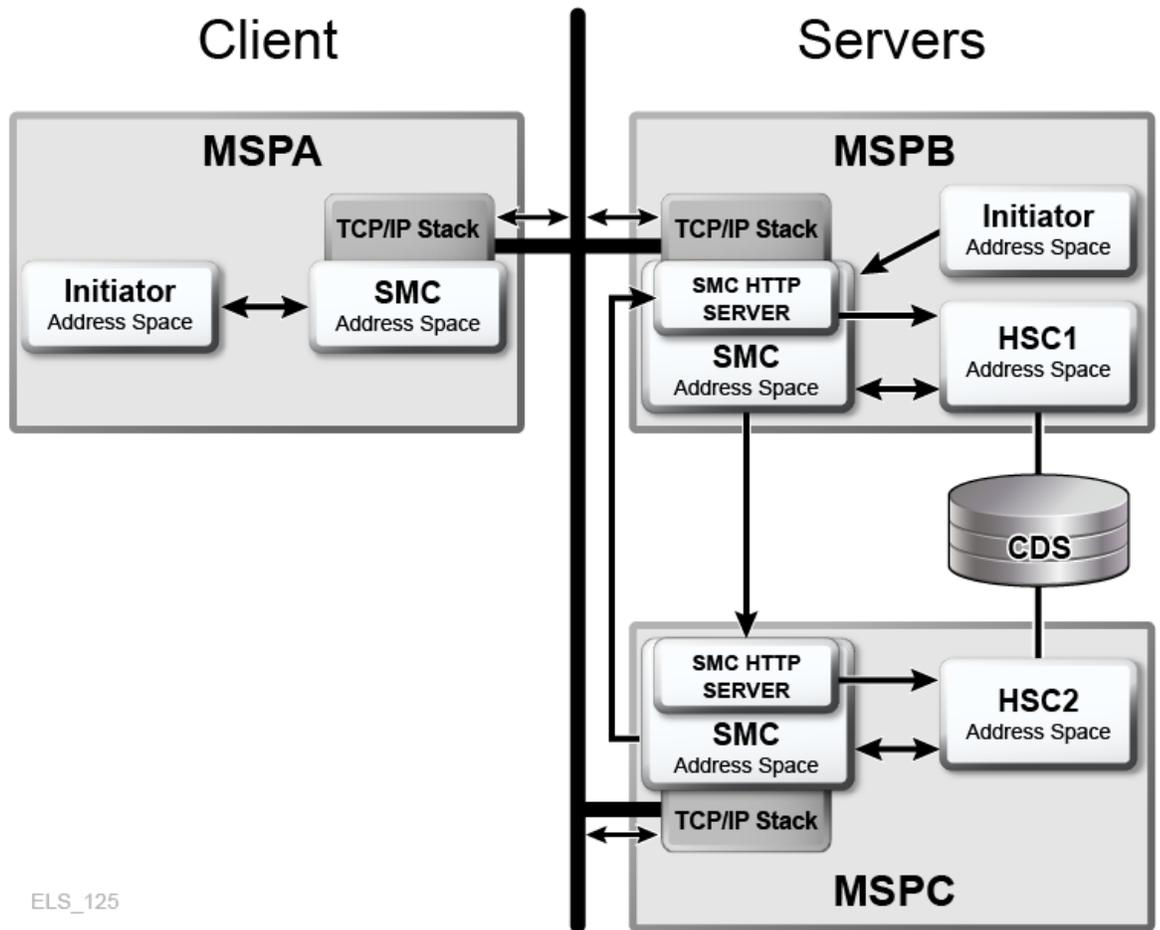
The following `TAPEPlex` and `SERVer` commands are required for the SMC on MSPA:

```
TAPEPLEX NAME(PLEX1)
SERVER NAME(MSPBPATH) TAPEPLEX(PLEX1) HOST(MSPB)
SERVER NAME(MSPCPATH) TAPEPLEX(PLEX1) HOST(MSPC)
```

Requests originating in an Initiator Address Space on MSPA are intercepted by the SMC Address Space on MSPA. The SMC on MSPA sends requests for volume and drive data, and mount requests to the server on MSPB or MSPC.

On MSPB and MSPC, the SMC may operate only with the local HSC, or may use the communications facility to provide a backup, as shown:

The following `TAPEPlex` and `SERVer` commands are required for the SMC on MSPB:

```
TAPEPLEX NAME(PLEX1) LOCSUBSYS(HSC1)
SERVER NAME(MSPCPATH) TAPEPLEX(PLEX1) HOST(MSPC)
```

The HTTP component is defined for the SMC on MSPB:

```
HTTP START
```

The following `TAPEPlex` and `SERVer` commands are required for the SMC on MSPC:

```
TAPEPLEX NAME(PLEX1) LOCSUBSYS(HSC2)
SERVER NAME(MSPBPATH) TAPEPLEX(PLEX1) HOST(MSPB)
```

The HTTP component is defined for the SMC on MSPC:

```
HTTP START
```

The above `TAPEPlex` and `SERVer` commands allow MSPB to act as the backup library server to MSPC, and MSPC to act as the backup library server to MSPB.

> **Note:** See "SMC Drive Type Information Synchronization" for information about how the SMC acquires drive type information from the HSC.

Scenario 3: Two TapePlexes Accessed by a Single SMC

In this scenario, a single SMC communicates with two TapePlexes (represented by two CDSs).

The following figure illustrates this scenario:

Figure 3–3   Two TapePlexes Accessed by a Single SMC
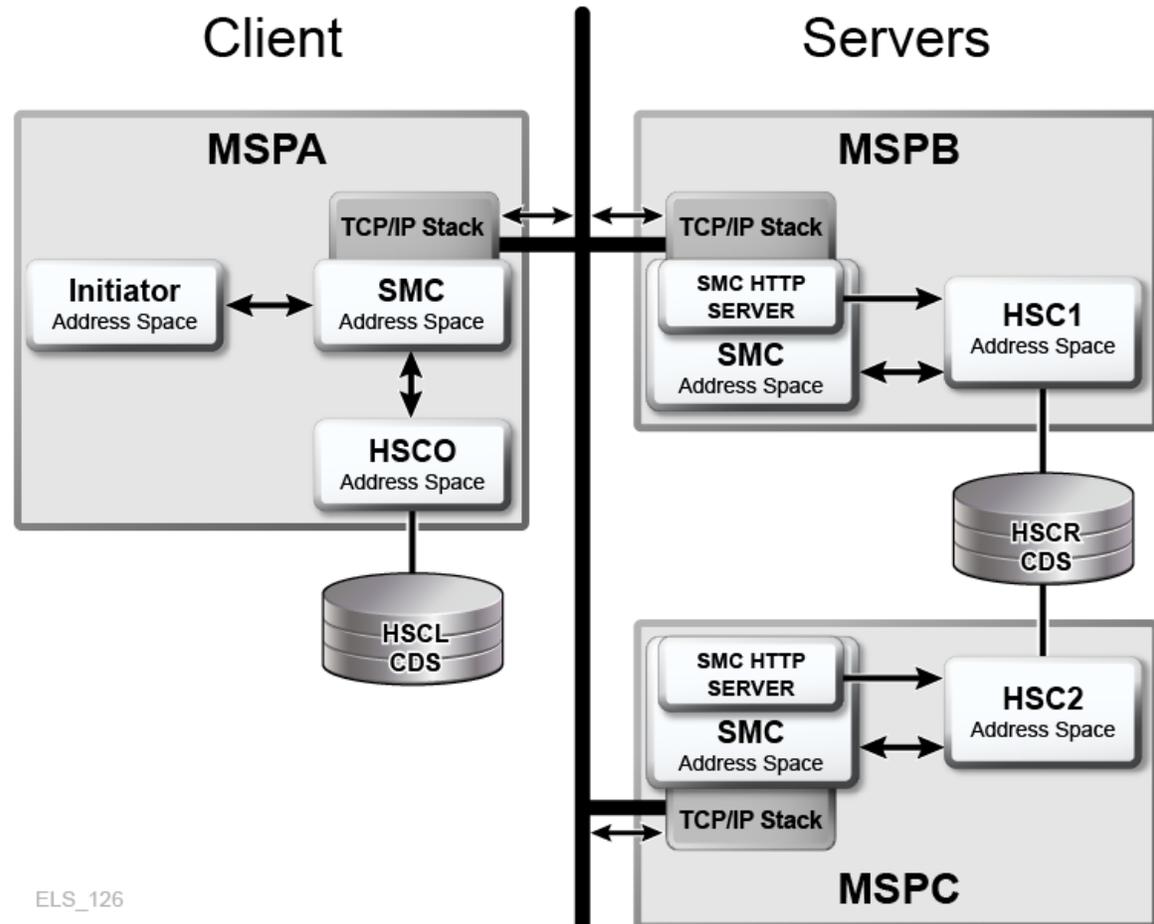
ELS_126

In this scenario, assume there are two TapePlexes (represented by two CDSs).

- SMC communicates directly with HSC on the same host.
- SMC uses the HTTP server to communicate with HSC on different hosts (MSPB and MSPC).

Allocation and mount requests originating in an Initiator Address Space on MSPA are intercepted by the SMC on MSPA. These requests are then sent to either the local HSCL executing on the same host, to HSC1 executing on host MSPB, or to HSC2 executing on host MSPB.

The following `TAPEPlex` and `SERVer` commands are required for the SMC on MSPA:

```
TAPEPLEX NAME(PLEX1) LOCSUBSYS(HSC0)
TAPEPLEX NAME (PLEX2)
SERVER NAME(MSPBPATH) TAPEPLEX(PLEX2) HOST(MSPB)
SERVER NAME(MSPCPATH) TAPEPLEX(PLEX2) HOST(MSPC)
```

> **Note:** See "SMC TapePlex Selection" for information on how the SMC selects among multiple TapePlexes to determine an "owner" for each allocation request (that is, each DD in a job step may have a different TapePlex owner).

The following `TAPEPlex` and `SERVer` commands are required for the SMC on MSPB:

```
TAPEPLEX NAME(PLEX2) LOCSUBSYS(HSC1)
SERVER NAME(MSPCPATH) TAPEPLEX(PLEX2) HOST(MSPC)
```

The HTTP component is defined for the SMC on MSPB:

```
HTTP START
```

The following `TAPEPlex` and `SERVer` commands are required for the SMC on MSPC:

```
TAPEPLEX NAME(PLEX2) LOCSUBSYS(HSC2)
SERVER NAME(MSPBPATH) TAPEPLEX(PLEX2) HOST(MSPB)
```

The HTTP component is defined for the SMC on MSPC:

```
HTTP START
```

> **Note:** There are no predefined limits to the number of TapePlexes or server paths that a single SMC can have configured.

Client/Server Drive Address Mapping

SMC and HSC provide facilities that allow you to manage an environment in which drive addresses are different between client and server hosts. Use the following scenarios to help you determine whether client/server drive address mapping is required, and what actions and facilities are required.

Scenario 1

- Client/server processing is not used.
- Each MSP host runs a copy of HSC.

Action Required: None

Scenario 2

- Client/server processing is used.

- Device addresses are identically defined for all hosts participating in a single client/server network.

