StorageTek Linear Tape File System, Library Edition

Administration Guide

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StorageTek Linear Tape File System, Library Edition Administration Guide, Release 1.0

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Preface

This guide describes how to configure and manage Oracle's StorageTek Linear Tape File System, Library Edition (LTFS-LE) software.

Audience

This document is intended for LTFS-LE Administrators.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

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Related Publications

To access Oracle StorageTek LTFS-LE and related product publications, visit the Oracle Technical Network at

http://docs.oracle.com

Conventions

The following text conventions are used in this document:

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

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Introduction

This chapter introduces Oracle's StorageTek LTFS-LE software and describes the components included in a typical LTFS-LE configuration.

The following topics are included:

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LTFS-LE Overview

Oracle's StorageTek Linear Tape File System, Library Edition (LTFS-LE) software provides a file system interface for data stored in an Oracle StorageTek tape library. It allows a client system to access the contents of the tape library as if it were disk storage, one large disk or flash drive.

LTFS-LE resides on a dedicated Linux server, and includes a browser-based user interface you can use to monitor LTFS-LE system performance and perform various administrative tasks.

LTFS-LE builds upon Oracle's open source Linear Tape File System, Open Edition (LTFS-OE) software to deliver file access at a library level.

Additionally, LTFS-LE includes a web services API that enables you to integrate LTFS-LE with user applications or software components. Refer to the *LTFS-LE WebServices Application Programming Interface Programmer's Guide* for more information.

LTFS-LE Benefits

LTFS-LE provides benefits in file access and portability.

File Access

LTFS-LE provides direct file system access to data stored on tape, without the need for a disk cache or third-party backup or archiving application. LTFS-LE enables applications to write and retrieve files directly from tape using a POSIX compliant interface accessible through a standard file system networking protocol such as Samba (CIFS).

LTFS-LE builds a *global namespace*, which catalogs all files and maintains a mapping of individual files to tape volumes in the library, along with the location status of individual volumes and drives. This global namespace can be accessed even when a cartridge is not mounted.

File Portability

LTFS-LE utilizes the open source LTFS 2.2 format, which allows files to be written to tape in a *self describing format*, meaning that a specific application is not required to determine the contents of the volume.

A self-describing LTFS-formatted tape volume consists of two partitions:

- Metadata partition

  This small partition at the beginning of the tape holds descriptive information about the user data stored on the tape cartridge. Metadata organizes all files in a hierarchical directory structure, and makes the actual stored data searchable and accessible.

- Data partition

  This large partition holds the actual data stored on the tape cartridge.

When a volume is loaded into a tape drive, the complete file folder image is displayed. The file structure is obtained from the metadata partition, and the raw file content is obtained from the data partition.

LTFS-LE System Components

The following figure shows the main components of a typical LTFS-LE configuration:

Figure 1–1 LTFS-LE System Components
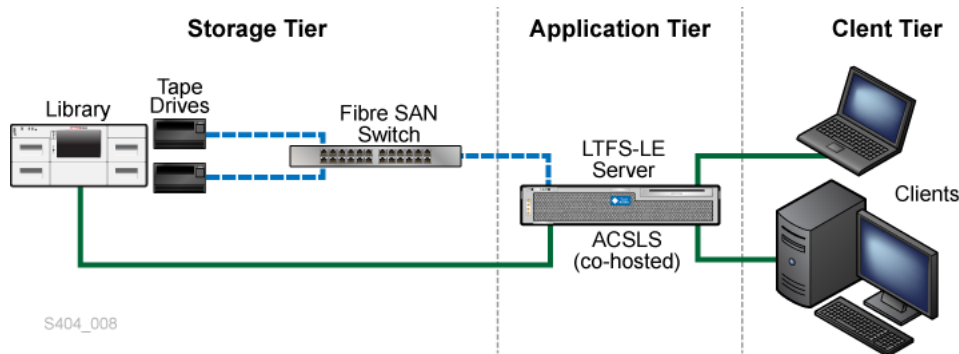
As shown in Figure 1–1, a typical LTFS-LE configuration includes several components that can be grouped into the following tiers:

- Storage tier
- Application Tier
- Client Tier

For specific LTFS-LE software and hardware requirements, refer to the *Linear Tape File System, Library Edition Planning and Installation Guide*.

