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LIBRARYSTATION™

OPERATOR AND SYSTEM PROGRAMMER'S GUIDE

PRODUCT TYPE
SOFTWARE

LibraryStation™

Operator and System Programmer's Guide

Release 6.1

312598101

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132084	February 15, 2005	---	First Edition	This document applies to LibraryStation, Version 6.1.

Contents

Figures

What's New With This Release?

LibraryStation 6.1 includes the following enhancements and modifications:

Enhancement/Modification	Publication(s)/ Primary Locations
The LibraryStation UNITATTR LSDEF statement is no longer supported, and is ignored by LibraryStation.	***LibraryStation Configuration Guide*** Chapter 10 Appendix B
Message changes, additions and deletions.	***LibraryStation Messages and Codes Guide*** Chapter 2 Appendix B

About this Guide

This guide describes operator commands, administration, and maintenance for LibraryStation Release 6.1.

Intended Audience

This guide is intended for all LibraryStation users including operators, system programmers, system analysts, storage administrators, system specialists, and operations specialists.

Reader's Comments

We'd like to know what you think about this guide. E-mail your comments to us directly. Our Internet address is:

```
glsfs@stortek.com
```

Be sure to include the part number and title of the guide you are referencing.

About the Software

LibraryStation 6.1 is supported by this guide.

How this Guide is Organized

This guide contains the following chapters and appendices:

- **Chapter 1, "Introduction"** provides an overview of LibraryStation.
- **Chapter 2, "Operator Command Overview"** provides an overview of LibraryStation operator commands.
- **Chapter 3, "Operator Commands"** describes LibraryStation operator commands.
- **Chapter 4, "Starting and Stopping LibraryStation"** provides procedures for starting and stopping LibraryStation.
- **Chapter 5, "Administration and Maintenance"** provides LibraryStation maintenance and administration information.
- **Appendix A, "Gathering Diagnostic Materials"** provides instructions for gathering diagnostic materials for Software Support.

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.

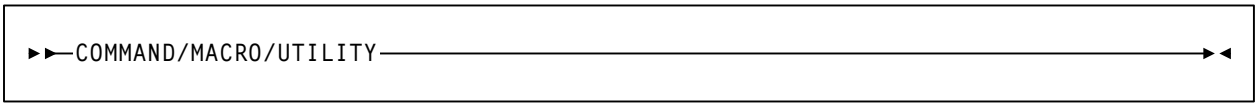
Warning: Information necessary to keep you from damaging your hardware or software.

Syntax Flow Diagrams

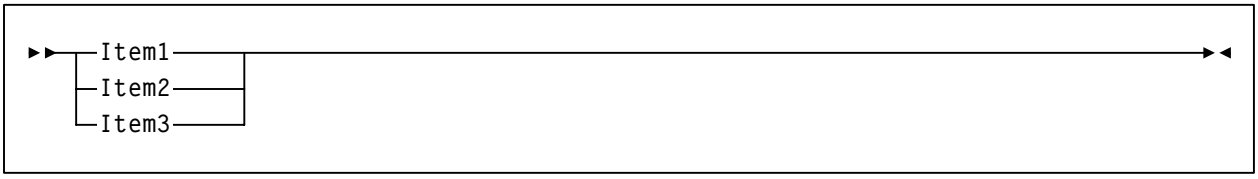
Syntax flow diagramming conventions include the following:

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

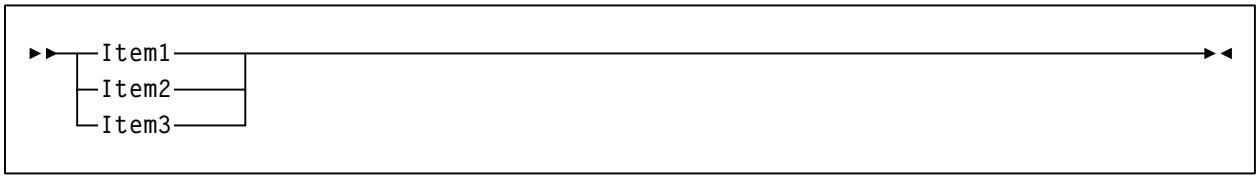


Diagrams are read left to right and top to bottom. Arrows indicate flow and direction.

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

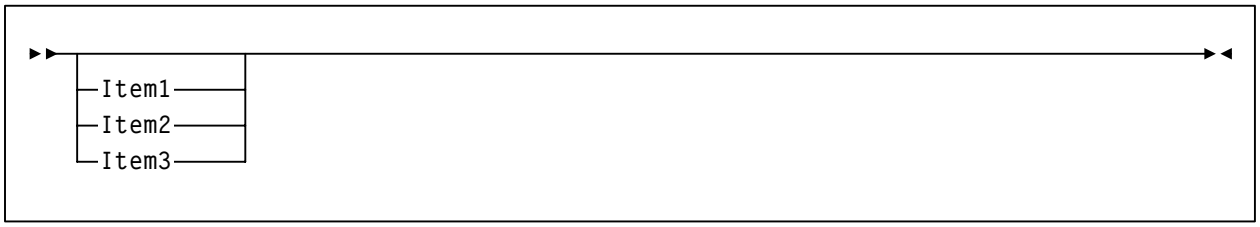
Single Required Choice

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.



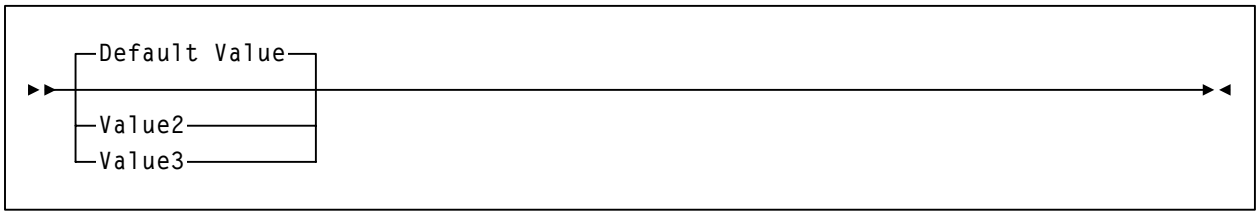
Single Optional Choice

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

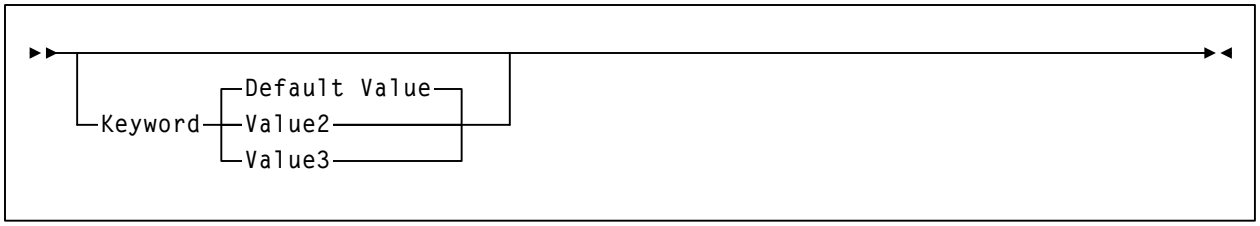


Defaults

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.

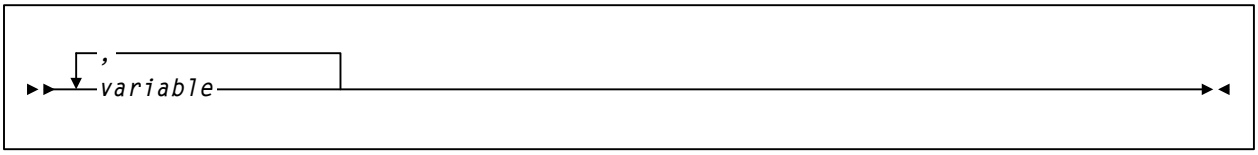


Some keyword parameters provide a choice of values in a stack. When the stack contains a default value, the keyword and the value choices are placed below the base line to indicate that they are optional, and the default value appears above the keyword line. In the following example, if the keyword is 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 nonincremental 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 nonincremental characters of the first element must be identical to those of the second element.
  - You cannot increment two portions of a range element. If 111AAA is the first element, you cannot specify 112AAB for the second element.
  - If a VOLSER range contains more than one decimal portion, any portion is valid as the incremental range. For example:

    A00B00 the largest range that can be specified is A00B00 through A99B99.

    A0B0CC the largest range that can be specified is A0B0CC through A9B9CC.

    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 nonincremental 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 LibraryStation.

StorageTek Nearline Control Solution (NCS) Publications

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

StorageTek LibraryStation Publications

- *LibraryStation Configuration Guide*
- *LibraryStation 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 Client System Component (MVS/CSC) Publications

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

StorageTek Virtual Storage Manager Publications

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

Technical Support

StorageTek Software Support and the StorageTek Customer Resource Center (CRC) maintain information about known LibraryStation Release 6.1 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.

Chapter 1. Introduction

This chapter describes the StorageTek LibraryStation product and its functions. Discussion of LibraryStation request processing and StorageTek library support is also included.

What is LibraryStation?

LibraryStation provides a communications interface between HSC and a client system running on another host (either MVS or open systems), allowing network clients to access the library services of a StorageTek Nearline Automated Cartridge System (ACS) through the MVS host system. LibraryStation can communicate with the MVS/CSC in an MVS-only environment, or the SMC and the StorageTek HTTP server can provide communication between MVS hosts. LibraryStation executes in the HSC address space on MVS.

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) client, a System Network Architecture (SNA LU6.2) client, and an MVS cross-system coupling facility (XCF) client. This protocol defines valid requests from network client systems and corresponds to an application layer protocol of the International Standards Organization (ISO) Open Systems Interconnection (OSI) reference model.

Additionally, LibraryStation provides an operator command set for controlling LibraryStation operation through the HSC operator console.

How Does LibraryStation Work?

LibraryStation acts as a control path interface between client systems and the HSC. Client systems communicate with LibraryStation through two methods. Open Systems Nearline Network protocol requests and corresponding replies are processed by the Client System Interface (CSI) for ONC/RPC clients or the Client Server Communications Interface (CSCI) for SNA LU6.2 and XCF clients of LibraryStation.

A hardware and software connection between the MVS system and network is required:

- For ONC/RPC clients:
  - The hardware connection is provided by a network interface adaptor that converts data on the Ethernet network to IBM channel commands. Depending on the TCP/IP communication product you choose, several types of network interface adapters may be used for a connection to an Ethernet network. Consult your TCP/IP vendor for a list of supported network adapters.
  - The software connection is provided by one of various TCP/IP communication products including IBM TCP/IP and CA Unicenter TCPaccess Communications Server. These products translate the data to a format that is understood by MVS applications such as LibraryStation.
- For SNA LU6.2 clients:
  - The hardware necessary to provide network connectivity between the client system and LibraryStation is not provided by StorageTek. Typical configurations use an IBM 3172 or IBM 3174 Interconnect Controller to connect to a token ring network where the client system is also attached. It is also possible to use channel-to-channel connections where the client resides on another MVS system.
  - The software connection is provided by APPC/MVS and VTAM. APPC/MVS provides a programming interface to LibraryStation while VTAM controls the physical hardware.
- For XCF clients:
  - XCF support runs in MVS 5.2.2 or above, executing as a sysplex environment. To use XCF, and for sysplex itself, you must have a coupling facility (CF) or a channel-to-channel (CTC) device.

When a client system makes a library services request, such as a mount or dismount request, LibraryStation translates the request into a format that the HSC understands. The HSC in turn delivers the request to the Library Management Unit (LMU) through the use of an establishment controller (an IBM 3174, for example) just as if the request had originated from the HSC.

When the HSC needs to respond to the originator, LibraryStation translates the response from the HSC format to the format expected by the client system. After a cartridge is mounted using this control path sequence, the client system can begin moving data to or from a cartridge drive that is attached to the library and connected directly to the client system. This separate data path uses a channel that is supported by the client; an ESCON, FIPS-60 ‘‘Bus and Tag,’’ or SCSI channel.

Request Processing

The flow of requests and responses between the network client system and the Library Management Unit (LMU) of the ACS is described below. Communications occur through a control path from the client system, through the HSC host to the LMU and back. Figure 1 on page 4 illustrates the flow of requests and responses. ONC/RPC clients are used in this example.

