Client System Component for MVS

Operator's Guide

Release 5.1

313486802

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This edition applies to Release 5.1 of the Client System Component (MVS/CSC) software. Information in this publication is subject to change. Comments concerning the contents of this manual should be directed to:

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Document Effectivity

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128601	December, 2002	---	First Edition	This document applies to the Client System Component (MVS/CSC), Version 5.1.

Contents

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What's New With This Release?

MVS/CSC 5.1 includes the following changes and enhancements:

- SMP/E APPLY and ACCEPT installation steps for MVS/CSC are now included in the NCSAPPLY and NCSACCPT sample members, respectively.
- The following ALTER operator command parameters and/or MVS/CSC startup parameters are no longer honored:

  - ALOCtime
  - GDGAll
  - JES3set
  - SMSAcsr
  - SMSMOD
  - UNITAff
  - UXPrms
  - X02sub
  - X08sub
  - XJ3sub.

  The SMC provides allocation functions. Refer to the *SMC Configuration and Administration Guide* for more information.

- The allocation and job processing components of the Trace operator command have been moved to the SMC TRACE command. Specifically, support has ended in the MVS/CSC for the ALLCdata parameter and the following component names:

  - AL (allocation enhancement)
  - JP (job processing)
  - J3 (JES3)

  Refer to the *SMC Configuration and Administration Guide* for more information.

- Volume ranges can be specified either as alphabetic or numeric ranges for all commands and utilities that allow ranges to be entered.
- Message changes, additions and deletions.

About this Guide

This guide describes how to operate the Client System Component (MVS/CSC).

Intended Audience

Part 1, “MVS/CSC System Overview”is intended for all users of the MVS/CSC product.

Part 2, “MVS/CSC Operations”is intended for systems administrators or system programmers responsible for configuring the MVS/CSC environment.

Part 3, “MVS/CSC Administration and Maintenance”is intended for system administrators or system programmers responsible for configuring communications between the MVS/CSC and Library Control System (LCS), or server, in a non-sysplex environment.

Part 4, “Appendices”is intended for system administrators or system programmers responsible for configuring communications between the MVS/CSC and LCS in a sysplex environment.

Reader’s Comments

We’d like to know what you think about this guide. E-mail your comments to Software Information Development directly. Our Internet address is:

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sid@stortek.com
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Be sure to include the number and title of the guide you are referencing.

About the Software

MVS/CSC Release 5.1 is supported by this guide.

How this Guide is Organized

This guide contains the following chapters and appendices:

Part 1. “MVS/CSC System Overview”

- **Chapter 1, “Introduction”** describes the features and functions provided by the MVS/CSC.

Part 2. “MVS/CSC Operations”

- **Chapter 2, “Operating the MVS/CSC”** describes normal and manual-mode operations for the MVS/CSC.
- **Chapter 3, “Issuing MVS/CSC Operator Commands”** describes the MVS/CSC operator commands.
- **Chapter 4, “Operator Console Interface”** describes the operator console interface provided by the MVS/CSC.

Part 3. “MVS/CSC Administration and Maintenance”

- **Chapter 5, “Software Diagnostic Tools and Recovery Procedures”** describes the software diagnostic tools and automatic system recovery functions provided with the MVS/CSC.

Part 4. “Appendices”

- **Appendix A, “Third-Party Software Restrictions”** describes restrictions when using third-party software products.
- **Appendix B, “Gathering Diagnostic Materials”** describes diagnostic materials that might be requested by Software Support for problem resolution.
- **Appendix C, “List of Abbreviations”** defines commonly used abbreviations associated with the MVS/CSC.

A glossary and index are also included.

Conventions Used in this Guide

Typographic

In the JCL examples in this guide, some fields appear in lower case. You must update these fields to match your installation requirements.

Symbols

The following symbols are used to highlight text in this guide:

Note: Information that may be of special interest to you. Notes are also used to point out exceptions to rules or procedures.

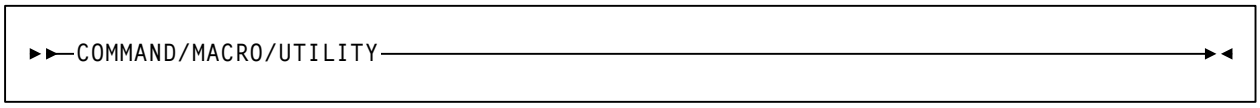
Warning: Information necessary to keep you from damaging your hardware or software.

Syntax Flow Diagrams

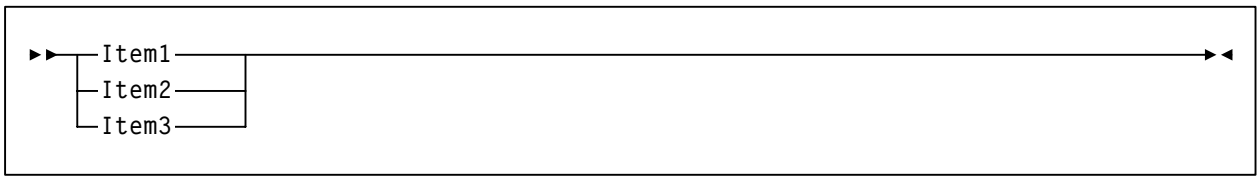
Syntax flow diagramming conventions include the following:

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.



or

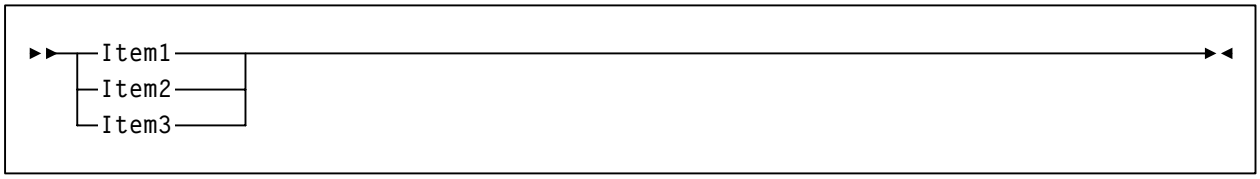


Diagrams are read left to right and top to bottom. Arrows indicate flow and direction.

- a statement begins with ►►
- a statement ends with ►◄
- diagrams continuing to the next line begin with ►
- fragments begin and end with |

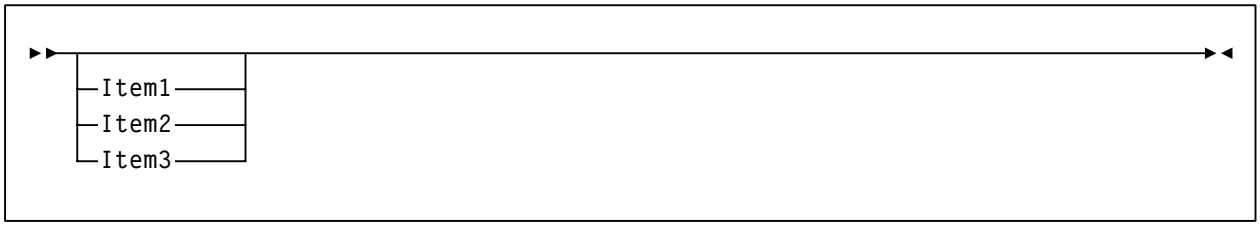
Single Required Choice

Branch lines (without repeat arrows) indicate that a single choice must be made. If one of the items from which a choice is being made is positioned on the base line of the diagram, a single choice is required.



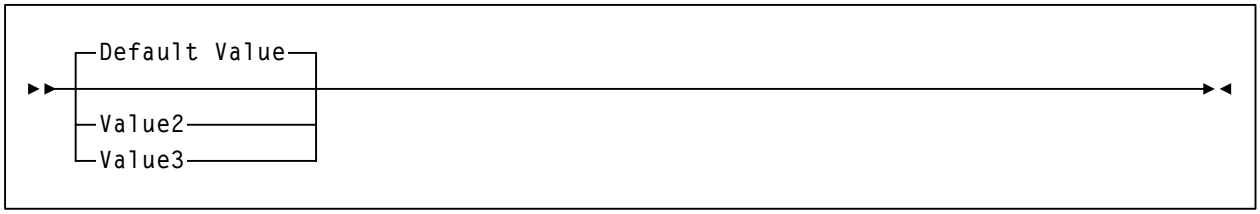
Single Optional Choice

If the first item is positioned on the line below the base line, a single choice of items in the stack is optional.

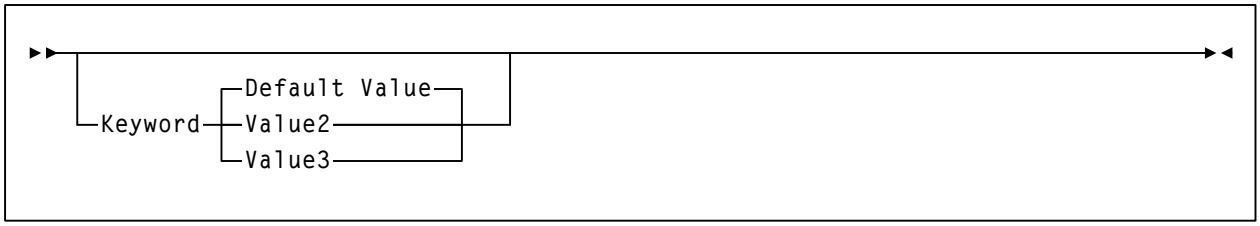


Defaults

Default values and parameters appear above the base line. In the following example, if a value is not specified with the command, `Default Value` is used by the HSC.

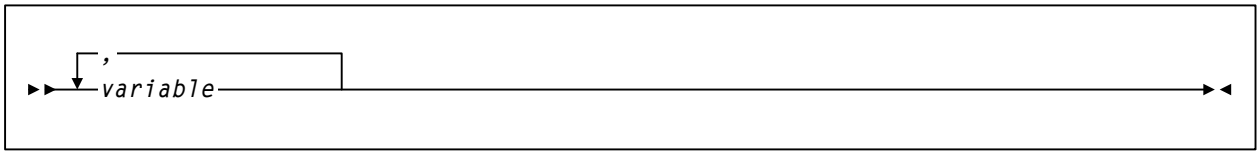


Some keyword parameters provide a choice of values in a stack. When the stack contains a default value, the keyword and the value choices are placed below the base line to indicate that they are optional, and the default value appears above the keyword line. In the following example, if the keyword is not specified with the command, keyword `(Default Value)` is used by the HSC.



Repeat Symbol

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



Keywords

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

Variables

Italic type is used to indicate a variable.

Alternatives

A bar (|) is used to separate alternative parameter values.

Delimiters

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

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 (for example, 1-9, or 010-094). Leading zeros are not required. The decimal portion is referred to as 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 referred to as 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, only the right-most portion is valid as the incremental range. For example:

    A00B00 — the largest range that can be specified is A00B00 through A00B99.

    A0B0CC — the largest range that can be specified is A0B0CC through A0B9CC.

    000XXX — 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, 000AAA-000ZZZ, or 9AAA55-9ZZZ55). This portion is referred to as 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.

- 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:

A00A0-A99A0	increments VOLSERs A00A0 through A09A0, then A10A0 through A99A0.
9AA9A-9ZZ9A	increments VOLSERs 9AA9A through 9AZ9A, then 9BA9A through 9ZZ9A.
111AAA-111ZZZ	increments VOLSERs 111AAA through 111AAZ, then 111ABA through 111ZZZ
999AM8-999CM8	increments VOLSERs 999AM8 through 999AZ8, then 999BA8 through 999CM8
A3BZZ9-A3CDE9	increments VOLSERs A3BZZ9 through A3CAA9, then A3CAB9 through A3CDE9
AAAAAA-AAACCC	increments VOLSERs AAAAAA through AAAAAZ, then AAAABA through AAACCC
CCCNNN-DDDNNN	increments VOLSERs CCCNNN through CCCNNZ, then CCCNOA through DDDNNN *

* **Caution:** 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	26^1	26
AA-ZZ	26^2	676
AAA-ZZZ	26^3	17,576
AAAA-ZZZZ	26^4	456,976
AAAAA-ZZZZZ	26^5	11,881,376
AAAAAA-ZZZZZZ	26^6	308,915,776

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

Blanks are not allowed between parameters and parentheses, or between parentheses and arguments. For example:

`LS C ID(3218)` **is a valid entry.**

`LS C ID ( 3218 )` **is not.**

Control Statements

The standard syntax conventions for control statements are as follows:

- The only valid control statement information area is from column 2 to column 72. Columns 73-80 are ignored.
- Parameters are 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.
- /* and */ can be used to enclose comments in the job stream. Comments cannot be nested.
- The maximum length for a control statement is 32,767 characters.

Related Publications

The following publications contain information about specific topics relating to the use of MVS/CSC.

StorageTek Nearline Control Solution (NCS) Publications

- *NCS (MVS/HSC, LibraryStation, MVS/CSC, SMC) Installation Guide*
- *Requesting Help from Software Support*

StorageTek Client System Component (MVS/CSC) Publications

- *MVS/CSC Configuration Guide*
- *MVS/CSC System Programmer's Guide*
- *MVS/CSC Messages and Codes Guide*

StorageTek Storage Management Component (SMC) Publications

- *SMC Configuration and Administration Guide*

StorageTek Host Software Component (MVS/HSC) Publications

- *MVS/HSC Configuration Guide*
- *MVS/HSC Operator's Guide*
- *MVS/HSC System Programmer's Guide*
- *MVS/HSC Messages and Codes Guide*

StorageTek LibraryStation Publications

- *LibraryStation Configuration Guide*
- *LibraryStation Operator and System Programmer's Guide*
- *LibraryStation Messages and Codes Guide*

StorageTek Virtual Storage Manager Publications

- *VTCS Installation and Configuration Guide*
- *VTCS Administration Guide*
- *VTCS Messages and Codes Guide*
- *VTCS Reference*

StorageTek Automated Cartridge System Library Software (ACSLS) Publications for the UNIX-Based LCS

- *ACSLS Installation and Services Manual*
- *ACSLS Programmer's Guide*
- *ACSLS System Administrator's Guide*

StorageTek Common Library Services (CLS) Publications for the VM-Based LCS

- *CLS Installation Manual*
- *CLS Messages and Codes Manual*
- *CLS Reference Manual*
- *CLS Reference Summary Card*
- *CLS User's Guide*

Technical Support

StorageTek Software Support and the StorageTek Customer Resource Center (CRC) maintain information about known NCS Release 5.1 product updates. You can contact Software Support or access the CRC for the latest information available concerning product updates (i.e. documentation, PTFs, PUTs).

See the *Requesting Help from Software Support* guide (included in the NCS package) for information about contacting StorageTek for technical support and for requesting changes to software products, or access StorageTek's CRC homepage at:

```
http://www.support.storagetek.com
```

Note: You must obtain a login ID and password in order to access the CRC. You can request a login ID and password from the CRC homepage.

Part 1. MVS/CSC System Overview

Chapter 1. Introduction

Overview

MVS/CSC provides client functions and communications between an MVS host and the Library Control System (LCS) or server residing on another MVS or non-MVS host. When combined with the LCS and SMC, the MVS/CSC provides the following benefits:

- a library shared by multiple host systems (both IBM and non-IBM)
- secondary library attachment for remote backup
- library attachment to more than sixteen MVS hosts, with MVS/CSC installed on each attached host system

This chapter summarizes the features and functions provided by MVS/CSC, including:

- MVS/CSC operating environment
- MVS/CSC basic functions
- MVS/CSC system interfaces
- MVS/CSC configurations
- IBM Sysplex support
- Dynamic server switching capability
- StorageTek product support
- StorageTek LCS software products
- Third-party software products that coexist with MVS/CSC
- Communications methods used to transmit commands to the LCS
- Mixed media and devices for the MVS-based and UNIX-based LCS

MVS/CSC Operating Environment

MVS/CSC runs on any processor that supports IBM MVS/ESA SP,[1] and runs in an IBM multi-processor environment. The MVS/CSC supports both MVS/ESA SP JES2 and MVS/ESA JES3 systems. Except for noted differences, the information in this document applies to both JES2 and JES3 environments.

In addition, references in this document to JES2 apply to both JES2 environments and JES3 environments that run without TAPE SETUP processing; references to JES3 apply only to JES3 environments that run with TAPE SETUP processing.

Operating System Requirements

JES2 Environment	JES3 Environment
• MVS/ESA SP Version 5.2.2 or higher (including all OS/390 and z/OS versions) **Note:** if using TCP/IP, OS/390 version 2.7 or later is recommended	• MVS/ESA SP Version 5.2.2 or higher (including all OS/390 and z/OS versions) • JES3 Version 5.1.1 or higher (including all JES3 OS/390 and z/OS versions) **Note:** if using TCP/IP, OS/390 version 2.7 or later is recommended

MVS/CSC Basic Functions

The MVS/CSC's primary functions are to provide user policy information to the SMC and to transmit information requests and directives to the appropriate LCS.

Note: The following functions, previously influenced by the MVS/CSC, are managed by the Storage Management Component (SMC):

- Drive allocation
- Processing of Mount, Dismount, and Swap messages on MVS systems. If a message requests an MVS/CSC drive, the SMC routes the request to the MVS/CSC.

Refer to the *SMC Configuration and Administration Guide* for more information.

Once the cartridge is mounted, the data is transferred using the data path under the control of the MVS client operating system.

