STORAGETEK ™

StorageTek Library Manager

Overview

Version 2.0

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This edition applies to Library Manager, version 2.0. Information in this publication is subject to change. Comments concerning the contents of this manual should be directed to:

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Preface

This book provides an overview of StorageTek's Library Manager, version 2.0, a library-control software product for the L Series and 97*xx* SCSI-automated tape libraries. This book is intended for system administrators who need to install and configure the Library Manager in an open systems environment.

Related Publications

For more information about the Library Manager and related products, refer to these publications:

- *Introducing the Library Manager* - provides high-level Marketing information about Library Manager.

- *Library Manager Installation Guide* - provides instructions for installing Library Manager 2.0 on computer systems running Windows NT 4.0 and Windows 2000.

- *Library Manager Diagnostic Interface Guide* - provides instructions for using the LMDI diagnostic tool, which allows you to diagnose problems with SCSI connections and library hardware. It also provides instructions for verifying that your libraries and drives are correctly attached to the server before you install Library Manager.

- *ACSLS System Administrators Guide* - a complete system administration guide for ACSLS.

Web Site Addresses

For information about the Library Manager and supported StorageTek SCSI libraries, go to the following web pages:

- L180 Tape Library:
  http://www.stortek.com/products/tape/L180/

- L700 Tape Library:
  http://www.stortek.com/products/tape/L700/

- Timberwolf (97*xx*) Tape Libraries:
  http://www.stortek.com/products/tape/97*xx*/
  (*xx* can be 10, 14, 30, 38, or 40)

For more information about backup applications and other software available from StorageTek business partners, go to the following web sites:

- VERITAS Software, Inc.
  http://www.veritas.com/us/

- Legato Systems, Inc.
  http://www.legato.com

- Computer Associates International
  http://www.cai.com/arcserveit

- Hewlett-Packard Company
  http://www.openview.hp.com/products/omnibackmixed

- Silicon Graphics, Inc.
  http://www.sgi.com

Overview

This chapter provides an overview of version 2.0 of the Library Manager. The Library Manager server runs under Windows NT and Windows 2000.

The following information is provided:

- "What is the Library Manager?"
- "What does the Library Manager Server Support?"
- "Using the Library Manager in a Distributed Tape Automation System"
- "Sharing Devices Between Backup Applications"

What is the Library Manager?

The Library Manager is a software program that provides intelligent library control for StorageTek SCSI tape libraries, including the Timberwolf (97*xx*) libraries and the L Series libraries. The Library Manager's management and control features include the ability to bring SCSI libraries online and offline, and the ability to do tape operations, such as enter, eject, mount, dismount, or query tape cartridges.

Functions   The Library Manager is designed to function with multiple *heterogeneous* client applications. Backup applications such as NetBackup, ARCserve*IT*, NetWorker, or OmniBack, can access the common library-control functions provided by the Library Manager. Other client applications to the Library Manager may supply advanced media-management services, such as Silicon Graphics' Tape Management Facility (TMF) or Data Management Facility (DMF). All of these applications can be distributed anywhere throughout the network.

To communicate with the Library Manager, an application must use the Automated Cartridge System Application Programming Interface (ACS API) for control of library functions. The ACS API is a widely accepted interface used by many popular backup applications, including legacy applications. The Library Manager uses a subset of the ACS API that provides exclusively for library control and leaves media management and data handling to the client application.

Figure 1 provides a detailed system-flow diagram of the Library Manager. The GUI and the ACS Adapter can run on remote machines; the Diagnostic Interface requires a web browser, and runs remotely as well. The GUI uses XML/HTTP protocols to communicate with the Web Server (one of the

components of the Library Manager); the backup applications and media managers use the ACS API over the ONC/RPC protocol to communicate with the ACS Adapter.