Storage Tier

The storage tier consists of the following components:

- Library

  LTFS-LE supports the following libraries:

  - LTFS-LE 1.0.3 and earlier

- – StorageTek SL3000 FRS 4.0 or higher. SL3000 AEM has not been tested nor is it supported.

  – StorageTek SL8500 FRS 8.07 or higher

  – StorageTek SL150 FRS 2.01 or higher

- LTFS-LE 1.0.4 and later

  – StorageTek SL150 FRS 2.01 or higher

Note: ACSLS **does not support** partitioned SL150s. Although ACSLS does not prevent partitioning an SL150, if you do so, and attempt to configure the partition to ACSLS, errors may occur. For more information, refer to "ACSLS Support of the SL150" in the *StorageTek Automated Cartridge System Library Software Administrator's Guide*.

If you use the SL150, ensure that the "Library Volume Label Format" list control setting is set to "Trim last 2 characters (default)" in your SL150 configuration settings.

Refer to the *StorageTek SL150 Module Tape Library User's Guide* for more information.

- Tape Drives (and associated media)

  LTFS-LE supports LTO 5, LTO6, LTO 7, T10000C, and T10000D tape drives. However, LTFS-LE does not support a mixture of T10000C and T10000D tape drives within an LTFS-LE partition (or library if it is not partitioned).

  For more information about supported tape drives, refer to the *Linear Tape File System, Library Edition Planning and Installation Guide*.

  - LTFS-LE 1.0.3 and earlier

    – StorageTek T10000C (standard cartridge only)

    – StorageTek T10000D (standard cartridge only)

    – HP-LTO 5 Full-Height

    – HP-LTO 6 Full-Height

    – IBM-LTO 7 Full-Height

  - LTFS-LE 1.0.4 and later

    – HP-LTO 5 Half-Height

    – IBM-LTO 6 Half-Height

    – IBM-LTO 7 Half-Height

- Fibre SAN switch

  The storage area network (SAN) switch connects multiple tape drives to the LTFS-LE server.

- ACSLS server

  Oracle's Automated Cartridge Subsystem Library Software (ACSLS) manages the SL150, SL3000, or SL8500 tape library. ACSLS runs on a dedicated Solaris SPARC or Solaris x86 server platform.

LTFS-LE communicates with ACSLS to retrieve information about the contents of the library and directs ACSLS to perform library operations such as tape mounts, dismounts, enters and ejects.

A restricted version of ACSLS is included with LTFS-LE.

> **Note:** Optionally, you can co-host ACSLS 8.4 with latest patch on the LTFS-LE server. This is only supported for the SL150 library. See "Co-Hosting ACSLS on the LTFS-LE Server" on page 1-4 for more information.

Application Tier

The application tier consists of the LTFS-LE software that resides on a dedicated server running Oracle Linux Server Edition Release 6 Update 5 Media Pack for x86_64-bit.

This server contains the base LTFS-LE software, global namespace, browser based user interface (BUI), database, and additional supportive software.

> **Note:** Optionally, you can co-host ACSLS 8.4 with latest patch on the LTFS-LE server. This is only supported for the SL150 library. See "Co-Hosting ACSLS on the LTFS-LE Server" on page 1-4 for more information.

Client Tier

The client tier consists of one or more Microsoft Windows or Oracle Linux-based client systems connected to the LTFS-LS server using a POSIX compliant interface accessible through a standard file system networking protocol such as Samba (CIFS).

These clients can access the volumes contained in the LTFS-LE library as if they were folders on disk. This requires that you configure client connectivity software on both the LTFS-LE server and the client system.

See Chapter 9, "Configuring the LTFS-LE Client" for more information about configuring clients for use with LTFS-LE.

Co-Hosting ACSLS on the LTFS-LE Server

Optionally, ACSLS 8.4 with latest patch can now be installed (co-hosted) on the LTFS-LE server, eliminating the need for a dedicated ACSLS server in your LTFS-LE configuration.

> **Note:** Only SL150 has been tested in a co-hosted environment.