Action Required: None

Scenario 3

- Client/server processing is used.

- Device addresses are identically defined for all hosts in a single client/server network, but not all devices are defined to all hosts.

Action Required: Drive address mapping is not required. However, you must use the HSC SET SLIDRIVS utility to define all drive addresses on hosts that will be used as servers, even if the devices are not defined to the host. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the SET SLIDRIVS utility.

Scenario 4

- Client/server processing is used.

- Device addresses are identically defined to all HSC hosts, but one or more SMC client-only hosts use a different set of addresses for the same device.

Action Required: Use the SMC DRIVemap command to map the SMC client host addresses to the HSC host addresses. SMC performs the necessary address translations in influencing allocations and requesting mounts from the server. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the DRIVemap command.

Scenario 5

- Client/server processing is used.

- Two MSP hosts (MSP1 and MSP2), both running HSC and SMC.

- One MSP host (MSP3) running only SMC but defined as communicating to either of the two hosts as a server.

- Device addresses are defined differently among all three hosts. For example:

- For example:

  - MSP1 (AA0-AAF)

  - MSP2 (BA0-BAF)

  - MSP3 (CA0-CAF)

Action Required:

1. Since the SMC on MSP3 can communicate with either the MSP1 or MSP2 host for a particular mount event, you must use the HSC SET utility, SET DRVHOST, to designate one of these hosts as the "drive host master." For example, MSP1 (AA0-AAF).

   Once the drive host master is specified in the HSC CDS, the addresses associated with that host master (AA0-AAF) are used by both MSP1 and MSP2 when communicating with the SMC.

   If desired, you can add a dummy host ID to be the HSC DRVHOST, and use nonexistent drive addresses to map to client addresses. For example, use the HSC SET NEWHOST utility to define host name DRVDUMMY and define the device range as 000-00F.

Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the HSC SET DRVHOST utility and HSC SET NEWHOST utility.

2. Use the SMC DRIVemap command on clients MSP2 and MSP3 to map drive addresses BA0-BAF and CA0-CAF to the server addresses AA0-AAF. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the DRIVemap command.

SMC Drive Type Information Synchronization

The SMC acquires drive type information from the ELS library control systems, HSC and using configuration queries sent from the SMC to each defined TapePlex.

■ For HSC subsystems, drive configuration changes are automatically recognized by the SMC for both local and remote systems.

Specifying Drive Type Information Using SMC UNITAttr Commands

The SMC UNITAttr command enables you to augment or override information returned from ELS library control system configuration queries as required by the local host tape device configuration. Specifically, the UNITAttr command enables you to do the following:

■ Set MODEL=IGNORE for device addresses not available for this host.

■ Specify model types for nonlibrary devices on this host.

■ Specify NOTAPEPLEX for a nonlibrary device address or range on this host, that are TapePlex owned devices on other hosts.

■ Specify TapePlex ownership for a device address or range that is defined to multiple TapePlexes, but for this host the attached devices belong to the specified TapePlex.

■ Specify TapePlex ownership and model for devices that may be referenced by a mount after the SMC is started, but before the TapePlex is initialized.

> **Note:** UNITAttr commands are not required, and should only be issued under the conditions described in this section.

Specifying SMC UNITAttr Commands for Inaccessible Devices

To define devices that are represented by a UCB, but are not accessible from this host, issue an SMC UNITAttr command for each inaccessible device as follows:

UNITATTR ADDR(ccuu) MODEL(IGNORE)

UNITAttr MOdel(IGNORE) processing remains unchanged from previous releases. As a result, SMC does not include the device in any of its processing.

Specifying SMC UNITAttr Commands for Nonlibrary Devices

To define nonlibrary device types on this host, issue an SMC UNITAttr command for each nonlibrary device as follows:

UNITATTR ADDR(ccuu) MODEL(model)

A nonlibrary device is a StorageTek device that requires additional model information to be defined to differentiate it from other nonlibrary devices with similar UCB characteristics.

Specifying SMC UNITAttr Commands for Nonlibrary Devices with the Same Address as a TapePlex-Owned Device

If a device address for your host overlaps with a device address for a TapePlex owned device, and the TapePlex owned device is inaccessible from this host, issue an SMC `UNITAttr` command specifying the NOTAPEPlex parameter as follows:

```
UNITATTR ADDR(ccuu) MODEL(model) NOTAPEPLEX
```

As a result, if a TapePlex such as HSC claims ownership through data returned from a configuration query, NOTAPEPlex overrides the TapePlex. The configuration information is ignored and the device remains a nonlibrary device.

If you fail to specify NOTAPEPlex, the TapePlex configuration information overrides the UNITAttr specified without the NOTAPEPlex parameter, and the device definition changes from a nonlibrary to TapePlex owned device.

Specifying SMC UNITAttr Commands for TapePlex-Owned Devices with the Same Address as Another TapePlex-Owned Device

If your configuration includes multiple TapePlexes with overlapping device addresses or ranges, and both TapePlexes are defined to the SMC, enter a `UNITAttr` command with the TAPEPlex parameter to establish which TapePlex owns the specified device or range on this host. Enter a `UNITAttr` command for each of the duplicate drive addresses as follows:

```
UNITATTR ADDR(ccuu) MODEL(model) TAPEPLEX(name)
```

Example Assume the following:

- Host MSPA includes two TapePlexes, HSC1 and HSC2.

- HSC1 includes a 9840 device range 2900-2903.

- HSC2 includes a 4480 device range 2900-2903.

- However, on MSPA, devices 2900-2903 are attached to HSC1. MSPA has no connection to the HSC2 device range.

Given this scenario, issue an SMC `UNITATTR` command as follows:

```
UNITATTR ADDR(2900-2903) MODEL(9840) TAPEPLEX(HSC1)
```

This command directs the SMC to ignore any configuration information for the specified devices from any TapePlex other than the specified TapePlex.

> **Note:** If MSPA recognized address range 2900-2903 defined to HSC2 as a different address range (for example, 4900-4903), MSPA would use the SET DRVHOST facilities to define address range 2900-2903 on HSC2 as address range 4900-4903 for any client configuration queries. See "Client/Server Drive Address Mapping."

Specifying SMC UNITAttr Commands for Devices in TapePlexes that are Initialized After the SMC

To define TapePlex owned devices when tape jobs are executed after the SMC starts but before the TapePlex is initialized, enter an SMC `UNITAttr` command for all TapePlex owned devices as follows:

```
UNITATTR ADDR(2900-2903) MODEL(9840) TAPEPLEX(HSC1)
...
UNITATTR ADDR(9000-903F) MODEL(VIRTUAL) TAPEPLEX(HSC1)
```

This directs the SMC to keep track of any tape policy for pending mounts, including VTCS MGMTCLAS.

SMC TapePlex Selection

When the SMC intercepts a specific or scratch allocation request, it selects an owning TapePlex to service the request. The following criteria are evaluated by the SMC in the order shown to determine which TapePlex controls the allocation request:

1. TapePlexes are interrogated in the order they are defined. If `TAPEPlex` commands are defined to the SMC, the order of the `TAPEPlex` commands is used. If `TAPEPlex` commands are not defined to the SMC, the order in the MSP SSCVT table is used.

2. If the Eligible Device List (EDL) for the request does not contain drives owned by a specific TapePlex, that TapePlex cannot own the request.

3. If an applicable SMC POLicy requests a specific TapePlex, it is selected as the request owner.

4. If the SMC POLicy esoteric contains only drives in a single TapePlex, it is selected as the request owner.

5. If the requested specific volume serial is specified in a TAPEREQ statement, the POLicy associated with the TAPEREQ determines the owner.

6. If a specific requested volume is found in a TapePlex, that TapePlex is considered the owner unless overridden by explicit esoteric or TapePlex selection. If the volume is not found in a TapePlex, but that TapePlex contains a VOLPARM definition for that volume, then the TapePlex is considered the owner if the specific volume is not found in any other TapePlex.

7. If a TapePlex indicates that it has scratch volumes for the request, it is considered the owner unless overridden by explicit esoteric or TapePlex selection. If the TapePlex does not have scratch volumes for the request, but the specified subpool name is known to the TapePlex, then the TapePlex will be considered the owner if scratch volumes are not found in any other TapePlex.

To select a TapePlex owner from among multiple libraries, specify a TapePlex name using the TAPEPlex parameter on the SMC `POLicy` command. Refer to the *ELS Command Control Statement, and Utility Reference* for information about this command.

4

Policy

Two primary functions of the SMC are to influence MSP allocation to select devices compatible with tape volumes and to intercept MSP messages for tape mounts and dismounts to automate these operations for library and virtual drives.

For specific volumes, SMC allocation is primarily based on volume media and location.

For scratch volumes, SMC allocation and mount processing are primarily based on user policies. Policies to control scratch allocation and mounts may be selected using either the SMC TAPEREQ control statements.

You can use user exits to select policies. Refer to the *ELS Legacy Interfaces Reference* for more information.

The SMC POLicy Command

Use the SMC `POLicy` command to specify your policies for tape allocation and mount requests. This command enables you to create a named policy containing all of the attributes associated with an allocation or mount event, including MEDia, RECtech or MODel, SUBPool, ESOTeric, VTCS MGMTclas, and TAPEPlex.

The `POLicy` command can be used with TAPEREQ statements to associate a named policy with allocation and mount requests.

SMC policies are normally defined in a single data set or PDS member which is loaded at SMC startup using the SMC `READ` command. Additionally, the `POLicy` command may be issued at any time to add a new policy or replace the contents of an existing policy.

In the following sample SMCCMDS data set, the `READ` command loads the CNTL.PDS(POLMEM) data set containing the SMC policies:

Example 4–1   Sample SMCCMDS Data Set

```
ALLOCDEF ZEROSCR(ON,INSIDE)
MSGDEF CASE(MIXED)
TAPEPLEX NAME(HSCPLEX) LOCSUB(HSC0)
READ DSN('CNTL.PDS(POLMEM)')
TREQDEF DSN('CNTL.PDS(TREQMEM)')
```

Note the following:

■   `POLicy` commands must be processed *before* the `TREQDEF` command if any `TAPEREQ` statements reference policies by name.

- If any `POLicy` command references a TAPEPlex, the TapePlex name must be defined using a `TAPEPlex` command *before* the `POLicy` command is processed.

- Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the SMC `POLicy` command and TAPEREQ control statement.

SMC Policy and Esoteric Preferencing

The SMC `POLicy` command enables you to preference devices during the allocation process. The ESOTeric parameter can specify a list containing a maximum of eight esoterics. During drive exclusion, devices in any of the listed esoterics are included. During drive prioritization, devices are ordered according to their position in the esoteric list. This feature enables you to do the following:

- Prefer faster or slower models of equivalent drives.

- Prefer a certain device type (for example, 9940) if drives are available but select an alternative device type if preferred drives are busy

By default, SMC prefers drives based on the following criteria in order:

1. specific volume LSM location

2. esoteric list

3. LSM scratch count.

The relative weight can be changed using the `POLicy` PREFer parameter. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information.

SMC Policy and the TAPEREQ Control Statement

SMC TAPEREQ control statements identify tape request attributes, including the tape policy associated with allocation and mount requests. The selected policy is based on the TAPEREQ selection criteria, such as data set name or job name.