1. The client system initiates communication with the MVS host by sending an Open Systems Nearline Network (OSNN) protocol request over the network to the network interface adaptor (for example, the StorageTek 9300-001 Control Path Adaptor). This request could specify actions such as a tape volume mount or a query for information.
2. The network interface adaptor passes the packet through the IBM channel to the communication subsystem software on the MVS host, IBM TCP/IP for example.
3. The communication subsystem manages multiple communications connections and directs the communications packet to LibraryStation.
4. LibraryStation interprets the packet's information and protocols. LibraryStation may pass the request to the HSC for further processing and delivery to the LMU, or it may process the request directly.
5. The LMU initiates library operation, including robotic activity.
6. The LMU sends its response to the HSC for further processing and delivery to LibraryStation.
7. LibraryStation interprets the message information and protocols and passes the response to the Communications subsystem.
8. The Communications subsystem provides additional communications information required for the response to be received by the network client and sends the message to the network interface adaptor.
9. The network interface adaptor passes the packet back to the client system through the network (Ethernet, Token Ring, etc.)
10. The client system receives the response message from LibraryStation.
11. Data transfers between the client system and the ACS occur through separate ESCON, FIPS-60 ‘‘Bus and Tag’’ or SCSI data paths.

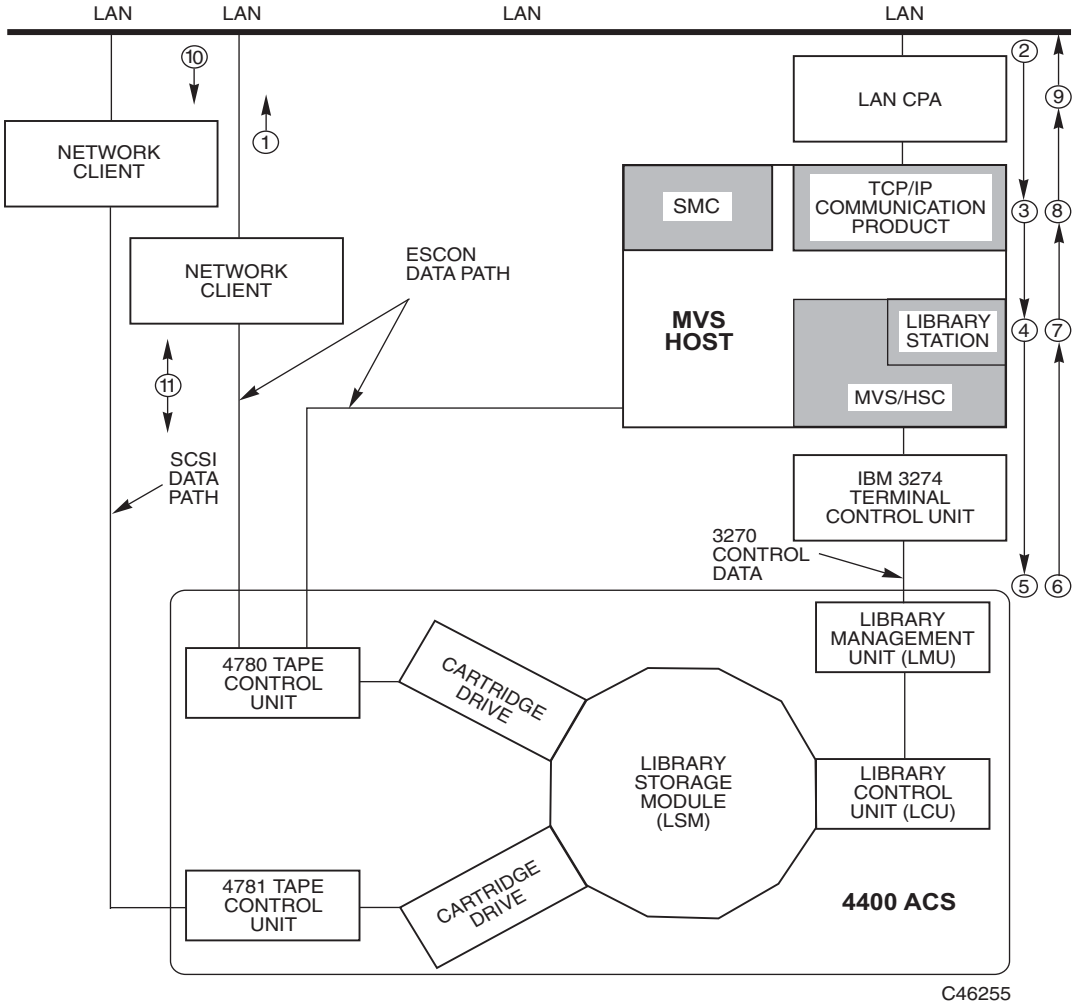


Figure 1. Flow of Requests and Responses through LibraryStation

StorageTek Library Product Support

The following sections list the StorageTek Automated Cartridge Subsystems (ACSs), cartridge tape transports, and media supported for LibraryStation 6.1.

StorageTek ACSs

LibraryStation 6.1 supports the following ACSs:

Table 1. StorageTek ACSs

ACS	Description
StreamLine SL8500	A modular library scalable from 1,500 to over 200,000 cartridges in mainframe, Windows, UNIX, and supercomputer environments. The SL8500 includes the following features: • Four internal rails on which four handbots travel. Optionally, you can upgrade to eight handbots, two per rail, for redundancy. Each rail is considered to be a separate LSM. • Internal pass-thru ports (elevators), used to transport cartridges from one rail to another within the library • Optional external pass-thru ports (two per rail), used to transport cartridges from one SL8500 library to another • Integrated Library Control Unit (LCU) and Library Management Unit (LMU) functionality • Compatible transports and associated media **Notes:** • Refer to the appendix "HSC Support of the SL8500" in the *HSC Operator's Guide* for more information about the SL8500 library. • Refer to the *HSC Configuration Guide* for SL8500 configuration information.
4400	One or more LSMs with attached Library Control Units (LCUs) and a Library Management Unit (LMU). • LSMs - 4410 (Standard), 9310 (Powderhorn), 9360 (WolfCreek)
9740 (TimberWolf)	• One or more 9740 LSMs • Integrated LMU
9360 (WolfCreek) stand-alone	• One or more 9360 LSMs • Integrated LMU

StorageTek Cartridge Tape Transports

LibraryStation 6.1 supports the following cartridge tape transports:

Table 2. StorageTek Cartridge Tape Transports

Transport	Description
4480	Provides read/write capability for 18-track recording format and standard capacity cartridge.
4490	Provides read/write capability for 36-track recording format and enhanced capacity cartridge. 4490 transports can also read data recorded in 18-track format.
9490	Provides read/write capability for 36-track recording format and enhanced capacity cartridge. The 9490 tape transport provides improved performance over the 4490 tape transport by supporting a higher data transfer rate and Enterprise Systems Connection (ESCON) attachment.
9490EE	Provides read/write capability for a higher capacity, 36-track ZCART cartridge. 9490EE transports can read any 36-track cartridge and can also write to standard and enhanced capacity cartridges.
SD3	Provides read/write capability for the high-capacity, helical scan recording format.
T9840A	Access-centric transport, provides 20 GB read/write capability for 9840 cartridges at a native, uncompressed transfer rate of 10 MB/sec. Volumes written by T9840A and T9840B transports are interchangeable between the two devices.
T9840B	Access-centric transport, provides 20 GB read/write capability for 9840 cartridges at a native, uncompressed transfer rate of 19 MB/sec. Volumes written by T9840A and T9840B transports are interchangeable between the two devices.
T9840C	Access-centric transport, provides 40GB read/write capability for 9840 cartridges at a native, uncompressed transfer rate of 30 MB/sec. The T9840C can read volumes written by T9840A and T9840B transports, but cannot write to them unless the entire volume is being re-written.
T9940A	Capacity-centric transport, provides 60 GB read/write capability for 9940 cartridges. The T9940A cannot read volumes written by T9940B transports, and cannot write to them unless the entire volume is being re-written.
T9940B	Capacity-centric cartridge tape transport, provides 200 GB read/write capability for 9940 cartridges. The T9940B can read volumes written by T9940A transports, but cannot write to them unless the entire volume is being re-written. With VSM, T9940B transports may **only** be defined as 3490-image devices. With a native interface, T9940B transports may **only** be defined as 3590-image devices.

StorageTek Media

LibraryStation 6.1 supports the following media:

Table 3. StorageTek Media

Media	Description
Standard capacity (3480)	cartridge used on any longitudal 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 (ECART)	cartridge used only on 36-track transports (i.e., 4490, 9490, or 9490EE), has a length of 1100 ft. and is visually identified by a two-tone color housing.
Extended-enhanced capacity (ZCART)	cartridge used only on Timberline 9490EE 36-track transports, uses a thinner media to provide twice the capacity of the ECART cartridge.
Helical (SD-3)	cartridge used only on Redwood (SD-3) transports, is visually identified by the leader block on the left side of the cartridge. There are four types of helical cartridges: DD3A (10 GB) DD3B (25 GB) DD3C (50 GB) DD3D (cleaning cartridge)
9840 (STK1)	cartridge used only on T9840 transports, providing storage of up to 40 GB of uncompressed data. capacity: 20 GB (when written by T9840 A/B transport) 40 GB (when written by T9840C transport)
9940 (STK2)	cartridge used only on T9940 transports, providing storage of up to 200 GB of uncompressed data. capacity: 60 GB (when written by T9940A transport) 200 GB (when written by T9940B transport)

Note: An ACS can contain mixed library transports and media. In addition, 3480-, 3490E-, and helical-type cartridge transports can be attached to the MVS system outside of the library.

Chapter 2. Operator Command Overview

Operator interactions in a LibraryStation environment include LibraryStation operator commands, HSC operator commands, and TCP/IP operator commands:

- LibraryStation operator commands are described in this guide.
- HSC operator commands are described in the *StorageTek Host Software Component Operator's Guide.*
- TCP/IP commands are described in the documentation provided by your TCP/IP vendor.

LibraryStation operator commands provide an interface for the MVS operator to start, stop, and control LibraryStation processing. This includes canceling active requests and displaying status of entries within LibraryStation.

Relationship to HSC Commands

For LibraryStation network functions not specifically implemented as LibraryStation operator commands, there are HSC commands that perform the necessary functions, such as Mount.

LibraryStation commands are distinguished from HSC commands by the letters `LS` in front of the command (such as `LS START`). The command string is preceded by a site-dependent initial prefix character, such as a period. LibraryStation uses the prefix character that is defined for HSC commands in the HSC LIBGEN.

LibraryStation commands can be entered using any of the allowable HSC command formats, such as:

```
.LS START
.LS,START
.LS   START
.LS,   START
F HSC0,LS START
```

Syntax is checked when a LibraryStation command is issued by the MVS operator. If the syntax is incorrect, an error message is generated. Refer to the *LibraryStation Messages and Codes Guide* for specific message information.

LibraryStation Command Summary

LibraryStation commands are summarized in the following table. Note that commands in this table are shown in mixed case; lower case letters may be omitted to form abbreviations (such as "STO" for the STOp command and "S" for the Start command).

Table 4. LibraryStation Operator Command Summary

Command	Function
Activate Standby	Notifies standby LibraryStations to begin initialization
Cancel	Stops processing of a LibraryStation client request or operator command
CLrlock	Removes all active and pending locks from a library drive.
Display COmmand	Displays online help for specific LibraryStation commands
Display DRive	Displays the status of drives that are attached to the network served by LibraryStation
Display Request	Displays the status of all or specified active LibraryStation client requests and operator commands
Display Status	Displays the status of LibraryStation processing Idle Quiesces LibraryStation client request and operator command processing
Idle	Quiesces LibraryStation client request and operator command processing
INit	Initializes LibraryStation in the HSC address space
SEt	Changes certain LSINIT parameter values
Start	Changes LibraryStation from quiesced to fully functional
STOp	Terminates LibraryStation processing in the HSC address space
Trace	Traces LibraryStation processes
Vary DRive	Changes the state of a library drive to be available or unavailable to LibraryStation

Online Help for LibraryStation Commands

Similarly to HSC, online help is available for LibraryStation commands. The LS Display Cmd operator command is used to display information about specific LibraryStation commands. For example:

```
LS DISPLAY CMD(START)
```

or

```
LS DISPLAY COMMAND(START)
```

displays information about the LS Start command.