The following figure shows the main components of an LTFS-LE configuration co-hosting ACSLS:

Figure 1–2   LTFS-LE Co-Hosting Configuration
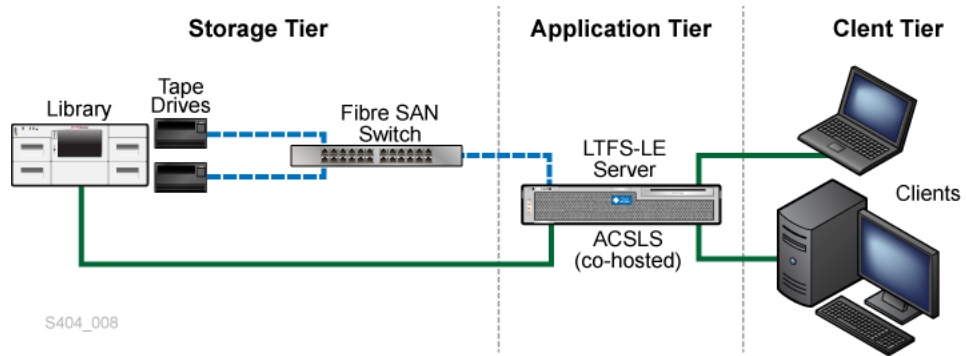
If you choose this option, refer to the *Linear Tape File System, Library Edition Planning and Installation Guide* for important information about how to install and configure this environment.

2

Getting Started

This chapter describes the initial tasks required for you to begin to use LTFS-LE. It also introduces the LTFS-LE browser based user interface (BUI).

The following topics are included:

- "Verifying Library Configuration and Settings" on page 2-1
- "Accessing the LTFS-LE BUI" on page 2-3
- "Using the LTFS-LE BUI to Create the Library in the LTFS-LE Application" on page 2-5

Verifying Software Installation

Ensure that you have installed the following software:

- LTFS-LE 1.0 software
- LTFS Open Edition (LTFS-OE) software

Refer to the *StorageTek Linear Tape File System, Library Edition Planning and Installation Guide* for more information.

To verify that LTFS-OE is installed, issue the `ltfs -V` command from the LTFS-LE server. See "Displaying Oracle Enterprise Linux (OEL) Version" on page 11-11 for more information.

Verifying Library Configuration and Settings

LTFS-LE supports a single ACS/library, either a dedicated library or a zoned library partition. Ensure that you have configured the SL150, SL3000 or SL8500 tape library with appropriate drives and media. Using the SLConsole, ensure that the library partition has drive bays, storage cells, and an HLI library CAP.

Additionally, define the following settings:

1. Use the ACSLS command, `config_acsss`, option 3 to configure the following parameters:

   - Number of days to retain volumes that are identified as ABSENT or EJECTED to the database should be set to zero (0).

   - Select the default (TRUE) to support alphanumeric volume ranges for commands and utilities. Alphanumeric ranges include all valid vol_ids in ASCII collating sequence.

> **Note:** Changes to alphanumeric volume ranges will not take effect until ACSLS is restarted.

2. Set your CAP to manual mode:

```
set cap priority <cap_id>
```

Example:

```
set cap priority 5 2,0,6
```

Refer to the *StorageTek Automated Cartridge System Library Software Installation Guide* for more information about the `config_acsss` command.

Verifying Drive Connections

To verify drive connections, perform the following steps to compare drive serial numbers in ACSLS with drive serial numbers on the LTFS-LE server.

1. Use the ACSLS `display` command to display your drive serial numbers:

```
display drive * -f type serial_num
```

Example Output:

```
ACSSA> display drive * -f type serial_num
2013-07-19 15:34:13              Display Drive
Acs  Lsm  Panel  Drive  Type        Serial_num
2    0    10     6      T1C         576001000518
2    0    10     7      HP-LTO5     HU1246T5MV
2    0    10     11     HP-LTO5     HU1246T5PW
```

2. Display the drive serial numbers on the LTFS-LE server:

```
lsscsi -g | grep -i tape
```

Output Example:

```
# lsscsi -g | grep -i tape
[7:0:0:0]    tape    HP        Ultrium 5-SCSI   I59S  /dev/st0  /dev/sg5
[9:0:0:0]    tape    STK       T10000C          1.57  /dev/st1  /dev/sg6
[11:0:0:0]   tape    HP        Ultrium 5-SCSI   I59S  /dev/st2  /dev/sg7

sg_ing </dev/sq#> | greap "Unit serial number"
```

Output Example:

```
# sg_inq /dev/sg5 | grep "Unit serial number"
Unit serial number: HU1246T5MV

# sg_inq /dev/sg6 | grep "Unit serial number"
Unit serial number: 576001000518

# sg_inq /dev/sg7 | grep "Unit serial number"
Unit serial number: HU1246T5PW
```

3. Verify that the serial numbers from steps 3 and 4 match using the `display drive` command output from ACSLS `cmd_proc`.