The TAPEREQ POLicy parameter directs the SMC to reference an associated SMC policy defined by an SMC `POLicy` command.

TAPEREQ control statements reside in a definition data set specified by the `TREQDEF` operator command. TAPEREQ statements must be placed in this definition data set; they cannot be issued as operator commands.

Note the following:

- Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the SMC TAPEREQ control statement and `POLicy` command.

- POLicy commands must be processed *before* the `TREQDEF` command if any TAPEREQ statements reference policies by name. See "Sample SMCCMDS Data Set.".

- If your installation is using TAPEREQ statements without POLICY, or user exits, refer to the *ELS Legacy Interfaces Reference* for information about the interaction between POLICY and other TAPEREQ and user exit policy specifications.

Specifying TAPEREQ and Policy by Volume Serial

Using a combination of TAPEREQ statements and `POLicy` commands, SMC enables you to specify allocation policy based on specific volume serial numbers. In some cases this feature may allow you to replace HSC nonlibrary VOLATTRs with SMC TAPEREQ control statements and `POLicy` commands.

> **Note:** The VOLSER keyword on a TAPEREQ statement is allowed only if the POLicy keyword is also specified and references a previously defined SMC policy with the keyword VOLTYPE(SPECIFIC).

Using policy associated with volume serials enables you to:

- Define different volume characteristics for the same volume serial for different clients.

  For example, suppose that volser AAAAAA exists in the TapePlex on an HSC server with a media of STK1R, but on a specific client, volume AAAAAA is a nonlibrary standard cartridge. The following combination of POLicy commands and TAPEREQ statements allows the SMC to bypass the volume lookup for volume AAAAAA and use the specified policy information:

  ```
  POLICY NAME(MANVOL) VOLTYPE(SPECIFIC) MEDIA(STANDARD) NOTAPEPLEX
  TAPEREQ VOLSER(AAAAAA) POLICY(MANVOL)
  ```

- Limit volume lookup to a single TapePlex based on volume serial.

  For example, suppose that the SMC on a client host has two defined TapePlexes, PLEX1 and PLEX2, which contain overlapping volume serial ranges

  (AAA000-AAA999 and BBB000-BBB999). By default, SMC queries the TapePlexes in the order in which they are defined and uses information from the first TapePlex that recognizes the volume serial. The following combination of POLicy commands and TAPEREQ statements allows the SMC to choose the correct version of the volume for the client host:

  ```
  POLICY NAME(PLEX1VOL) VOLTYPE(SPECIFIC) TAPEPLEX(PLEX1)
  POLICY NAME(PLEX2VOL) VOLTYPE(SPECIFIC) TAPEPLEX(PLEX2)
  TAPEREQ VOLSER(AAA000-AAA999) POLICY(PLEX1VOL)
  TAPEREQ VOLSER(BBB000-BBB999) POLICY(PLEX2VOL)
  ```

- Direct allocation of volumes outside the library into a specific TapePlex.

  The following combination of POLicy commands and TAPEREQ statements causes SMC to bypass library volume lookup and allocate the selected nonlibrary volumes to library drives compatible with standard cartridges:

  ```
  POLICY NAME(INLIB) VOLTYPE(SPECIFIC) ESOTERIC(LIB1ESOT) MEDIA(STANDARD)
  NOTAPEPLEX
  TAPEREQ VOLSER(AAA000-AAA999) POLICY(INLIB)
  ```

> **Note:** In the example above, The NOTAPEPLEX parameter on the POLicy command directs the SMC system to bypass its TapePlex volume lookup logic.

Example

The following example illustrates the recommended method for specifying SMC Policy commands, TREQDEF commands, and TAPEREQ control statements.

1. Include the following entry in the SMC Start procedure:

   ```
   //SMCCMDS DD DSN=MY.PARMLIB(MYSMCCMD),DISP=SHR
   ```

2. Include the following entries in SMCCMDS member MYSMCCMD:

```
READ DSN('MY.PARMLIB(SMCPOL)')
TREQDEF DSN('MY.PARMLIB(SMCTREQ)')
```

> **Note:** If TAPEREQ statements include POLicy parameters, the POLicy commands must be processed *before* the TREQDEF command since the policy name in the TAPEREQ statement is validated against the defined policy definitions.

3. Add the SMC POLicy commands to member SMCPOL, for example:

```
POLICY NAME(POL1) SUBPOOL(SP1) MEDIA(STK1R) RECTECH(STK1RC) TAPEPLEX(HSC)
POLICY NAME(POL2) SUBPOOL(SP2) MEDIA(VIRTUAL) MGMTCLAS(ABC)
```

4. Modify TAPEREQ control statements in member SMCTREQ to point to the named policies, for example:

```
TAPEREQ DSN(A.B.*) POLICY(POL1)
TAPEREQ DSN(A.C.*) POLICY(POL2)
```

These TAPEREQ statements point to the SMC policy names defined in Step 3.

The HOST parameter on the SMC READ command enables you to specify different policy definitions for different hosts. For example:

```
READ DSN(MY.PARMLIB(PRODPOLS)) HOST=PROD
READ DSN(MY.PARMLIB(TESTPOLS)) HOST=TEST
```

If the host name is PROD, member PRODPOLS is loaded. If the host name is TEST, member TESTPOLS is loaded.

5

Allocation

A primary function of the SMC is to influence the operating system selection of tape drives during allocation to ensure that acceptable devices are selected in a StorageTek TapePlex and virtual environment. In addition, the SMC creates a preferred list of acceptable devices based on specific volume location, scratch load balancing, and user policies.

Generally, SMC allocation cannot add devices to the original list created from the job's JCL. It can only eliminate unacceptable devices and preference the remaining acceptable devices.

The SMC determines the list of drives acceptable for each tape allocation by applying a series of criteria (known as "exclusion levels") to the initial set of devices, removing those drives that do not meet the criteria. This process is known as *drive exclusion*.

If the SMC attempts to apply a particular exclusion criterion and therefore, all remaining eligible drives are excluded, messages SMC0045 and SMC0046 are displayed indicating that a particular exclusion criterion could not be applied. However, the exclusion process continues, with the SMC applying subsequent criteria if possible.

SMC allocation may intentionally cause a job to fail allocation when it appears that a mount to any of the drives in the available list would fail. For example, a volume with a media STK1R cannot be physically mounted on a 9490 drive, and a nonlabeled tape cannot be virtual.

Additionally, some customers may prefer to fail a job in allocation rather than use undesired scratch media or require a specific volume to be ejected and entered into a different ACS. You can use the SMC ALLOCDEF (or ALLOCJOB) MINLVL parameter to fail jobs in allocation, or conversely, to override the SMC default behavior of failing jobs in allocation.

- Setting MINLVL=0 specifies that the SMC should NEVER fail a job in allocation.

- The default MINLVL, 2, indicates that jobs should be failed in allocation only for incompatible media or virtual label type.

Customers may set MINLVL to higher values if desired. See "Drive Exclusion" for detailed information about SMC exclusion levels for specific and scratch volumes.

After all exclusion criteria have been applied, the remaining drives are arranged in order of their desirability based on policy, volume location or scratch count, and last mount time. This process is known as *drive prioritization*. During this process, the SMC also sets flags in MSP control blocks to indicate that the mount should be deferred until OPEN, unless a policy specifies that mounts should not be deferred.

> **Note:** SMC allocation does not consider the status of the drives (for example offline, busy) when selecting drives eligible for an allocation request. If all SMC-selected drives are unavailable, the job enters allocation recovery.

Drive Exclusion

The drive exclusion process includes the following steps:

1. The SMC examines the initial list of eligible devices for each tape DD in each jobstep (or dynamic allocation), and gathers policy information from various sources, including a combination of SMC POLicy commands and TAPEREQ control statements and user exits.

2. The SMC uses policy information to select the "owning TapePlex" for each tape allocation. If a POLICY specifies a TapePlex name, or specifies an esoteric that contains devices controlled by a single TapePlex, then that TapePlex is selected as the owner for allocation.

   When multiple TapePlexes are eligible for ownership of the application, the first TapePlex that returns a successful status is selected as the owner. For a specific volume request, a successful response indicates that the volume is in the library or is defined as a virtual volume. For a scratch request, a successful response indicates that the TapePlex has available scratch volumes for the requested media and scratch subpool.

3. The SMC performs "volume lookup" by communicating with one or more TapePlexes, and gathering information about specific volume characteristics and location, in addition to available scratch volumes. If the SMC is unable to obtain this information from a TapePlex, the ALLOCDef FAILnoinfo parameter may be used to control whether the job is allowed to fail in allocation or to proceed based only on available policies.

4. The SMC applies the information received from volume lookup and policies using an ordered set of levels, with the earliest (lowest numbered) levels applied first and least important levels applied later. For example, level 2 is considered more important, and is applied before level 3.

Whenever application of a particular exclusion would eliminate all drives, the SMC ignores the criterion and continues with the next exclusion level.

Note the following:

- See Chapter 4, "Policy" for a description of SMC Policy specification.
- Refer to the *ELS Legacy Interfaces Reference* for more information about user exits.

Drive Exclusion - Specific Volumes

For a specific volume allocation, the SMC excludes drives in order from lowest exclusion level to highest, based on the criteria in the following table. The lower the level number, the more important the exclusion criteria.

Keywords associated with each exclusion level are specified in the exclusion criteria displayed in messages SMC0043 and SMC0046.

Table 5–1   Drive Exclusion Levels (Specific Request)

Level	Specific Volume Criteria	Keyword
Multiple TapePlex Pre-Req 1	Exclude drives not in requested TapePlex Primary source: POLicy TAPEPlex parameter Secondary source: Specific volume user exit (08/13) TAPEPLEX	None
Multiple TapePlex Pre-Req 2	Exclude drives based on ESOTERIC when the esoteric only includes devices in one TAPEPLEX. Primary source: POLicy or TAPEREQ ESOTeric parameter Secondary source: Specific volume user exit (08/13) ESOTERIC	None
Multiple TapePlex Pre-Req 3	Exclude drives based on unsuccessful volume lookup. Only drives in the first TapePlex that has a successful volume lookup remain eligible. If no TapePlex has a successful volume lookup, then the first defined TapePlex is used.	None
1	For non-labeled (NL) specific volume requests, exclude all virtual drives. Exclude all MODEL=IGNORE drives. Exclude drives incompatible with the volume media. Primary source: external volume label Secondary source: VOLATTR MEDIA parameter The volume media can be obtained from the volume label or from an HSC VOLATTR statement MEDIA parameter.	VIRTUALLABEL MEDRECTECH
2	For virtual volumes only, exclude virtual drives that reside in an inaccessible VTSS or in a VTSS to which a migrated virtual volume cannot be recalled. This is the default minimum level.	AVAILVTSS
3	Exclude drives based on the required recording technique. Source: VOLATTR RECTECH parameter or volume density (that is, 9840A/B and 9840C).	VOLATTRRECTECH
4	Exclude drives based on user location policies. Primary source: POLicy or TAPEREQ ESOTERIC parameter. Secondary source: Specific volume user exit (08/13) or affinity separation exit (10/12) return codes.	USERPOLICY
5	Exclude drives based on the SMC ALLOCDEF EXTVOLESOT esoteric.	EXTVOLESOT
6	Exclude drives based on volume location type (that is, library or nonlibrary).	LOCTYPE
7	Exclude drives based on the ACS location of the volume (for library volumes), and the resident VTSS for virtual volumes.	ACSORVTSS
8	Exclude drives based on the requested recording technique. Primary source: POLicy or TAPEREQ RECTECH parameter.	POLRECTECH

Example

The following example illustrates how the SMC applies exclusion levels to influence the allocation of specific volumes.