These examples can also be abbreviated as follows:

```
LS D CM(S)
```

or

```
LS D CO(S)
```

LibraryStation Messages

Responses to LibraryStation commands are routed as messages to the console where the command was issued. Messages are also sent to consoles for certain unsolicited events. In a sysplex environment, the response is issued to all consoles.

Messages are processed through the same mechanism used by the HSC, so terminals that use lower case for other character sets can have LibraryStation messages appear in upper case, the same as for HSC commands.

LibraryStation messages are prefixed by the following message identifier:

SLS3*nnnc*

where:

SLS3	identifies the message as a LibraryStation message
nnn	defines a unique LibraryStation message
c	denotes an operator action, such as "I" for an informational message.

Individual LibraryStation messages are described in the *LibraryStation Messages and Codes Guide*.

Note: The HSC Display Message facility can also be used to display information about LibraryStation messages. For example, the command `D MSG (3999)` displays information about message SLS3999I.

Operating States

LibraryStation has three operating states. Other than during initialization, termination, or in standby status, LibraryStation is always in one of these states:

- RUN

  LibraryStation is active. This is the normal operating state. Operator commands and client requests are accepted in this state.

- IDLE PENDING

  LibraryStation is in the process of quiescing. This state is entered following the issuance of a LibraryStation Idle command by the operator or an Idle request from the client. Current client requests are processed in this state. Operator commands and certain client requests (Cancel, Idle, Query, Query_Lock, Start, and Vary) are accepted in this state. A LibraryStation Start command is required to return to RUN state from the IDLE PENDING state.

- IDLE

  LibraryStation has quiesced. This state is entered after current client requests are processed in the IDLE PENDING state following the issuance of a LibraryStation Idle operator command or client request. Operator commands and certain client requests (Cancel, Idle, Query, Query_Lock, Start, and Vary) are accepted in this state. A LibraryStation Start command is required to return to RUN state from the IDLE state.

The current operating state is identified when the Display Status operator command or Query Server client request is issued.

See Chapter 4, “Starting and Stopping LibraryStation” on page 41 for information about LibraryStation initialization and termination.

Chapter 3. Operator Commands

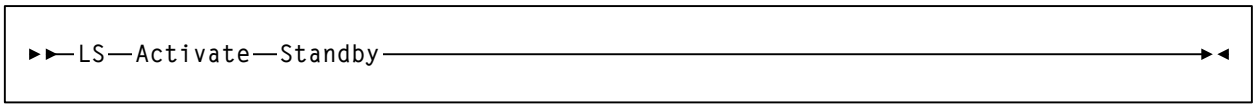
LibraryStation operator commands provide an interface for the MVS operator to start, stop, and control LibraryStation processing. This chapter includes syntax, parameters, examples, and output for LibraryStation operator commands.

ACTIVATE STANDBY Command

The Activate Standby command notifies one or more LibraryStations in standby status to begin initialization. The first standby LibraryStation that starts initialization becomes active.

This command can be entered to any SLS subsystem with a LibraryStation in defer, standby, or active status.

Syntax



Parameters

Activate
initiates the Activate command.

Standby
indicates a standby LibraryStation is to be activated.

Example

```
.LS A S
```

This example requests that a standby LibraryStation become active.

Output

A message is sent to the console where the Activate Standby command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3382I Standby LibraryStations notified
```

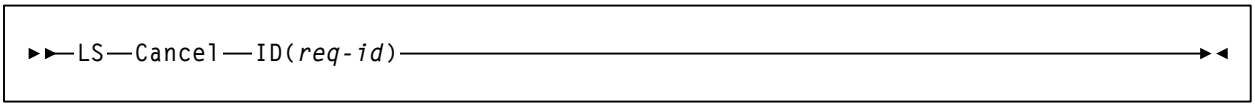
CANCEL Command

The Cancel command attempts to terminate a previous command or client application request. The specified request is stopped when LibraryStation receives the Cancel command. No attempt is made to undo any activity that was completed before the Cancel command was received.

The following requests may be cancelled:

- Eject
- Enter
- Lock
- Query
- Query_Lock
- Set_Scratch

Syntax



Parameters

Cancel
initiates the Cancel command.

ID
indicates that a specific request is to be cancelled.

req-id
identifies the specific request to cancel. The valid range is 1-65535.

Example

```
.LS C ID(3128)
```

In this example, request 3128 is cancelled.

Output

Messages are sent to the console where the Cancel command was issued. In a sysplex environment, the response is issued to all consoles. For example:

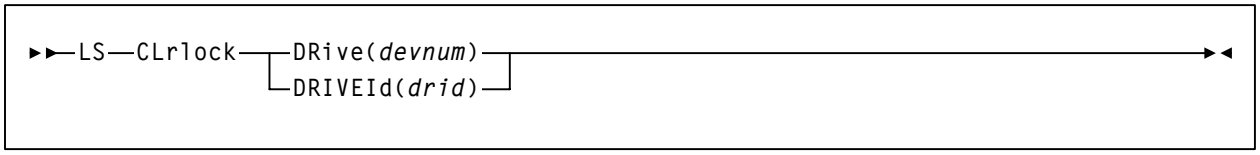
```
SLS3412I Request 3128 not cancelled; request not active
SLS3448I Cancel of request 3488 scheduled
```

CLRLOCK Command

The Clrlock command removes all active and pending locks on a library drive. The lock identifier is not required.

The lock drive mechanism is used by network clients to serialize drive requests. The Clrlock command removes outstanding locks that cannot be removed using Open System Nearline Network protocol commands.

Syntax



Parameters

CLrlock
initiates the CLrlock command.

DRive
specifies that all active and pending locks are to be removed for a device number.

devnum
identifies a specific drive number.

DRIVEId
specifies that all active and pending locks are to be removed for a driveid.

drid
identifies a specific driveid. Driveids are specified using the following format:

AA:LL:PP:NN

where:

- *AA* is the ACS number (00-7E hexadecimal)
- *LL* is the LSM number (00-23 hexadecimal)
- *PP* is the drive panel number within the LSM (1-10 decimal)
- *NN* is the relative drive number within the panel (0-19 decimal)

Note: When using the Clrlock command, ensure that the correct drive identifier is specified:

- If an incorrect identifier is used and a lock is removed from an unintended drive, problems may result and the client using the unintended drive may be forced to cycle their system.
- If a Clrlock command is issued for an unintended drive currently being used by a client, that client may be forced to cycle their system. If the drive still fails to operate, you may need to issue the Clrlock command against it, and the client may need to cycle their system until the problem is resolved.

Examples

```
.LS CL DR(51F)
.LS CL DRIVEI(01:0F:10:2)
```

In these examples, all active and pending locks were removed for the following:

- Device number 51F
- Drive number-3 on panel-10, in LSM-0F, of ACS-01

Output

Messages are sent to the console where the CLrlock command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3473I Clearlock response
Drive (51F) (00:00:00:00) Status: all locks are cleared
```

In this example, all active and pending locks were removed for Device number 51F.

```
SLS3473I Clearlock response
Drive (000) (01:0F:10:2) Status: no locks found for resource
```

In this example, no locks were found for the third drive on panel-10, in LSM-F, of ACS-01.

```
SLS3473I Clearlock response
Drive 00:00:01:00 is not configured to LS
```

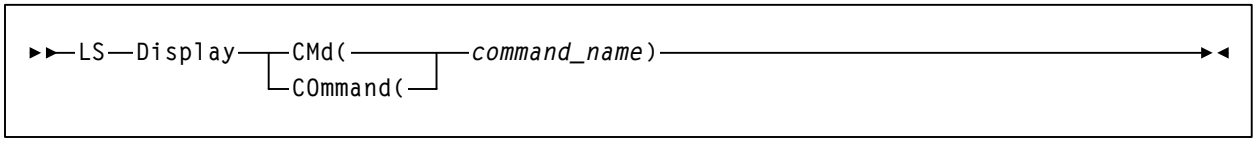
In this example, an invalid drive was entered.

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages displayed.

DISPLAY CMD Command

The Display Cmd command displays syntax and usage information about specific LibraryStation commands.

Syntax



Parameters

Display
initiates the Display command.

CMd or COmmand
indicates that a LibraryStation command follows.

command-name
specifies the name of the LibraryStation command to display information about.

Note: LibraryStation commands may be abbreviated as indicated in the syntax diagrams for each command. For example, Cancel maybe abbreviated to `C`.

Examples

```
.LS D CM(C)
.LS D CM(D)
.LS D CO(V)
```

These examples display information about the LibraryStation Cancel, Display, and Vary commands.

Output

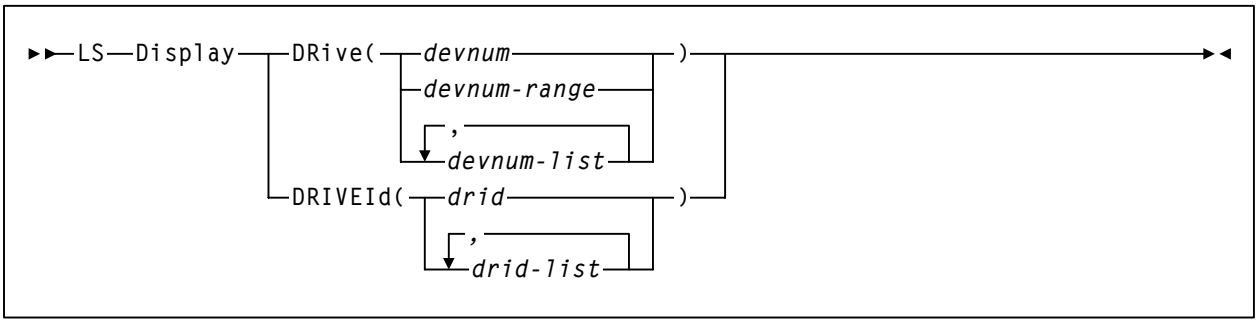
Online help information is sent to the console where the Display CMd command was issued.

DISPLAY DRIVE Command

The Display Drive command displays the status of the drives that are attached to the network served by LibraryStation.

Note: References to library drives in LibraryStation commands refer only to the drives as viewed from the network clients. For example, the LibraryStation Display Drive command does not display information about MVS-attached drives that are not known to the network client system.

Syntax



Parameters

Display
initiates the Display command.

DRive
specifies that drive status is requested for specific device numbers.

devnum or devnum-range or devnum-list
identifies one or more device numbers to display status for.

devnum-range is specified as two device numbers joined by a dash.

devnum-list elements may be either a single device number or a range of device numbers, with each list element separated by a comma or a blank.

Device numbers are defined in the HSC LIBGEN and are composed of three or four hexadecimal characters.

A range of numbers is valid for the *devnum* format only. The range may consist of 2 to 42 valid device numbers. If a range is specified, only existing LibraryStation-defined drives are reported. If no LibraryStation drives are defined in that range, an appropriate message is issued.

DRIVEId
specifies that drive status is requested for specific driveids.

drid or ***drid-list***

identifies a single driveid or a list of driveids. Driveids can be specified using the following format:

AA:LL:PP:NN

where:

- *AA* is the ACS number (00-7E hexadecimal)
- *LL* is the LSM number (00-23 hexadecimal)
- *PP* is the drive panel number within the LSM (1-10 decimal)
- *NN* is the relative drive number within the panel (0-19 decimal)

Note: The "Drive Worksheet" on page 21 can be used to record site-specific information needed for this command.