Refer to the *StorageTek Automated Cartridge System Library Software Installation Guide* for more information about the `display` and `cmd-proc` commands.

Accessing the LTFS-LE BUI

After you configure the physical tape library, you must access the LTFS-LE browser based user interface (BUI) to define the library in the LTFS-LE application.

BUI Overview

The LTFS-LE BUI is used primarily by the LTFS-LE System Administrator to perform various administrative tasks and monitor LTFS-LE system performance.

The LTFS-LE BUI resides on the LTFS-LE server and is accessed from a standard web browser such as Windows Explorer or Mozilla Firefox.

You can use the LTFS-LE BUI to do the following:

- Discover library resources
- Monitor the LTFS-LE system, including online capacity, drive availability, and LTFS-LE events.
- Manage drives and volumes, placing them online or offline, assigning them to LTFS-LE, and adding them to the LTFS-LE default drive and volume pools.
- Enter, eject, and vault volumes.
- Format or unformat volumes for use with LTFS-LE.
- Schedule a local LTFS-LE system backup.

The BUI is installed as part of LTFS-LE. Refer to the *StorageTek Linear Tape File System, Library Edition Planning and Installation Guide* for more information.

The following figure shows the LTFS-LE BUI:

Figure 2–1 LTFS-LE Browser User Interface (BUI)
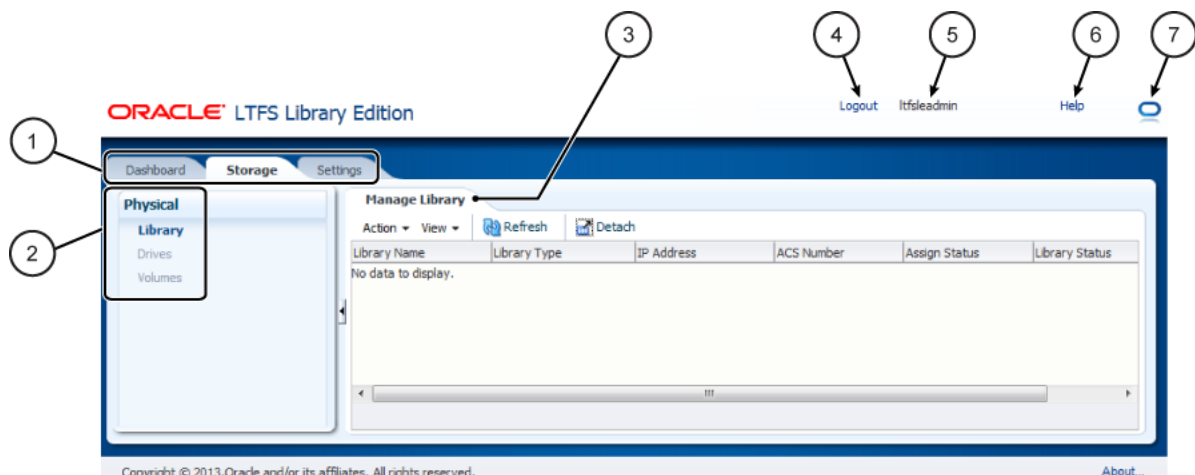
Legend:

1. Tabs

2. Selection panel

3. Page

4. Logout link

5. Username

6. Help link

7. Processing Indicator

As shown in Figure 2–1, the LTFS-LE BUI includes the following elements:

- Tabs

  Click tabs to manage different aspects of the LTFS-LE system. The following tabs are displayed from left to right at the top of the interface.

  - Dashboard

    Use this tab to monitor LTFS-LE library, drive, and volume capacity along with LTFS-LE event logs.

    See Chapter 6, "Monitoring the LTFS-LE System"for more information.

  - Storage

    Use this tab to manage LTFS-LE library, drives, and volumes.

  - Settings

    Use this tab to define LTFS-LE system settings.

- Selection panel

  When you select the Storage or Settings tab, this panel appears on the left side of the interface.

  Use this panel to select different pages within the selected tab.

- Page

  Pages provide the LTFS-LE settings you can modify. Use the tabs and selection panel to display the appropriate page.