1. However, if IBM has dropped support for a particular MVS/ESA SP level, then the MVS/CSC will no longer support that level. For newly announced IBM operating system levels, it is our intent to support each new level. Program Temporary Fixes (PTFs) might be available for IBM operating system levels that were not supported at the time of this version, or for products that become available after this version of the MVS/CSC. Contact StorageTek Software Support for information about the availability of PTFs for additional support. See the *Requesting Help from Software Support* guide for information about contacting StorageTek Software Support.

Depending on the configuration, the MVS/CSC communicates with the LCS using one of the following communications methods:

- Virtual Telecommunications Access Method (VTAM) “3270 BISYNC”
- Systems Network Architecture Logical Unit 6.2 (SNA LU 6.2)
- Transmission Control Protocol/Internet Protocol (TCP/IP)
- Cross-system coupling facility (XCF)

The MVS/CSC translates each request to the command format appropriate for the LCS.

In addition to basic functions provided to start and stop the MVS/CSC software, the MVS/CSC provides diagnostic aids (event logging and tracing), utility functions, user exits, and recovery processing. The MVS/CSC also provides an operator interface on MVS consoles through which you can issue commands to MVS/CSC. For the VM-based LCS, commands can be forwarded to the CLS or VM/HSC using the communications link.

MVS/CSC System Interfaces

The MVS/CSC consists of the following system interfaces:

- Tape management system interfaces to communicate with your tape management system
- Communications interfaces to link the MVS/CSC to the LCS for sending and receiving messages
- Operator console interfaces to allow operator commands to be issued for the MVS/CSC
- Programmatic interface to allow programs to request certain services from the MVS/CSC (MVS-based and UNIX-based LCS only)

MVS/CSC Configurations

The MVS/CSC program runs as a subsystem on the IBM MVS operating system along with the SMC subsystem. MVS/CSC can coexist with the MVS Host Software Component (MVS/HSC) on the same MVS host, thus providing access to multiple libraries from a single MVS host environment. This allows the MVS/HSC to control a local primary library complex[2] while one or more MVS/CSC subsystems access secondary, possibly remote libraries.

When multiple MVS/CSCs (or an HSC with one or more MVS/CSCs) exist on the same MVS host, the SMC on this host determines whether to use the HSC or any of the MVS/CSCs to process a particular allocation or Mount/Dismount/Swap message event. Refer to the *SMC Configuration and Administration Guide* for more information.

Each MVS/CSC can communicate with only one LCS at a time. In turn, each LCS manages a single library complex. Multiple MVS/CSC subsystems can exist on a single MVS host system, and each MVS/CSC subsystem can be attached to a different LCS. MVS/CSC supports the following LCS platforms:

- UNIX-based
- MVS-based
- VM-based

2. A library complex consists of one HSC Control Data Set (CDS) and a maximum of 256 Automatic Cartridge Systems (ACSs). Each ACS can contain a maximum of 16 Library Storage Modules (LSMs).

The following figure illustrates a basic client-server configuration using TCP/IP as the communications method.

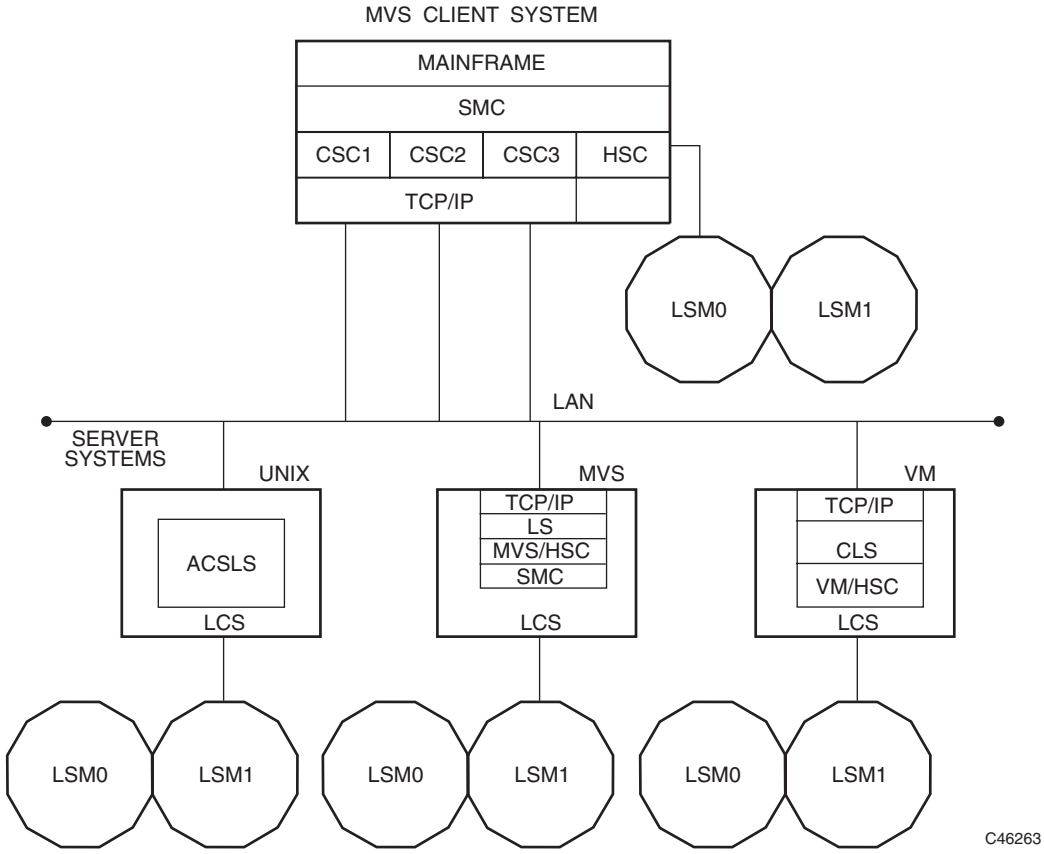


Figure 1. MVS/CSC-to-LCS Configuration

IBM Sysplex Support

The MVS/CSC supports the IBM sysplex (systems complex). A sysplex consists of multiple MVS systems cooperating to process work. In a parallel sysplex, applications that run on different MVS systems can simultaneously share data using the coupling facility. The cross-system coupling facility (XCF), SNA LU 6.2, and TCP/IP provide MVS communications for a sysplex environment.

In order to use XCF for communications between the MVS/CSC and the MVS-based LCS, the XCF group name and member name specified in the MVS/CSC startup parameters must match those defined to the MVS-based LCS.

In order to use SNA LU 6.2 for communications between the MVS/CSC and the MVS-based LCS, the partner LU specified in MVS/CSC's side information file must match the partner LU used to identify the LCS.

In order to use TCP/IP for communications between the MVS/CSC and the MVS-based LCS, you must specify the subsystem name or address space name of the TCP/IP stack, if the name was changed during the installation of the TCP/IP software.

Dynamic Server Switching

The MVS/CSC provides dynamic server switching support for multiple MVS-based LCSs that also support this capability. Dynamic server switching is supported only when the communications method is XCF or SNA LU 6.2. Dynamic server switching is not supported for the VM-based or UNIX-based LCS.

Dynamic server switching allows an MVS/CSC client to dynamically switch to an alternate LCS when it detects that the current LCS is unavailable. Dynamic server switching is initiated and controlled by the client system, and is configured using the MVS/CSC SRVRLIST startup parameter.

For each MVS/CSC client, an ordered server list is specified in the MVS/CSC SRVRLIST startup parameter. You can specify up to three MVS-based LCSs. The first LCS specified is considered to be the primary LCS. When the MVS/CSC detects that the current LCS is unavailable, the client dynamically switches connection to the next LCS specified in the list. When the alternate LCS no longer has requests outstanding, MVS/CSC periodically attempts to re-establish connection to the primary LCS.

Note: If you mount a cartridge from the current LCS before dynamic server switching occurs, you can dismount the cartridge from the new, alternate LCS.

StorageTek Library Product Support

The following sections lists the MVS/CSC Automated Cartridge Systems (ACSs), tape cartridge subsystems, and media types that the MVS/CSC supports.

StorageTek ACSs

4400 ACS	9360 stand-alone ACS	9740 ACS
• Library Storage Modules (LSMs)—4410 (standard), 9310 (PowderHorn), or 9360 (WolfCreek) • Library Control Units (LCUs) • Library Management Unit (LMUs)* • Cabling for LMUs to the LCUs and LCS	• LSMs—9360 (WolfCreek) • Integrated LMU*	• LSMs—9740 (TimberWolf)** • Integrated LMU*

* LMU Microcode Release 1.5.x or higher is required.
** LMU Microcode Release 1.6.x or higher is required for 9740 LSM and 9840 transport support.

StorageTek Tape Cartridge Subsystems

- 4480 Cartridge Subsystem (18-track)
- Silverton 4490 Cartridge Subsystem (36-track)
- TimberLine 9490 Cartridge Subsystem (36-track)
- TimberLine 9490EE Cartridge Subsystem (36-track)
- RedWood SD-3 Cartridge Subsystem (helical)
- 9840 Cartridge Subsystem
- T9840B Cartridge Subsystem
- T9940A Cartridge Subsystem

StorageTek Media Types

Standard capacity cartridge

This cartridge can be used on any longitudinal transport (i.e. 4480, 4490, 9490, or 9490EE).

Note: If data is written to the tape in 36-track mode, the data cannot be read by an 18-track 4480 transport.

Enhanced capacity cartridge (ECART)

This cartridge has a length of 1100 feet and can be used only on 36-track transports (i.e. 4490, 9490, and 9490EE). This cartridge is visually identified by a two-toned colored housing.

Extended-enhanced capacity cartridge (ZCART)

This cartridge can be used only on TimberLine 9490EE 36-track transports. These cartridges use a thinner media to provide twice the capacity of the ECART cartridge.

9840 cartridge

This cartridge can be used on 9840 or T9840B transports. Physically it is the same size as a standard 3480 cartridge, however, it has a 20 GB media capacity.

T9840B cartridge

This cartridge can be used only on T9840B transports. Physically it is the same size as a standard 3480 cartridge, however, it has a 20 GB media capacity.

T9940A cartridge

This cartridge can be used only on T9940A transports. It has a 60 GB media capacity. There are two types of T9940A cartridges: STK2P and STK2W.

Helical cartridge

This cartridge can be used only on RedWood (SD-3) transports. It is identified by the leader block on the left side of the cartridge. There are four types of helical cartridges: DD3A, DD3B, and DD3C, and DD3D.

In MVS-based and UNIX-based LCS environments, an ACS can contain mixed library transports (i.e. 4480, 4490, 9490, 9490EE, 9840, and SD-3 cartridge transports), and mixed media (i.e. standard, ECART, ZCART, 9840, and helical). In addition, 3480-, 3490E-, 3590, and helical-type cartridge transports can be attached to the MVS system outside the library.

StorageTek Library Control System (LCS) Software Products

The StorageTek LCS is the control interface between the mainframe computer systems (client systems) and the StorageTek library products. The LCS consists of hardware and software products that are attached to the MVS/CSC through a communications link.

The MVS/CSC receives requests from the SMC or the MVS host system and translates them to messages, which it sends to the LCS. The LCS receives the requests from the MVS/CSC to perform the automated handling of library cartridges. The LCS directs and monitors a single library and manages message and request traffic from one or more connected client systems. The LCS determines where the cartridge resides.

The LCS controls the library and manages the library database, which contains volume location and volume attribute information for all cartridges within the library. The LCS also performs activities such as mounting, dismounting, and entering and ejecting cartridges. The Library Management Unit (LMU) manages the movement (or exchanges) of cartridges between the Library Storage Modules (LSMs).

The MVS/CSC can be attached to any of the following LCSs:

- UNIX-based LCS, which consists of the Automated Cartridge System Library Software (ACSLS)
- MVS-based LCS, which consists of the Host Software Component for MVS (MVS/HSC) with LibraryStation
- VM-based LCS, which consists of the Host Software Component for VM (VM/HSC) and the Common Library Services (CLS)

Each LCS is described in more detail in the following sections.

Note: See the *NCS Installation Guide* for specific LCS software release levels.

UNIX-Based LCS

The UNIX-based LCS consists of the StorageTek ACSLS software product. ACSLS consists of a system administration component, interfaces to client system applications, and library management facilities that support the entire family of Nearline Automated Cartridge Systems.

The UNIX-based LCS resides on a UNIX-based platform. The MVS/CSC using the UNIX-based LCS requires that the ACSLS software be installed.

MVS-Based LCS

The MVS-based LCS consists of the following StorageTek software products:

- MVS/HSC
- LibraryStation (a feature of MVS/HSC)

Host Software Component (HSC) controls the ACS. It runs as a subsystem on the MVS server system. The library database records cell status, characteristics, and disposition of all cartridges stored in the library.

LibraryStation is a software communications interface feature of the MVS/HSC; it resides on the MVS server system as a component of the MVS/HSC. LibraryStation provides software support and an interface for the Open Systems Nearline Network protocol. This includes an Open Network Computing Remote Procedure Call (ONC RPC 3.0) client, a Systems Network Architecture (SNA LU 6.2) client, an MVS cross-system coupling facility (XCF) client, and a TCP/IP client. Additionally, LibraryStation provides an operator command set for controlling LibraryStation operation through the MVS/HSC operator console.

The MVS-based LCS software can reside on an MVS processor running MVS/ESA SP. The MVS/CSC using the MVS-based LCS requires that the MVS/HSC, LibraryStation, and communications software be installed.

VM-based LCS

The VM-based LCS consists of the following StorageTek software products:

- Host Software Component for VM (VM/HSC)
- Common Library Services (CLS)

Host Software Component (HSC) controls the ACS. It runs as a VM application on the VM-based LCS. The library database records cell status, characteristics, and disposition of all cartridges stored in the library.

Common Library Services (CLS) provides the communications interface between the client system (in this case MVS) and the VM/HSC. The CLS receives client requests and translates them to a form that can be executed by the HSC.

The VM-based LCS resides on an IBM System 370 processor running the Virtual Machine (VM) operating system. The MVS/CSC using the VM-based LCS requires that the CLS and VM/HSC software be installed.

Third-Party Software Interaction

The MVS/CSC subsystem operates in conjunction with various other third-party software, including:

- CA-1 (TMS) and CA-DYNAM/TLMS Tape Management Systems
- Data Facility Hierarchical Storage Manager (DFHSM)
- MIM
- AutoMedia (Zara) Tape Management System
- Any System Authorization Facility (SAF) compliant software product

Note: Only those third-party software products known to coexist with MVS/CSC are listed above. The MVS/CSC should not prevent other third-party software from functioning. However, there are certain restrictions on using third-party software. See Appendix D, “Third-Party Software Restrictions” on page 171.

Tape Management Systems

The MVS/CSC provides support for the following tape management products:

- CA-1
- CA-DYNAM/TLMS (Tape Library Management System)
- AutoMedia (Zara)

Interaction with tape management systems is managed by the Storage Management Component (SMC). Refer to the *SMC Configuration and Administration Guide* for more information.

Multi-image Manager (MIM)

MIM is a third-party software product that is used in a multi-CPU environment to control the allocation of transports to a particular host. The MVS/CSC can coexist with MIM. However, you must follow certain procedures when using MIM with the MVS/CSC. See Appendix D, "Third-Party Software Restrictions" on page 171 for information about MIM restrictions.

Note: With MIM Release 2.0, there are no restrictions for startup and no restrictions on MIM features.

Data Facility Hierarchical Storage Manager (DFHSM)

The MVS/CSC supports the use of 3480, 3490, 3490E, 3590, and helical-type transports by DFHSM. MVS/CSC supports dynamic allocation of cartridge transports by DFHSM.

System Authorization Facility (SAF)

The MVS/CSC operates with and does not compromise the integrity of any security facility using the SAF interface.

Communications Methods

The MVS/CSC subsystem is connected to the LCS using a communications link. The following list describes the communications links that can be used to connect the MVS/CSC:

- Transmission Control Protocol/Internet Protocol (TCP/IP) is used by the VM-based, UNIX-based, or MVS-based LCS. You can use the following software for TCP/IP communications:
  - IBM TCP/IP
  - Interlink TCPaccess
  - Interlink CISCO IOS
- Virtual Telecommunications Access Method (VTAM) is divided into two categories:
  - VTAM for "3270 BISYNC" communications, which is used only by the VM-based LCS
  - VTAM for SNA LU 6.2 communications, which is used by the UNIX-based or MVS-based LCS
- Cross-system coupling facility (XCF) is used only by the MVS-based LCS for sysplex environments

Note: See the *NCS Installation Guide* for the supported communications software release levels.

The following figure shows the communications connections using the TCP/IP communications protocol and the SNA LU 6.2 communications protocol for a UNIX-based LCS.

Note: The data path is not shown in this illustration.