JCL:

```
//DDNAME DD DSN=ABC.DEF,DISP=OLD
```

Policy specification:

```
POLICY NAME(POL1) VOLTYPE(SPECIFIC) ESOTERIC(A19840B,A19840A)
```

```
RECTECH(STK1RB)

TAPEREQ DSN(ABC.*) POLICY(POL1)
```

Volume lookup information:

- Specific volume VOL123
- SMC volume lookup indicates that VOL123 has a media type of STK1R single density in TapePlex HSCLIB ACS 0.

Allocation Exclusion Processing:

1. Starting at exclusion level 1, the SMC excludes all non-9840 devices (those not compatible with the volume media).

2. Level 2 has no effect.

3. The SMC does not exclude any devices at level 3 since there was no HSC VOLATTR to limit the volume to single density drives.

4. The SMC excludes all drives not in the esoteric A19840B or A19840A.

5. The SMC does not exclude any devices at level 5 because the volume is in the TapePlex.

6. The SMC excludes all nonlibrary drives, if any remain.

7. The SMC attempts to exclude all drives not in ACS 0. However, since the remaining devices at this point include only 9840 drives in ACS1 (based on the esoterics A19840B and A19840A), there are no drives remaining in the EDL after this exclusion.

    The SMC then "backs up" to the EDL as it was before the level 7 exclusion and issues messages SMC0045/SMC0046 specifying ACSORVTSS as the conflicting criterion.

    Only drives in esoterics A19840B and A19840A remain eligible, based on exclusion level 4.

8. Level 8 has no effect.

Allocation preference processing:

During drive prioritization, SMC assigns a higher preference value to drives in esoteric A19840B, and a lower preference value to drives in A19840A.

Drive Exclusion - Scratch Volumes

For a scratch volume allocation, the SMC excludes drives in order from lowest exclusion level to highest based on the criteria in Table 5–2. The lower the level number, the more important the exclusion criteria.

Keywords associated with each exclusion level are specified in the exclusion criteria displayed in messages SMC0043 and SMC0046.

Table 5–2   Drive Exclusion Levels (Scratch Request)

Level	Specific Volume Criteria	Keyword
Multiple TapePlex Pre-Req 1	Exclude drives not in requested TapePlex Primary source: `POLicy` Secondary source: TAPEPLEX name from user exit (02/04)	None
Multiple TapePlex Pre-Req 2	Exclude drives based on ESOTERIC when the esoteric only includes devices in one TAPEPLEX. Primary source: `POLicy` or TAPEREQ ESOTeric parameter Secondary source: Scratch volume user exit (02/04) ESOTERIC	None
Multiple TapePlex Pre-Req 3	Exclude drives based on unsuccessful scratch lookup based on media type and subpool. Only drives in the first TapePlex that has a successful scratch lookup remain eligible. Primary source: `POLicy` or TAPEREQ MEDIA and SUBPOOL parameters. Secondary source: Scratch volume user exit (02/04) subpool If no TapePlex has a successful scratch lookup, the first defined TapePlex is used.	None
1	For nonlabeled (NL) scratch volume requests, exclude *all* virtual drives. Exclude all MODEL=IGNORE drives.	VIRTUALLABEL
2	For virtual volumes only, exclude virtual drives that reside in an inaccessible VTSS, and all drives in VTSSs that do not support the requested VTCS Management Class.	AVAILVTSS
3	Exclude drives based on the requested media. Primary source: `POLicy` or TAPEREQ MEDIA parameter. Secondary source: Scratch volume user exit (02/04) virtual media return code or virtual esoteric.	POLMEDIA
4	Exclude drives based on user location policies. Primary source: `POLicy` or TAPEREQ ESOTERIC parameter. Secondary source: Scratch volume user exit (02/04) or affinity separation exit (10/12) return codes.	USERPOLICY
5	Exclude drives based on the media of available scratch volumes in subpool. Primary source: `POLicy` or TAPEREQ SUBPOOL parameter. Secondary source: Scratch volume user exit (02/04) subpool name or number. Tertiary source: Scratch subpool 0 (default subpool), containing all real and virtual scratch tapes including those in named subpools.	SUBPOOL
6	Exclude library, nonlibrary, or virtual drives based on location of available library or virtual scratch volumes.	LOCTYPE
7	Exclude drives based on the SMC `ALLOCDef` command ZEROSCR parameter.	ZEROSCRATCH
8	Exclude drives based on the requested recording technique. Primary source: `POLicy` or TAPEREQ RECTECH parameter	POLRECTECH

Example - Real Scratch Volume

The following example illustrates how the SMC applies the exclusion levels to influence the allocation of scratch volumes.

JCL:

```
//DDNAME DD DSN=DEF.GHI,DISP=NEW
```

Policy specification:

```
POLICY NAME(POL2) VOLTYPE(SCRATCH) SUBPOOL(SP1) MEDIA(ECART) MODEL(9490)

TAPEREQ DSN(DEF.*) POLICY(POL2)

SMC ALLOCDEF ZEROSCR(ON)
```

Scratch user exit returns use SUBPOOL(SP2) and ESOTERIC(XYZ).

Volume lookup information:

SMC volume lookup reports that TapePlex HSCLIB has scratch volumes in subpool SP1.

Allocation exclusion processing:

1. Starting at exclusion level 1, the SMC excludes drives which have an SMC `UNITATTR` command specifying MODEL=IGNORE.

2. Level 2 has no effect.

3. The SMC excludes all devices that do not support a media ECART.

4. Because POLicy is specified, the user exit esoteric XYZ is ignored, and level 4 has no effect. Message SMC0197 is issued to indicate this.

5. The SMC excludes all drives not compatible with the scratch volumes in subpool SP1 (TAPEREQ policy overrides user exit policy).

6. The SMC excludes all nonlibrary drives.

7. If scratch volumes for SP1 exist only in a single ACS, the SMC excludes drives in other ACSs.

8. The SMC excludes all remaining drives that do not have a MODEL of 9490.

Example - Virtual Scratch Volume

The following example illustrates how the SMC applies the exclusion levels to influence the allocation of virtual scratch volumes.

JCL:

```
//DDNAME DD DSN=GHI.JKL,DISP=NEW
```

Policy specification:

```
POLICY NAME(POL3) VOLTYPE(SCRATCH) ESOTERIC(VTSS1) SUBPOOL(VIRT1) MGMTCLAS(MGMT1)
TAPEREQ DSN(GHI.*) POLICY(POL3)

SMC ALLOCDEF SMS(ON)
```

As MGMT2 is not a valid policy name, it is ignored and the policy from TAPEREQ POL3 is used.

Volume lookup information:

SMC volume lookup returns a list of VTSSs eligible for scratch allocation. In this example the list returned is VTSS2 and VTSS3 based on online VTSSs with access to ACSs and RTD recording techniques compatible with MGMT1.

Allocation exclusion processing:

1. Starting at exclusion level 1, the SMC excludes drives which have an SMC `UNITATTR` command specifying MODEL=IGNORE.

2. The SMC excludes all virtual drives not in either VTSS2 or VTSS3.

3. The SMC excludes all non-virtual drives because the POLICY esoteric VTSS1 contains only virtual drives.

4. The SMC excludes all drives not in VTSS1.

   Since VTSS1 is not one of those returned by HSC/VTCS, the SMC "backs out" the level 4 exclusion and issues messages SMC0045/SMC0046, but continues other processing. Only drives in VTSS2 and VTSS3 remain eligible, based on exclusion level 2.

   In this example, the remaining exclusion levels have no effect.

Affinity Separation

Explicit unit affinity is an MSP facility that allows volumes associated with two separate JCL DD statements, or allocation requests, to be mounted serially on the same drive. A request for all generations of a GDG group (GDG ALL chain) can be considered as a GDGALL affinity.

The SMC makes no distinction between these two types of affinity. When processing an affinity chain, the drive exclusion process examines each allocation in the chain separately up to and including the minimum exclusion level. The chain is always separated when the minimum exclusion level processing results in lists of eligible drives, for two or more members of the chain, that do not contain common drives.

For example:

```
//DD1 DD UNIT=CART,DSN=MY.STK1R.DATASET,DISP=OLD
//DD2 DD UNIT=AFF=DD1,DSN=MY.LONGI.DATASET,DISP=OLD
```

DD1 specifies a data set on 9840 or T9840B media and DD2 specifies a data set on longitudinal media. Drive exclusion level 1 for specific volumes creates a list of eligible drives for each DD according to volume media required. The two lists do not contain a common drive. As a result, the SMC breaks the affinity chain between DD1 and DD2, and the two DD statements no longer represent one drive allocation but two separate allocation requests.

Affinity Head-Of-Chain

For SMC affinity chain processing, the head of the affinity chain containing only scratch or only specific volumes is the first DD statement in the chain. If an affinity chain contains both scratch and specific volumes, the first specific volume is treated as the head of chain.

User Policy Influence on Affinity Separation

After the minimum level of drive exclusion and affinity separation completes, user policy influences the remaining affinity separation decisions.

You can use the ALLOCDef or ALLOCJob SEPLvl parameter to specify that affinity chains NOT be separated based on the exclusion levels described in this chapter. You can also use user exits 10 and 12 to control affinity separation. Refer to the *ELS Legacy Interfaces Reference* for more information.

Drive Prioritization

SMC drive priority is assigned based on the following criteria:

- For specific volumes, drives in LSMs closest to the volume are preferred. The SMC sets equal priority value for drives that are located the same number of passthrus away from the specific volume.

- For scratch volumes, drives in LSMs with the largest number of scratch volumes matching the policy-requested media and recording technique are preferred.

- The POLicy ESOTeric list causes drives to be preferred according to the order specified in the esoteric list.

- The POLicy PREFer parameter indicates the relative priority of LSM location (location for specific volumes), the esoteric list (esoteric for both scratch and specific volumes) and scratch count (count for scratch volumes) in determining the preference value of each device.

> **Note:** Refer to the *ELS Legacy Interfaces Reference* for other prioritization factors.

After a final list of drives has been selected for allocation, the preference order of the eligible drives (after considering LSM and drive type preferencing) is selected based on a "last use" algorithm.

To reduce excessive wear on allocated drives, the SMC assigns drive preference values by rotation based on the "last mount time" for each drive. This value is examined for every drive in the final drive list. The drive that had the most recent mount is located, and the drive immediately following it in the list is selected as the most preferred for the current allocation.

> **Note:** This algorithm does not apply to virtual drives.

Deferring Mounts

By default, the SMC defers all automated tape mounts. The SMC ALLOCDef command DEFER parameter can be set to override this default. For optimal performance, it is recommended that you use the default DEFER(ON). Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the SMC ALLOCDef command.