- Logout link

  Click this link to close the LTFS-LE application.

- Username

  Indicates the username currently logged in.

- Help link

  Click this link to access screen-level help for the LTFS-LE BUI, including step by step instructions for LTFS-LE BUI functions.

- Processing indicator

  This indicator changes to indicate whether the LTFS-LE system is processing or idle.

Launching the BUI

> **Note:** The LTFS-LE BUI has been tested and verified with Microsoft Internet Explorer 8 and Mozilla Firefox 17.

To launch the LTFS-LE BUI:

1. Launch your web browser and enter the following to connect to the LTFS-LE server:

   http://<*servername*>:7001/LTFS

   Where *servername* is the name of your LTFS-LE server.

2. When the Login dialog appears, enter the administrator username and password you defined during LTFS-LE installation, and click **OK**. Refer to the *StorageTek Linear Tape File System, Library Edition Planning and Installation Guide* for more information.

3. When the Accessibility Settings dialog appears, select any desired settings and click **OK**. See Appendix A, "Accessibility Settings" for more information.

   The BUI launches and the Dashboard page appears.

Using the LTFS-LE BUI to Create the Library in the LTFS-LE Application

Use the LTFS-LE BUI to create the library in the LTFS-LE application. When you create the library, LTFS-LE polls ACSLS for library, drive, and volume information, and uses volume metadata to build the global namespace.

> **Note:** Before proceeding, ensure that you have completed the configuration tasks described in "Verifying Library Configuration and Settings" on page 2-1.

To create the library in the LTFS-LE application using the LTFS-LE BUI:

1. Launch the LTFS-LE BUI in your web browser. See "Launching the BUI" on page 2-4.

2. When the LTFS-LE BUI appears, click the **Storage** tab and select **Library** from the selection panel.

   The Manage Library page appears, and the following is displayed:

   ```
   No data to display
   ```

   Also notice that the Drives and Volumes links are not active in the selection panel.

   > **Note:** If a previously-created library exists, you must release that library before creating a new one. See "Releasing the Library" on page 3-4 for more information.

3. Click the **Action** drop-down menu and select **Create Library**.

   The Create Library page appears.

Figure 2–2   LTFS-LE Create Library page

4. In the Library Name field, enter your ACSLS Library Name.

5. In the IP Address field, enter the ACSLS server IP Address.

6. In the Port field, enter 30031. This is the default ACSLS server port.

    If you are using a firewall and want to use a different port, you may specify a port value between 1 and 65535. Refer to the *Automated Cartridge Subsystem Library Software System Programmer's Guide* for more information.

7. In the ACS field, enter the ACS ID.

8. Click **Apply**.

    A progress indicator appears as the library is created.

    Once the library is created, the following information appears:

    ■ Library Type

    ■ Discovered Time

    ■ Connection Status (Connected)

9. Click **OK**.

    The Manage Library page appears as library discovery begins:

    1. LTFS-LE queries ACSLS to discover the physical library, drives, and volumes.

    2. Volumes are physically mounted and checked for LTFS-LE compatibility.

    3. LTFS-LE collects format information and volume metadata.

    4. Volumes are dismounted.

    > **Note:**   These activities are recorded in the Recent Events log in the LTFS-LE Dashboard.

    During this process, the Assigned Status indicates `Unassigned`, and the Library Status indicates `Discovering`.

    Once discovery is complete, the Assigned Status indicates `Assigned`, and the Library Status indicates `Discovered`, as shown in the following figure:

Figure 2–3   LTFS-LE Library Discovered

Additionally, the Manage Library page displays the following information about your library:

- Library Name

- Library Type

- IP Address

- ACS Number

10. Select **Drives** or **Volumes** from the selection panel to view the physical tape drives and volumes that were discovered.

- All LTFS-LE formatted volumes are automatically assigned to LTFS-LE and placed online. Additionally, they are added to the LTFS-LE default volume pool.

- All LTFS-LE compatible drives are automatically assigned to LTFS-LE and placed online. Additionally, they are added to the LTFS-LE default drive pool.

- Non-formatted volumes are unassigned and placed offline. These volumes are **not** added to the default volume pool.

- Non LTFS-LE compatible drives are unsassigned and placed offline. These drives are **not** added to the default drive pool.

3

Managing the Library

This chapter describes how to use the LTFS-LE BUI to manage aspects of your LTFS-LE library.