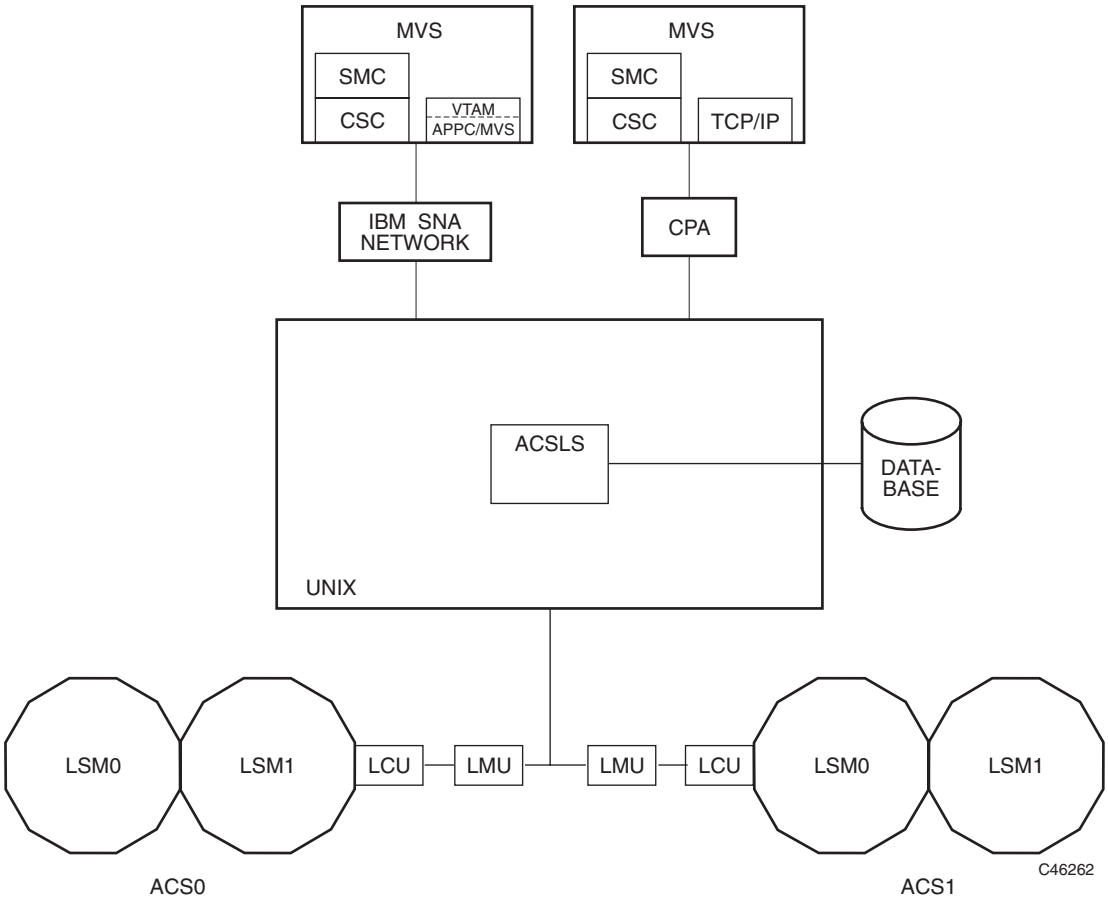


Figure 2. Communications Using TCP/IP and SNA LU6.2 (Unix-Based LCS)

The following figure shows the communications connections using the TCP/IP communications protocol and the SNA LU 6.2 communications protocol for an MVS-based LCS.

Note: The data path is not shown in this illustration.

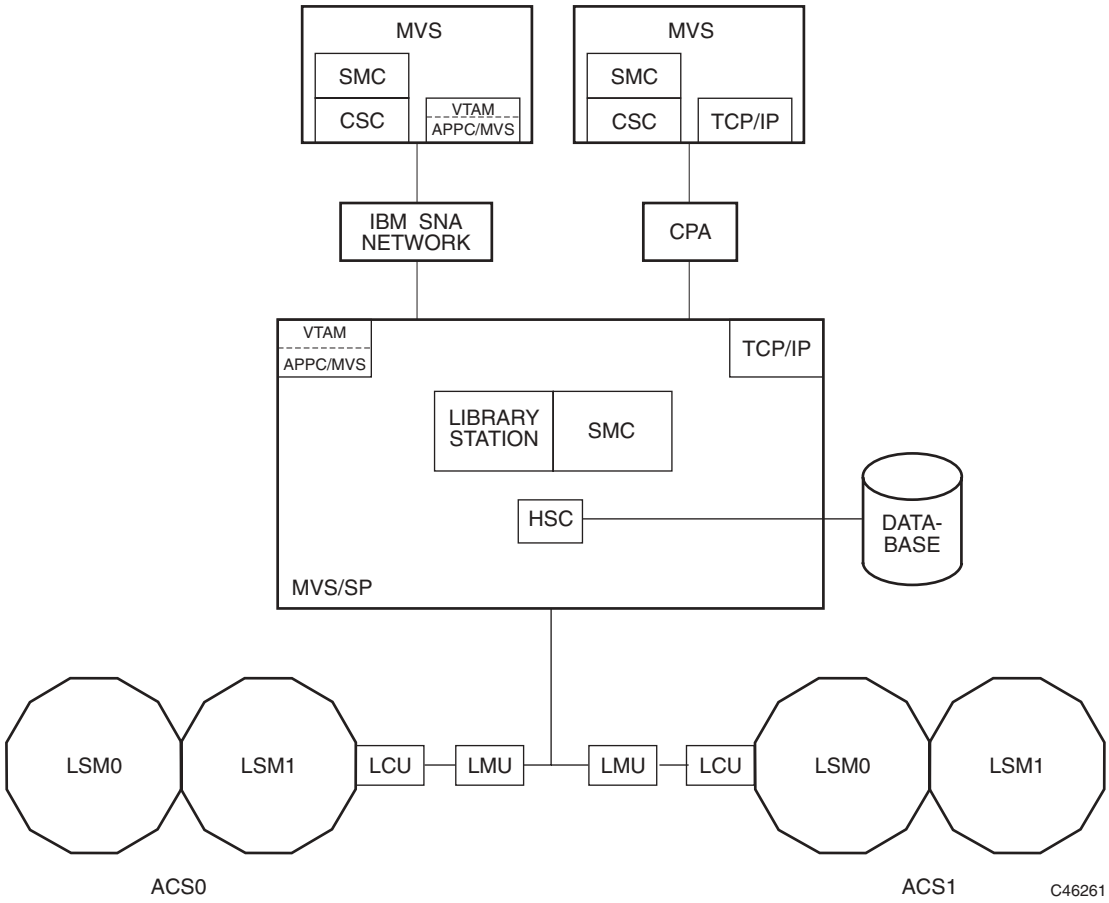


Figure 3. Communications Using TCP/IP and SNA LU 6.2 (MVS-Based LCS)

The following figure shows the TCP/IP and VTAM “3270 BISYNC” communications protocol for a VM-based LCS.

Note: The data path is not shown in this illustration.

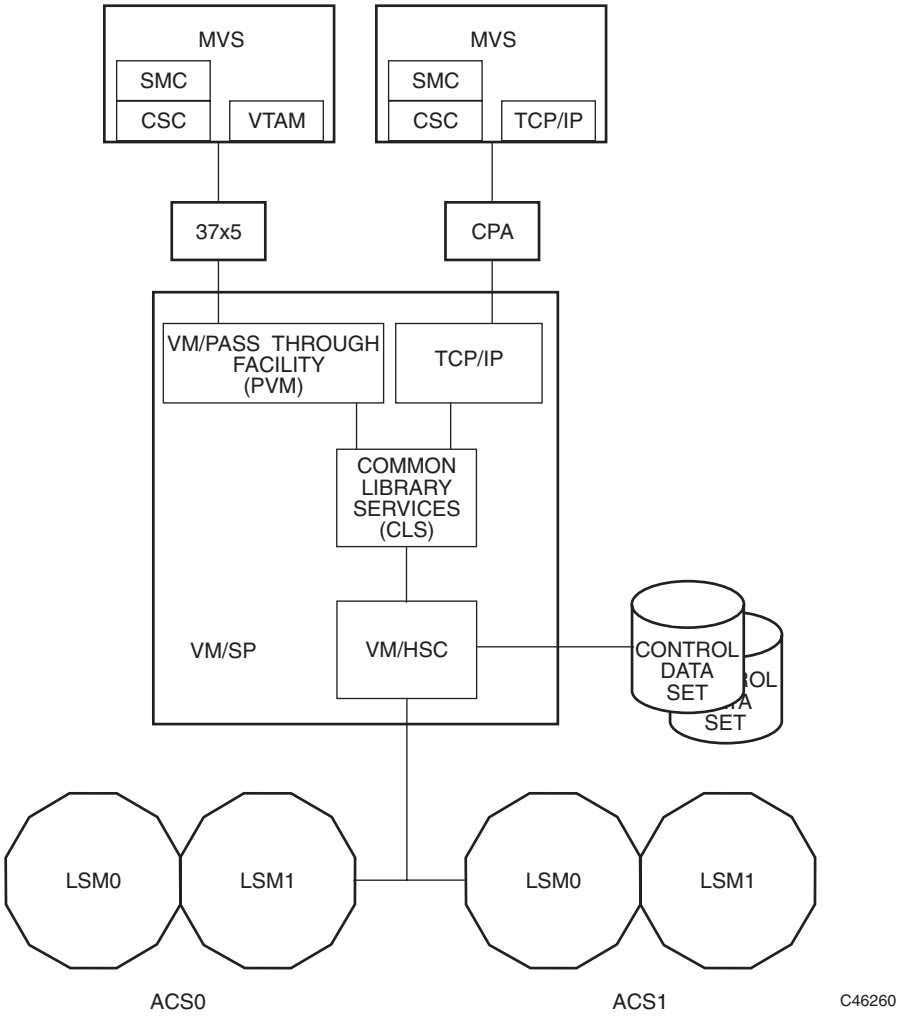


Figure 4. Communications Using TCP/IP and VTAM “3270 BISYNC” (VM-Based LCS)

The following figure shows the XCF communications protocol in a sysplex environment with either channel-to-channel (CTC) or coupling facility links for dynamic server switching.

Note: The data path is not shown in this illustration

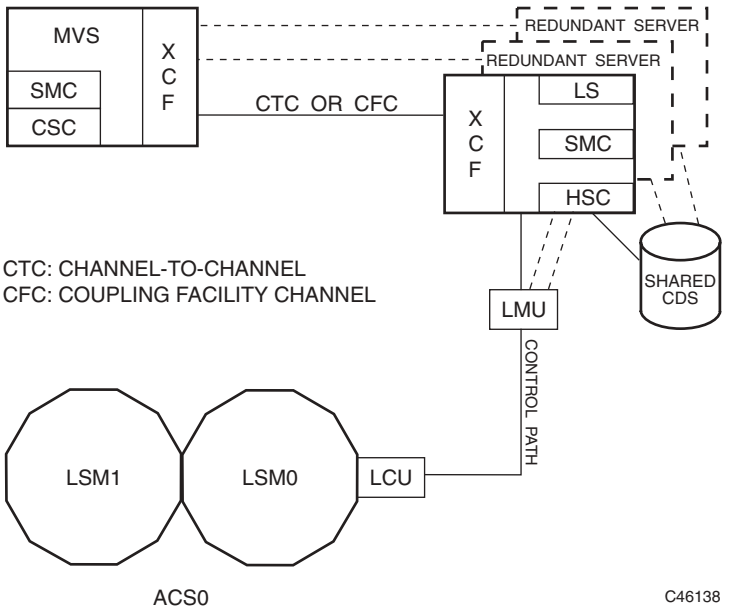


Figure 5. Communications Using XCF in a Sysplex Environment (MVS-Based LCS)

User Policy Definition for Mixed Media and Devices

The MVS/CSC supports mixed media (i.e., standard, ECART, ZCART, 9840, and helical) and mixed cartridge transport devices (i.e., 4480, 4490, 9490, 9490EE, 9840, and SD-3) in an ACS for the MVS-based and UNIX-based LCS. Mixed media and cartridge transport devices are not supported for the VM-based LCS.

The Storage Management Component (SMC) calls on MVS/CSC policies in order to perform drive exclusion and Mount/Dismount/Swap processing in a library environment containing mixed media and cartridge transport devices. This support does not require changes to JCL or the invocation of MVS/CSC user exits. Refer to the *SMC Configuration and Administration Guide* for more information.

TAPEREQ control statements are used to specify tape request attributes to the MVS/CSC. These statements are used to place a data set that meets the criteria specified by the TAPEREQ attributes on a specific media type, and create a data set using a specific recording technique.

You can define parameters for TAPEREQ control statements requesting that a data set be created using the following recording techniques:

- 18-track, thereby requiring that a 4480 transport be assigned to the request
- 36-track, thereby requiring that a 4490, 9490, or 9490EE transport be assigned to the request
- 9840, thereby requiring that a 9840 transport be assigned to the request
- T9940A, thereby requiring that a T9940A transport be assigned to the request
- Helical, thereby requiring that a SD-3 transport be assigned to the request

Device Preferencing

Device preferencing is applicable only to library configurations containing a mixture of StorageTek's 36-track 4490, 9490, and 9490EE Cartridge Subsystems. It is managed by the Storage Management Component (SMC). Refer to the *SMC Administration and Configuration Guide* for more information.

DFSMS/MVS Storage Management Subsystem Support

User policy specification via SMS is supported by the Storage Management Component (SMC). Refer to the *SMC Administration and Configuration Guide* for more information.

Part 2. MVS/CSC Operations

Chapter 2. Operating the MVS/CSC

Overview

This chapter describes how to use the MVS/CSC to access library services. It describes the following:

- Operator interfaces
- MVS/CSC operations, including starting and stopping the MVS/CSC
- Manual mode operations for the UNIX-based, MVS-based, and VM-based Library Control System (LCS)

Operator Interfaces

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

- Starting and stopping the MVS/CSC
- Displaying MVS/CSC information
- Altering MVS/CSC configuration
- Invoking MVS/CSC recovery processing
- Enabling MVS/CSC diagnostics

Depending on the server environment, other consoles may be provided. For the UNIX-based LCS, the ACS System Administrator (ACSSA) console provides access to the LCS and the library. There is no equivalent console for the MVS-based LCS. For the VM-based LCS, the MVS system console provides an operator interface to both the MVS/CSC and the VM-based LCS for controlling the library. During normal operations, facilities that are part of the Host Software Component (HSC) and the Common Library Services (CLS) can be initiated from the MVS system console. The LCS processor console and the CLS operator console also provide access to the library. See Chapter 4, “Operator Console Interface” on page 65.

MVS/CSC Operations

The following sections describe normal MVS/CSC operations, including:

- Pre-initializing the MVS/CSC
- Starting the MVS/CSC
- Stopping the MVS/CSC

Pre-Initializing the MVS/CSC

Both the MVS/CSC and the LCS must be initialized before the library can be accessed. The MVS/CSC can either be pre-initialized by the MVS subsystem pre-initialization routine during the initial program load (IPL) of the MVS host system, or by issuing the MVS SETSSI command to dynamically define the MVS subsystem name.

The subsystem pre-initialization routine is identified in the MVS IEFSSNyy member of SYS1.PARMLIB. The pre-initialization routine is executed once for each IPL of the MVS host system. The pre-initialization routine establishes unique identification of the MVS/CSC subsystems in the MVS host system. Once the IPL of MVS has completed and the pre-initialization routine has executed, you can start the MVS/CSC subsystem.

Issuing the MVS Start command invokes the subsystem initialization routine. This routine determines what parameters are in effect, initializes communications, performs any cleanup necessary (such as resource recovery), and begins normal processing.

Before initialization of the MVS/CSC, the MVS/CSC startup parameters must be specified. These parameters reside in a member of a partitioned data set or in a sequential data set. The parameters are identified by the SCSPARM DD name in the MVS/CSC startup procedure.

During MVS/CSC startup processing, the MVS/CSC synchronizes the state of its resources with the LCS and MVS using its synchronization processing. For the VM-based LCS, the MVS/CSC sends an *availability* message to the CLS during initialization. The MVS/CSC waits for a return availability message from the CLS before processing can occur.

Starting the MVS/CSC

Note: MVS/CSC 5.1 requires a valid license key for initialization. Refer to the *MVS/CSC Configuration Guide* for more information.

The MVS Start command initializes the MVS/CSC. The syntax of the Start command is:

```
START csc-proc-name[,PRM=RESET|COLD|[AMPND|NOAMPND]]
```

START or S is the keyword for the MVS Start command. The value specified for *csc-proc-name* is the name of a member in a procedure library. You can specify the following values for the PRM parameter:

RESET

Instructs the MVS/CSC to reset its internal initialization and termination flags. This parameter may be required if the last execution on the MVS/CSC was terminated by an MVS Force command.

COLD

Instructs the MVS/CSC to rebuild its internal control structures. This parameter is required if migrating from a prior version of the MVS/CSC to this version of MVS/CSC and no IPL of the MVS host system was performed. This parameter may also be required if an MVS/CSC PTF has been applied and no IPL of MVS was performed.

AMPND

Instructs the MVS/CSC to automate pending mounts for configured drives during initialization. This setting is the default and need not be entered.

Notes:

- Configured drives are defined as those listed in the MVS/CSC LIBUNIT startup parameter.
- SCRPOOL and TAPEREQ requests are not honored for pending mounts processed during initialization.
- Automation of pending mounts for Virtual Tape Drives (VTDs) is not supported.

NOAMPND

Instructs the MVS/CSC to bypass automation of pending mounts during initialization.

Note: AMPND and NOAMPND are mutually exclusive. Specifying both results in messages SCS0004I and SCS0511I.

The MVS/CSC system responds by displaying console messages (shown in the following figure). The messages explain that the MVS/CSC subsystem started at the time shown and that initialization completed. Specific messages indicating that a session with the LCS was successfully initialized will be issued depending on the configuration and parameters specified.

```
IEF403I CSC0 - STARTED - TIME=08.45.56
 SCS0500I MVS/CSC 5.1 LICENSED/SECRET/UNPUBLISHED
             WORK/COPYRIGHT (1992 - 2002) STORAGETEK
...
...
SCS0517I MVS/CSC subsystem CSC0 initialization complete
```

Stopping the MVS/CSC

MVS/CSC processing can be stopped by causing an orderly shutdown or an immediate shutdown.