> **Note:** Virtual mounts are always deferred.

SMC Allocation Exceptions

The SMC does not influence the following types of cartridge tape allocation:

- Demand allocation (that is, request for a specific drive(s))

> **Note:** The SMC performs DEFER processing for demand allocation.

- Allocations excluded explicitly by entering the ALLOCJob command BYPASS parameter. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the SMC ALLOCDef command.

■   Allocations where the list of eligible devices contains only devices that are "unknown" (that is, not virtual, not library, and not defined in an SMC `UNITAttr` command).

SMC Allocation Processing - JES Operating System Hooks

The SMC examines all I/O device allocations on a JES system to determine whether to process the allocation request.

The SMC uses the MSP subsystem interface (SSI) IEFJFRQ Subsystem Function Request exit to gain control during tape allocation events. The SMC takes control in the JES environment for the SSI24 (common allocation) Subsystem Function.

SSI24 Common Allocation

During SSI24 common allocation processing, the SMC performs the following processes to arrive at the best set of eligible drives:

■   Drive exclusion

■   Unit affinity separation

■   Defer processing (when CA1RTS is set to ON)

■   EDL updated with the drive exclusion results (when MIACOMPAT is set to ON)

The results of the drive exclusion process are not reflected in MSP control blocks until tape allocation time, unless MIACOMPAT or CA1RTS is set to ON.

The results of unit affinity separation are used to update MSP VOLUNIT entries in the SIOT.

6

Message Handling

The SMC intercepts specific MSP, JES, and Tape Management System (TMS) messages related to mount, dismount, and swap operations. When the intercepted message includes a drive defined to a TapePlex, the SMC directs the owning TapePlex to perform the requested operation.

Messages that are intercepted by the SMC are listed in Appendix A, "Intercepted Messages".

Note: The IATUX71 user exit must be installed to allow JES mount messages to be processed. Refer to the publication *Installing ELS* for more information.

User Directed Message Handling

If the SMC does not currently support the Tape Management System at your installation, you can still direct the SMC to intercept the specific messages issued by your TMS. Use the USERMsg command to define these additional messages. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information.

User Exit 01 enables you to change or enhance actions taken on intercepted messages, and can direct the SMC to perform actions on messages that are not in the intercepted message list.

The SMC calls the user exit for each intercepted message. This includes the default messages listed in Appendix A, "Intercepted Messages" and all messages defined using the USERMsg command.

Note the following:

■ Only messages intercepted by the SMC are passed to the user exit.

■ The SMC does not support the user exit 01 return code of REPLY.

Message Handling Policies

The SMC honors the following MSP and SMC policies related to mount, dismount, and swap message handling:

MSP Policies

The System Authorization Facility (SAF) enables tape protection at the volume level (CLASS=TAPEVOL) using your current security software. If defined, the SMC honors the policies defined through the SAF interface regarding the write-protect requirement

for a volume mounted on a library transport. The SMC invokes the SAF interface by issuing a RACROUTE macro, and protects read-only volumes through the ACS Virtual Thumbwheel (VTW) support.

SMC Policies

The SMC `MOUNTDef` command enables the control of message handling (that is, mount/dismount) options previously controlled by the HSC `MNTD` command, HSC input parameters and LIBGEN options.

These options control the automation of pending mounts, delete disposition at dismount time, whether messages are produced when a library volume is mounted outside the library, and when mount messages are rolled off the console.

> **Note:** Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the `MOUNTDef` command.

Tape Management System Support

The SMC interprets Mount, Dismount, and Swap messages from the following Tape Management Systems:

- CA-1
- CA-DYNAM/TLMS
- AutoMedia (Zara)
- CONTROL-T

For tape management systems that supply a subpool, the subpool is interpreted by the SMC and used as the requested subpool name, unless overridden by user exit 01 or a TAPEREQ statement. Related messages include:

- CTS002
- CTT101A
- CTT104A
- TMS002

SMC Swap Processing

The SMC automates the swap process (I/O error or operator initiated) in the same manner as HSC enhanced swap processing. This eliminates the need for operators to find a compatible "swap-to" device when DDR has chosen an incompatible device. If the SMC cannot find a compatible swap-to device, or if all compatible devices are busy, the SMC issues a message and control is returned to DDR processing with no further SMC involvement. Enhanced swap processing is the only mode supported in SMC.

The SMC swap process begins when one of the following messages is issued:

```
KHE200I
KHE203I
KHE205I
```

If device XXX1 is known to the SMC as a library device, the SMC suppresses the message and begins the automatic swap process.

The SMC issues one of three messages:

- `SMC0108  No compatible drive found for SWAP processing`

- Or when a compatible drive can be selected by the SMC:

  `SMC0107  SWAP volser from XXX1 to XXX2`

- Or when the MOUNTDEF SWAPLIMIT count has been exceeded:

  `SMC0233 SWAPLIMIT=NNNNNN exceeded; swap processing canceled`

If SMC0108 has been issued and MOUNTDEF SWAPAUTOREPLY is on then message KHE201D or KHE206D will be replied to with NO.

If SMC0233 has been issued and the bypassReply variable of MOUNTDEF SWAPLIMIT is OFF then message KHE206D will be replied to with NO.

Device XXX2 is the SMC-selected device that has been determined to be compatible for the swap. The SMC next suppresses the MSP KHE201D or KHE206D message and replaces the message with:

```
SMC0110 Allow swap of volser from XXX1 to XXX2;
Reply 'Y', or 'N' or DEVICE
```

The operator may approve the device selected, cancel the swap or choose a different device. If the operator selects a different device, the SMC accepts the device with no further compatibility checking.

If the reply is 'Y' or a new device, MSP issues the following message:

```
KHE202I PROCEED WITH SWAP OF XXX1 TO XXX2
```

If XXX1 is a library owned device, the dismount of the volume is automated. If XXX2 is a library owned device, the mount of the volume is automated.

> **Note:** Ensure that your MSP security package (for example, RACF, TopSecret) is configured to grant SMC the necessary authority to respond to MSP swap messages KHE201D and KHE206D.

HSC Mount-Related Messages

Certain mount-related messages may still be issued by the HSC due to error conditions.

- SLS0088D is issued when, due to an error condition, a repeated mount for the same volume is required.

- SLS1075D is issued when a dismounted volume encounters an I/O or other type of error.

Managing HSC Mounts from the SMC Client

SMC client/server architecture provides the ability to perform management of certain mount/dismount exception conditions from the client console rather than from the server console. Conditions handled by the SMC include the following:

- Displaying messages on the drive and console indicating the volume and its location for manual mounts when an LSM is offline.

■ When a drive is found to be loaded with another volume during a mount request from a job in execution, the dismount is forced and the mount is automatically redriven based on the UCB outstanding mount status.

> **Note:** When a mount or dismount message is intercepted by SMC and directed to an HSC server, the SLS0107D message is not issued on the server or client. When a loaded drive condition is detected by the HSC for an SMC directed dismount, the HSC waits one minute for the drive to unload, and then terminates the dismount. If the dismount is performed as part of a mount request from the SMC, the loaded drive status is returned to the SMC, and the SMC then redrives the mount request if the mount is still pending.

■ When a drive or volume is in use by another process, verifying that the mount is still pending, periodically retrying the request, and allowing the operator to cancel or retry the request at any time

■ When the TAPEPlex WTORdest Client option is selected, certain WTOR messages are not issued on the HSC server but are sent directly to the client console instead. The operator response to the message is then transmitted back to the server, as SMC redrives the mount or dismount to the server. The following HSC mount/dismount WTOR messages are currently supported with this option:

- SLS0134

- SLS0905

- SLS2126

- SLS2905

- SLS2984

- SLS0109

- SLS4084

Refer to the publication *ELS Messages and Codes* for more information about these messages.

7

Monitor Functions and Recovery Procedures

SMC provides several internal monitor functions designed to ensure that the SMC subsystem and all client/server communications are operating correctly.

The SMC monitor subtask periodically performs the following actions, depending on the parameters you set in the SMC `MONitor` command:

- Checks TapePlex communications when there are no currently active communication paths, or when the current communication path is not the preferred path.

- Checks TapePlex communications when there has been no communication with the TapePlex for a period of time.

- Ensures that the SMC IEFJFRQ exit, where SMC influences MSP/EX allocation, is active.

- Cleans up inactive communication tokens

- Re-drives pending mounts

- Optionally, reports on scratch subpools that have reached their low scratch threshold value

If you do not enter a `MONitor` command, all of the above actions, except for scratch thresholds, are monitored. In addition, by default, SMC always attempts to revert to the primary communication path (first defined server) after an outage.

Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the SMC `MONitor` command.

Communications Monitoring

If SMC monitoring is active, the status of each TapePlex is checked periodically.

If the TapePlex appears to be active, communicating on the local or primary server path (or has PREFprimary set to OFF), is at full service level, and has established communication since the last active check interval, then no further processing is performed.

However, in any of the following circumstances, the SMC attempts to communicate with the TapePlex, restarting at the first defined communication path if PREFprimary ON is set.

- The TapePlex does not have a current active communication path.

- The TapePlex is active on a secondary communication path and the default value PREFprimary ON is set.

■ The TapePlex is not at the full service level.

■ The TapePlex has not established communication since the last active check interval.

Whenever communication is switched from one communication path to another, or communication is successfully established after a period of not communicating to the TapePlex, an SMC message indicating communication switched or active is produced.

When SMC detects an error preventing communication, one of the following SMC messages is produced and remains as a non-deletable message on the console:

■ Message SMC0260 indicates a specific error for a local path or server.

■ Message SMC0261 indicates that there are no defined, non-disabled communication paths for a TapePlex.

The presence of either of these messages indicates that SMC cannot currently communicate with a TapePlex, and cannot influence tape allocation based on server volume information. When this situation occurs, allocation may be directed to drives with a device type that is incompatible with the volume. Oracle recommends setting the `ALLOCDef` command FAILnoinfo SPECIFIC parameter to fail jobs during allocation to prevent specific tape allocations from being directed to incorrect device types.

Mount Monitor

An important function of the SMC monitor subtask is to ensure that all mounts have been successfully automated.

The monitor subtask periodically checks all UCBs for pending mount status, and compares this status to the last mount request sent by SMC to the server for the device. Mounts that were not sent to the server due to TapePlex or communication outages are re-driven as soon as possible. For other types of mounts, SMC issues message SMC0231 to indicate that the mount monitor has detected an outstanding mount, and then performs different processing for virtual and real tape mounts.

■ For virtual tape mounts, SMC sends the request to the server and receives a response indicating that the mount request was accepted by the server. If the mount remains pending after a pre-determined interval, SMC attempts to re-issue the mount request, with an indication that no response should be generated until the mount completes or fails. If a failure occurs, SMC updates the SMC0231 message with the failure reason (for example, that a VTV could not be recalled from an MVC volume), and the message remains non-deletable until the mount succeeds or the job is canceled.

■ For real mount failures, which may result from hardware outages or other issues where the operator responded "I" (ignore) to an HSC mount WTOR message, SMC waits for a pre-determined interval and then attempts to re-drive the mount.