Examples

```
.LS D DR(51F)
.LS D DR(51C-51F)
.LS D DR(51C,51D)
.LS D DRIVEI(01:0F:10:2)
```

In these examples, status is displayed for:

- Device number 51F
- A range of device numbers from 51C through 51F
- A list of device numbers 51C and 51D
- Drive number-3 on panel-10, in LSM-0F, of ACS-01

Output

Messages are sent to the console where the Display Drive command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3472I Display drive response
Drive (051F) (00:01:10:03) Type 4490 ONLINE, available
```

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

Drive Worksheet

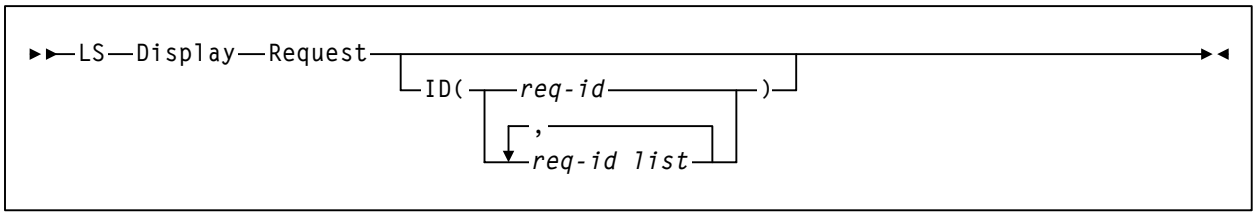
Record information about your drives on this worksheet for use as a reference while using the Display Drive and Vary Drive commands.

Device Number (*devnum*)	ACS Number (*AA*)	LSM Number (*LL*)	Panel Number (*PP*)	Drive Number (*NN*)

DISPLAY REQUEST Command

The Display Request command displays the status of all or selected active requests.

Syntax



Parameters

Display
initiates the Display command.

Request
specifies that request status is to be displayed.

ID
indicates that a specific requestid to display follows. If ID is not specified, all active and pending requests are listed.

req-id or req-id list
specifies a single request number or a list of request numbers separated by a comma or a blank. The valid range is 1-65535.

Examples

```
.LS D R
.LS D R ID(2134)
.LS D R ID(2135,2138,2150)
```

In these examples, the following requests are displayed:

- All requests are displayed
- Request 2134 is displayed
- Request 2135, 2138, and 2150 are displayed

Output

Messages are sent to the console where the Display Request command was issued. In a sysplex environment, the response is issued to all consoles. For example:

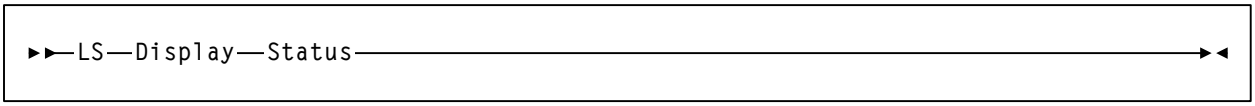
```
SLS3469I Request status
Request 02134: command QUERY status PENDING
```

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

DISPLAY STATUS Command

The Display Status command displays the status of LibraryStation processing, including standby status and LibraryStation state (RUN, IDLE, or IDLE PENDING) and the number of current and pending requests for mounts, dismounts, enters, and ejects.

Syntax



Parameters

Display
initiates the Display command.

Status
specifies that LibraryStation status is to be displayed.

Example

```
.LS D S
```

This example displays LibraryStation status.

Output

Messages are sent to the console where the Display Status command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3468I Server status
Server is RUN
Mount(00/00) Dismount(00/00) Enter(00/00) Eject(00/00)
```

Message SLS3468I in the sample output indicates that LibraryStation is in RUN state. In other instances, this message can indicate IDLE PENDING or IDLE operating states. This message can also indicate that LibraryStation is initializing. See “Operating States” on page 12 for descriptions of LibraryStation operating states.

Message SLS3468I in the sample output also indicates the number of current and pending requests for mounts, dismounts, enters, and ejects. The number to the left of “/” indicates current requests, while the number to the right of “/” indicates pending requests.

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

IDLE Command

The Idle command quiesces processing of LibraryStation network requests.

When Idle is issued, LibraryStation moves from RUN state to IDLE PENDING state, which indicates that LibraryStation is in the process of quiescing. All current client requests are completed when LibraryStation is in this state. Operator commands and some client requests (Cancel, Idle, Query, Query_Lock, Start, and Vary) are accepted in this state.

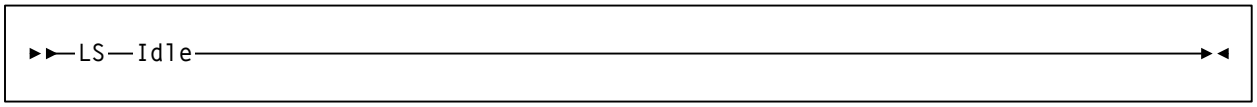
When all client requests have been processed in the IDLE PENDING state, LibraryStation enters IDLE state. In this state, LibraryStation has quiesced. Operator commands are accepted, as are the following client requests: Cancel, Idle, Query, Query_Lock, Start, and Vary.

Restarting LibraryStation After Idle

An LS Start command must be issued to return LibraryStation to its normal processing state (RUN) after an Idle command has been issued.

Use the LibraryStation Display Status command to display the current operating state.

Syntax



Parameters

Idle
initiates the Idle command.

Example

```
.LS I
```

This example quiesces LibraryStation request processing.

Output

Messages are sent to the console that issued the Idle command. In a sysplex environment, the response is issued to all consoles. For example:

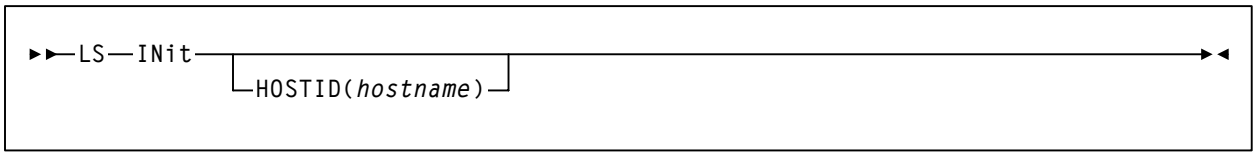
```
SLS3919I LS is now idle
SLS3404I IDLE command successfully executed
SLS3422I IDLE is currently pending
```

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

INIT Command

The Init command initializes LibraryStation in the HSC address space.

Syntax



Parameters

INit
initiates the INit command.

HOSTID
specifies that the command is only to be executed if the host name identified by hostname matches the HSC hostid of the host system from which the command is executed.

hostname
identifies the host to use for HOSTID.

For systems where LibraryStation has been made available to more than one HSC host, the HOSTID (hostname) parameter allows you to place the Init command in the HSC PARMLIB control data set in conjunction with the LSINIT DEFER parameter.

Thus, LibraryStation can be configured to start automatically during HSC initialization on the host system identified in the HOSTID parameter. If this host system fails, the MVS operator can start LibraryStation manually on an alternate host by issuing the Init command from that host.

Examples

```
.LS IN
.LS IN HOSTID(MVS1)
```

These examples initialize LibraryStation. The first example initializes LibraryStation on the host from which it is issued. The second example initializes LibraryStation on host "MVS1." The second example would typically be issued from within the PARMLIB control data set. (This example would have to be issued from host MVS1 to be successful.)

Output

Messages are sent to the console where the Init command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3350I LS initialization started (V6.1.0)
SLS3128I LM has been restarted; LM state is running
SLS3247I CSI network interface state active
SLS3352I LS initialization complete
```

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

SET Command

The Set command changes the values of certain LSINIT control statement parameters. Any parameter changed with the Set command will only have its new value until HSC is restarted and the LSINIT command is reprocessed.

The PDF and PDFX values are for the dynamically allocated PDF and PDFX only. If you use the Set command to display the values for the PDF and PDFX and the values are reported to be undefined, then there is no dynamic allocation and the PDF and PDFX used are specified in the startup JCL.

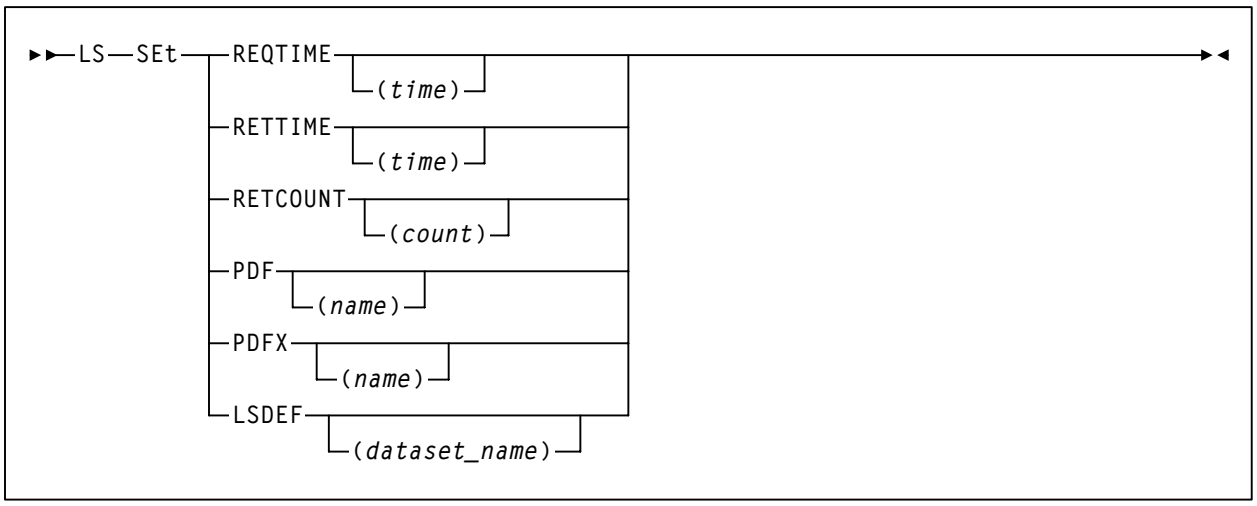
After the SET Command

After the Set command is issued, the LibraryStation parameter will have the new value, and LibraryStation will begin using it. The LSDEF value is only checked when LibraryStation is initialized and doesn't take effect until LibraryStation is stopped and initialized again. However, if the HSC is restarted, this value is no longer in effect.

If the changes made by the Set command are to be permanent, changes equivalent to the Set command changes should be made to the LSINIT parameters.

To display the current value of the parameter, enter the Set command specifying the parameter without any options.

Syntax



Note: PDF and PDFX are not applicable for MVS sysplex installations using XCF or LU6.2.

Parameters

Refer to the *LibraryStation Configuration Guide* for a complete description of the valid values for these keywords.

Example

```
.LS SET LSDEF
.LS SET RETTIME(20)
```

The first example displays the current value set for LSDEF. The second example changes the minimum number of seconds that LibraryStation waits between attempts to establish a network connection.

Output

Messages are sent to the console that issued the Set command. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3463I Current LSDEF value is MY.LSDEF.FILE
SLS3464I RETTIME set to 20
```

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

START Command

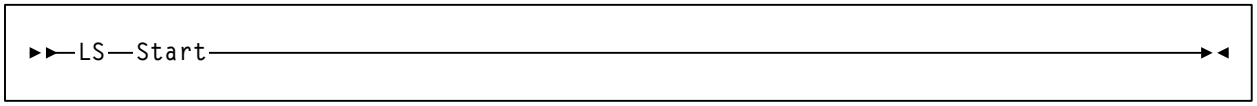
The Start command changes the state of LibraryStation from quiesced (IDLE or IDLE PENDING) to fully functional (RUN).

Restarting LibraryStation After Idle

A LibraryStation Start command must be issued to return LibraryStation to its normal processing state (RUN) after an Idle command has been issued.

Use the LibraryStation Display Status command to display the current operating state.

Syntax



Parameters

Start
initiates the Start command.

Example

```
.LS S
```

This example starts LibraryStation after it has been quiesced.