Orderly Shutdown

During an orderly shutdown, the MVS/CSC waits for processing of all activities in progress to be completed before completing shutdown.

Immediate Shutdown

During an immediate shutdown, the MVS/CSC stops all processing and immediately begins shutdown processing.

Any of the following MVS commands can be used to stop MVS/CSC processing:

- STOP

  The MVS Stop command causes an orderly shutdown of the MVS/CSC.

```
STOP csc-proc-name
```

  STOP or P is the keyword for the MVS Stop command. The value specified for *csc-proc-name* is the name of the MVS/CSC started task currently running.

- CANCEL

  The MVS Cancel command causes all MVS/CSC operations to be cancelled and causes an immediate shutdown of the MVS/CSC.

```
CANCEL csc-proc-name,DUMP
```

  CANCEL is the keyword for the MVS Cancel command. The value specified for *csc-proc-name* is the name of the MVS/CSC started task currently running. The optional DUMP parameter instructs the MVS host system to produce a dump of the MVS/CSC address space.

- FORCE

  The MVS Force command causes all MVS/CSC operations to be cancelled and causes an immediate shutdown of the MVS/CSC. However, unlike the Cancel command, the Force command may cause unpredictable results when the MVS/CSC is restarted. Therefore, use of this command is not recommended.

```
FORCE csc-proc-name
```

FORCE is the keyword for the MVS Force command. The value specified for *csc-proc-name* is the name of the MVS/CSC task currently running.

Communications Considerations When Stopping the MVS/CSC

The communications access method software:

- IBM TCP/IP, Interlink TCPaccess, or Interlink CISCO IOS for TCP/IP communications
- VTAM for "3270 BISYNC" communications
- APPC/MVS and VTAM for SNA LU 6.2 communications
- Cross-system coupling facility (XCF) for XCF communications

should be operational before starting the MVS/CSC subsystem. If the communications software must be stopped, the MVS/CSC should be stopped using the MVS Stop (or Cancel) command before stopping the communications software.

Manual Mode Operations

This section describes manual mode operations for:

- UNIX-based and MVS-based LCS
- VM-based LCS

Manual Mode Operations for the UNIX-Based and MVS-Based LCS

When the ACS or LSM is offline and a mount request is issued for a library transport, the MVS/CSC returns the following message:

```
SCS0917D Mount of volser on drive XXXX failed - LSM offline; reply
"C"ancel, "R"etry, or "M"anual mount
```

A response of "M" to the message results in either of the following messages, depending on whether or not the mount request was for a specific cartridge.

```
SCS0080I Mount of volser on drive XXXX - Volume at AAL:PP:RR:CC
SCS0080I Mount of    on drive XXXX -
```

For specific requests, the volume serial number (*volser*), drive address (XXXX), and cartridge location (AAL:PP:RR:CC) is supplied. For non-specific requests, only the drive address (XXXX) is supplied; the volume serial number and cartridge location are not provided.

For the UNIX-based LCS, you can issue the following command from the ACS System Administrator (ACSSA) console to obtain the volume serial number and location of scratch volumes:

```
query scratch x
```

where x is the pool identifier of the scratch subpool. The default subpool number is 0.

The following example shows the listing that would appear in response to the query, assuming volumes U01102, U01103, and U01104 are available scratch cartridges:

```
11-07-01 13:55:14           Scratch Status
Scratch Pool   Identifier  Home Location Status
 0             U01102      0, 0, 4, 1, 1 home
 0             U01103      0, 0, 0, 1, 0 home
 0             U01104      0, 0, 2, 1, 1 home
```

For the MVS-based LCS, the operator must know which volumes are scratch and the location of these volumes.

After determining the location of the cartridge, unlock and go inside the LSM. For the appropriate transport, press and hold the Rewind button for several seconds (or the Rewind *and* Unload buttons, depending on the type of transport). This causes the panel lights to flash on the panel corresponding to the transport that requested the mount. For specific cartridge mounts, the panel lights will be alternately flashing the volume serial number and the cartridge location in the LSM. The LSM location will be flashing four numbers representing LSM, panel, row, and column. For scratch cartridge mounts the LSM location will be flashing all zeros.

Locate the cartridge and place it in the designated transport. The lights will flash rewinding, unloading, and so forth. When the MVS job is completed, the cartridge should be removed from the LSM.

To vary the ACS online for the UNIX-based LCS, issue the following command from the ACSSA console:

```
vary acs x online
```

where x is the ACS identifier.

To vary the ACS online for the MVS-based LCS, issue the following HSC command from an MVS console:

```
vary xxx online
```

where xxx is the device address of the station.

To vary the LSM online and return it to automatic mode for the UNIX-based LCS, issue the following command from the ACSSA console:

```
vary lsm x,y online
```

where x is the ACS identifier and y is the LSM identifier.

To vary the LSM online and return it to automatic mode for the MVS-based LCS, issue the following HSC command from an MVS console:

```
modify xxx online
```

where xxx is the LSM identifier.

If the LSM is offline when a program terminates and MVS issues a dismount message, the MVS/CSC displays the following message:

```
SCS0924D Dismount of volser from drive XXXX failed - LSM offline;
reply "M"anual dismount or "R"etry
```

where *volser* is the volume identifier and XXXX is the transport identifier.

A response of "R" initiates a software retry. If the LSM was varied online before the "R" response, the volume will be dismounted automatically. If you reply "M" to the message, the volume must be manually removed from the LSM.

Note: It is highly recommended that the Audit command be issued after manual mount processing.

Manual Mode Operations for the VM-Based LCS

When an LSM is offline or the ACS is disconnected, mount and dismount activity can still continue in manual mode. In manual mode, what is normally accomplished by the robot inside the LSM must be done manually by data center personnel.

The HSC detects the manual-mode condition and issues a message asking if a manual mount should be performed. Any response to the HSC message allows the MVS/CSC to continue with its own operator-intervention messages.

The HSC and MVS/CSC together allow manual-mode operations to continue, including controlling the disposition of the manually mounted cartridge in the library database.

The following sections describe procedures for mounting and dismounting cartridges in a variety of circumstances using manual-mode operations. The descriptions provided in this chapter show how the MVS/CSC interacts with manual-mode messages issued by the HSC. The steps and procedures described here should provide adequate instruction about operating in manual mode. See the *MVS/HSC Operator's Guide* and the *VM/HSC Operator's Guide* for more complete descriptions of manual-mode operations.

LSM Manual Mode Procedures

When an LSM cannot operate in automatic mode, the robot does not mount and dismount cartridges automatically. You must go inside the LSM and mount and dismount cartridges manually. This section describes the following procedures for operating an LSM in manual mode:

- Determining that the LSM is not in automatic mode
- Placing the LSM in manual mode
- Handling manual mount requests
- Handling manual dismount requests

Note: Manual mode procedures depend on the tape management system being used, and on whether PROP (Programmable Operator facility) is used. Refer to the documentation for your tape management system. Those procedures supersede the procedures described in this chapter.

Determining That the LSM is Not in Automatic Mode

Any of the following are signs that indicate when an LSM is not functioning in automatic mode:

- The LSM access door is open.
- The robot does not automatically mount and dismount cartridges.
- The HSC issues a console message informing the operator that an LSM is "not ready" indicating a problem has been detected in the LSM. The message identifies the LSM and provides a reason code for the failure. See the *HSC Messages and Codes Guide* for an explanation of the reason code.

Displaying LSM Status—If you suspect that the LSM is not functioning in automatic mode, issue the following command at an MVS console to display the status of the LSM:

```
CSCn HSC DISPLAY LSM lsm-id
```

The status display indicates "not ready" if the LSM is not functioning in automatic mode.

Placing the LSM in Manual Mode

Place the LSM in manual mode by issuing the following command at an MVS console:

```
CSCn MODIFY lsm-id OFFLINE
```

When the LSM is offline, the following message is displayed on the console:

```
... LSM AAL now OFFLINE
```

The LSM remains in manual mode until the MODIFY *lsm-id* ONLINE command is issued and completes successfully.

Verifying the LSM is Offline—If you did not see the "LSMid *AAL* now OFFLINE" message, you can verify that the LSM is offline by issuing the following command at an MVS console:

```
CSCn HSC DISPLAY LSM lsm-id
```

The status display indicates "OFFLINE" if the Modify command was successful. If the LSM is not offline, reissue the Modify command with the FORCE option.

Note: Placing the LSM offline does not cause the cartridge transports in the affected LSM to become offline.

Manual Mode Dismount Processing for Robot-Mounted Cartridges—Placing an LSM in manual mode does not cause the cartridge transports in the affected LSM to become offline. Jobs that are running when an LSM is modified offline continue without interruption. As the jobs complete, manual dismount requests are issued for cartridges that were mounted by the robot before the LSM was modified offline.

Normal HSC manual mode processing deletes a cartridge from the library database when the dismount message is displayed. The HSC considers the dismount complete; it cannot be displayed as an outstanding request. This type of processing assumes the operator manually dismounts the cartridge and removes it from the LSM. Cartridges that are removed must be re-entered after the LSM is modified online.

If an LSM is only going to be in manual mode for a short time, the operator can take control of these dismount requests by issuing the following command:

```
CSCn SET DISMOUNT MANUAL
```

This directs the HSC to prompt for an operator decision whenever a dismount is requested for a robot-mounted cartridge. The following choices are available:

- Manually dismount the cartridge and reply "D" to the dismount message. The record of the cartridge is deleted from the library database and the cartridge must be removed from the LSM.

- Reply “I” to the message to ignore the dismount. The dismount can be re-driven after the LSM is modified online by issuing the HSC Dismount command.
- Do not respond to the dismount message, which leaves the dismount request outstanding. The HSC automatically re-drives the dismount request when the LSM is modified online.

Note: Use the Set Dismount command to display the current dismount setting.

Handling Manual Mount Requests

Whenever a mount is requested for a cartridge residing in a manual mode LSM, the HSC immediately informs the operator that a manual mount is needed by issuing one or more messages to the console. Each message contains text, such as any of the following:

```
... Manual volume at ...
... manual mount is required
... Intervention required; ...
```

indicating that the cartridge must be mounted manually.

The MVS/CSC issues the following message when a manual mount situation occurs:

```
SCSØ917D Mount of volser on drive XXXX failed - LSM offline;
reply “C”ancel, “R”etry, or “M”anual mount
```

A reply of “C” to the message cancels the entire mount operation. A reply of “R” instructs the MVS/CSC to resend the failed mount request to the server. A reply of “M” allows manual mode processing to proceed.

One HSC message provides the cartridge volume serial number and cell location, and prompts the operator to respond either “D” (delete) or “I” (ignore). The operator can also choose to *not* respond to the message. The operator response (or no response) determines how the HSC processes the dismount.

The manual mount message is also issued when a cartridge in a manual mode LSM is needed to satisfy a mount request in an automatic mode LSM. When this happens, do the following:

1. Remove the cartridge from the manual mode LSM.
2. Reply “D” to the message.
3. Enter the cartridge into the automatic mode LSM.

Manually Mounting a Cartridge (Before a Reply of M to SCS0917D)—To proceed with the manual mount, the operator can either reply "D" (delete) or make no reply to the HSC manual mount message.

Replying Delete to the Message: When the manual mount message is displayed on the console, do the following:

1. Write down the volume serial number and cell location of the requested cartridge, and the address of the assigned transport shown in the message.
2. Go inside the LSM.
3. When the cartridge is in your hand, exit the LSM and reply "D" to the mount message. The HSC is notified that a manual mount is in progress and deletes the record of the cartridge from the library database.
4. Insert the cartridge in the transport.

Note: If the transport does not load the cartridge, leave the cartridge mounted and press the REWIND switch to activate the transport.

Not Replying to the Message: When the manual mount message is displayed on the console, do the following:

1. Go inside the LSM.
2. Locate the cartridge using the information provided in the transport display, and remove it from the cell location.
3. Insert the cartridge in the transport.

Note: If the transport does not load the cartridge, leave the cartridge mounted and press the REWIND switch to activate the transport.

Not Performing the Manual Mount (Before a reply of R to SCS0917D)—To choose not to perform the manual mount, the operator can either reply "I" or make no reply to the HSC manual mount message.

Ignoring a Manual Mount Request: To ignore the mount, reply "I" to the mount message. The HSC releases the mount request and the cartridge remains in the library database.

After the LSM is modified online, the mount can be re-driven by issuing the HSC Mount command. The HSC does not automatically reprocess a mount request that has been ignored.

Not Responding to a Manual Mount Request: If plans are to place the LSM in automatic mode (modify online), the operator can choose to *not* respond to the manual mount message. The HSC queues the mount and waits for a response.

When the LSM is placed in automatic mode, the mount request is re-issued.

How Manual Mounts Affect the Library Database—The operator's response to the HSC manual mount message determines how the library database (Control Data Set) is affected.

- A response of "D" (delete) logically ejects the cartridge from the library database. Logical ejection is done to maintain integrity of the library database.
- A response of "I" leaves the cartridge in the library database.
- No response to the message leaves the cartridge in the library database.

Handling Manual Dismount Requests—When an LSM is in manual mode, two different situations can occur that may require operator intervention to manually dismount a cartridge:

- A dismount request for a cartridge that was mounted by the robot before the LSM was placed in manual mode
- A dismount request for a cartridge that was manually mounted by the operator.

Manual Dismounts of Cartridges Mounted by the Robot—The HSC Set Dismount command controls HSC dismount processing of cartridges that were mounted by the robot. See "Manual Mode Operations" on page 27 for more information about using the Set command.

Using the HSC Dismount Auto Command: If the Set Dismount command is set to AUTO (the default), the HSC displays a manual dismount message that identifies the cartridge volume serial number and the transport address. The HSC immediately deletes the cartridge from the library database. The operator must manually dismount the cartridge and remove it from the LSM.

Using the HSC Set Dismount Manual Command: If the Set Dismount command is set to MANUAL, the HSC displays a manual dismount message that identifies the cartridge volume serial number and the transport address, and prompts the operator to respond "D" (delete) or "I" (ignore).

Reply "D" to proceed with the manual dismount. Immediately enter the LSM, dismount the cartridge, and remove it from the LSM. The HSC deletes the cartridge from the library database.

Reply "I" to ignore the dismount. The HSC releases the dismount request and the cartridge remains in the library database. After the LSM is modified online, the dismount can be re-driven using the HSC Dismount command.

Do not reply to the message if you plan to modify the LSM online. The cartridge is dismounted automatically when the LSM is returned to automatic mode.

Manual Dismounts of Manually Mounted Cartridges—After the system has finished processing a manually mounted cartridge, the HSC issues a dismount message identifying the transport address and the volume serial number of the cartridge to be dismounted. The message does not require an operator response.

Do the following:

1. Go inside the LSM and locate the appropriate transport.
2. Dismount the cartridge from the transport and exit the LSM.
3. Store the cartridge outside the LSM.

How Manual Dismounts Affect the Library Database

Manual Dismount After Robot Mount (Set Dismount AUTO): The HSC deletes the cartridge from the library database.

Manual Dismount After Robot Mount (Set Dismount MANUAL): Manual dismounts of cartridges that were mounted by the robot cause the HSC to display a message which prompts the operator to respond either "D" (delete) or "I" (ignore).

- A response of "D" deletes the cartridge from the library database.
- A response of "I" leaves the cartridge in the library database.
- No response to the message leaves the cartridge in the library database.

Manual Dismount After Manual Mount: The operator's response to the manual mount message determines how manual dismounts of manually mounted cartridges affect the library database.

- If the operator replied "D" (delete) to the manual mount message, the cartridge was removed from the library database at mount time.
- If the operator made no reply to the message, the cartridge remains in the library database.

Returning the LSM to Automatic Mode (VM-Based LCS)

This section describes the following procedures for returning the LSM to automatic mode:

- Placing the LSM in automatic mode
- Handling outstanding requests for manual mounts
- Handling outstanding dismounts during manual mode operations

Placing the LSM in Automatic Mode

Place the LSM in automatic mode by issuing the following command at the console:

```
CSCn .MODIFY lsm-id ONLINE
```

The HSC issues the following message:

```
... LSM AAL now ONLINE
```

Handling Outstanding Requests for Manual Mounts

There may be outstanding manual mounts if you replied "I" to the HSC manual mount message, or made no response to the message and did not mount the cartridge. In both cases, the mounts can be automated after modifying the LSM online.

- If you replied "I" to the manual mount message, you can re-drive the mount after the LSM is placed in automatic mode by replying "R" to the MVS/CSC message.
- If you have not responded to the manual mount message, the mount is performed automatically after the LSM is placed in automatic mode.

Handling Manual Mounts Requiring Automated Dismounts

Dismount requests for manually mounted cartridges may be received before and after the LSM is placed in automatic mode. If manually mounted cartridges are deleted from the library database at mount time, the HSC requires operator assistance to semi-automate the dismounts.

Manual Dismount Requested Before the LSM is Online—You can ignore a manual dismount request and modify the LSM online, leaving the cartridge mounted on the transport. When the LSM is in automatic mode, the dismount can be semi-automated in one of two ways.

- You can initiate the dismount by doing the following:

  1. Issue the following HSC command:

     ```
     CSCn DISMOUNT  ,devaddr
     ```

     where *devaddr* specifies the address provided in the manual dismount message of the transport containing the cartridge to be dismounted. Do **not** specify a volume serial number.