**Figure 1 System Flow Diagram of the Library Manager**

One or more StorageTek SCSI Tape Libraries
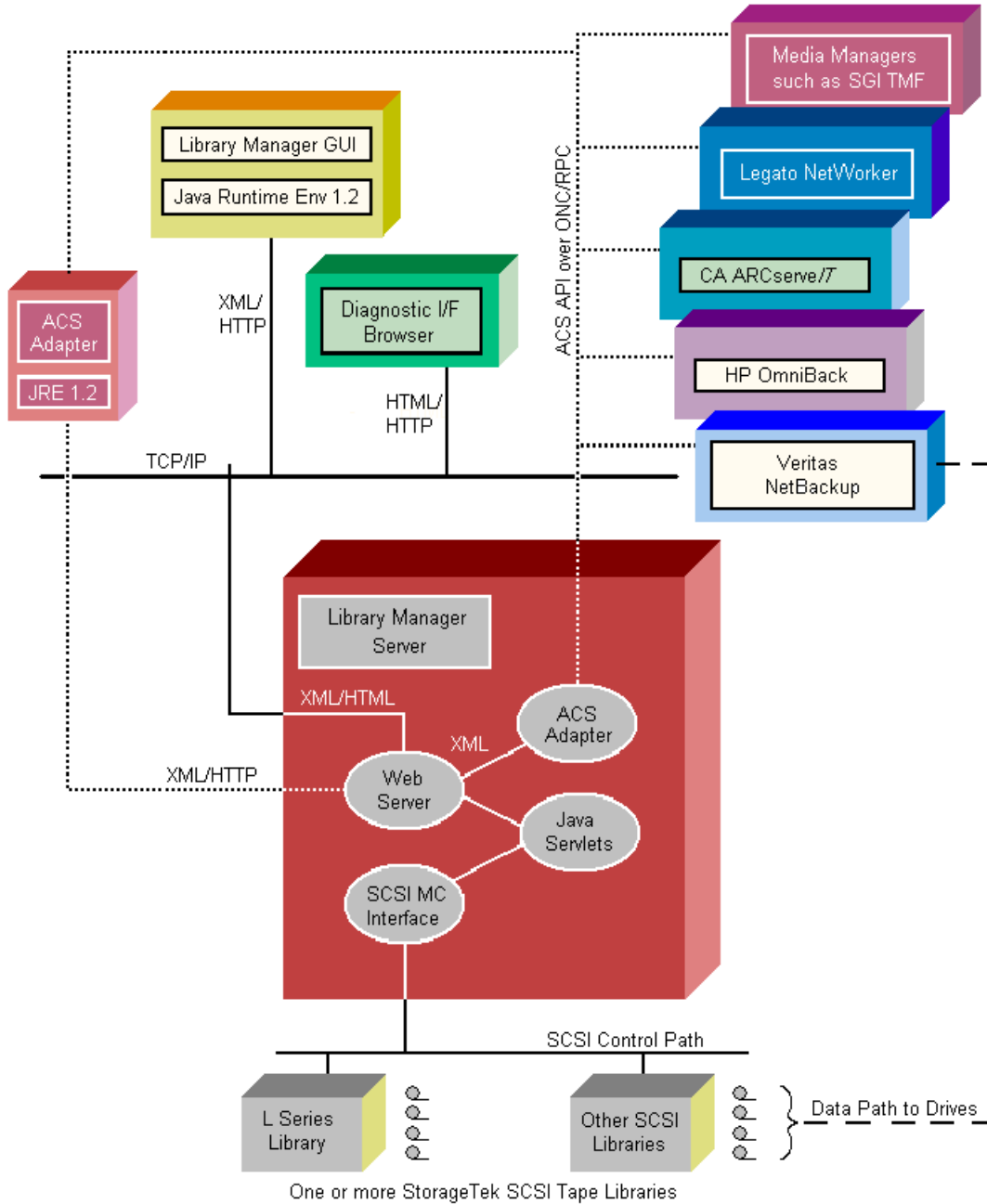
Features   The Library Manager provides the following features:

Extensibility   The Library Manager can be easily extended to support new library hardware devices or SAN hardware without impacting legacy ACS API applications. The Library Manager's GUI communicates over standard XML/HTTP protocols; the ACS Adapter component can be modified for new client applications. In addition, the Java servlets have a modular design and new servlets can be added to support future tape-library features.

Reliability   The Library Manager has been extensively tested and certified by StorageTek business partners for use with their backup applications.