■ For both real and virtual mounts, only a single attempt is made to re-drive a mount. The SMC0231 message remains outstanding to indicate the reason why a pending mount was not satisfied.

> **Note:** SMC does not support detection of pending mounts when the following conditions are present:
>
> ■ ALLOCDef DEFer(OFF) has been specified,
>
> ■ the job entry subsystem is JES, and
>
> ■ the mount is outstanding on a JES LOCAL processor.

You can use the SMC `Display DRives` command to determine the current status of a pending mount within the SMC subsystem. Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the statuses displayed by this command.

Recovery Procedures

Because the SMC Mount Monitor checks and re-drives pending mounts, it should not be necessary to perform manual procedures to cause the system to re-drive an outstanding mount. However, if a mount re-drive was unsuccessful, and the cause of the problem was resolved, you can use the SMC `RESYNChronize` command to force outstanding mounts to be re-driven again by SMC. If the mount remains unsatisfied, you may need to perform a manual recovery.

> **Note:** SMC does not support detection of pending mounts when the following conditions are present:
>
> ■ ALLOCDef DEFer(OFF) has been specified,
>
> ■ the job entry subsystem is JES, and
>
> ■ the mount is outstanding on a JES LOCAL processor.

Inactive TapePlex or Inactive SMC: Preventing Allocation Errors

When a TapePlex becomes inactive, or communication errors prevent SMC from communicating with a TapePlex, allocation may select a device incompatible with a specific volume. To prevent this from occurring, it is recommended that you set the `ALLOCDef` command FAILnoinfo parameter to SPECIFIC, which will cause jobs to fail in allocation rather than be allocated to an incompatible device.

Certain software products allow you to suspend processing that may require dynamic allocation. For example, if one of these software products is installed on the local processor, you can issue commands to prevent this type of processing without stopping the product.

In JES, you can postpone common allocations by holding the job queue or purging all initiators. Refer to the appropriate Fujitsu publication for more information about JES operator commands.

Inactive TapePlex or Inactive SMC: Re-Driving Mounts

You can use the operating system facilities to determine mounts that may not have been successfully re-driven by either the SMC Mount Monitor or the SMC `RESYNChronize` command.

Issue the following command to determine how long the job has been waiting:

`*I,J=jjjj,W`

where *jjjj* is the job number.

Issue the following command to determine the volume and drive the job is waiting on:

`*CALL,DISPLAY,J=`*jjjj*

If a mount is lost during MSP processing, issue the following MSP command on the system requesting the mount to determine if any drives have a mount request pending:

`D R,L`

Issue the following command to determine which volser to mount:

`D U,,,`*uuuu*`,1`

where uuuu is the address of the device for which the mount is pending.

If the SMC is inactive but the TapePlex is active, you can use the HSC `Mount` command to request HSC to perform the mount:

`M `*vvvvv*`,`*dddd*

Refer to the *ELS Command, Control Statement, and Utility Reference* for more information about the HSC `Mount` command.

SMC Recovery Procedures (JES)

This section describes recovery procedures for the following problem scenarios:

- "Inactive SMC - Active TapePlex"
- "Active SMC - Inactive TapePlex"
- "Automating Mount Requests for Inactive TapePlexes"
- "Lost MSP Mount Requests for Active TapePlexes"

Inactive SMC - Active TapePlex

When the SMC fails while one or more TapePlexes remain active, the following functions are not performed:

- Allocation processing
- Automation of mount/dismount/swap messages

When this occurs, restart the SMC.

Certain software products allow you to suspend processing that may require dynamic allocation. For example, if one of these software products is installed on the local processor, you can issue commands to prevent this type of processing without stopping the product.

Common allocations can be postponed by holding the job queue or purging all initiators. Refer to the appropriate Fujitsu publication for more information about JES operator commands.

If the SMC MOUNTDef AUTOPendmount (ON) option was specified, outstanding mount messages are re-driven.

Active SMC - Inactive TapePlex

When a TapePlex fails or is terminated, volumes and drives owned by that TapePlex become unknown to SMC. The following functions are not performed:

- Volume lookup for allocation influencing
- Automated mount processing

When this occurs, restart the TapePlex and issue the SMC `RESYNC` command. The SMC re-establishes communication with the TapePlex and automates any outstanding mounts, regardless of the SMC `MOUNTDef` AUTOPendmount setting. See "Automating Mount Requests for Inactive TapePlexes" below for more information.

Certain software products allow you to suspend processing that may require dynamic allocation. For example, if one of these software products is installed on the local processor, you can issue commands to prevent this type of processing without stopping the product.

Common allocations can be postponed by holding the job queue or purging all initiators. Refer to the appropriate Fujitsu publication for more information about JES operator commands.

> **Note:** You can provide a backup path to a remote TapePlex that is automatically activated when the local HSC is discovered to be inactive. See Chapter 3, "SMC and StorageTek TapePlex Management" for more information.

Automating Mount Requests for Inactive TapePlexes

MSP mount requests for drives owned by inactive TapePlexes are automatically redriven when the corresponding TapePlexes are activated.

Lost MSP Mount Requests for Active TapePlexes

An MSP mount request may be lost when an LMU error occurs. Use this procedure if you suspect lost mounts.

1. Issue the following MSP command on the system requesting the mount to determine if any drives have a mount request pending:

   `D R,L`

2. Issue the following MSP command on the same system to determine which VOLSER to mount:

   `D U,,,uuuu,1`

3. If the drive is defined to an HSC TapePlex, issue the HSC `Mount` command for the volume on the MSP system on which the HSC is active.

A

Intercepted Messages

This appendix describes messages from external sources that are intercepted by the SMC.

Fujitsu Operating System Messages

The messages listed in Table A–1 are received by the SMC. Fujitsu message manuals describe the exact format (for example, spacing) and definition for each message. Ellipses indicate that the message contains more text than is shown.

Correct operation of the SMC depends on these messages. Do not suppress or alter them using products designed to handle messages through the subsystem interface (SSI). Many automated operations systems use the subsystem interface to intercept and alter or suppress messages.

> **Note:** If the "suppressed by subsystem" and "hardcopy only" bits are turned on in the WQE (the MSP write queue element) before the SMC has received the message, the SMC ignores the WTO, and the message is not displayed at the console.

If you plan to use an automated operations system and are unsure about how it intercepts messages, contact the product vendor.

Although these messages may be suppressed (that is, prevented from displaying in the console) by using MPFLSTxx parameters or an MPF exit, the text of these messages should not be changed. The use of other WTO exits to change the display characteristics or the text of these messages is not supported by the SMC.

Volume serial numbers ('ser') as specified in messages from the operating system, are defined as follows:

Messages that contain VOLSERs with more than six characters or any character except A-Z, 0-9, # (crosshatch), $, ¥ (yen character), and optional trailing blanks are ignored by the SMC.

Table A–1   Intercepted Operating System Messages

Message ID	Description
JBB068A	U dddd,ser...
JBB111E	D dddd,ser
JBB114E	D dddd...
JBB135A	U dddd,ser...

Table A–1   (Cont.) Intercepted Operating System Messages

Message ID	Description
JBB400A	M dddd, ser...
JBB401A	F dddd,ser...
JBB501A	M dddd,ser{,labtyp}
JBB501E	M dddd,ser{,labtyp}
JBB502E	n,dddd,ser...
JBB509A	F dddd,ser...
JBB512I	I/O ERR	LBL ERR	SEC VOL...
JBB701D	M dddd, VOLUME TO BE LABELED ser
JBB702I	dddd, VOLUME LABELS CANNOT BE VERIFIED
JBB703I	dddd, VOLUME IS FILE PROTECTED
JDJ233A	M dddd,ser{,labtyp}
JDJ233D	M dddd,ser{,labtyp}
JDJ234E	{K	D	R} dddd{,ser...}
KHE200I	SWAP dddd to eeee - OPERATOR	I/O ERROR
KHE202E	PROCEED WITH SWAP OF dddd TO eeee
KHE203I	ERROR ON dddd, SELECT NEW DEVICE
KHE205I	SWAP ddd - OPERATOR	I/O ERROR
KHE207A	WRONG VOLUME MOUNTED ON dddd, MOUNT ser,...
KAA000I	MSP I/O error message processed only for specific Fault Symptom Codes generated by StorageTek tape devices

Tape Management System Messages

SMC processes messages from several tape management systems, including CA-1 and CONTROL-M/Tape.

CA-1 Messages

The following CA-1 (TMS) messages are intercepted by the SMC. Refer to the Computer Associates publication *CA-1 User Manual, Volume 1* for the exact format and meaning of each message.

- CTS001
- CTS002
- CTS004
- CTS005
- CTS007
- CTS008
- CTS009
- CTS010
- CTS011

- CTS014
- CTS015
- CTT100A
- CTT101A
- CTT102A
- CTT103A
- CTT104A
- CTT105A
- TMS001
- TMS002
- TMS004
- TMS005
- TMS007
- TMS008
- TMS009
- TMS010
- TMS011
- TMS014
- TMS015
- IECTMS7
- CA$F810A
- CA$F813A

CONTROL-M/TAPE (formerly CONTROL-T) Messages

The following CONTROL-M/TAPE messages are intercepted by the SMC. Refer to the appropriate BMC publication for the exact format and meaning of each message.

- CTT100A
- CTT101A
- CTT102A
- CTT103A
- CTT104A
- CTT105A

B

SMC Interaction with Other Software

This appendix describes SMC interaction with various third-party products.

Automated Operations

Customers who use an automated operations product should review WTOR SMC0110, issued during SMC swap processing, for possible auto-ops rule changes.

CA-MIA Tape Sharing

The Computer Associates Unicenter CA-MIA Tape Sharing for MSP/EX relies upon direct modification of the EDL at SSI24 time to determine what tape drives remain eligible for an allocation event. However, the SMC does not directly modify the EDL as part of its normal allocation processing. To enable proper coexistence with CA-MIA Tape Sharing, set the MIAcompat parameter of the `ALLOCDef` command to ON.

CA1-RTS Real Time Stacking

The Computer Associates Real Time Stacking product relies on DEFER processing being performed at SSI24 time. However, the SMC normally performs DEFER processing during SSI78 time. To enable proper coexistence with CA1-RTS, set the CA1rts parameter of the `ALLOCDef` command to ON.

CA-Vtape

The Computer Associates CA-Vtape supplies user exits 02 and 08 for the SMC that activate and enable CA-Vtape processing. Normally, user exits 02 and 08 will not be called if an applicable SMC POLICY object applies to the allocation event. There are several alternatives to ensure that the CA-Vtape supplied user exits are invoked:

- Do not specify a default SMC TAPEREQ statement in your SMC TREQDEF definitions file. If no default SMC TAPEREQ statement is found, and if all other TAPEREQs target specific SMC controlled allocation events, then the supplied user exits will be called to determine if the non-SMC controlled allocation events are to be directed to CA-Vtape.

- If you do specify a default SMC TAPEREQ statement, use the legacy TAPEREQ definitions to define the tape policy and do not direct the default TAPEREQ definition to a POLICY object. Thus, if your default TAPEREQ statement is to specify virtual media, then specify the last TAPEREQ statement as:

```
TAPEREQ JOB(*) MEDIA VIRTUAL
```

instead of:

```
TAPEREQ JOB(*) POLICY VIRTPOL
```

where policy VIRTPOL specifies MEDIA VIRTUAL.