2. Reply "E" to the following HSC message:

```
... Dismount of...; reply I, U,VOLSER, R, or E
```

The cartridge is dismounted and ejected from the LSM.

- You can wait for the next mount request for the transport containing the cartridge to be dismounted. When the robot discovers the cartridge mounted in the transport, the HSC issues the message:

```
... Dismount of... ; reply I, U,VOLSER, R, or E
```

Reply "E" to dismount the cartridge and eject it from the LSM.

Dismount Requested After the LSM is Online—Dismounts requested after the LSM is online cause the HSC to issue the message:

```
... Dismount of... ; reply I, U,VOLSER, R, or E
```

Reply "E" to dismount the cartridge and eject it from the LSM.

Chapter 3. Issuing MVS/CSC Operator Commands

Overview

This chapter provides command syntax and parameter descriptions for each MVS/CSC command:

- ALTER
- DISPLAY
- LIST
- LKEYDEF
- LOAD
- LOG
- MODIFY
- RESYNCH
- TRACE
- TREQDEF

Note: Virtual Storage Manager (VSM) support has been added for certain MVS/CSC operator commands. Refer to the VTCS customer documentation for more information.

MVS/CSC provides operator commands that let you manage and display the status of certain library resources, cartridges, transports, and library components. The commands are summarized in Table 1. Note that commands in this table are shown in mixed case; lower case letters may be omitted to form abbreviations (for example, you can specify LO for the LOad command or T for the Trace command).

Table 1. MVS/CSC Command Summary

Command	Function
ALTer	Modifies the specified MVS/CSC startup parameter.
Display	Displays information about parameter settings and status of communications links.
LIst	Displays the contents of the MVS/CSC control block and storage (for diagnostic use).
LKEYDEF	Allows license key information (defined by LKINFO commands) to be retrieved by the MVS/CSC.
LOad	Loads and transfers control to a LINKLIB member (for diagnostic use).
LOG	Turns on or off the logging of MVS/CSC events and communications between the MVS/CSC and the LCS.
MODify	Varies LSMs either online or offline.
RESYNCh	Initiates the recovery process that resynchronizes the state of LCS resources to the current state of the MVS/CSC.
Trace	Turns on or off the tracing of MVS/CSC activities.
TREQDEF	Loads or reloads the tape request (TAPEREQ) control statements.

Command Format

This section describes the format required to enter commands to the MVS/CSC, the MVS host system, and the CLS-type server.

Specifying MVS/CSC Commands

MVS/CSC commands are entered using the following format:

- Command prefix character or MVS/CSC subsystem name
- Command keyword
- Required or optional parameters

The command keyword must be prefixed by either the command prefix character or the MVS/CSC subsystem name. When the command prefix character is defined, it precedes console messages issued by MVS/CSC.

The command prefix character is defined using the COMPRFX startup parameter. The command keyword must follow the command prefix character. No blanks are allowed between the prefix character and the command keyword. You can separate parameters by a comma or a blank. The following shows the required format:

```
prefix-characterCOMMAND-KEYWORD [PARM1] [PARM2]...[PARMn]
```

The MVS/CSC subsystem name is defined in the PARMLIB member IEFSSNyy. The subsystem name identifies the MVS/CSC subsystem that processes the command. The command keyword must follow the subsystem name. One or more blanks are allowed between the subsystem name and the command keyword. Parameters can be separated by a comma or a blank.

```
CSCn COMMAND-KEYWORD [PARM1] [PARM2]...[PARMn]
```

Specifying MVS Commands

MVS operator commands are supported to start, stop, cancel, and force the shutdown of MVS/CSC. MVS commands supported by the MVS/CSC do not require prefix characters, subsystem names, or system qualifiers. For example, the MVS command to start the MVS/CSC subsystem (CSC0) can be entered as follows:

```
S CSC0
```

See "MVS/CSC Operations" on page 24 for more information about using MVS commands to start and stop the MVS/CSC subsystem.

Specifying HSC and CLS Commands

For the VM-based LCS, certain HSC and CLS commands are supported to perform functions not specifically implemented as MVS/CSC commands.

For HSC and CLS commands, a system qualifier (HSC, CLS, or SLK) is specified to designate the command as an HSC or CLS command. If a system qualifier is not entered for these commands, the commands are passed in the following order and executed by the appropriate system:

- MVS/CSC
- CLS
- SCP (with prefix SLK)
- HSC

See "MVS Operator Console Interface" on page 65 for more information.

MVS/CSC Command Descriptions

This section provides detailed descriptions of each MVS/CSC command, including an explanation of its functions and the values associated with each parameter. Examples showing the use of commands are included as appropriate.

See “Syntax Flow Diagrams” on page xv for syntax flow diagramming conventions.

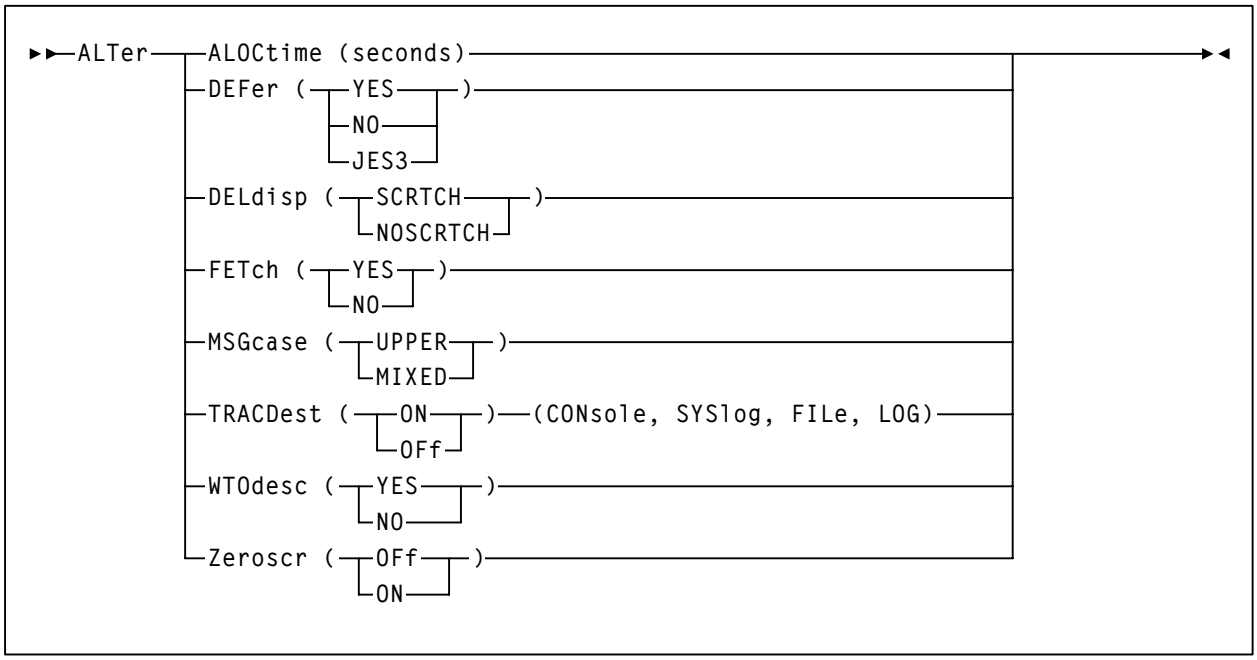
ALTER Command

The ALTer command modifies the specified MVS/CSC startup parameter.

Note: Virtual Storage Manager (VSM) support has been added for this command. Refer to the VTCS customer documentation for more information.

Syntax

The following diagram shows the syntax of the ALTer command. The parenthesis are optional. The blank space following each parameter name is required.



Parameter Descriptions

This section describes the values you can specify with the ALTER command.

ALOCtime
Specifies the number of seconds that the MVS/CSC allocation enhancement component waits for the server to respond to a query request for volume location and volume attribute information. Values can range from 10 to 3600.

Note: See the *MVS/CSC Configuration Guide* for considerations when specifying ALOCTIME.

DEFer
Specifies whether or not MVS mount messages are deferred.

YES
Enables deferred mount processing for cartridges. This setting overrides the user's JCL and defers mounting cartridges until the data set is opened.

NO
Disables deferred mount processing for cartridges. During MVS allocation, the cartridge is mounted when a system initiator begins the step allocation process. During JES3 allocation, some or all of the cartridges required by a job are mounted before job execution.

JES3
Enables JES3 deferred mount processing. Cartridges are mounted when a system initiator begins the step allocation process.

This parameter applies only to JES3 environments with TAPE SETUP processing.

Note: MVS/CSC automatically defers all library mounts for dynamic allocation requests regardless of the setting on the DEFER startup parameter during JES3 device allocation.

DELdisp
Specifies whether or not a dismounted scratch cartridge is returned to scratch status when MVS indicates delete disposition.

SCRTCH
Specifies that the dismounted cartridge be returned to the scratch list when MVS indicates delete disposition.

NOSCRTCH
Specifies that the dismounted cartridge is not returned to the scratch list when MVS indicates delete disposition.

FETch
Specifies whether or not JES3 operator fetch message IAT5110 is issued during library mount processing.

YES
Specifies that JES3 operator fetch messages are issued for library mount processing.

NO
Specifies that JES3 operator fetch messages are suppressed for library mount processing.

Note: The MVS/CSC IATUX09 JES3 user exit must be installed in order to suppress operator fetch messages.

MSGcase
Specifies the format of message output.

UPPER
Specifies that console message output from the MVS/CSC is displayed in upper case.

MIXED
Specifies that console message output from the MVS/CSC is displayed in mixed case.

TRACDest
Specifies whether or not the named trace destinations are active.

ON
Specifies that the named trace destinations are active.

Valid trace destinations are:

- MVS operator console (CONsole)
- MVS system log (SYSlog)
- MVS/CSC trace data set (FILe)
- Event-log data set (LOG)

If you specify FILe or LOG, the MVS/CSC trace data set or event-log data set must exist.

OFf
Specifies that the named trace destinations are not active.

WTOdesc

Specifies whether or not mount and dismount messages are highlighted.

YES

Specifies that MVS mount and dismount messages for library-controlled cartridges remain highlighted during an automated mount or dismount.

NO

Specifies that MVS mount and dismount messages for library-controlled cartridges are not highlighted during an automated mount or dismount.

Zeroscr

Specifies whether or not devices in ACS(s) that do not contain valid scratch volumes are marked ineligible during allocation.

Note: Refer to the *SMC Configuration and Administration Guide* for information about Zeroscr support in a JES3 environment.

ON

Specifies that devices in ACS(s) that do not contain qualified scratch volumes are marked ineligible during allocation, even if a job requires allocation recovery.

Note: In order for this parameter to take effect, user exit 02 (SCSUX02) must be active and return UX02LIB (return code 4) for the affected mount request.

OFf

Specifies that devices in ACS(s) that do not contain valid scratch volumes are **not** marked ineligible during allocation, even if this requires the ejection of a scratch cartridge from one ACS to be inserted into another ACS.

Example of ALTER DELDISP Command

In this example, the delete disposition parameter is modified. Cartridges used temporarily are returned to the HSC scratch pool.

```
CSC4 ALT DELDISP SCRTCH
```

Messages are sent to the console where the command was issued. For example:

```
SCS0614I Configuration parameter DELDISP changed to value SCRTCH
```

Example of ALTER TRACDEST Command

```
!ALT TRACDEST ON SYS
```

In this example, the trace destination parameter is modified. Trace output will be sent to the MVS system log.

Messages are sent to the console where the command was issued. For example:

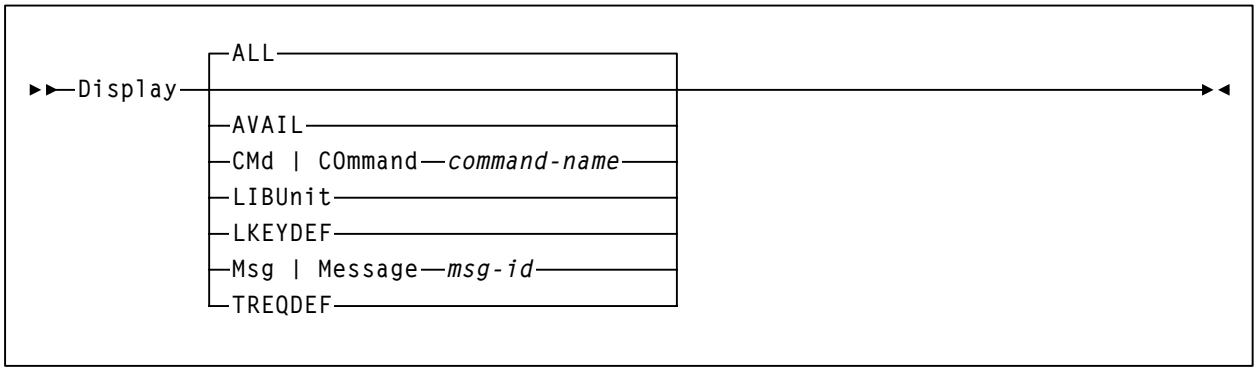
```
!SCS0609I TRACDEST Altered, current setting: SYSlog
```

DISPLAY Command

The Display command displays information about parameter settings and communication links. In addition, this command displays help text information for specific MVS/CSC operator commands and messages. The information is displayed at the MVS operator console.

Syntax

The following diagram shows the syntax of the Display command.



Parameter Descriptions

This section describes the values you can specify with the Display command.

ALL
Displays the status of system elements and current startup parameter settings.

AVAIL
Displays the server system status and communications-link availability.

CMd or COmmand
Displays syntax and usage information for a specific MVS/CSC command.

command-name
Specifies the desired command name. The MVS/CSC checks only the first six characters. Thus, longer command names can be abbreviated to the first six characters. You must specify the entire command name for commands containing six or less characters.

LIBUnit
Displays all library transports controlled by the MVS/CSC and the current processing status of each transport.

LKEYDEF
displays information about definition data set, containing LKEYINFO statements, that is currently loaded. Definition data sets are loaded by issuing a LKEYDEF command or control statement. The display includes the name of the definition file (data set and member name if appropriate), the identifying string if the data set

contains an OPTion TITLE statement, and the date and time the parameters were loaded.

Note: Refer to the *MVS/CSC Configuration Guide* for more information about OPTion TITLE, LKEYINFO, and LKEYDEF statements.

Msg or Message

Displays detailed information about a specific MVS/CSC message.

msg-id

Identifies the four-digit numeric portion of the desired message identifier. Leading zeros are not required. For example, in message SCS1661I, the *msg-id* is 1661. In message SCS0005I, the *msg-id* can be shortened to 5.

TREQDEF

Displays the name of the data set (and member, if applicable) that contains the tape request attributes and the date and time the attributes were loaded. If the OPTion TITLE statement was specified, the identifying string describing the contents of the data set is also displayed.

Example of DISPLAY ALL Command

```
CSC4 DISPLAY ALL
```

In this example, status is displayed for all parameters and system values for MVS/CSC subsystem CSC4 running in a JES3 environment.

Messages are sent to the console where the command was issued. For example:

```
>SCS0612I MVS/CSC CSC5 status:
Server :  LS              Avail=YES
Comm   :  TCP/IP          Internet Address=129.80.17.195
                          TCPNAME=Not Specified
                          REQTIME=900
                          RETCOUNT=5
                          RETTIME=4
Message:  WTODESC=NO      MSGCASE=Mixed
Scratch:  SCRLABL=SL      DELDISP=NOSCRTCH
          ZEROSCR=ON
Misc   :  PREFIX=>        DEFER=NO         ENQNAME=STKCSCQN
          ALOCTIME=55     FETCH=NO
Logging:  ENABLED         Volser=TS0015
          DSN=NOFI.CSC400.LOG
Tracing:  ENABLED         IT AL RE MH CF
          Destination(s)  Trace File
Userdata: 1...+...10....+...20....+...30....+...40....+...50
          1...+...60....+...70....+...80....+...90....+..99
Esoteric: NONLIB=TNL3480
          LIBDEV=TACS0
Devices : 0A31 0A32
Tapereq : From NOFI.TEST.PARMLIB(TREQLS)
          Loaded on 2001-01-20 at 10:38:07
```

Example of DISPLAY AVAIL Command

```
CSC4 D AVAIL
```

In this example, the server system status and communications-link status is displayed for MVS/CSC subsystem CSC4.

Messages are sent to the console where the command was issued. For example:

```
SCS0622I MVS/CSC System is Available and the communications link is
Active
```

Example of DISPLAY CMD Command

```
Display CMD TREQDEF
```

In this example, information about the TREQDEF command is displayed.

The following help text is displayed at the console where the command was issued:

```
SCS0041I Command TREQDEF Help:
The TREQDEF command loads or reloads the TAPEREQ control statement, which specifies
tape request attributes.  (See MVS/CSC Configuration Guide for information about the
tape request attributes you can specify.)

TREQDEF <DATASET (dataset-name) | DSN (dataset-name)>
        [VOLume (volume-serial-number)]
        [UNIT (unit-name)]

Parameter Descriptions
DATASET or DSN
   Specifies the name of the dataset containing the TAPEREQ control statement;
   optionally, contains the OPTion TITLE statement.
    dataset-name
      Indicates the name of the dataset.
      The definition dataset can be a fixed length 80 byte sequential dataset, or a
      fixed length 80 byte member of a PDS.  If the definition dataset is a
      member of a PDS, you must enclose the PDS and member name within single quotes

VOLume
   Optionally, specifies the volume on which the dataset resides.  This parameter
   is required if the dataset is not cataloged.
   volume-serial-number
      Indicates the volume serial number.

UNIT
   Optionally, specifies the unit where the definition dataset resides
   unit-name
      Indicates the unit name.  If the definition dataset is not cataloged or this
      parameter is omitted, a unit name of SYSDA is the default.
```

Example of DISPLAY LIBUNIT Command

```
!D LIBUNIT
```

In this example, status is displayed for all library units controlled by MVS/CSC subsystem CSC4.