Portability   With the exception of the SCSI Media Changer Interface, all the Library Manager code is written in Java and is portable across platforms.

Performance   The Library Manager's performance over the control path meets the requirements for StorageTek's SCSI tape libraries. The Library Manager handles physical library functions, such as the robotics control of tape cartridges.

Service   The Library Manager is fully supported by StorageTek service. Its Java-based, modular design allows fixes to be deployed over the Web. Furthermore, the Library Manager does not need to be restarted if fixes are applied to the GUI or to the ACS Adapter.

Online and offline states for the server and library devices allow you to coordinate hardware maintenance activities that availability and quality of service are not negatively impacted.

System Components

The Library Manager works through well-defined system components that interface with each other to provide library control, as shown in Figure 2.

Figure 2   Component Architecture
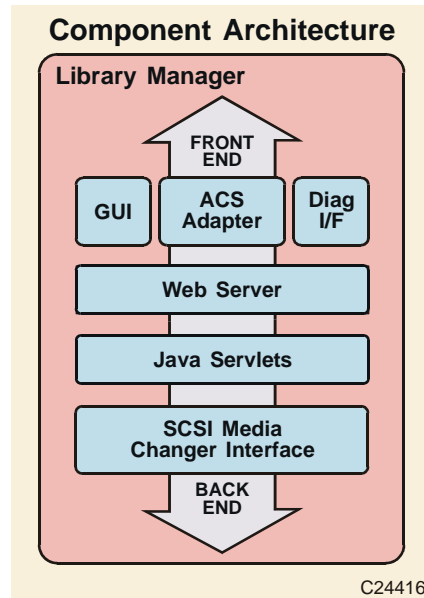
The Library Manager's system components are described in the following sections. (See Figure 1 on page vi for a detailed illustration of the system.)

Graphical User Interface (GUI)

The GUI is an administrative interface to the Library Manager that you can use to monitor and to manage all attached SCSI libraries. The GUI allows you to perform tape management functions such as entering, ejecting, mounting, dismounting, and querying tape cartridges in the library. The GUI also provides an *alias* feature, which allows you to customize a separate application view for each backup application's format (see "Sharing Devices Between Backup Applications" on page xii).

Using the GUI, you can administer the Library Manager locally or remotely from any workstation on the network. The remote version of the GUI runs as a Java application that can be installed on supported platforms using the Library Manager's Web Server. The platforms must have Java Runtime Environment 1.2.2 installed.

For security reasons, the Library Manager provides sequential access to the GUI allowing one session at a time to control Library Manager functions. When a users terminates a GUI session, another user can log in; however, each user must use the same password (initially defined as *admin* when the product is shipped).

ACS Adapter

The ACS Adapter provides a front-end interface to the Library Manager, controlling communication between ACS API client applications and the Library Manager Web Server using the ONC/RPC protocol. The ACS Adapter translates ACS requests generated by client applications into XML requests

that the Library Manager receives and executes. It also does reverse translation, converting XML responses into ACS responses when information is returned from the Library Manager to the client application.

The ACS Adapter is installed through the Library Manager's Web Server using a simple GUI installation procedure. You can install it on the Library Manager server or on a separate server if desired. Installing it on a separate server allows you to install multiple adapters for networking reasons or to support special device alias configurations (see "Sharing Devices Between Backup Applications" on page xii).

HTML Interface   The HTML Interface to the Library Manager allows you to administer the Library Manager remotely using low-bandwidth networks and runs through common Web browsers on virtually any platform.

Web Server   The Library Manager Web Server supplies communication services by directing the XML requests from clients (the GUI and the ACS Adapter) to the appropriate Java servlets. It also handles XML responses using HTTP communications protocols, and provides basic services to the Library Manager GUI and its online help system for delivering HTML content.

Java Servlets   Java Servlets are standard extensions to Java that execute commands to control specific library functions. Each servlet has a corresponding XML document for its requests and responses.

SCSI Media Changer Interface   The SCSI Media Changer Interface is a subsystem interface that maps from the Java Servlet API to SCSI library implementations. The SCSI Media Changer Interface takes the command structure generated by the Java servlets and modifies it into SCSI requests and responses for the different types and models of SCSI libraries.