- Specify ALLOCDef CAVTAPe(ON) in either your SMCCMDS or SMCPARMS data set at startup. When ALLOCDef CAVTAPe(ON) is specified, then user exits 02 and 08 are called even when an applicable SMC POLICY object applies to the allocation event.

MSP Security Packages

Ensure that your MSP security package (for example, RACF, TopSecret) is configured to grant SMC the necessary authority to respond to MSP swap messages.

Open Type J

The Open Type J macro is not supported during SMC message handling processing.

Additionally, SMC allocation enhancements may not operate if you use the MSP Open Type J macro. Because this macro enables you to change volume serial numbers or data set names at open time, information available at Job Step Allocation time may be incorrect as interpreted by the SMC.

> **Note:** Some vendor software products use MSP Open Type J. If you are experiencing unexpected allocation results using a vendor software product, check with the vendor to determine if Open Type J is used and follow the recommendations below.

SMC allocation may influence MSP allocation erroneously based on information that may have changed at open time. To prevent this problem when using the Open Type J macro, specify the appropriate esoteric in the JCL or specify an appropriate esoteric in an applicable TAPEREQ control statement or `POLicy` command

SAMS: DISK (DMS)

Sterling Software's SAMS: DISK (DMS) has two methods of allocating transports:

- Allocates transports at session startup, holds onto the transports throughout the session and uses Open Type J (see "Open Type J")
- Uses dynamic allocation (DYNALLOC) to allocate transports when required

The SMC allocates correctly when dynamic allocation is used. Therefore, the latter method of allocating transports is recommended.

Glossary

This glossary defines terms and abbreviations used in this publication.

4410

Oracle's StorageTek standard Library Storage Module (LSM).

4480

Oracle's StorageTek 18-track 1/2-inch cartridge transport.

4490

Oracle's StorageTek 36-track long-tape cartridge transport with ESCON support. Also known as Silverton.

9310

Oracle's StorageTek Library Storage Module (LSM), a high-performance version of the standard 4410 LSM. Also known as PowderHorn.

9360

Oracle's StorageTek Library Storage Module (LSM). Also known as WolfCreek.

9740

Oracle's StorageTek Library Storage Module (LSM). Also known as TimberWolf.

Abnormal end of task (abend)

A software or hardware problem that terminates a computer processing task.

ACSid

A method used in the LIBGEN process to identify ACSs by using decimal digits, 00 to 99.

ACS

Automated Cartridge System, a fully-automated, cartridge storage and retrieval library subsystem consisting of one or more Library Storage Modules (LSMs) connected by pass-thru ports.

ACS library

A library is composed of one or more Automated Cartridge Systems (ACSs), attached cartridge drives, and cartridges residing in the ACSs.

ACSLS

Automated Cartridge System Library Software, Oracle's StorageTek library control software, which runs in the UNIX®-based Library Control System.

address

Coded representation of hardware id, or the destination or origination of data.

allocation

The assignment of resources to a specific task.

asynchronous transmission

Character-oriented data transmission (as distinct from IBM's block-mode transmission).

Automated Cartridge System (ACS)

See **ACS**.

Automated Cartridge System Library Software (ACSLS)

See **ACSLS**.

automatic mode

A relationship between an LSM and all attached hosts. LSMs operating in automatic mode handle cartridges without operator intervention. This is the normal operating mode of an LSM that has been modified online. The opposite situation is "manual mode." See manual mode.

bar code

A code consisting of a series of bars of varying widths. This code appears on the external label attached to the spine of a cartridge and is equivalent to the volume serial number (volser). This code is read by the robot's machine vision system.

BISYNC

Binary Synchronous Communications. An early low-level protocol developed by IBM and used to transmit data on a synchronous communications link. It is a form of data transmission in which synchronization of characters is controlled by timing signals generated at the sending and receiving stations.

CAPid

A CAPid uniquely defines the location of a CAP by the LSM on which it resides. A CAPid is of the form "AA:LL:CC" where AA:LL is the LSMid and CC is the two digit CAP number.

cartridge

The plastic housing around the tape. It is approximately 4 inches (100 mm) by 5 inches (125 mm) by 1 inch (25 mm). The tape is threaded automatically when loaded in a transport. A plastic leader block is attached to the tape for automatic threading. The spine of the cartridge contains an OCR/Bar Code label listing the VOLSER (tape volume identifier).

Cartridge Access Port (CAP)

An assembly that allows several cartridges to be inserted into or ejected from an LSM without human entry into the LSM.

cartridge drive (CD)

A hardware device containing two or four cartridge transports and associated power and pneumatic supplies.

cartridge tape I/O driver

Operating system software that issues commands (for example, read, write, and rewind) to cartridge subsystems. It is the software focal point for attaching a particular type of control unit. (An example is Oracle's StorageTek CARTLIB product.)

cell

A receptacle in the LSM in which a single cartridge is stored.

CGI

Common Gateway Interface

channel

A device that connects the host and main storage with the input and output devices' control units. A full-duplex channel has two paths (that is, 2 wires, or one wire with signals at two frequencies). A half-duplex channel requires that one port receives while the other transmits.

channel-to-channel (CTC)

Refers to the communication (transfer of data) between programs on opposite sides of a channel-to-channel adapter.(I)

client

The ultimate user of the ACS services as provided by the Library Control System.

client link

The communications link between the LCS and a client.

client/server

A model of interaction in a distributed system in which a program at one site serves a request to a program at another site and awaits a response. The requesting program is called a client; the program satisfying the request is called a server.

client system

The system to which the LCS provides an interface to a StorageTek Automated Cartridge System.

Client System Component (CSC)

Software that provides an interface between the Client Computing System's operating system and the StorageTek Library Control System (LCS).

coaxial cable

A transmission medium used in data transmissions for networks using synchronous communications, as opposed to twisted-pair, the primary medium for asynchronous RS-232 communications.

complex

A system composed of other systems, specifically the ACS server system and the client system.

connected mode

A relationship between a host and an ACS. In this mode, the host and an ACS are capable of communicating (in the sense that at least one station to this ACS is online).

connection number

The unique identifier on the server for a communications path. The number is assigned by TCP/IP to identify the unique connection between the server node and a specific port on the server, and the client node and a specific port on the client. The connection number exists only as long as the connection exists.

console

The primary I/O device to control a session on a system.

control data set (CDS)

The data set used by the host software to control the functions of the automated library. Also called a library database.

Control Path Adaptor (CPA)

A Bus-Tech, Inc. hardware device that allows communications between a host processor's block multiplexer channel and a local area network.

Control Unit (CU)

A microprocessor-based unit situated locally between a channel and an I/O device. It translates channel commands into device commands and sends device status to the channel.

coupling facility

A special logical partition that provides high-speed caching, list processing, and locking functions in a sysplex.(I)

coupling facility channel

A high bandwidth fiber optic channel that provides the high-speed connectivity required for data sharing between a coupling facility and the central processor complexes directly attached to it.(I)

CTC

Channel-to-channel.

Data Path Adapter

A hardware device which translates from a client computing system's data protocol to the data protocol of the StorageTek Control Unit or IMU. An example is DEC's TC44-AA/BA STI-to-4400 ACS Interconnect.

data set

A set of records treated as a unit.

data sharing

The ability of concurrent subsystems or application programs to directly access and change the same data while maintaining data integrity.(I)

device number

A four-digit hexadecimal number that uniquely identifies a device attached to a processor.

device preferencing

The process of preferring one 36-track transport type over another 36-track transport type.

device separation

See **drive exclusion**.

DFSMS

Data Facility Storage Management Subsystem.

direct access storage device (DASD)

IBM's term for a disk drive storage device.

directed allocation

See drive prioritization.

disconnected mode

A relationship between a host and an ACS. In this mode, the host and the ACS are not capable of communicating (there are no online stations to this ACS).

dotted-decimal notation

The syntactic representation of a 32-bit integer that consists of four 8-bit numbers written in base ten with periods (dots) separating them. In TCP/IP descriptions, dotted-decimal notation is used for Internet addresses.

drive exclusion

(previously known as device separation) refers to the SMC function of excluding drives for an allocation request based on SMC exclusion criteria.

drive panel

An LSM wall containing tape transports. The drive panel for a T9840 transport can contain either 10 or 20 transports. The drive panel for a non-T9840 transport can contain a maximum of 4 transports.

drive prioritization

(previously known as directed allocation) refers to the SMC function of influencing selection of a particular drive based on allocation criteria, including volume location.

Dual LMU

A hardware/microcode feature that provides a redundant LMU capability.

dump

A printed representation of the contents of main storage at time t. This representation is used for debugging purposes.

dynamic server switching

The capability of switching server processors when a system failure occurs on the active server.

ECART

Enhanced Capacity Cartridge.

Enhanced Capacity Cartridge

A cartridge that has a length of 1100 feet and can be used only on 36-track transports (that is, 4490, 9490, and 9490EE).

Enterprise Systems Connection (ESCON)

A set of products and services that provides a dynamically connected environment using optical cables as a transmission medium.(I)

error codes (EC)

Numeric codes displayed by messages indicating the type of problem that caused an error.

error recovery procedures (ERP)

Procedures designed to help isolate and, where possible, to recover from errors in equipment.

ESCON

Enterprise Systems Connection.

esoteric name

The name assigned to transports that have the same device type.

Ethernet

One LAN architecture using a bus topology that allows a variety of computers to be connected to a common shielded coaxial spine. The Ethernet architecture is similar to the IEEE 802.3 standard.

event control block (ECB)

Provides an area for a completion code to be stored when an operation has completed.

file

A set of related records treated as a unit.

File Transfer Protocol (FTP)

A TCP/IP command that provides a way to transfer files between machines connected through TCP/IP.

foreign socket

One of two end-points in a TCP/IP connection-oriented protocol. Specifies the address of a foreign host that can connect to the server.

GB

1,073,741,834 bytes of storage

handshake

A flow-of-control signal sent by one process to another.

helical cartridge

A high capacity, helical scan cartridge that can hold up to 50GB of uncompressed data. This cartridge can be used only on RedWood (SD-3) transports.

host computer

A computer that controls a network of computers.

Host Software Component utilities

Utilities provided by the VM/HSC that can be executed from the HSCUTIL virtual machine. See client-initiated utilities.

HTTP

Hypertext Transfer Protocol.

IEEE 802.3

A standard produced by the IEEE and accepted worldwide for local area networks using CSMA/CD (Carrier Sense Multiple Access with Collision Detection).

ICRC

Improved Cartridge Recording Capacity. A compression and compaction feature that increases the amount of data that can be stored on a 1/2-inch cartridge.

initial program load (IPL)

A process that activates a machine reset.

Interactive Storage Management Facility

A series of applications for defining DFSMS/MVS storage groups and classes.

Internet

A collection of networks using TCP/IP that functions as a virtual network.

Internat address

The numbering system used to specify a network or host on that network for TCP/IP communications. Standard Internet address notation is dotted-decimal format.

Internet Protocol (IP)

Formal description of messages and rules two networks use to exchange messages.