Messages are sent to the console where the command was issued. For example:

```
!SCSØ611I MVS/CSC CSC4 devices:
Device  Model     Status          Volser  ACS  LSM  PAN  DEV
 A5ØØ   448Ø      Volume Mounted  UØ1234  ØØ   ØØ     1   Ø
 A511   SD3       Volume Mounted  UØ1111  ØØ   ØØ     2   1
 A512   949Ø      Volume Mounted  UØ1867  ØØ   ØØ     4   1
 A6ØØ   9490EE    Volume Mounted  UØ1947  ØØ   ØØ     4   2
 A611   984Ø      Volume Mounted  UØ2466  ØØ   ØØ    1Ø  19
```

Example of DISPLAY LKEYDEF Command

```
CSC4 D LKEYDEF
```

Sample Output

```
... LKEYINFO parameter status: xxx
    Loaded from SYS4.CSC.DEFS(LKEYDEFS)
    Title: LKEY TEST
    Loaded on 2ØØ2-Ø3-21 at 1Ø:17:21
```

In this example, license key information is displayed for MVS/CSC subsystem CSC4.

Example of DISPLAY MSG Command

```
Display MSG 165
```

In this example, information about message SCS0165E is displayed.

The following help text is displayed at the console where the command was issued:

```
SCS0031I Message ID 165 Help:
SCS0165E VOLUME volser HAD UNEXPECTED REASON CODE DDD RETURNED FROM LCS SERVER

         EXPLANATION: A SCRAtch update utility attempted to update the scratch status
         of a specified volume serial number (volser), but encountered an unexpected
         error reason code (DDD) from the LCS server, as follows:

         # 102 - Parameter error
         # 103 - LCS internal error or the server is idle (ACSLS or LibraryStation
                 server)
         # 105 - HSC internal error
         # 255 - Recovery in process

         SYSTEM ACTION: The utility continues processing.

         USER RESPONSE: The error does not cancel the SCRAtch Update utility, but the
         specified volume is not updated.

         # If the reason code is 105, it is likely that the volume is errant, and may
           require the HSC to be recycled (VM-based or MVS-based environments only).
         # If the reason code is 255, verify that the server is active.
         # If you are unable to resolve the problem, contact StorageTek Software
           Support.
```

Example of DISPLAY TREQDEF Command

```
!D TREQDEF
```

In this example, the status of the TREQDEF parameter is displayed. Messages are sent to the console where the command was issued. For example:

```
!SCS1631I TREQDEF parameter status:
          Loaded from MY.TAPEREQ.FILE
          Title: CSC tape requests definitions
          Loaded on 2002-06-28 at 01:23:45
```

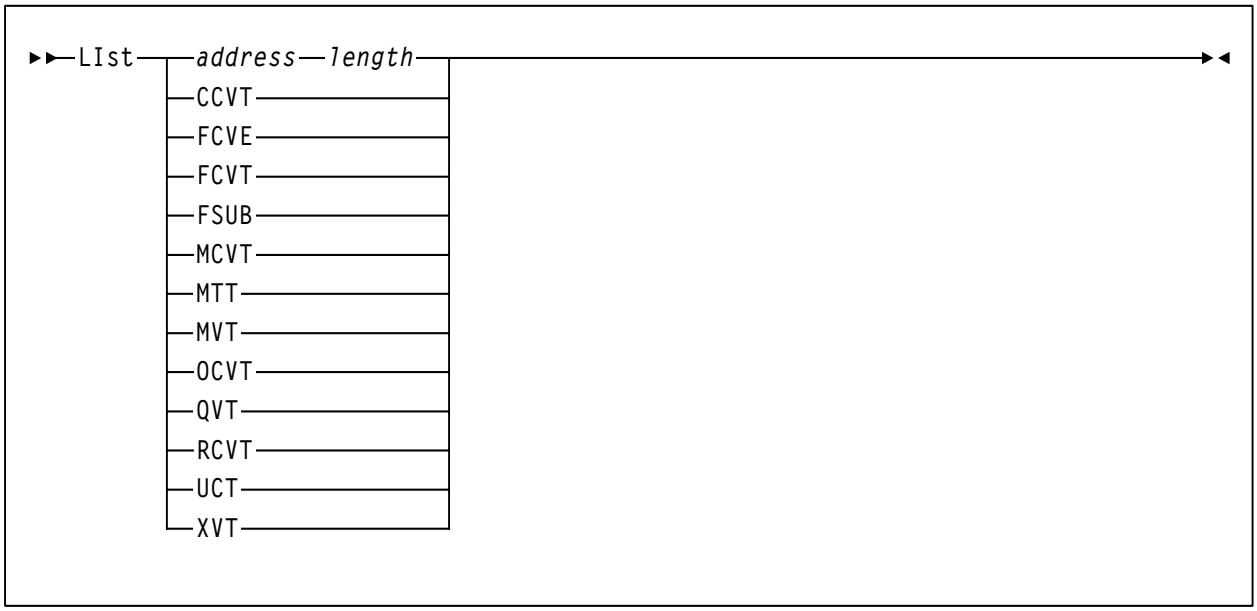
LIST Command

The LIst command displays the contents of the specified MVS/CSC control block and MVS/CSC storage. The output from this command is displayed at the MVS operator console.

Note: The LIst command should be used only for diagnostic purposes as directed by a StorageTek System Support Representative (SSR).

Syntax

The following diagram shows the syntax of the LIst command.



Parameter Descriptions

This section describes the values you can specify with the LIst command.

address

Specifies the location within the MVS/CSC memory at which to begin listing the contents of memory.

length

Specifies the number of bytes of memory starting at the location given in the address parameter. The default value is 16 bytes.

The following section describes the contents of the display resulting from specifying each parameter with the LIst command:

CCVT
Communication Server Control Vector Table

FCVE
Configuration Manager Control Vector Table Extension

FCVT
Configuration Manager Control Vector Table

FSUB
Configuration Manager Subpool Map

MCVT
Mount/Dismount Communications Vector Table

MTT
MVS/CSC Transport Table

MVT
MVS/CSC Vector Table

OCVT
Operator Command Vector Table

QVT
ASCOMM Vector Table

RCVT
Recovery Control Vector Table

UCT
Utilities Communication Vector Table

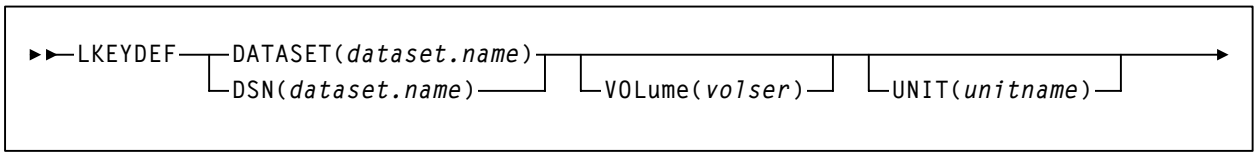
XVT
Programmatic Interface Vector Table

LKEYDEF Operator Command

The LKEYDEF operator command retrieves LKEYINFO control statements containing license key information, and loads them into an address space where they are available for retrieval by the MVS/CSC. The LKEYDEF operator command overrides the LKEYDEF startup parameter settings.

Note: Refer to the *MVS/CSC Configuration Guide* for more information about StorageTek license keys.

Syntax



Parameter Descriptions

DATASET or DSN

Specifies the name of the data set containing the LKEYINFO commands.

dataset-name

Indicates the name of the data set.

The definition data set can be a fixed length 80-byte sequential data set, or a fixed length 80-byte member of a PDS. If the definition data set is a member of a PDS, you must enclose the PDS and member name within single quotes.

VOLume

Optionally, specifies the volume on which the data set resides. This parameter is required if the data set is not cataloged.

volser

Indicates the volume serial number.

UNIT

Optionally, specifies the unit where the definition data set resides.

unitname

Indicates the unit name. If the definition data set is not cataloged or this parameter is omitted, a unit name of SYSDA is the default.

Example

In the following example, the LKEYDEF operator command specifies that MVS/CSC license key information is retrieved from the data set MY.LKEYINFO.FILE.

```
LKEYDEF DSN(MY.LKEYINFO.FILE)
```

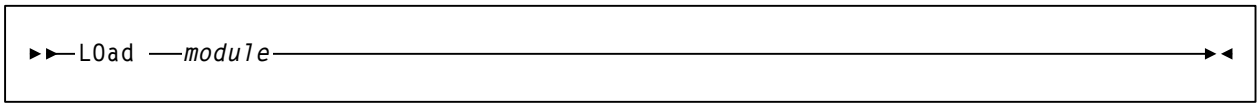
LOAD Command

The LOad command loads and transfers control to a LINKLIB member. The LINKLIB member must be an MVS/CSC diagnostic module.

Note: The LOad command should be used only as directed by a StorageTek System Support Representative (SSR).

Syntax

The following diagram shows the syntax of the LOad command.



Parameter Descriptions

This section describes the values you can specify with the LOad command.

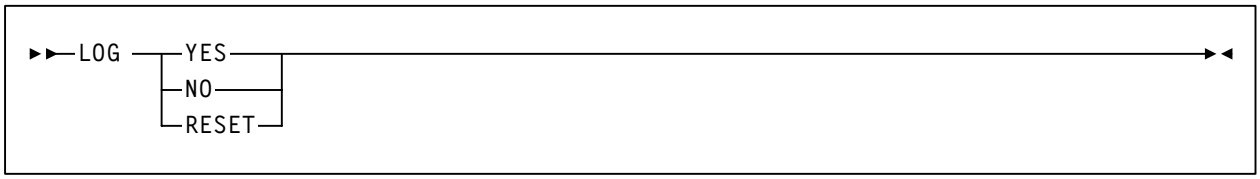
module
Specifies the name of the MVS/CSC LINKLIB member to be loaded.

LOG Command

The LOG command turns on or off the logging of MVS/CSC events and the logging of communications between the MVS/CSC and the LCS. It can also be used to reset the event log.

Syntax

The following diagram shows the syntax of the LOG command.



Parameter Descriptions

This section describes the values you can specify with the LOG command.

YES
Specifies that logging of events is to start at the current location in the event-log data set.

NO
Specifies that logging of events is to stop.

RESET
Specifies that logging is to begin or continue after resetting to the start of the event-log data set.

Example of LOG RESET Command

```
CSC7 LOG RESET
```

In this example, logging is reset to begin or continue after resetting to the start of the event-log data set.

Messages are sent to the console where the command was issued. For example:

```
SCS0624I MVS/CSC logging is reset
```

For event logging in a VM-based LCS configuration, you can print the event-log data set using the Event Log Report utility. See the *MVS/CSC System Programmer's Guide* for more information about the Event Log Report utility.

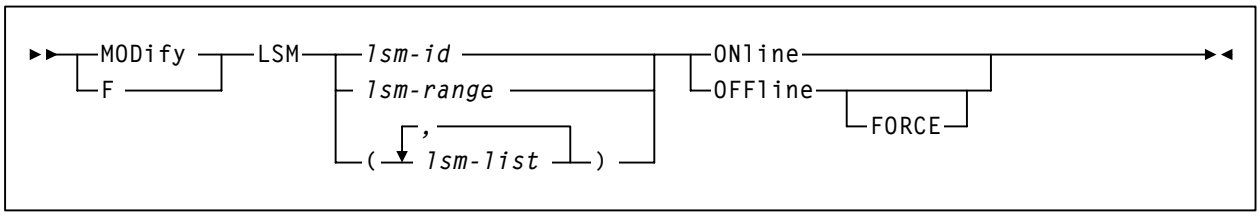
For event logging in an MVS-based or UNIX-based LCS configuration, you can view the event-log data set directly, without post-processing by the Event Log Report utility. See "Event Log Facility" on page 75 for more information.

MODIFY Command

The MODify or F command varies LSMs either online or offline to all hosts.

Syntax

The following diagram shows the syntax of the MODify command.



Parameter Descriptions

This section describes the values you can specify with the MODify LSM command.

LSM
Indicates that one or more LSMs are to be varied online or offline to all hosts.

lsm-id or lsm-range or (lsm-list)
Identifies one or more LSMs to be varied online or offline to all hosts.

Use this parameter to specify a single LSMid, a range of LSMids, or a list of single and/or ranges of LSMids. If you specify a list, the elements in the list must be separated by commas or blanks, and the list must be enclosed within parentheses.

The format for an LSMid is *AAL*, where *AA* is the ACSid and *L* is the LSM number. Hexadecimal values from 000 through 7EF are valid for the LSMid.

ONline
Specifies that the LSM(s) is to be varied online to all hosts.

This places the LSM(s) in automatic mode.

OFFline
Specifies that the LSM(s) is to be varied offline to all hosts.

Modifying an LSM offline stops any new automated cartridge handling operations from being initiated, while allowing current activity to terminate normally. When all active requests have been processed, the MVS/CSC issues a console message to inform the operator that the LSM is offline. An offline LSM is placed in manual mode; that is, the operator must enter the LSM and manually mount/dismount tapes as required. See “Manual Mode Operations” on page 27 for manual operation procedures.

FORCE

Specifies that the LSM(s) is to be varied offline immediately.

If you specify the FORCE option with the OFFline parameter, all outstanding requests to the LSM are purged, and an initial program load (IPL) process might need to be run on the LSM. FORCE is only valid with the OFFline parameter.

Example of MODIFY Command

```
MOD LSM (002,003) OFFLINE
```

In this example, LSMs 002 and 003 are varied offline.

Example of F Command

```
F LSM 002 ONLINE
```

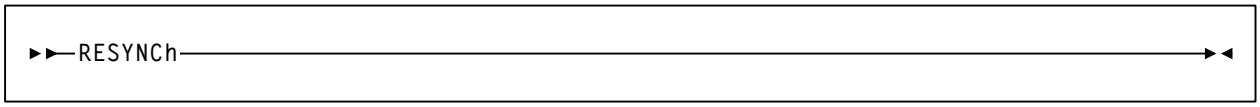
In this example, LSM 002 is varied back online.

RESYNCH Command

The RESYNCh command begins the synchronization process, which synchronizes the state of LCS resources with the current state of the MVS/CSC. This command can be used to force the LCS to a known state if the state of the MVS/CSC and LCS resources do not match.

Syntax

The following diagram shows the syntax of the RESYNCh command.



Parameter Descriptions

None.

TRACE Command

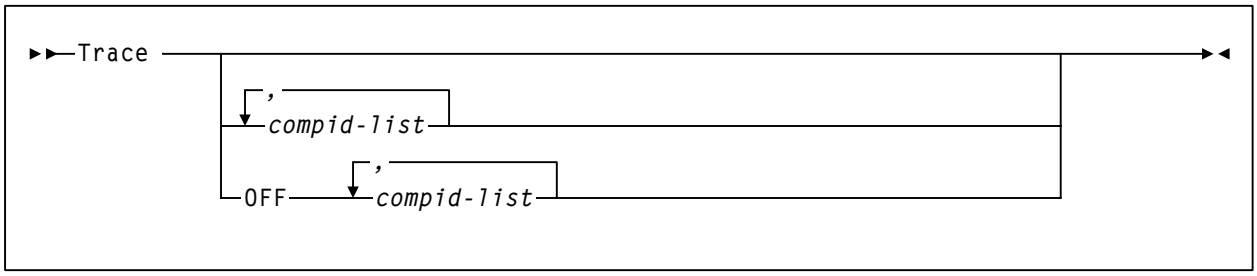
The Trace command enables or disables tracing of activities for selected MVS/CSC components. Output from the Trace command is directed to destination(s) specified on the TRACDest startup parameter. The TRACDest startup parameter must be set to CONsole and/or SYSlog for tracing of allocation data areas.

When the Trace command is specified without parameters, the trace status of each MVS/CSC component currently being traced is displayed.

Note: The Trace command should be used only for diagnostic purposes as directed by a StorageTek System Support Representative (SSR).

Syntax

The following diagram shows the syntax of the Trace command.