Output

Messages are sent to the console where the Start command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3919I LS is now running
SLS3404I START Command successfully executed
```

STOP Command

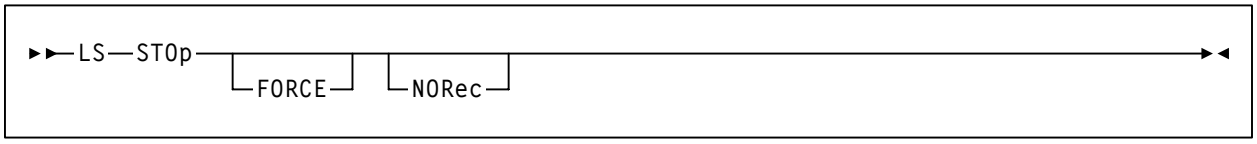
The Stop command terminates execution of LibraryStation within the HSC address space.

Restarting LibraryStation After Stop

A LibraryStation Init command can be used to reinitialize LibraryStation after a Stop command has been issued.

If LibraryStation is active and supports cross host recovery, standby LibraryStations are notified to begin initialization. If the notification fails for any reason, the Activate Standby command can also be used to reinitialize a LibraryStation after the Stop command has been issued.

Syntax



Parameters

STOp
initiates the STOp command but allows current client requests to complete before LibraryStation stops.

Note: In a parallel sysplex environment, STOP FORCE must be used instead of STOP if you wish to stop a server and redirect its work to a standby server.

FORCE
terminates LibraryStation immediately without allowing current requests to complete. Except for the sysplex scenario described above, FORCE should only be used if a STOP command without this option fails to terminate LibraryStation.

NORec
terminates LibraryStation without notifying LS systems in standby mode that termination is in progress. This prevents automatic initialization of a standby LibraryStation.

Examples

```
.LS STO
.LS STO FORCE
```

These examples terminate LibraryStation. The second example terminates LibraryStation immediately.

Output

Messages are sent to the console where the Stop command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3919I LS is now IDLE
SLS3361I LS termination started
SLS3362I LS termination complete
SLS3368I LS stopped
```

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

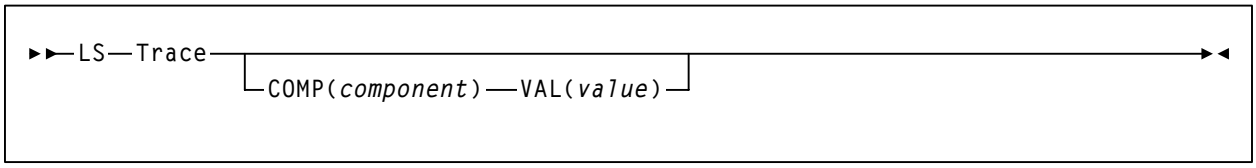
TRACE Command

The Trace command traces LibraryStation processes, including detailed startup and termination data, network client requests and responses, error conditions, state changes, and operator command requests.

Note: The LibraryStation Trace command is generally not used by customers except at the request of StorageTek support personnel while diagnosing a problem. It is only included here with the standard operator commands so that you will have reference information available if you are instructed to run Trace.

The LibraryStation Trace command uses the MVS Generalized Trace Facility (GTF) through the HSC. Consequently, several MVS and HSC procedures must be performed before LibraryStation tracing can work properly. Refer to "Tracing" on page 50 for more information about tracing prerequisites.

Syntax



Parameters

Trace
initiates the Trace command. If no other parameters are specified, the current LibraryStation component trace settings are displayed.

COMP
indicates that a character component to trace will be identified next.

component

A single component identifier or a list of component identifiers to use for the trace command. The component identifiers are as follows:

CAP	CAP Request Processor
CL	Common Library
CSCI	Client Server Communication Interface
CSI	Client System Interface
DB	Persistent Data File Manager
HIF	HSC Interface
IF	Information Manager
IT	Initialization/Termination
LM	Library Manager
LO	Lock Manager
MT	Mount Request Processor
QU	Query Request Processor
SA	System Administrator
SCR	Scratch Request Processor
VA	Vary Request Processor

VAL

indicates that a trace map bit value will be identified next.

value

The following values are the same for each component:

00000000	Turns off tracing for the specified component
80000000	Module entry and exit. The GTF record identifier is D001 for module entry, D002 for module exit. **Warning:** This value can impact system performance.

Some components and processors also trace various stages or inputs/outputs during their processing, as described below.

The CAP processor also provides trace information that contains the CAP request packet.

40000000	CAP request packet. The GTF record identifier is D500.
20000000	CAP response packet. The GTF record identifier is D501.

The CL component provides trace information containing IPC information.

40000000	IPC information. The GTF record identifier for IPC open is D150; IPC transmit is D151; IPC read is D152.
20000000	XCF information. The GTF record identifier for XCF open is D153; XCF transmit is D154; XCF read is D155.

The CSCI component provides the following trace information:

40000000	Important variable values for all CSCI sub components.
08000000	Entry/Exit for the PER component.
04000000	Important variable values for the PER component.
00800000	Entry/Exit for the LU6 component.
00400000	Important variable values for the LU6 component.
00200000	All CPI/C calls issued by the LU6 component.
00080000	Entry/Exit for the XDR component.
00040000	Important variable values for the XDR component.
00008000	Entry/Exit for the CIF component.
00004000	Important variable values for the CIF component.
00000800	Entry/Exit for the IPC component.
00000400	Important variable values for the IPC component.

The CSI component traces various processing information described below.

20000000	Signal received. GTF record identifier is D752.
10000000	CSI initiation. GTF record identifier is D753.
08000000	CSI termination. GTF record identifier is D754.
04000000	Request packet arrival from the network interface. GTF record identifier is D755.
02000000	Response packet sent to the network interface. GTF record identifier is D756.
00400000	CSI state change. GTF record identifier is D759.
00200000	Miscellaneous communications data area information. GTF record identifier is D75A.

The LM component provides the following trace information:

40000000	Entry parameters. GTF record identifier is D351.
20000000	Signal received. GTF record identifier is D352.
10000000	LM initialization. GTF record identifier is D353.
08000000	LM termination. GTF record identifier is D354.
04000000	Request received from the CSI component. GTF record identifier is D355.
02000000	Request received from the SA component. GTF record identifier is D356.
01000000	Request received from LibraryStation. GTF record identifier is D357.
00800000	Request processor creation. GTF record identifier is D358.
00400000	LM state change. GTF record identifier is D359.
00200000	Request processor termination. GTF record identifier is D35A.

The MT processor provides tracing information for request and response packets.

00000001	Mount request packet. GTF record identifier is D600.
00000010	Mount response packet. GTF record identifier is D601.

The IF component provides the following trace information packets:

40000000	ACS record. GTF record identifier is D250.
20000010	LSM record. GTF record identifier is D251.
10000000	CAP record. GTF record identifier is D252.

The HIF component provides the following trace information packet.

40000000	Trace point record. GTF record identifier is D100 for BEFORE HSC call, D101 for AFTER HSC call. Module name and offset are needed from the trace record to determine HSC call.

If any trace value is set for a specific component, GTF record type D000 will also be produced if the component has provided for its issuance. The D000 trace record consists of one word that indicates how many words of data follow.

Example

```
.LS T COMP(IT) VAL(80000000)
```

This example traces module entry and exit for the LibraryStation Initiation/Termination (IT) component.

Output

LibraryStation messages are sent to the console that issued the Trace command. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3470I Trace command status
LS trace mask 80000000 set for IT component
```

Trace output data is sent to the GTF Trace data set for use by StorageTek support personnel.

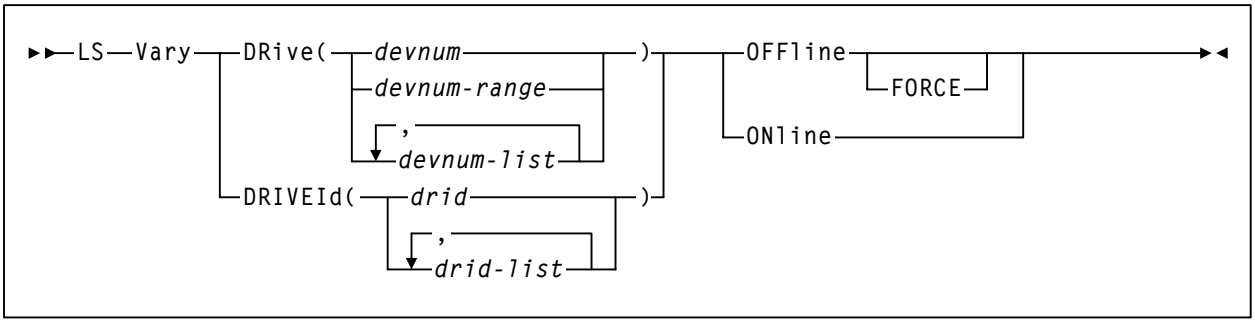
Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

VARY DRIVE Command

The Vary Drive command varies the state of a library drive as seen by the network.

Note: References to library drives in LibraryStation commands refer only to the drives as viewed from the network clients. LibraryStation does not affect MVS-attached drives. For example, the LibraryStation Vary Drive command does not perform an MVS Vary of the drive.

Syntax



Parameters

Vary
initiates the Vary command.

DRive
specifies that a drive state change is requested for specific device numbers.

devnum
specifies that drive status is requested for specific device numbers.

devnum or devnum-range or devnum-list
identifies one or more device numbers to display status for.

devnum-range is specified as two device numbers joined by a dash.

devnum-list elements may be either a single device number or a range of device numbers, with each list element separated by a comma or a blank.

Device numbers are defined in the HSC LIBGEN and are composed of three or four hexadecimal characters.

A range of numbers is valid for the *devnum* format only. The range may consist of 2 to 42 valid device numbers. If a range is specified, only existing LibraryStation-defined drives are reported. If no LibraryStation drives are defined in that range, an appropriate message is issued.

DRIVEId
specifies that a drive state change is requested for specific driveids.

drid or drid-list
identifies a single driveid or a list of driveids. Driveids can be specified using the following format:

AA:LL:PP:NN

where:

- *AA* is the ACS number (00-7E hexadecimal)
- *LL* is the LSM number (00-23 hexadecimal)
- *PP* is the drive panel number within the LSM (1-10 decimal)
- *NN* is the relative drive number within the panel (0-19 decimal)

Note: Site-specific information required for this command was recorded on the "Drive Worksheet" on page 21.

OFFline
makes the drive unavailable for requests from LibraryStation network clients.

FORCE
forces the drive offline immediately, even if the drive is in use (as shown by the Display Drive command). This parameter is only valid for OFFLINE requests and should only be used after determining that the device is not in use.

ONline
makes the drive available for requests from LibraryStation network clients.

Examples

```
.LS V DR(51F) ON
.LS V DR(51C-51F) OFF
.LS V DR(51C,51D) ON
.LS V DRIVEI(Ø1:ØF:1Ø:2) OFF FORCE
```

In these examples, the following devices are varied:

- Device number 51F is varied online
- A range of device numbers from 51C through 51F is varied offline
- A list of device numbers 51C and 51D are varied online
- Drive number-3 on panel-10, in LSM-0F, of ACS-01 is forced offline immediately

Output

Messages are sent to the console where the Vary Drive command was issued. In a sysplex environment, the response is issued to all consoles. For example:

```
SLS3471I Vary command status
Drive (051F) (00:00:09:00) varied ONLINE
```

Refer to the *LibraryStation Messages and Codes Guide* for additional information about specific messages that are displayed.

Chapter 4. Starting and Stopping LibraryStation

This chapter includes information for stopping and Starting LibraryStation.

Starting LibraryStation

LibraryStation requires an LSINIT control statement in order to initialize. This control statement is established in the HSC SLSSYSxx parameter data set during LibraryStation installation and configuration.

Depending on site-specific LSINIT control statement parameters, LibraryStation can be initialized in any of the following ways:

- Automatically, during the HSC initialization process
- Manually, when the LibraryStation LS Init operator command is issued after HSC initialization
- Via cross host request, when the LibraryStation is in standby status and the active LibraryStation supporting cross host recovery terminates

Notes:

- LibraryStation 6.1 requires a valid license key for initialization. Refer to the *LibraryStation Configuration Guide* for more information.
- If LibraryStation is installed on or made available to more than one host system through shared DASD, initialization can occur from any host system authorized by the LSINIT control statement parameters to start LibraryStation.

If syntax errors occur on the LSINIT statement or in processing the options data sets indicated by parameters on the LSINIT statement, error messages will be generated. When an error message is encountered, refer to the *LibraryStation Messages and Codes Guide* for specific message information.

LibraryStation initialization proceeds to a state in which network and/or operator requests for LibraryStation services can be processed. Any resources required by LibraryStation are allocated, checks are made to insure that Communication Interface is available, and interfaces to the MVS/HSC are checked for operability.

The following conditions cause LibraryStation to be aborted:

- Resources Unavailable

  LibraryStation could not acquire the necessary resources for successful initialization. The SYSLOG is updated with the error condition and LibraryStation terminates.

- Startup Parameter Errors

  Errors in the startup LSINIT statement cause LibraryStation to terminate. The SYSLOG is updated with the error condition and LibraryStation terminates.

The following conditions cause LibraryStation to be functionally degraded when initialized:

- ONC/RPC Unavailable

  Network communications are unavailable due to an inability to register ONC/RPC services. LibraryStation periodically attempts to register ONC/RPC services.

- MVS/APPC Unavailable

  Network communications are unavailable due to an inability for LibraryStation to register with MVS/APPC. This would normally indicate that the MVS/APPC address space is not active. LibraryStation periodically attempts to register with MVS/APPC.

Stopping LibraryStation

LibraryStation can be terminated in either of the following ways:

- Automatically, when HSC is terminated or changed to base level
- Manually, by the MVS operator using the LibraryStation LS Stop command

At termination, communication with network clients is discontinued and resources acquired by LibraryStation are returned to the operating system. All outstanding requests and replies are allowed to complete, except when the LS Stop command includes a Force parameter.

Significant events that occur during termination are recorded in the SYSLOG. The log records the start of termination as well as subsequent events.

LibraryStation processing of operator commands is stopped. The SYSLOG records the start of termination. If an error should occur during termination, the error is recorded in the SYSLOG and termination continues. When termination completes, LibraryStation resources are returned to the operating system, and a termination complete message is recorded in the SYSLOG.

If cross host recovery support is specified, the active LibraryStation issues an LS initialization request to all other active HSC subsystems during termination. The first standby LibraryStation to begin initialization becomes the active LibraryStation.

Chapter 5. Administration and Maintenance

This chapter describes ongoing system administration and maintenance procedures, including:

- Administration procedures to change the number of tape cartridge drives available to LibraryStation or add LibraryStation to additional MVS hosts.
- Administration procedures to modifying LibraryStation operating characteristics in the LSINIT control statement.
- Maintenance procedures that may be required to recover from a hardware or software failure during LibraryStation operation.
- Diagnostic tools you may use or that StorageTek support personnel may ask you to use in the event of system failures or performance problems.

Note: Virtual Storage Manager (VSM) support has been added for certain LibraryStation diagnostic tools. Refer to your VTCS publications for more information.

System Administration

This section describes administrative procedures you may perform as your LibraryStation system hardware and software configurations change. The following administrative scenarios are discussed:

- Making additional tape cartridge drives available to LibraryStation
- Making existing tape cartridge drives unavailable to LibraryStation
- Modifying LSINIT Operating Characteristics

Making Additional Tape Cartridge Drives Available to LibraryStation

The number of tape cartridge drives that can be accessed by LibraryStation was initially established during LibraryStation configuration. This procedure is included in the *LibraryStation Configuration Guide*. However, As your system requirements change, you may need to make additional drives available for network mounts and dismounts.

Note: Refer to the sections concerning tape cartridge drive access and LibraryStation security in the *LibraryStation Configuration Guide* before making additional tape cartridge drives available to LibraryStation.

Tape cartridge drives are made available to LibraryStation through the HSC LIBGEN. You must modify one or more macros in the LIBGEN to make additional tape cartridge drives available to LibraryStation.

Specifically, you need to modify the SLIDLIST macro for the drive panel containing the tape cartridge drives you wish to make available to LibraryStation. If new device numbers are being created, you must also create new SLIDRIVS macros containing those device numbers.

For example, suppose the HSC LIBGEN contains the following macros:

```
        SLILIBRY HOSTID=(HSC1,LSID)
PANEL2  SLIDLIST HOSTDRV=(DRV1,DUMMY1)
DRV1    SLIDRIVS ADDRESS=(410,411,412,413)
DUMMY1  SLIDRIVS ADDRESS=(,,,)
```

In this example, drives in PANEL2 are available to hostid HSC1 but not to LibraryStation (hostid LSID). If you wish to make the drives in PANEL2 available to LibraryStation but unavailable to HSC1, modify the SLIDLIST macro as follows:

```
PANEL2  SLIDLIST HOSTDRV=(DUMMY1,DRV1)
```

The drive panel is now available only to LibraryStation.

When you have finished modifying HSC LIBGEN macros, you may need to reconfigure the LIBGEN:

- If the changes only involved changing device numbers in SLIDRIVS macros, you can use the Set utility (SLIDRIVS option) to implement the changes.
- If the changes involved more than simply changing device numbers, you must reconfigure the LIBGEN using the MVS Start command with the Reconfig parameter in the PROC.

Refer to the *Host Software Component System Programmer's Guide* for detailed information about individual HSC macros, the Set utility, and the reconfiguration process.

Note: Some versions of the *Host Software Component System Programmer's Guide* state that library station device numbers can be set using the HSC Set Utility with the SLISTATN option. This is a generic reference to LMU station device numbers and is ***not*** a reference to the LibraryStation product described here. LibraryStation device numbers ***cannot*** be set using the SLISTATN option of the HSC Set utility.

Making Existing Tape Cartridge Drives Unavailable to LibraryStation

The number of tape cartridge drives that can be accessed by LibraryStation was initially established during LibraryStation configuration, as described in the *LibraryStation Configuration Guide*. As your system requirements change, you may need to make existing drives unavailable for network mounts and dismounts.

Tape cartridge drives are made available to LibraryStation through the HSC LIBGEN. You must modify one or more macros in the LIBGEN to make existing tape cartridge drives unavailable to LibraryStation.

Specifically, you need to modify the SLIDLIST macro for the drive panel containing the tape cartridge drives you want to make unavailable to LibraryStation.

For example, suppose the HSC LIBGEN contains the following macros:

```
        SLILIBRY HOSTID=(HSC1,LSID)
PANEL2  SLIDLIST HOSTDRV=(DRV1,DRV1)
```

This macro indicates that the drive panel is available to both hostids in the SLILIBRY macro. To make the drive panel represented as PANEL2 unavailable to LibraryStation, replace the operand in the same position as the hostid LSID in the SLILIBRY macro with a dummy operand, such as DUMMY1. For example:

```
PANEL2  SLIDLIST HOSTDRV=(DRV1,DUMMY1)
```

Then add a new SLIDRIVS macro for the dummy operand, with no device numbers assigned. For example:

```
DUMMY1  SLIDRIVS ADDRESS=(,,,)
```

The drive panel is now available only to the hostid that occupies the first position in the SLILIBRY HOSTDRV parameter.

When you have finished modifying HSC LIBGEN macros, you may need to reconfigure the LIBGEN:

- If your changes only involved changing device numbers in SLIDRIVS macros, you can use the Set utility (SLIDRIVS option) to implement the changes.
- If the changes involved more than simply changing device numbers, you must reconfigure the LIBGEN using the MVS Start command with the Reconfig parameter in the PROC.

Refer to the *Host Software Component System Programmer's Guide* for detailed information about individual HSC macros, the Set utility, and the reconfiguration process.

Note: Some versions of the *Host Software Component System Programmer's Guide* state that library station device numbers can be set using the HSC Set Utility with the SLISTATN option. This is a generic reference to LMU station device numbers and is ***not*** a reference to the LibraryStation product described here. LibraryStation device numbers ***cannot*** be set using the SLISTATN option of the HSC Set utility.

Modifying LibraryStation Operating Characteristics

LibraryStation operating characteristics can be modified in several ways:

- Any LSINIT parameter can be changed by updating the LSINIT statements and then restarting the HSC.

  Refer to the *LibraryStation Configuration Guide* for information about changing LSINIT parameters.

- Several LSINIT parameters (such as LSDEF) can be temporarily changed with the Set command but the changes are not effective until LibraryStation is stopped and re-initialized. These changes remain in effect until the HSC is restarted.
- Other LSINIT parameters (REQTIME, RETTIME, RETCOUNT) can be temporarily changed with the Set command and the changes are effective immediately. These changes remain in effect until the HSC is restarted.
- The Persistent Data File (PDF) can be modified at any time, but these changes are not effective until LibraryStation is stopped and re-initialized.
- Refer to the *LibraryStation Configuration Guide* for information about changing the PDF file.
- The LSDEF parameter file can be modified at any time, but these changes are not effective until LibraryStation is stopped and re-initialized.

  Refer to the *LibraryStation Configuration Guide* for information about changing the LSDEF files.

LibraryStation Diagnostic Tools

Several diagnostic tools are included with or are available to LibraryStation, including the following:

- Logging of high-level events to the MVS SYSLOG file
- Tracing of detailed system-level information through the MVS Generalized Trace Facility (GTF)
- LibraryStation system analysis independent of network or client activity through the SLGDIAG installation verification program
- Network and client system analysis through diagnostic tools supplied by the TCP/IP communications product and network client systems

Each tool is described in this section.

Note: Virtual Storage Manager (VSM) support has been added for certain LibraryStation diagnostic tools. Refer to your VTCS publications for more information.

Logging

Logging is the recording of high-level information and is meant for customer information and initial debugging. Activities that are logged during LibraryStation operation provide an audit trail of information that is useful in determining the state of LibraryStation during problem occurrences.

Information about LibraryStation initialization, termination, error conditions, and state changes is logged continuously in the MVS SYSLOG file. The message prefix `SLS3` identifies LibraryStation events in the file, as shown in the figure below.

Note: The HSC also outputs messages for LibraryStation events. These messages appear with LibraryStation messages in the SYSLOG file.

```
08.14.55 STC 2998  >SLS0000I  LS D S
08.14.57 STC 2998  >SLS3416I  Server is RUN
08.14.57 STC 2998  >SLS3417I  Mount(00/00) Dismount(00/00) Enter(00/00) Eject(00/00)
08.15.02 STC 2998  >SLS0000I  LS D DR(A30)
08.15.03 STC 2998  >SLS3467I  Drive(A30)(00:00:00)(00:00:09:00) Type 4480 ONLINE, avail
08.15.33 STC 2998  >SLS0000I  LS D R
08.15.34 STC 2998  >SLS3418I  Request 00003: command QUERY status PENDING
08.15.44 STC 2998  >SLS0000I  LS I
08.15.44 STC 2998  >SLS3919I  LS is now IDLE
08.15.44 STC 2998  >SLS3404I  IDLE command successfully executed
08.15.54 STC 2998  >SLS0000I  LS S
08.15.54 STC 2998  >SLS3919I  LS is now running
08.15.54 STC 2998  >SLS3404I  START command successfully executed
```

Figure 2. Sample SYSLOG Output

Tracing

LibraryStation generates trace information that can be recorded in the MVS Generalized Trace Facility (GTF) along with HSC trace information.

Detailed system-level information is traced, including startup and termination data, network client requests and responses, error conditions, state changes, and operator command requests.

Note: Normally, you will only activate tracing when requested to do so by StorageTek support personnel. Current HSC procedures for collecting GTF trace information and forwarding it to StorageTek Central Support are also applicable for LibraryStation.

LibraryStation tracing is dynamically invoked with the LS Trace command. However, since tracing requires the GTF software and also relies on HSC tracing facilities, the following procedures must be performed before LibraryStation tracing can work properly:

1. GTF must be started to create GTF output for events.

   Refer to the *Host Software Component System Programmer's Guide* for more information about using GTF.

2. The HSC Trace command must be run with the component name `LS` (such as `TRACE LS`) to make tracing available to LibraryStation.

   Refer to the *Host Software Component System Programmer's Guide* for more information about the HSC Trace command.

When GTF is started and the TRACE LS command has been issued, the LibraryStation Trace command can be run. The trace records for LibraryStation are user GTF records. An eventid is assigned to the HSC, and the HSC assigns an internal subtype designation. Specific subtypes are assigned for use by LibraryStation.

For MVS/ESA, trace information collected with GTF is extracted and printed using the IBM IPCS utility with the GTFTRACE subcommand. For MVS/XA, the AMDPRDMP utility serves this purpose.

Refer to "TRACE Command" on page 32 for information about the specifics of running the LibraryStation Trace command.

SLGDIAG Installation Verification Program

Note: Virtual Storage Manager (VSM) support has been added for the SLGDIAG installation verification program. Refer to your VTCS publications for more information.

The SLGDIAG installation verification program verifies basic LibraryStation operation independent of network or client activity. SLGDIAG generates basic query, mount, and dismount requests to LibraryStation.

The LibraryStation requests are generated by a program executable as a batch job on the MVS server processor and passed to LibraryStation.

Note: Though SLGDIAG is specified for use as a batch program invoked through JCL, you could choose to make SLGDIAG available as a started task or as a TSO-startable program.

SLGDIAG requires the use of an available tape drive and tape cartridge and must be executed on the same MVS host system where LibraryStation is initialized. You may choose to dedicate a tape cartridge to this purpose to make SLGDIAG a readily-available operator tool.

SLGDIAG exercises LibraryStation using the following interfaces

- ONC/RPC interface through TCP/IP
- SNA LU6.2 interface using APPC/MVS
- TCP/IP (CSCI)
- XCF

For this reason, TCP/IP, APPC/MVS, or XCF (depending on which interface is used) must be operational, though it need not be in actual contact with an external network.

Note: The following example displays the basic format of the code needed to perform this procedure. For best results, use the sample JCL contained in the data set defined by the SLCSAMP SMP/E DDDEF, member name SLGDJCL