ISMF

Interactive Storage Management Facility

job control language (JCL)

A problem oriented language designed to describe a job's processing requirements to an operating system.

JES

Job entry subsystem.(I)

JES2

An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for execution, processes their output, and purges them from the system. In an installation with more than one processor, each JES2 processor independently controls its job input, scheduling, and output processing. See also JES3.(I)

JES3

An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for execution, processes their output, and purges them from the system. In complexes that have several loosely coupled processing units, the JES3 program manages processors so that the global processor exercises centralized control

over the local processors and distributes jobs to them through a common job queue. See also JES2.(I)

LAN

Local Area Network, a network in a small (local) geographic area

LCS

Library Control System (LCS)

LCS processor console

The Library Control System processor console is used to control the VM operating system (for the VM-based LCS).

LCU

See Library Control Unit.

LIBGEN

The process of defining the configuration of a library to the VM/HSC.

library

See TapePlex.

library cartridge transport

See transport.

library complex

A library complex consists of one HSC Control Data Set (CDS) and may contain up to 256 Automatic Cartridge Systems (ACSs), each of which may contain up to 24 Library Storage Modules (LSMs).

library control component

Software that controls the mounting and dismounting of cartridges in an ACS.

library control platform

The hardware and software that provides the proper environment for the Library Control System.

library control processor

Properly configured computer hardware that supports the operation of the Library Control System.

Library Control Software

A library control component, the client system interface, and library utilities.

Library Control System (LCS)

The library control platform and the Library Control Software.

Library Control Unit (LCU)

The portion of an LSM that controls the movements of the robot.

library database

A file or data set containing information about the location and status of the removable media volumes, such as cell location, scratch status. Also called a control data set (CDS).

library drive

A cartridge drive in the ACS, as distinct from a standalone cartridge drive.

Library Management Unit (LMU)

See **LMU**.

library mode

The operation of a 4480 Cartridge Subsystem as part of a 4400 Automated Cartridge System, as opposed to manual mode, in which the operator inserts cartridges into the transports. See manual mode.

Library Storage Module (LSM)

See **LSM**.

LMU

Library Managment Unit, A hardware and software product that coordinates the activities of one or more LSMs/LCUs.

local area network (LAN)

See **LAN**.

local port

The designation of a given application or process among many that are available for a TCP/IP-capable host processor.

local socket

The address combination of a TCP/IP-capable host's network address and a specific port for an application process.

logical port (LP)

See **LP**.

LP

logical port, CLS software that interfaces with the client system. The CLSLP is one of the software components used to pass data between the client system and the VM/HSC.

LSM

Library Storage Module, The standard LSM (4410) a twelve-sided structure with storage space for up to around 6000 cartridges. It also contains a free-standing, vision-assisted robot that moves the cartridges between their storage cells and attached transports. See also PowderHorn, SL3000, SL8500, and WolfCreek.

LSMid

An LSMid is composed of the ACSid joined to (concatenated with) the LSM number.

LSM number

A method used to identify an LSM. An LSM number is the result of defining the SLIACS macro LSM parameter during a LIBGEN. The first LSM listed in this parameter acquires the LSM number of 00 (decimal) the second LSM listed acquires a number of 01, and so forth, until all LSMs are identified (up to a maximum of 99).

manual mode

Operation of a cartridge drive apart from an ACS. See library mode.

master LMU

The LMU currently controlling the functional work of the ACS in a dual LMU configuration.

mixed configuration

A configuration that contains different types of cartridge drives in both manual and library modes.

modem

A device that enables digital data to be transmitted over an analog transmission facility.

multi-client

The environment where more than one (homogenous or heterogeneous) client system is connected to one LCS.

MVS system console

The MVS/CSC provides an operator interface through the MVS system console.

OCR label

Optical character recognition label. An external label attached to the spine of a cartridge that is both human and machine readable.

operator console

In this document, the operator console refers to the MSP client system console.

operating system (OS)

Software that controls the execution of programs that facilitate overall system operation.

Pass-thru Port (PTP)

A mechanism that allows a cartridge to be passed from one LSM to another in a multiple LSM ACS.

physical port

The communications hardware required to support a server/client link.

physical volume

A physically bound unit of data file media. See cartridge.

PowderHorn (9310)

The high-performance version of the standard LSM.

preconfigured package

A storage server package including all hardware, software, and configuration parameter settings delivered by the vendor.

product change request (PCR)

A request for enhancement to a product. Normally, this request comes from a client, but may come from Oracle.

program temporary fix (PTF)

A software release designed to remedy one or a series of defects.

program update tape (PUT)

One or more tapes containing updates to, or new versions of, the MVS/CSC system software.

protocol

A formal description of message formats and the rules two or more machines must follow to exchange these messages.

recovery

Automatic or manual procedures to resolve problems in the server system.

reel-id

Identifier of a specific tape volume. Equivalent to volume serial number (VOLSER).

request

Term used to refer to commands issued to the 4400 ACS to perform a tape-related function.

scratch tape

A tape that is available to any user because it is not owned.

scratch tape subpool

A defined subset of all scratch tapes. Subpools are composed of one or more ranges of volsers with similar physical characteristics (type of volume—reel or cartridge, reel size, length, physical location, and so on). Some installations may also subdivide their scratch pools by other characteristics such as label type.

SD-3

Oracle's StorageTek helical cartridge transport. Also known as RedWood.

SL3000

Oracle's StorageTek SL3000 modular library offers mixed media, logical and physical partitioning capabilities, advanced management, and high availability. It supports mixed environments, including mainframe and open systems, and is scalable from 200 to just under 6,000 cartridge slots.

SL8500

Oracle's StorageTek SL8500 modular library offers mixed media, logical and physical partitioning capabilities, advanced management, and high capacity and availability. It supports mixed environments, including mainframe and open systems, and is scalable from the standard 1,450 cartridge slots to 100,880 cartridge slots in a complex configuration.

server

An ELS library control system such as HSC. In SMC a server is represented by a named SERVER path to a named TAPEPLEX. While the SMC HTTP server component is required as the middle ware on the remote host, the server, as far as SMC is concerned is the ELS library control system operating on the remote host.

socket

A unique address on a network plus a node address plus the id of one specific application on a specific network. An abstraction used by TCP/IP.

standard capacity cartridge

A cartridge that can be used on any longitudinal transport (that is, 4480, 4490, 9490, or 9490EE).

standby

The status of a station that has been varied online but is connected to the standby LMU of a dual LMU ACS.

standby LMU

The redundant LMU in a dual LMU configuration that is ready to take over in a Master LMU failure or when the operator issues a SWITCH command.

station

A hardware path between the host computer and an LMU over which the VM/HSC and LMU send control information.

storage server

A set of hardware and software products designed to enable heterogeneous computer systems to use automated tape cartridge library services.

Storage Management Component (SMC)

Software interface between IBM's z/OS operating system and StorageTek automated library control systems, HSC. SMC performs the allocation processing, message handling, and SMS processing for the ELS solution.

switchover

The assumption of master LMU function by the standby LMU.

synchronous

See **BISYNC**.

synchronous LAN

Local area network built on synchronous communications.

Systems Network Architecture (SNA)

A description of the logical structure, formats, protocols, and operational sequences for transmitting information units through and controlling the configuration and operation of networks.

T9840A

Oracle's StorageTek access-centric cartridge transport capable of reading and writing 9840A cartridges.

T9840B

Oracle's StorageTek access-centric cartridge transport capable of reading and writing T9840B cartridges.

T9840C

Oracle's StorageTek access-centric cartridge transport capable of reading and writing T9840C cartridges.

T9840D

Oracle's StorageTek access-centric cartridge transport capable of reading and writing T9840D cartridges.

T9940A

Oracle's StorageTek capacity-centric cartridge transport capable of reading and writing 60GB T9940A cartridges.

T9940B

Oracle's StorageTek capacity-centric cartridge transport capable of reading and writing 200GB T9940B cartridges.

T10000A

Oracle's StorageTek T10000 A high-capacity cartridge transport capable of reading and writing 120GB or 500GB T10000A cartridges.

T10000B

Oracle's StorageTek T10000 B high-capacity cartridge transport capable of reading and writing 240GB or 1TB T10000B cartridges

T10000C

Oracle's StorageTek T10000 C high speed/capacity tape drive, delivering up to 252 MB/sec and 5 TB, native, making it ideal for data center operations with growing data volumes.

T10000D

Oracle's StorageTek T10000D high speed/capacity tape drive, delivering up to 252 MB/sec and 8.5 TB native capacity, making it ideal for data center operations with growing data retention requirements.

tape drive

A tape processing device consisting of up to four transports in a cabinet. A drive can refer to an individual transport.

tape library management system (TLMS)

TLMS, as used in this document, refers to any tape library management system, not to CA-1.

TapePlex

(formerly "library"), a single StorageTek hardware configuration, normally represented by a single HSC Control Data Set (CDS). A TapePlex may contain multiple Automated Cartridge Systems (ACSs) and Virtual Tape Storage Subsystems (VTSSs).

TCP/IP

Transmission Control Protocol/Internet Protocol.

trace event type

Types of event traced through the system when tracing is enabled.

trace file

A file that contains information useful for debugging the system.

transaction

A specific set of input that triggers the execution of a specific process.

Transmission Control Protocol (TCP)

An inter-network standard protocol that provides a full-duplex stream service.

transport

An electro-mechanical device used to thread, position, and read or write from a tape.

UCB

Unit Control Block.

userid

Sometimes referred to as the VM userid, the userid is the name that identifies a specific "virtual machine" user or client.

utility

Program that performs a function ancillary to the chief function(s) of a computer system.

virtual machine (VM)

See **VM**.

virtual storage

A feature of the OS where main storage requirements are allocated by segments (or pages) as needed by programs, thus creating the apparent existence of unlimited or virtual storage.

Virtual Storage Manager (VSM)

A storage solution that virtualizes volumes and transports in a VTSS buffer to improve media and transport use.

Virtual Tape Control System (VTCS)

The primary host code for the Virtual Storage Manager (VSM) solution. This code operates in a separate address space, but communicates closely with HSC.

Virtual Tape Storage Subsystem (VTSS)

The DASD buffer containing virtual volumes (VTVs) and virtual drives (VTDs). The VTSS is a StorageTek RAID 6 hardware device with microcode that enables transport emulation. The RAID device can read and write "tape" data from/to disk, and can read and write the data from/to a real tape drive (RTD).

Virtual Telecommunications Access Method (VTAM)

IBM host-resident communications software that serves as a common interface for communications.

VM

Virtual Machine, A functional simulation of a computer and its associated devices. Each virtual machine is controlled by a suitable operating system.

VM/SP or VM/XA

A proprietary operating system of IBM corporation that consists mainly of two major components, CP and CMS.

volume

A tape cartridge (data carrier) that is mounted or dismounted as a unit.

volume serial number (VOLSER)

An identifier of a physical volume.

WolfCreek (9360)

The high-performance LSM with a smaller capacity than the standard LSM.

ZCART

An extended-enhanced cartridge that uses a thinner media to provide twice the capacity of the enhanced capacity (ECART) cartridge. This cartridge has a length of 2200 feet and can be used only on TimberLine 9490EE 36-track transports.

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