Parameter Descriptions

This section describes the values you can specify with the Trace command.

compid-list

Specifies one or more component identifiers for which tracing is being started or stopped. If components are specified but OFF is not specified, tracing for the specified components is turned on. The component identifier can be any of the following:

AS	Address Space Communication
CF	Configuration Manager
CS	Communications Server
IT	Initiation/Termination
MD	Mount/Dismount
MH	Message Handler
OC	Operator Commands
RE	Recovery
SV	Services

UT Utilities

PG Programmatic Interface

Example of TRACE Command

```
CSC4 Trace
```

In this example, the current trace status is displayed for each component being traced. Messages are sent to the console where the command was issued. For example:

```
SCS0068I Current TRACE Status:
Address Space Communication (AS)   NOT Traced
Communications Server       (CS)   NOT Traced
Configuration Manager       (CF)   NOT Traced
Message Handler             (MH)   NOT Traced
Initialization/Termination  (IT)   NOT Traced
Mount/Dismount              (MD)   NOT Traced
Operator Commands           (OC)   NOT Traced
Recovery                    (RE)   NOT Traced
Utilities                   (UT)   NOT Traced
Services                    (SV)   NOT Traced
Programmatic Interface      (PG)   NOT Traced
```

Example of TRACE OFF Command

```
CSC4 T OFF
```

In this example, tracing of all components and allocation data areas is turned off. Messages are sent to the console where the command was issued. For example:

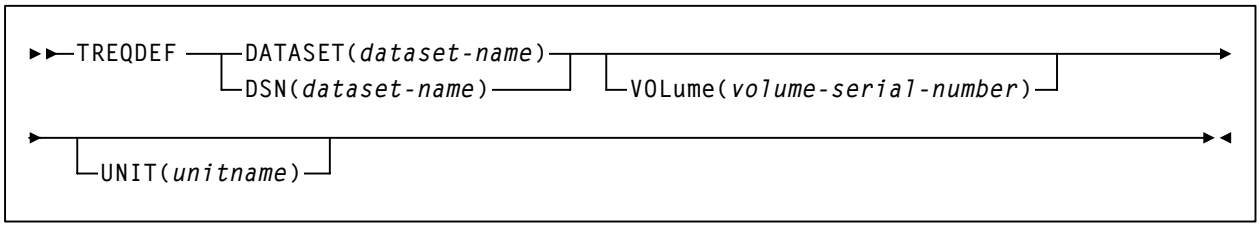
```
SCS0068I Current TRACE Status:
Address Space Communication (AS)   NOT Traced
Communications Server       (CS)   NOT Traced
Configuration Manager       (CF)   NOT Traced
Message Handler             (MH)   NOT Traced
Initialization/Termination  (IT)   NOT Traced
Mount/Dismount              (MD)   NOT Traced
Operator Commands           (OC)   NOT Traced
Recovery                    (RE)   NOT Traced
Utilities                   (UT)   NOT Traced
Services                    (SV)   NOT Traced
Programmatic Interface      (PG)   NOT Traced
```

TREQDEF Command

The TREQDEF command loads or reloads the TAPEREQ control statement, which specifies tape request attributes. (See the *MVS/CSC Configuration Guide* for information about the tape request attributes you can specify.)

Syntax

The following diagram shows the syntax of the TREQDEF command.



Parameter Descriptions

This section describes the values you can specify with the TREQDEF command.

DATASET or DSN
Specifies the name of the data set containing the TAPEREQ control statement; optionally, contains the OPTion TITLE statement.

dataset-name
Indicates the name of the data set.

The definition data set can be a fixed length 80-byte sequential data set, or a fixed length 80-byte member of a PDS. If the definition data set is a member of a PDS, you must enclose the PDS and member name within single quotes.

VOLume
Optionally, specifies the volume on which the data set resides. This parameter is required if the data set is not cataloged.

volume-serial-number
Indicates the volume serial number.

UNIT
Optionally, specifies the unit where the definition data set resides.

unitname
Indicates the unit name. If the definition data set is not cataloged or this parameter is omitted, a unit name of SYSDA is the default.

Chapter 4. Operator Console Interface

Overview

This chapter describes the operator console interface provided with the MVS/CSC.

MVS Operator Console Interface

MVS/CSC commands are provided to display MVS/CSC information, alter startup parameter settings, start recovery processing, and enable diagnostic procedures. MVS commands are used to start, stop, cancel, or force the shutdown of MVS/CSC. These commands are issued from the MVS operator console.

For the VM-based LCS, the MVS operator console interface also supports VM/HSC commands as well as CLS commands. You can also receive and reply to HSC and CLS messages. Information in response messages is also displayed on the MVS operator console.

HSC, CLS, and SLK[4] commands must be prefixed by identifiers that explicitly direct the commands to those software components. If a system qualifier is not entered for these commands, the commands are passed in the following order and executed by the appropriate system:

- MVS/CSC
- CLS
- SCP (with prefix SLK)
- HSC

The MVS/CSC interprets commands as they are entered. It executes MVS/CSC commands and sends CLS and HSC command strings to the CLS. The CLS interprets each command, executes CLS commands, and forwards HSC commands to the HSC for execution.

The following sections list the HSC and CLS commands supported by the MVS operator console interface.

4. SLK identifies the VM/HSC Control Program

HSC Commands

The MVS operator console interface supports the following VM/HSC commands:

- CAPPREF
- CLEAN
- DISMOUNT
- DISPLAY
- DRAIN
- EJECT
- ENTER
- MODIFY
- MOUNT
- SENTER
- SET

Commands intended for the MVS/CSC are not prefixed with a component identifier. Commands intended for the HSC must be prefixed with (1) either the MVS/CSC command prefix character or the MVS/CSC subsystem name *and* (2) the HSC component identifier (HSC). In the following example, the first HSC Display command is prefixed with the MVS/CSC command prefix character (!). The second HSC Display command is prefixed with the MVS/CSC subsystem name (CSC0).

```
!HSC DISPLAY LSM 000
CSC0 HSC DISPLAY LSM 000
```

Because the commands contain the HSC component identifier, the MVS/CSC sends them first to the CLS for interpretation. The CLS, in turn, sends them to the HSC for execution.

The MVS/CSC command shown in the following example is interpreted and executed by the MVS/CSC:

```
CSC0 DISPLAY AVAIL
```

If the command were not an MVS/CSC command, it would be passed on to the CLS. If the command is a CLS command, it is processed by the CLS, otherwise CLS passes the command to the HSC for processing.

For HSC commands that are also MVS/CSC commands, the HSC component identifier must be specified in order to execute the command for the HSC. For example, the Display command is both an MVS/CSC and an HSC command. The first command in the following example shows the Display command for the MVS/CSC; it has no component identifier. The second command shows the Display command for the HSC; it specifies the HSC component identifier.

```
CSC0 DISPLAY .....
CSC0 HSC DISPLAY .....
```

See the *VM/HSC Operator's Guide* for a complete list of HSC commands and descriptions of each command.

CLS Commands

The MVS operator console interface supports the following CLS commands:

- Query
- Release
- Reserve
- Tell

See the *CLS Reference Manual* for a complete list of CLS commands and descriptions of each command.

Operator Response

Some HSC and CLS commands require a reply to the response returned by the HSC or CLS. The MVS/CSC coordinates the local response with the MVS system console so that replies should use the MVS reply identifier. The CLS and HSC systems may also send unsolicited messages to the MVS host system. Responses from unsolicited messages are routed through the CLS. The ACSLS and LibraryStation do not send unsolicited messages to the MVS/CSC.

Part 3. MVS/CSC Administration and Maintenance

Chapter 5. Software Diagnostic Tools and Recovery Procedures

Overview

This chapter describes the following diagnostic facilities and recovery capabilities provided with MVS/CSC to help in diagnosing problems and monitoring activities:

- Synchronization and system recovery processing
- Availability and heartbeat message processing (VM-based LCS)
- The Event Log facility, which records significant events
- The Trace facility, which displays execution paths of MVS/CSC modules
- Operator recovery procedures, which describe options for handling errors that require operator intervention

Synchronization and System Recovery Processing

The MVS/CSC provides synchronization and system recovery processing functions and early detection of failures through use of heartbeat logic, timers, information from the LCS system, and the ability of MVS/CSC software to recognize potential error conditions.

Synchronization Recovery Processing

Recovery is the automatic process of synchronizing resource states between the MVS/CSC and the LCS after a failure or outage. If the MVS/CSC terminates abnormally, it can be restarted using instructions provided in “Starting the MVS/CSC” on page 24. The MVS/CSC automatically attempts to recover resources at start time.

The MVS/CSC recovery processing functions are designed to minimize the impact of system failures on system operations. The recovery functions of the automated tape library cartridge system are designed to require minimum human intervention during recovery processing. The primary recovery responsibilities provided by MVS/CSC are to:

- Recover system resources that were being used before a system failure.
- Synchronize library resource states between the MVS/CSC and the LCS.
- Avoid disturbing MVS jobs currently using library resources.

The MVS/CSC software detects internal software failures and unexpected LCS responses (for example, the LSM is offline or an LSM door is open). The MVS/CSC performs recovery operations to minimize the impact of MVS jobs currently using or waiting to use library transports and cartridges. It responds to failure conditions using error messages, operator intervention, process retries, waiting periods, diagnostic data capture, and MVS/CSC subsystem abends.

After re-establishing communications with the LCS, the MVS/CSC is responsible for resynchronizing with the LCS system. During recovery processing, the MVS/CSC issues messages to the LCS to determine the status of library resources. Based on the responses from the LCS, MVS/CSC synchronization processing adjusts the status of both LCS and MVS/CSC resources, so that the LCS and MVS/CSC systems contain the same information about current library transports and cartridges.

System Recovery Processing

The unavailability of the MVS/CSC, the LCS, or the library hardware can have a severe impact on the operation of the MVS host system. The MVS/CSC attempts to detect failures as quickly as possible in order to avoid impacting MVS jobs currently using or waiting to use library resources.

System Recovery for a UNIX-based or VM-based LCS

When the MVS/CSC detects that a UNIX-based or VM-based LCS is not available, it stops sending library requests until the LCS has returned to normal operating mode. For mount and dismount requests for library transports, a WTOR message requesting intervention is issued to the MVS operator. If the LCS availability has been re-established, the operator should reply that the operation be retried. If the LCS is still unavailable after the operation is retried, the operator may want to cancel the job.

Notes:

- This process also applies to a client/server configuration that consists of a single MVS-based LCS.
- See “System Recovery for an MVS-based LCS” for information about system recovery for an MVS-based LCS when the communications method is either SNA LU 6.2 or XCF, and multiple LCSs are defined to the MVS/CSC.
- See “Operator Recovery Procedures” for information about operator recovery procedures.

System Recovery for an MVS-based LCS

The MVS/CSC provides dynamic server switching support for multiple MVS-based LCSs that also support this capability. Dynamic server switching is supported only when the communications method is XCF or SNA LU 6.2. Dynamic server switching is not supported for the UNIX-based and VM-based LCS.

You use the SRVRLIST startup parameter to specify a list of up to three MVS-based LCSs to eliminate an LCS as a single point of failure. When the MVS/CSC detects that the primary MVS-based LCS is not available, server requests are redirected to an alternate

LCS for processing. Request processing continues on the alternate LCS until the connection with the primary LCS is re-established. The MVS/CSC attempts to re-establish the connection with the primary LCS every five minutes during request processing. When the connection is re-established with the primary LCS, control is returned to that LCS to process subsequent server requests. The connection to the alternate LCS is closed when responses to all outstanding requests have been received.

Note: The MVS/CSC only tries to re-establish the connection with the primary LCS during request processing.

If the MVS/CSC detects that both the primary and alternate LCSs are not available, the MVS/CSC stops sending library requests and recovery processing is invoked. For mount and dismount requests for library transports, a WTOR message requesting intervention is issued to the MVS operator. If the connection is re-established with an LCS, you should reply that the operation be retried. If the connection can not be re-established with an LCS, you might want to cancel the job.

Notes:

- See "Operator Recovery Procedures" for information about operator recovery procedures.
- See the *MVS/CSC Configuration Guide* for more information about using the SRVRLIST startup parameter to define multiple MVS-based LCSs for dynamic server switching.

Recovery Procedures

Recovery from system failures is accomplished using any of the following software processing:

- Programmed recovery techniques (such as ESTAEs and FRRs)
- Recovery routines supplied by the MVS system
- Automatic restarting or reinitiating the systems
- System requests for operator intervention
- Messages sent to the LCS for status information
- Messages sent to the LCS to update status information

Availability and Heartbeat Message Processing (VM-based LCS)

The following sections describe recovery processing for the VM-based LCS.

Availability Message Processing

There may be times when the CLS does not respond to the MVS/CSC *availability* message sent during initialization. When this occurs, the MVS/CSC must wait for the availability message exchange to be completed before any processing can occur. After a specified amount of time without a response from the CLS system, the MVS/CSC sends a message to the MVS console requesting operator assistance in resolving the situation. For information about responding to system generated messages, see the *MVS/CSC Messages and Codes Guide*.

Heartbeat Logic

Periodically, the CLS system transmits a *heartbeat* message to the MVS/CSC. The amount of time between heartbeat messages is transmitted to the MVS/CSC at MVS/CSC start-up time. The purpose of the heartbeat message is to ensure that the MVS/CSC system is still functioning and to inform the MVS/CSC that the CLS is still functioning.

The CLS system sends the heartbeat message under the following conditions:

- If the CLS has not sent or received a message from the MVS/CSC after a specified amount of time. The interval is specified in the CLS using the CLS Configuration Management (CLSCM) program. The MVS/CSC gets the message from the CLS. Each client system can define a different interval.
- If there is no response to the heartbeat message after a specified amount of time (the CLS system sends warning messages to the VM and CLS operators alerting them of a possible failure condition).

The CLS holds all outgoing and incoming messages in a queue until a response to the heartbeat message is received from the MVS/CSC. Failure conditions could include the following:

- Communications link failure
- Immediate MVS/CSC shutdown
- Abnormal MVS/CSC termination
- MVS system failure
- Communications failure

The MVS/CSC also includes a mechanism for detecting lack of message traffic from the CLS system. The MVS/CSC timer is set to twice the value of the CLS heartbeat interval. If the timer expires, the CLS is designated as unavailable. Once the CLS is made unavailable, the MVS/CSC system sends a message to the MVS console, notifying the operator that the CLS is not available. Once the MVS/CSC detects that the CLS is not available, it begins recovery processing.

Event Log Facility

The MVS/CSC Event Log facility records starts and stops of the MVS/CSC, all message traffic between the MVS/CSC and server, and other miscellaneous events. This information can be used in problem determination for the LCS or MVS/CSC, and also for general reporting of activities.

The LOG startup parameter, which is specified in the startup parameter file, is used to start, stop, or reset event logging. Event logging can be started or stopped using the LOG operator command. If the event-log data set was not allocated at MVS/CSC initialization time and you want to start event logging, you must first reinitialize the MVS/CSC and specify the SCSLOG DD name in the startup procedure and set the LOG startup parameter to YES or RESET. See the *MVS/CSC Configuration Guide* for more information about the LOG startup parameter. See "LOG Command" on page 58 for information about the LOG operator command.

For MVS-based and UNIX-based configurations, the MVS/CSC writes a summary report about LCS requests and responses to the event-log data set in text format. This allows you to view the event-log data set directly, without post-processing by the Event Log Report utility.

The following example shows how requests and responses are written to the event-log data set for MVS-based and UNIX-based LCS configurations.

```
SL0B552 05261995185730480 seq_nmbr=33 QUERy_VOLUME rc=SUCCESS vol=MVC055 count=1
SL0B562 05261995185733320 seq_nmbr=33 ACK rc=SUCCESS
SL0B562 05261995185734470 seq_nmbr=33 FINAL rc=SUCCESS vol=MVC055 vol_status=VOLUME_HOME loc=2.0.3.0
```

The first 25 bytes contain the log record type and the timestamp; **seq_nmbr** is the sequence number, which matches the requests and responses, and **rc** is the return status from the status of network requests and/or the LCS. The information that follows the return codes represents the portions of the LCS requests or responses that are related to the end-user requests.

Note: To assist in diagnosis and resolution of a problem, the event log should be included with other documentation when reporting a system failure to StorageTek Software Support.

Trace Facility

The MVS/CSC Trace facility helps in diagnosing problems. It records the logic path being executed through each module in each MVS/CSC component for which tracing is enabled. While debugging a specific problem, the specific components to be traced can be specified. The MVS/CSC issues the appropriate Write-To-Operator (WTO) calls to trace the execution of the designated modules.

Tracing is enabled using the Trace startup parameter or the Trace operator command. See the *MVS/CSC Configuration Guide* for information about the Trace startup parameter. See "TRACE Command" on page 62 for information about the Trace operator command.

Note: The Trace facility is usually used at the request of StorageTek Software Support to assist in diagnosis and resolution of a problem.

Normal operation of the MVS/CSC is performed with tracing disabled for all MVS/CSC components.

Operator Recovery Procedures

Certain situations may require operator intervention to manually mount cartridges. For example, MVS jobs that allocate library transports and cartridges can be started when the LSM is offline. In this case, the cartridges can be manually mounted until the LSM is varied online so that the jobs can continue processing.

The following information may be helpful when performing recovery operations:

- Using the MVS/CSC Display(LIBUnit) command.

  The values displayed as a result of using the MVS/CSC Display command reflect the MTT values as modified by recovery or by the mount or dismount modules. If the RESYNCh command has not been issued, the values in the MTT come from the mount and dismount modules (assuming that the MVS UCB is allocated). If the RESYNCh command has been issued and the MVS UCB is not allocated, the values put in the MTT will come from the LCS. If the UCB is allocated during RESYNCh command processing, the values put in the MTT will come from the MVS UCB.

- The server is offline or idle.

  If the ACSLS or LibraryStation is offline or idle, you must use manual procedures described in “Manual Mode Operations for the UNIX-Based and MVS-Based LCS” on page 27. If the CLS is offline, you must use manual procedures described in “Manual Mode Operations for the VM-Based LCS” on page 29.

- A library transport is not available to the LCS.

  If a library transport is not available to the LCS, the MVS/CSC issues the SCS0918D mount message with reason code 101. Replying “R” after varying the drive online retries the mount or dismount. Replying “C” will cancel the mount or dismount attempt but does not cancel the job.