```
//SLGDIAG JOB ( installation options )
//*
//**  THIS JOB RUNS LIBRARYSTATION DIAGNOSTICS PGM
//**                  ------ SLGDIAG ------
//RUNDIAG  EXEC PGM=SLGDIAG ,
//    PARM='diag_keywords'
//STEPLIB  DD  DISP=SHR,DSN=high_level_index.SLCLINK
//         DD  DISP=SHR,DSN=high_level_index.SACLINK
//         DD  DISP=SHR,DSN=high_level_index.CSLLINK
//SYSPRINT DD  SYSOUT=A
//SYSIN    DD  diag_keywords_file
=COMMTYPE=RPC|LU6|XCF|TCPIP
=DRIVE=drv
=VOLUME=vol
/*
```

Figure 3. JCL for SLGDIAG Installation Verification Program

Notes:

- Add the following DD statement if SNA LU6.2 is a supported client through APPC/MVS:

  ```
  DD   DSN=SYS1.CSSLIB,DISP=SHR
  ```

  SYS1.CSSLIB must be an authorized data file.

- Add the following DD statement if CA Unicenter TCPaccess TCP/IP products are used:

  ```
  DD   DSN=IOS.TCPLINK,DISP=SHR
  ```

  The TCPLINK data set must precede the SACLINK data set.

- Add the following DD statement if IBM TCP/IP is used to support ONC/RPC clients:

  ```
  //SYSTCPD DD   DSN=ddd.eee.fff(anyname)
  ```

The SLGDIAG *diag_keywords* may be specified in either the EXEC PARM statement or they may be provided in a file.

- If *diag_keywords* are specified in the EXEC PARM statement, the SYSIN DD statement in the JCL example is not required.
- If the *diag_keywords* are specified in the EXEC PARM statement, the keywords are separated by blanks.
- If the *diag_keywords* are provided in a file (or in the JCL input stream), each keyword must be specified on a separate line, beginning in column-1.
- All *diag_keywords* must be immediately preceded and followed by an equal sign (=). Lines that do not begin with equal will be ignored.
- The value to be assigned to the keyword is provided immediately to the right of the keyword's trailing equal sign.
- The SLGDIAG keyword parameters can be specified in any order.
- Keywords may not contain imbedded blanks.
- If any of the keywords are specified more than once, the last specification is the one that is used.
- Sequence numbers in a keyword file are not allowed. SLGDIAG will not accept these lines.
- If you misspell a keyword, the keyword's default is assumed.

SLGDIAG Supported Keywords

The following keywords are supported by SLGDIAG:

=VOLUME=*vol*
Specifies the volume to be mounted and dismounted. This keyword is required (except with VSM). There is no default.

=DRIVE=*drv*
Specifies the drive on which the volume is mounted. The drive is specified in the format *aa*,*ll*,*pp*,*d*, where *aa* is the ACS number, *ll* is the LSM number, *pp* is the panel number, and *d* is the relative drive number on the panel. This keyword is required. There is no default.

=COMMTYPE=*RPC|LU6|XCF|TCPIP*
Specifies which communication method(s) to use to communicate with LibraryStation. This keyword is optional. The default is *RPC*.

- If *RPC* is specified, SLGDIAG uses TCP/IP communications to send messages to LibraryStation.
- If *LU6* is specified, SLGDIAG uses APPC/MVS to send messages to LibraryStation.
- If *XCF* is specified, SLGDIAG uses XCF to send messages to LibraryStation. With XCF, SLGDIAG must be run out of an APF-authorized library.
- If *TCPIP* is specified, SLGDIAG uses TCP/IP (CSCI) communications to send messages to LibraryStation.

=TCPIPTEST=*YES|NO*
This keyword enables you to test your LibraryStation TCP/IP configuration. Unlike other SLGDIAG keywords, this keyword can be included in an SLGDIAG job submitted prior to starting LibraryStation. This keyword is optional. The default is NO.

- If *YES* is specified, SLGDIAG tests your LibraryStation TCP/IP configuration.
- If *NO* is specified, this test is disabled.

=TCPNAME=*comm_service_name*
Specifies the TCP/IP communications service. The keyword specified must match the TCPNAME parameter specification on the LSINIT statement. This keyword is optional and is used only when =COMMTYPE=*RPC or TCPIP*.

=TCPPORT=*TCP_port*
Specifies a TCP port used for TCP/IP communications. This keyword is optional and is used only when =COMMTYPE=*RPC* or *TCPIP*.

The value for TCPPORT must be between 1 and 65535. If the value specified is outside this range, TCPPORT takes the default value of 60001.

=SYMDESTN=*sym_dest_name*

Specifies the symbolic destination name that represents the transaction program and local logical unit that LibraryStation uses to register with APPC/MVS. The symbolic designation name must be the name of an entry in the active APPC/MVS side information file that represents LibraryStation. Refer to the *LibraryStation Configuration Guide* for information about how the side information entry is built. This keyword is optional and is used only if =COMMTYPE=*LU6*. The default is LIBSTAT.

=XCFGROUP=*xcf_group_name*

Specifies the name of the LibraryStation XCF group that is used by LibraryStation to register with XCF. This parameter is used only if =COMMTYPE=*XCF*. The default is SLGSTATN.

=XCFMEMBER=*xcf_member_name*

Specifies the name of the LibraryStation XCF member that SLGDIAG is to communicate with. This parameter is only used if =COMMTYPE=*XCF*.

The volume and transport information supplied to SLGDIAG are turned into valid LibraryStation ONC/RPC, SNA LU6.2, or XCF requests. These requests are forwarded to LibraryStation and the responses from LibraryStation to these requests are recorded.

A return code of 00, 04, 08, or 12 is returned by the SLGDIAG job step, indicating:

- (RC=00) The test completed successfully.
- (RC=04) The test failed because of a parameter error or request failure.
- (RC=08) The test failed because of a LibraryStation or HSC software error, an abend, or process failure.
- (RC=12) The test failed because of a network communication error.

Additional information about test failure is logged on the SYSPRINT data set. If SLGDIAG fails, refer to the SYSPRINT data set for messages that will help you determine the reason for the failure. Then correct the problem and run SLGDIAG again.

Network Diagnostic Tools

The TCP/IP communication product and the client processor(s) together contain tools to validate access to LibraryStation. While not strictly part of the LibraryStation product, these tools are necessary to diagnose the total library environment.

For example, network-attached clients should be able to use PING and RPCINFO to verify communications over the LAN through the CPA to the TCP/IP communication product.

- A PING command executed as

  ```
  PING host
  ```

  (where host is the name or Internet address of the MVS processor where LibraryStation will execute) should receive a response such as ‘‘host is active.’’

- An RPCINFO command executed as

  ```
  RPCINFO -P host
  ```

  (where host is the name or Internet address of the MVS processor where LibraryStation will execute) should receive two or more responses indicating RPC program numbers, versions, protocols, and port numbers for registered RPC programs. When LibraryStation is active, its program number (300031) will be displayed.

If APPC/MVS is used, the MVS DISPLAY APPC and DISPLAY NET commands can be used as an aid in problem determination. APPC/MVS and VTAM console messages can contain vital information necessary to identify and correct problems. It is also possible to run VTAM traces and format them using IPCS. If XCF is used, the MVS Display XCF command can be used as an aid in problem determination.

LibraryStation Failure Recovery

In a failure situation, The primary responsibility of LibraryStation is to maintain the consistency of internal data so that it can be retrieved during failure recovery.

After a system failure, LibraryStation software is automatically reinstated after HSC recovery has completed. The LibraryStation software performs self-recovery procedures to return LibraryStation to an operable state.

Operator intervention is required in a failure situation only if LibraryStation or component software fails during recovery processing, or if an ACS library component must be placed offline due to a hardware failure.

If an unrecoverable failure of the LibraryStation software occurs, issue the LS STOP operator command, followed by the LS INIT operator command. If this does not correct the problem, the HSC can be terminated to Base Service Level and then brought up to Full Service Level.

Note: In a parallel sysplex environment, STOP FORCE must be used instead of STOP if you wish to stop a server and redirect its work to a standby server.

Persistent Data File (PDF) Failure Recovery

The following does not apply to sysplex installations servicing only MVS/CSC clients using XCF or LU6.2. The PDF is disabled for these installations.

After an HSC failure, the PDF alternate index may lose synchronization with its base cluster if an I/O between the two was in progress when the abend occurred.

LibraryStation notifies you of this condition by generating error message SLS3300I during initialization. This message indicates that PDF indexes cannot be accessed or have become unsynchronized. Refer to the *LibraryStation Messages and Codes Guide* for detailed information regarding this message. LibraryStation cannot be successfully initialized until the condition is corrected.

Perform the following steps to recover from a PDF software error:

Note: The PDF must not be currently allocated to the HSC address space. Consequently, you must terminate the HSC to Base Service Level before performing this procedure.

1. Rebuild the PDF indexes.

   The JCL in Figure 4 on page 57 can be used to rebuild PDF indexes. This JCL is a ***representation*** of the code you will need to perform this procedure. It may not be the most accurate or most recent representation available. For best results, refer to the sample JCL contained in the data set defined by the SLCSAMP SMP/E DDDEF. The member name is SLGDBNX.

2. Initialize the HSC and LibraryStation.

   - If initialization is successful, continue with your normal operation.
   - If LibraryStation cannot be initialized because the PDF problem has not been corrected, continue with the next step.

3. If rebuilding the PDF indexes did not correct the problem, you will need to redefine the PDF as you did during LibraryStation installation. Refer to the *NCS Installation Guide* for information on defining the PDF data sets. Note that the server's lock information is lost when you rebuild the PDF.

   The JCL in Figure 5 on page 58 can be used to redefine the PDF. This JCL is a ***representation*** of the code needed to perform this procedure. It may not be the most accurate or most recent representation available.

   If you must redefine the PDF, be sure to set site-specific variables (such as NAME, VOLUMES, and RECORDS variables) to their previous values. Refer to the *NCS Installation Guide* for site-specific information you may need for this step.

4. After you have redefined the PDF, initialize the HSC and LibraryStation.
    - If initialization is successful, continue with your normal operation
    - If LibraryStation cannot be initialized because the PDF problem has not been corrected, continue with the next step
5. If reallocating the PDF does not correct the problem, you likely have a hardware problem in the device where the PDF is physically located. In this case, you must reallocate the PDF on a different volume. Be sure to set site-specific variables the same as they were previously, except for the VOLUME field. Enter the volser for the new DASD volume where the PDF is to be allocated in the VOLUME field.