What does the Library Manager Server Support?

Library Manager server, version 2.0 runs under Windows NT and Windows 2000. This section lists the hardware and software required on each platform for Library Manager to operate properly.

Windows Platform Requirements   Windows requires:

- Windows NT 4.0 (with the latest Service Pak) or Windows 2000
- Netscape Navigator 4.5 or higher, or Internet Explorer 5.0 or higher
- Java Runtime Environment (JRE) 1.2.2
- Pentium III
- 128 MB RAM
- 2GB available disk space
- Color, SVGA monitor, 1024 x 768

| | • SCSI adapter (the Library Manager product has been tested using Adaptec differential SCSI adapter cards) |

Automated Tape Libraries   The Library Manager supports any StorageTek SCSI tape library, including:

- Timberwolf libraries
- L Series libraries

Tape Drives   The Library Manager supports any tape drive that can be installed in a StorageTek SCSI tape library, including:

- DLT tape drives
- 9840 tape drives
- LTO tape drives (these drives do not support the mount read-only function)
- SDLT

New drives will be supported as they are released.

Internet Browsers   The Library Manager requires a web browser to access its online documentation and its diagnostic interface. It supports the following browsers:

- Netscape Navigator 4.5 or later with Java Plug-In 1.2
- Internet Explorer 5.0 or later with the latest Service Pak and Sun Java Plug-In 1.2

Backup Applications   The Library manager supports the following backup applications:

- VERITAS® NetBackup™ 3.2 and above
- Computer Associates ARCserve*IT*™ 6.6.1 and above
- Legato® NetWorker® 5.5.1 and above
- Hewlett-Packard OmniBack™ 3.1.5 and above
- Silicon Graphics Inc. OpenVault

Note: Windows-based Library Manager clients require LibAttach, an ACS API program that provides connectivity between the network client (SSI) and the server (CSI). Clients running Windows NT and Windows 2000 require LibAttach 1.1. LibAttach can be ordered when you order Library Manager.

Using the Library Manager in a Distributed Tape Automation System

In a distributed tape automation system, shown in Figure 3, more than one networked application can use the Library Manager to control a tape library. A single server controls the tape library, but multiple clients send and receive library-control requests and responses across the network.

In a distributed system, the Library Manager provides a real advantage by allowing the control path to be extended to the network using the de facto, industry-standard ACS API.

Figure 3   Distributed tape automation system
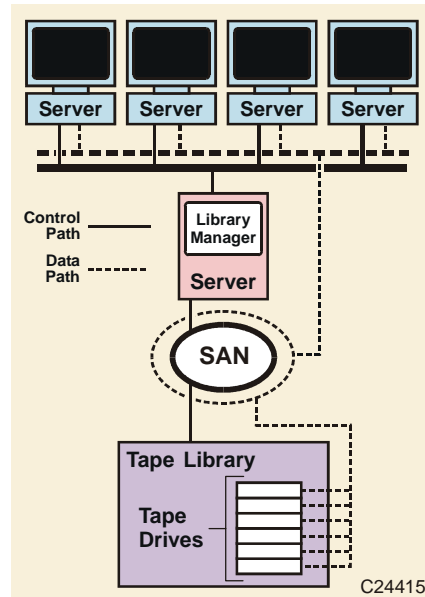
In a system using the Library Manager, client applications do business as usual when they read or write backup data over the data path. However, when these applications need library-control functions, they communicate with the Library Manager software, which resides on a server attached to the tape library. Advantages of this type of configuration include:

- **Library sharing** reduces the cost of capital equipment and administrative overhead.

- **Centralized management** makes it easier to synchronize backup activities across the network and to safeguard mission-critical data.

- **Scalable support** makes it possible to change or upgrade tape libraries without changing or reconfiguring each backup application.

- **Drive sharing** coordinates drive use by allowing participating applications to use drive-locking controls within the ACS API. Drive sharing is especially helpful in today's SAN environments where drives may be visible to multiple heterogeneous applications.

Following is a simplified scenario to illustrate how the control path and the data path work together in backup operations.

1. When the application starts a tape operation that requires reading or writing, the application sends an ACS API "tape mount" request to Library Manager over the network.