  If you are running in a JES3 environment and you reply “C” to cancel the job, you should also cancel the setup for the job. For example,

  ```
  *cancel setup jobnum
  ```

  where *jobnum* is the job number.

- A library transport is not available to the MVS.

  If a library transport is not available (for example, it was varied offline at the MVS console), the MVS IEF244I message indicating that the device could not be allocated

will appear. The MVS IEF238D message requesting a reply of device name or cancel will then appear.

- The requested volume is not in the library.

  If a requested volume is not in the library, the SCS0918D message indicating that the operator retry or cancel the request will appear. Canceling the mount request does not cancel the job.

- The network is not available.

  If the LCS is available (functioning) but the network is not available, the volumes may be loaded from the ACS System Administrator's (ACSSA) console without entering the LSM. The System Administrator should be told of the intended volume and transport because the MVS transport identification must be transferred to the appropriate LCS syntax. If the network becomes available before the REQTime value expires, the MVS/CSC RESYNCh command should be entered. If the REQTime value has expired, the MVS/CSC Recovery component will be in resynchronization. See the *MVS/CSC Configuration Guide* for more information about the REQTime startup parameter.

- The network is busy.

  If the network is overloaded for a time in seconds equal to the product of RETTime multiplied by RETCount, the MVS/CSC will fail the request. For mount and dismount requests, messages will be left on the MVS operator console. They must be answered one-by-one in order to stop the MVS/CSC. MVS/CSC will not terminate normally if outstanding mount and dismount messages exist. Otherwise, the mounts and dismounts will complete without intervention if the operator does not respond to the messages but waits until the network is not overloaded. See the *MVS/CSC Configuration Guide* for more information about the RETTime and RETCount startup parameters.

- TCP/IP communication software is terminated while the MVS/CSC is still active.

  If TCP/IP software terminates while the MVS/CSC is still active, the MVS/CSC does not recover. You must stop and restart the MVS/CSC. To avoid this problem, always stop the MVS/CSC using the MVS Stop (or Cancel) command before terminating TCP/IP software.

Note: CLS repeatedly attempts to re-establish the TCP/IP software connection. This continues until a connection is established, or the MVS/CSC is shut down.

Part 4. Appendices

Appendix A. Third-Party Software Restrictions

Multi-image Manager (MIM) is used in a multi-CPU environment to control the allocation of transports to a particular host.

The MVS/CSC can coexist with MIM, however, the following procedures must be followed when using MIM with MVS/CSC:

- The MVS/CSC can be started *before* or *after* MIM has been initialized.
- Devices within the MVS/CSC-controlled library cannot be in the MIM device-preference list. However, manual transports can remain in the device-preference list.
- MIM should not be used to control the ENQ in the MVS/CSC startup parameters.

Appendix B. Gathering Diagnostic Materials

Overview

During problem resolution, Software Support may request that you provide specific diagnostic material. While printed format may be accepted, machine readable data (on magnetic tape) is preferred. For small amounts of data, Software Support may request that you FAX the data. Doing this may significantly reduce the time needed to resolve your problem.

MVS Diagnostic Materials

The following MVS/CSC diagnostic materials may be requested by Software Support:

- Details of circumstances
- MVS SYSLOG
- SCSLOG dataset
- SCSTRACE dataset
- SYS<u>x</u>DUMP and SYS1.DUMP<u>nn</u> datasets
- Event Log Report (VM-based LCS)
- Event log dataset (MVS-based and UNIX-based LCS)
- EREP records (software)
- MVS/CSC startup parameter file
- MVS/CSC startup procedure (cataloged procedure)
- MVSCP/IOCP definition or HCD

Tape Format

If Software Support requests a tape containing your diagnostic materials, copy the requested files to tape using standard utility programs.

Include a description of the tape contents, including any information necessary for Software Support to retrieve the files from the tape (i.e. tape volume serial number and label attributes, number of files, file names and attributes, etc.).

See the *Requesting Help from Software Support* guide for more information.

Appendix C. List of Abbreviations

abend	Abnormal end of task
ACS	Automated Cartridge System
APPC	Advanced-Program-to-Program Communications
CAP	Cartridge access port
CDS	Control data set
CLS	Common Library Services
CLSCOMM	CLS Communications
CLSCM	CLS Configuration Management
CLSLP	CLS logical port
CLSM	CLS Manager
CLSOC	CLS operator console
CMS	Conversational monitor system
CP	Control program
CPA	Control Path Adaptor
CSA	Common service area
CSC	Client System Component
CSSC	Customer Service Support Center
DASD	Direct access storage device
DFSMS	Data Facility Storage Management Subsystem
DMS/OS	DASD Management System/Operating System
EC	Engineering change
EDL	Eligible Device List
ESC	European Support Center
HCD	Hardware Configuration Definition
HSC	Host Software Component

IBM	International Business Machines Corporation
ICRC	Improved Cartridge Recording Capacity
ID	Identifier or identification
IJS	Intermediate Job Summary table
IML	Initial microcode load
I/O	Input/output
IOCP	I/O Configuration Program
IP	Internet Protocol
IPL	Initial program load
ISMF	Interactive Storage Management Facility
JCL	Job control language
JES	Job entry subsystem
JST	Job Summary Table
LAN	Local area network
LCU	Library Control Unit
LMU	Library Management Unit
LP	Logical port
LU	Logical unit
LSM	Library Storage Module
MB	Megabyte
MIM	Multi-image Manager
MVS	Multiple virtual storage
MVS/ESA	Multiple Virtual Storage/Enterprise Systems Architecture
MVS/SP	Multiple Virtual Storage/System Product
PCR	Product change request
PGMI	Programmatic interface
PIB	Product Information Bulletin
PN	Part number
PROP	Programmable operator facility
PTF	Program temporary fix
PUT	Program update tape
PVM	VM/Pass-Through Facility

RACF	Resource access control facility
RPC	Remote procedure call
SAF	System Authorization Facility
SER	Software Enhancement Request
SCP	System control program
SLK	Refers to the SCP
SMP/E	System Modification Program Extended
SMC	Storage Management Component
SMS	Storage Management Subsystem
SNA	Systems Network Architecture
SP	System Product
SSR	System Support Representative
STK	StorageTek
Sysplex	System complex
TCP/IP	Transmission Control Protocol/Internet Protocol
TLMS	Tape library management system
TMI	Tape management interface
TMS	Tape management system
VLR	Volume location record
VM	Virtual machine
VOLSER	Volume serial number
VSM	Virtual Storage Manager
VTAM	Virtual Telecommunications Access Method
VTCS	Virtual Tape Control System
VTSS	Virtual Tape Storage Subsystem
WSC	World Wide Support Center
WTO	Write-to-operator
WTOR	Write-to-operator with reply
XCF	Cross-system coupling facility

Glossary

Terms are defined as they are used in the text. If you cannot find a term here, check the index.

A

Abnormal end of task (abend)— A software or hardware problem that terminates a computer processing task.

ACS-id— A method used in the LIBGEN process to identify ACSs by using hexadecimal digits, 00 to nn.

ACS— *See* Automated Cartridge System.

ACS library— A library is composed of one or more Automated Cartridge Systems (ACSs), attached 4480, 4490, 9490, 9490EE, SD3, or 9840 cartridge drives, and cartridges residing in the ACSs.

ACSSA— The ACS System Administrator console provides access to the LCS and the library for the UNIX-based LCS.

ACSLS— *See* Automated Cartridge System Library Software.

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).

authorization— The granting of VM userids access to the CLS system.

Automated Cartridge System (ACS)— The library subsystem consisting of one or two Library Management Units (LMUs) and from one to 16 Library Storage Modules (LSMs) attached to the LMUs.

Automated Cartridge System Library Software (ACSLS)— The library control software, which runs in the UNIX®-based Library Control System.

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.

B

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.

C

CAPid— A CAPid uniquely defines the location of a CAP by the LSM on which it resides. A CAPid is of the form "AAL" where "AA" is the acs-id and "L" is the LSM 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 the StorageTek CARTLIB product.)

cartridge transport— *See* transport.

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

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 computing system (CCS)— A computer and an operating system.

client-initiated utilities (CIU)— VM/HSC utilities that can be executed from a CLS or client operator console.

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 (LCS).

Client System Interface— Software that provides a transport and translation mechanism between the Library Control System (LCS) and the Client System Component (CSC).

CLS— *See* Common Library Services.

CLSCM— *See* Common Library Services Manager.

CLSCOMM— *See* Common Library Services Communication.

CLSM— *See* Common Library Services Manager.

CLSLP— *See* Common Library Services Logical Port.

CLSOC— *See* Common Library Services Operator Console.

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.

Common Library Services (CLS)— A Storage Technology software system that allows single or multiple non-IBM systems (client systems) to use the ACS.

Common Library Services Communication (CLSCOMM)— 3270 communication interface that connects CLS logical port to the client system.

Common Library Services Configuration Management (CLSCM)— *See* Configuration Management.

Common Library Services Logical Port (CLSLP)— The CLS software that resides on the CLS, and 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.

Common Library Services Manager (CLSM)— The CLS administrator virtual machine from where all CLS functions are controlled. This virtual machine controls the CLS Operator Consoles, routes commands and responses, and keeps logs of what the CLS has done.

Common Library Services Operator Console (CLSOC)— A VM-attached console that is used by CLS operators to monitor CLS events and from which CLS-related commands are issued.

communication parameters— Keywords that need to be specified for a client's mode of access to CLS (VM/Pass-Through facility or TCP/IP).

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

configuration data base (CDB)— Data used by CLS to maintain the CLS configuration.

Configuration Management (CM)— A CLS program that provides a menu-driven facility for users to define and maintain CLS configurations.

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 program (CP)— The piece of the VM operating system that controls the real hardware, provides services to virtual machines so that they appear to be real machines, and provides the timesharing services on the processor.

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.

conversational monitor system (CMS)— A virtual machine operating system that provides a general interactive environment and operates only under the control of VM.

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)

coupling services— In a sysplex, the functions of XCF that transfer data and status between members of a group residing on one or more MVS systems in the sysplex.(I)

cross-system coupling facility (XCF)— XCF is a component of MVS that provides functions to support cooperation between authorized programs running within a sysplex.(I)

CTC— Channel-to-channel.

D

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).

DMS/OS— DASD Management System/Operating System.

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 referred to as *device separation*) refers to the Storage Management Component (SMC) function of excluding drives for an allocation request based on SMC exclusion criteria. See the *SMC Configuration and Administration Guide* for more information.

drive panel— An LSM wall containing tape transports. The drive panel for a 9840 transport can contain either 10 or 20 transports. The drive panel for a non-9840 transport can contain a maximum of 4 transports.

drive prioritization— (previously referred to as *directed allocation*) refers to the Storage Management Component (SMC) function of influencing selection of a particular drive based on allocation criteria, including volume location. See the *SMC Configuration and Administration Guide* for more information.

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

Dual LMU VM/HSC— VM/HSC release 1.1.0 or later that automates a switchover to the standby LMU in a dual LMU configuration.

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.

E

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 (i.e. 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.

EXEC— VM CMS command.

F

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.

G

GB— 1,073,741,834 bytes of storage

H

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

heartbeat interval— Specifies how often CLS checks the communications link to a client to make sure it is still "up."

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.

heterogeneous systems— Systems of dissimilar processor or system type.

homogeneous— Of the same or a similar kind or nature.

host computer— A computer that controls a network of computers.

Host Software Component (HSC)— Software running on the Library Control System processor that controls the functions of the ACS.

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

HSC— *See* Host Software Component.

I

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.

Intelligent Management Unit (IMU)— Hardware similar to a Control Unit. This term is reserved for future products.

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.

Internet 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.

Inter-User Communication Vehicle (IUCV)— A CP communications facility that allows users to pass information between properly authorized virtual machines.

ISMF— Interactive Storage Management Facility.

J

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 via a common job queue. *See* also JES2.(I)

L

LAN— *See* local area network.

LCS— *See* Library Control System.

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— An installation of one or more ACSs, attached 4480, 4490, 9490, 9490EE, SD3, or 9840 cartridge drives (also known as transports), volumes (cartridges) placed into the ACSs, host software that controls and manages the ACSs and associated volumes, and the library control data set that describes the state of the ACSs.

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 16 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 stand-alone cartridge drive.

Library Management Unit (LMU)— A hardware and software product that coordinates the activities of one or more LSMs/LCUs.

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.

LibraryStation— Software that allows MVS hosts to share ACS facilities with client systems.

Library Storage Module (LSM)— 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 and WolfCreek.

LMU— *See* Library Management Unit.

local area network (LAN)— A network in a small (local) geographic area.

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)— 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.

LP— *See* logical port.

LSM— *See* Library Storage Module.

LSM-id— An LSM-id is composed of the ACS-id 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 0 (hexadecimal) the second LSM listed acquires a number of 1, and so forth, until all LSMs are identified (up to a maximum of sixteen or hexadecimal F).

M

manual mode— Operation of a 4480, 4490, 9490, 9490EE, SD3, or 9840 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.

N

Nearline Storage Server— The hardware and software necessary to use ACS libraries by client computing systems.

O

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 MVS client system console.

operating system (OS)— Software that controls the execution of programs that facilitate overall system operation.

P

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.

pipe— VM Inter-User Communications Vehicle (IUCV) path.

PowderHorn (9310)— The high-performance version of the standard LSM.

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

privilege class— Applicable to both the VM and CLS environments, userids are granted access to either system based on assigned rights to execute various commands.

product change request (PCR)— A request for enhancement to a product. Normally, this request comes from a client, but may come from StorageTek.

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.

R

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.

request status record (RSR)— An in-memory record, maintained by CLS, that tracks the status and disposition of each client request to the VM/HSC.

S

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— The StorageTek helical cartridge transport. Also known as RedWood.

shadow recording— A technique for recovery involving maintaining both a control data set and a copy (shadow) of the data set.

signon script— A series of statements used by CLS to initiate or verify VM Pass Through communications with the CSC. Signon scripts are defined by the CLSCM EXEC.

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 (i.e., 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 case of 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 Management Component (SMC)— Software interface between IBM's OS/390 and z/OS operating systems and StorageTek real and virtual tape hardware. SMC performs the allocation processing, message handling, and SMS processing for the NCS solution. It resides on the MVS host system with HSC and/or MVS/CSC, and communicates with these products to determine policies, volume locations, and drive ownership.

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

switchover— The assumption of master LMU function by the standby LMU.

synchronous— *See* BISYNC.

synchronous LAN— Local area network built on synchronous communications.

sysplex— A set of MVS systems communicating and cooperating with each other through certain multisystem hardware components and software services to process customer workloads.(I)

System Control Program (SCP)— A control program that provides the required environment in a virtual machine to run VM/HSC. The SCP is a component of the VM/HSC.

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.

T

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.

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.

U

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.

V

virtual machine (VM)— A functional simulation of a computer and its associated devices. Each virtual machine is controlled by a suitable operating system.

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 in order 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— *See* virtual machine.

VM/Pass-Through Facility— IBM's software utility for implementing synchronous communications between CLS and client.

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 location record (VLR)— A record, maintained by the CLS system, that tracks the status of each volume from the time it is mounted until it is dismounted.

volume serial number (VOLSER)— An identifier of a physical volume.

W

WolfCreek (9360)— The high-performance LSM with a smaller capacity than the standard LSM.

X

XCF— Cross-system coupling facility.

Z

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.

Numerics

802.3— *See* IEEE 802.3.

3270— IBM synchronous, block-mode, half-duplex terminals preferred for use with IBM 370 and related types of machine.

3270 protocol— A telecommunications protocol that supports networks of 327x CRTs on IBM mainframes.

3274— Terminal control unit used on the ACS for processor-to-LMU communications.

3480— IBM's 18-track half-inch cartridge tape drive model.

3490— IBM's 36-track half-inch cartridge tape drive model.

3590— IBM's newest cartridge tape drive model that supports 128-track recording technique.

4400 Automated Cartridge System (ACS)— A fully automated, cartridge-based, 18-track storage and retrieval library. A 4400 ACS consists of from one to two hundred and fifty-six LMUs with each LMU connected to from one to sixteen LSMs.

4410— The standard Library Storage Module (LSM).

4411— Library Control Unit (LCU).

4480— The StorageTek 18-track 1/2-inch cartridge transport.

4480 Cartridge Subsystem— The StorageTek 4480 Cartridge Subsystem consists of a control unit (CU) plus cartridge drives (CDs).

4490— The StorageTek 36-track long-tape cartridge transport with ESCON support. Also known as Silverton.

4780— Same as a 4480, but is used for attachment to certain non-IBM computers.

8380— StorageTek DASD system.

9310— The PowderHorn, a high-performance version of the standard LSM (4410)

9360— The WolfCreek, a high-performance LSM with a smaller capacity than the standard LSM (4410).

9490— The StorageTek 36-track cartridge transport. Also known as TimberLine.

9490EE— The StorageTek 36-track cartridge transport. Also known as TimberLine EE.

9740— A small, four-sided StorageTek library that supports large-style cartridge transports. This library can be configured to contain either 326 cartridges or 494 cartridges.

9840—The StorageTek cartridge transport that reads and writes 9840 cartridges.

T9840B—The StorageTek cartridge transport that reads and writes T9840B cartridges.

T9940A— The StorageTek capacity-centric cartridge transport capable of reading and writing 60GB T9940A cartridges.

T9940B— The StorageTek capacity-centric cartridge transport capable of reading and writing 200GB T9940B cartridges.

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