```
//SLGDBNX JOB job card info
//*
//* NOTE: IDCAMS BLDINDEX will attempt to do an internal sort.
//*       If there is insufficient virtual storage it may be
//*       necessary to add IDCUTx DD statements.  See IBM
//*       Access Method Services manual for more details.
//*
//BLDNDX   EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT= *
//SYSIN    DD *
   DELETE (alternate_index_name) AIX
   DEFINE ALTERNATEINDEX (                                    _
       NAME(alternate_index_name)                             _
       RELATE(cluster_name)                                   _
       KEYS(10 2)                                             _
       RECORDS(2000,4000)                                     _
       RECORDSIZE(27 27)                                      _
       VOLUMES(volser)                                        _
       UNIQUEKEY                                              _
       UNIQUE                                                 _
       UPGRADE )
   DEFINE PATH (                                              _
       NAME(path_name)                                        _
       PATHENTRY(alternate_index_name))
   BLDINDEX                                                   _
       INDATASET(cluster_name)                                _
       OUTDATASET(alternate_index_name)
   LISTCAT ENTRIES(                                           _
       cluster_name                                           _
       alternate_index_name                                   _
       path_name) ALL
//*
```

Figure 4. JCL for Rebuilding PDF Indexes

```
//SLGDBCR JOB job card info
//*
//* NOTE: A minimum of 1 Meg of virtual storage is needed
//* for this job, i.e., use REGION=1M on the job card
//*
//CREATEDB EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//INPUT    DD *
000000000000 DB INITIALIZATION RECORD
//SYSIN    DD *
 DELETE (cluster_name) CLUSTER
 DEFINE CLUSTER (                                  _
  NAME(cluster_name)                               _
  VOLUMES(volser)                                  _
  RECORDS(2000,4000)                               _
  RECORDSIZE(30 100)                               _
  KEYS(12 0)                                       _
  UNIQUE )
REPRO INFILE(INPUT)                                _
     OUTDATASET(cluster_name)
DEFINE ALTERNATEINDEX (                            _
  NAME(alternate_index_name)                       _
  RELATE(cluster_name)                             _
  KEYS(10 2) _
  RECORDS(2000,4000)                               _
  RECORDSIZE(27 27)                                _
  VOLUMES(volser)                                  _
  UNIQUEKEY                                        _
  UNIQUE                                           _
  UPGRADE )
DEFINE PATH (                                      _
  NAME(path_name)                                  _
  PATHENTRY(alternate_index_name) )
BLDINDEX                                           _
  INDATASET(cluster_name)                          _
  OUTDATASET(alternate_index_name)
LISTCAT ENTRIES (                                  _
  cluster_name                                     _
  alternate_index_name                             _
  path_name) ALL
```

Figure 5. JCL for Redefining the PDF

Dynamic Server Switching

LibraryStation 6.1 supports dynamic server switching for environments containing multiple LibraryStation servers, using a COMMTYPE of XCF or LU6.2.

Dynamic server switching allows an MVS/CSC client to dynamically switch connection to an alternate LCS (Library Control System) when it detects that the current LCS is unavailable.

Dynamic server switching is initiated and controlled by the client system. Dynamic server switching is configured for each MVS/CSC client using the MVS/CSC SRVRLIST startup parameter. Refer to the *MVS/CSC Configuration Guide* for more information on dynamic server switching and the SRVRLIST startup parameter.

Cross Host Recovery

Cross host recovery provides a standby server for open system clients, eliminating the need to manually start another LibraryStation when the active LibraryStation is terminated.

With cross host recovery enabled, at termination, the active LibraryStation notifies the standby LibraryStation(s). The first standby LibraryStation to receive the request becomes the active LibraryStation for open system clients. Refer to the *LibraryStation Configuration Guide* for more information about cross host recovery and the XHREC LSINIT parameter.

Appendix A. Gathering Diagnostic Materials

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.

LibraryStation Diagnostic Materials

The following LibraryStation diagnostic materials might be requested by Software Support:

- Details of circumstances
- GTF Trace data set
- MVS SYSLOG
- LAN packet trace
- Dump data set
- Startup parameters defined (including LSINIT and LSDEF control statements)
- HSC LIBGEN
- Copy of HSC Control Data Set (CDS)
- Copy of LibraryStation Persistent Data File (PDF)

Tape Format

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

If Software Support requests a tape of your SYSMDUMP or SYS1.DUMP, dump using IEBGENER or IPCS DCB=(RECFM=FB,LRECL=4160,BLKSIZE=4160). Failure to follow this requirement may delay problem resolution.

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 tape files, file names and attributes, etc.)

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

Glossary

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

A

ABEND— Abnormal end of task.

ACS— Automated Cartridge System.

ACSLS— Automated Cartridge System Library Server.

ACSLS ONC RPC protocol— A request processing protocol that defines valid requests from network client systems, corresponding to an application layer of the ISO OSI reference model.

ACS Library— A library is composed of one or more Automated Cartridge Systems, attached tape cartridge drives, and cartridges residing in the ACSs.

Advanced Program to Program Communication (APPC)— A set of inter-program communication services that support cooperative transaction processing in a SNA network. APPC is the implementation, on a given system, of SNA's logical unit type 6.2.

APPC/MVS— The implementation of SNA's 6.2 and related communication services in the MVS base control program.

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

Automated Cartridge System Library Server — Unix®-based software that interprets library commands from client applications or library operators and routes them to the appropriate LMU.

C

CAP— Cartridge Access Port. Also, the LibraryStation CAP Request Processor component.

cartridge tape control unit— A microprocessor-based unit logically situated between a channel and up to 16 cartridge transports that translates channel commands into transport commands and sends transport status to the channel.

CDS— Control Data Set.

CETI— Continuously Executing Transport Interface.

CL— LibraryStation Common Library component.

client system— See network client system.

Client System Component (CSC)— Software that provides an interface between the client computing system's operating system and the StorageTek library software, such as LibraryStation and the HSC.

Client System Interface (CSI)— The component of the LibraryStation subsystem that provides the RPC server interface to network clients.

client system user— A person who executes applications on a client system.

Continuously Executing Transport Interface (CETI)— An IBM communications channel protocol.

Control Data Set (CDS)— The data set used by the HSC software to control the functions of the ACS.

Control Path Adaptor (CPA)— A hardware component required by LibraryStation that converts an Ethernet communications packet to an IBM-compatible communications packet.

CPA— Control Path Adaptor.

CSC— Client System Component.

CSE— Customer Service Engineer.

CSCI— Client System Communications Interface

CSI— Client System Interface.

CSR— Customer Service Representative.

CSS— Central Software Support.

CSSC— Customer Service Support Center.

D

Database Manager (DBM)— A LibraryStation software component that is responsible for managing pertinent data objects that are not controlled by the HSC, including resource locks and drive status.

DASD— Direct Access Storage Device.

DB— LibraryStation Persistent Data File Manager component.

DBM— Database Manager.

Direct Access Storage Device (DASD)— A device in which access time is effectively independent of the location of the data.

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

E

EC— Error Codes.

ENQ— Enquiry character.

ERP— European Support Center.

F

FIPS— Federal Information Processing Standard.

G

Generalized Trace Facility (GTF)— A program that records significant system events for use in problem determination.

GRS— Global Resource Serialization.

GTF— Generalized Trace Facility.

H

heterogeneous— Of a dissimilar type or nature.

homogeneous— Of the same or similar type or nature.

Host Software Component— The StorageTek software that provides client volume location information through its Control Data Set (CDS) and provides the interface to the Nearline ACS hardware and client operator console.

HSC— Host Software Component.

host system— A computer that controls the access method for a network and provides services to client systems, such as an MVS host system that provides ACS library services to heterogeneous client systems such as a StorageTek NearNet System.

I

IBM— International Business Machines Corporation.

id— Identifier or identification.

IF— LibraryStation Information Manager component.

IPC— Interprocess Communication.

IPCS— Interactive Problem Control System.

ISO— International Standards Organization.

IT— LibraryStation Initialization/Termination component

I/O— Input/output.

J

JCL— Job Control Language.

Job Control Language— A control language used to identify a job to an operating system and to describe the job's requirements.

K

KSDS— Keyed Sequential Data Set.

L

LAN— Local Area Network.

LCF— Library Communication Facility.

LCU— Library Control Unit.

Library Communication Facility— Software required by LibraryStation that directs a communications packet to LibraryStation and provides the additional communications information that is required for the message to be accepted by LibraryStation.

Library Control Unit— The portion of an LSM that controls the LSM's robotic movements.

library drive— A cartridge transport attached to an LSM that is connected to and controlled by a client system.

Library Management Unit (LMU)— The portion of the Automated Cartridge System (ACS) that coordinates LSM communication and communicates with the HSC.

LibraryStation— Software that allows MVS hosts to share Automated Cartridge System facilities with heterogeneous network client systems.

Library Storage Module (LSM)— The portion of the Automated Cartridge System (ACS) that selects, mounts, dismounts, and stores tape cartridges.

LM— LibraryStation Library Manager component.

LO— LibraryStation Lock Manager component.

Local Area Network (LAN)— A data network located on the user's premises that uses serial transmission for direct communication among data stations.

LMU— Library Management Unit.

LP— Logical Port.

LS— LibraryStation.

LSM— Library Storage Module.

LU6.2— Logical Unit 6.2.

M

MT— LibraryStation Mount Request Processor component.

MVS— Multiple Virtual Storage.

MVS/HSC— The MVS version of StorageTek Host Software Component software.

N

network client system— A computer that is connected to a host system in a network, such as a a StorageTek NearNet system that communicates through an Ethernet network with an MVS host system.

network interface adaptor— Equipment that provides an electrical and logical interface between a network and specific equipment attached to the network.

O

ONC— Open Network Computing.

OS— LibraryStation Operating System Interface component.

OSI— Open Systems Interconnection.

P

PCR— Product Change Request

Persistent Data File (PDF)— One or more VSAM data files that contain data objects including resource locks and drive status that are managed by the LibraryStation DBM.

PDF— Persistent Data File.

PN— Part Number.

pool— A collection of tape cartridges having one or more similar features or attributes, such as a pool of scratch tapes.

Program Change Request (PCR)— A request for enhancement of a software program.

Program Temporary Fix (PTF)— A software program designed to remedy one or a series of defects in an existing software program.

Program Update Tape (PUT)— One or more tapes containing updates to a software program.

PTF— Program Temporary Fix.

PUT— Program Update Tape.

Q

QU— LibraryStation Query Request Processor component.

R

RACF— Resource Access Control Facility.

Resource Access Control Facility (RACF)— An IBM-licensed program that provides access control by identifying and verifying the users to the system.

RPC— Remote Procedure Call.

S

SA— LibraryStation System Administrator component.

SAF— System Authorization Facility.

SCR— LibraryStation Scratch Request Processor component.

scratch— An attribute of a tape cartridge that indicates it is blank or contains no useful data.

SCSI— Small Computer System Interface.

SL8500— See StreamLine (SL8500).

SMC— Storage Management Component

SMP/E— System Modification Program Extended.

SSR— Software Support Representative.

STK— StorageTek Stock Market symbol.

StorageTek— Storage Technology Corporation.

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.

StreamLine (SL8500)— A modular library scalable from 1,500 to over 200,000 cartridges in mainframe, Windows, UNIX, and supercomputer environments. The SL8500 utilizes hot swap components and multiple robots.

System Authorization Facility (SAF)— A security program (such as RACF) that provides access control by verifying users who attempt to access the system.

System Modification Program Extended(SMP/E) — An IBM-licensed program used to install software programs.

T

tape cartridge drive— A device containing cartridge transports and their associated power and pneumatic supplies.

TCU— Tape Control Unit.

Tape Management System (TMS)— A program that manages a tape library (such as CA-1), also called a tape library management system (TLMS).

TCP/IP (Transmission Control Protocol/Internet Protocol)— A family of protocols that provides communication between two computer systems.

TMS— Tape Management System.

V

VA— LibraryStation Vary Request Processor component.

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).

volume identifier— A six-character string that uniquely identifies a tape cartridge to the database. The tape cartridge must have a matching external label unless a virtual label has been assigned.

volume— A tape cartridge or DASD drive.

volume serial number (volser)— A six-character alphanumeric label used to identify a tape volume.

Virtual Storage Access Method (VSAM)— An access method for indexed or sequential processing of fixed and variable length records on direct access devices.

VSAM— Virtual Storage Access Method.

VTAM— Virtual Telecommunications Access Method.

XCF— The MVS cross-system coupling facility, which allows MVS images connected to a sysplex to communicate with each other.

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