2. Library Manager instructs the library robot to move the tape cartridge from its storage location into the appropriate tape drive and notifies the application when the tape is ready to use.

3. The application uses the data path to read or write data and to unload the tape. When it is finished, the application sends a "tape dismount" request to the Library Manager.

4. The Library Manager instructs the library robot to dismount the tape and to move it back to its original storage location in the library.

Sharing Devices Between Backup Applications

The Library Manager allows several backup applications to share instances of the ACS Adapter with their associated devices (library, drives, and CAPs). It does so using *application views* and *device aliases*.

The Library Manager automatically creates a special "ACSLS" application view that is used by all ACS API applications. This view has a set of associated device aliases that conform to the device naming scheme used by the ACS API. These device aliases allow more than one application to sequentially access the same set of devices and provide a way to change or delete devices without making changes to the applications themselves.

Note: For additional control over resource conflicts, the ACS API device locking primitive should be used. Many supported ACS API applications use device locking as a means for reserving drives in a heterogeneous environment.

The device aliasing scheme provides an additional measure of device independence to ACS API client applications. For example, if you need to bring down a malfunctioning drive and redirect nightly backups, you simply change the "ACSLS" application view so that the drive alias maps to a new physical drive. When the malfunctioning drive comes back online, you re-assign the alias: all without a single change to any of the ACS API backup applications.

The Library Manager administrative GUI lets you create additional *application views* beyond the "default" view and the "ACSLS" application view. These views can be created to help administrators manage the diversity of device names that are introduced in an environment supporting heterogeneous client applications. When using each individual application's interface, device naming schemes will vary. The Library Manager addresses this confusion by creating a default name and supporting the definition of additional device alias names on an application by application basis.

For example, if an application view is defined for the VERITAS NetBackup application and you need to troubleshoot a drive availability problem reported by the NetBackup administrator, you can select the application view that shows all devices with NetBackup alias names. Since the Library Manager maps each NetBackup alias to a physical device, you can quickly determine the source of the drive availability problem.

As previously mentioned, each application is a network client to the Library Manager. When an application has been added to the Library Manager, that application has an *application view* into the Library Manager Administrative GUI. An application view shows all the physical devices known to the application using *device aliases*. Figure 4 shows the application view pull-down and the configuration tab for device aliases. Note that you can create aliases for libraries, drives, and CAPs.

Figure 4   Device Alias configuration tab
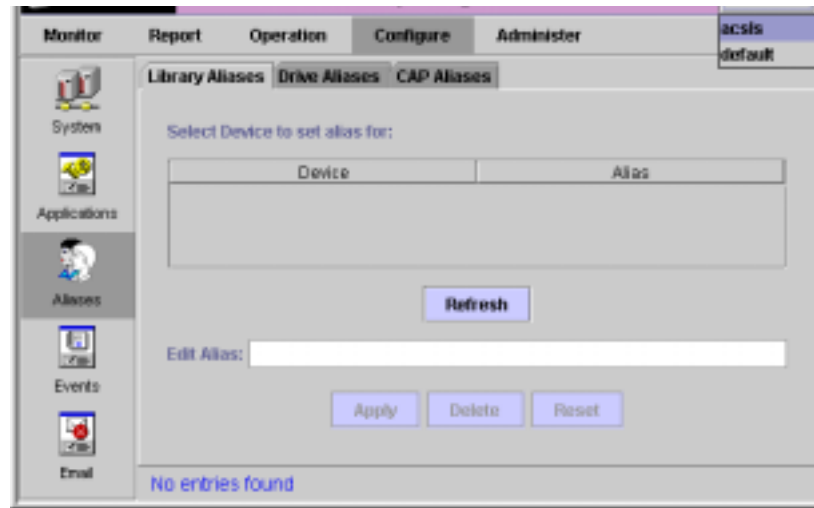
You can establish an application view and associated device aliases for each backup application connected to the Library Manager. Device aliases make it easier to deal with the various names used by the ACS API client applications and add additional control over mapping logical device names to physical devices. Device aliases provide a way to delete a device by removing the alias in the Library Manager instead of deleting the device at the application level.