The following topics are included:

- Library Requirements
- Viewing the Library Using the Manage Library Page
- Performing Library Management Tasks

> **Note:** To begin using LTFS-LE to manage your library, you must create the library using the LTFS-LE BUI. When you create the library, the LTFS-LE application polls ACSLS for all library, drive, and volume information, and uses volume metadata to build the global namespace. See "Using the LTFS-LE BUI to Create the Library in the LTFS-LE Application" on page 2-5 for more information.

Library Requirements

LTFS-LE supports a *single* ACS/library, either a dedicated library or a zoned library partition, which must be configured before LTFS-LE installation.

Refer to the *StorageTek SL150 User's Guide* for information about configuring a dedicated SL150 library partition.

Refer to the *StorageTek SL3000 User's Guide* for information about configuring a dedicated SL3000 library partition.

Refer to the *StorageTek SL8500 User's Guide* for information about configuring a dedicated SL8500 library partition.

Refer to the *StorageTek Linear Tape File System, Library Edition Planning and Installation Guide* for information about specifying the library partition during LTFS-LE installation.

Viewing the Library Using the Manage Library Page

Use the LTFS-LE BUI to view the status of your LTFS-LE library. To access the Manage Library page, click the **Storage** tab and select **Library** from the selection panel.

The following figure shows the Manage Library page:

Figure 3–1   LTFS-LE BUI Manage Library page

As shown in Figure 3–1, this page displays the following columns of information for the library:

- Library Name

  The library name defined when you create the library.

- Library Type

  The library type: SL150, SL3000 or SL8500.

  > **Note:**   SL3000 and SL8500 libraries are supported only on LTFS-LE 1.0.3 and earlier.

- IP Address

  The ACSLS server IP address.

- ACS Number

  The ACS identifier.

- Assign Status

  Indicates whether the library is assigned to LTFS-LE, or has been released.

- Library Status

  Indicates whether the library has been discovered.

Initially, this page indicates "No data to display." Once you create the library, this page displays your library information.

Performing Library Management Tasks

You can use the LTFS-LE BUI to perform the following library management tasks:

- "Assigning the Library" on page 3-3
- "Re-Discovering the Library" on page 3-3
- "Releasing the Library" on page 3-4
- "Deleting the Library" on page 3-5

> **Note:** To begin using LTFS-LE to manage your library, you must create the library in LTFS-LE using the LTFS-LE BUI. See "Using the LTFS-LE BUI to Create the Library in the LTFS-LE Application" on page 2-5 for more information.

Assigning the Library

To manage a library, including its devices and volumes, the library must be assigned to LTFS-LE. When you create the library, it is automatically assigned to LTFS-LE by default. If you choose to release the library, you can use the LTFS-LE BUI to re-assign it to LTFS-LE.

To assign a library using the LTFS-LE BUI:

1. Click the **Storage** tab and select Library from the selection panel.

   The Manage Library page appears.

2. Click the **Action** drop-down menu and select **Assign/Release Library**.

   The Assign/Release Library page appears. The released library is listed in the Unassigned column.

3. Select the library name from the **Released Library** column and use the arrow buttons to move it to the **Assigned Library** column.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Assign/Release Library page, click **OK**. A confirmation dialog box appears.

7. Click **OK** to apply your changes and close the dialog box.

   The Manage Library page is updated and the Assign Status indicates `Assigned`. If this fails to occur, you can click the **Refresh** button to reload the display.

Re-Discovering the Library

As described in "Using the LTFS-LE BUI to Create the Library in the LTFS-LE Application" on page 2-5, when you create the library in LTFS-LE, LTFS-LE obtains library, drive, and volume information from ACSLS and builds the global namespace.

Once the library is created, ACSLS automatically pushes notifications to LTFS-LE as necessary. Additionally, the LTFS-LE BUI enables you to re-discover the library on demand.

When you rediscover the library, LTFS-LE polls ACSLS to detect the physical library, including all available drives and volumes. It is recommended that you perform this action whenever new volumes are entered into the library.

To rediscover the library using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Library** from the selection panel.

   The Manage Library page appears.

2. Click the **Action** drop-down menu and select **Rediscover Library**.

Library discovery begins. On the Manage Library page, the Library Status indicates `Discovering`. Once discovery is complete, this indication changes to `Discovered`.

During library discovery:

■ LTFS-LE checks volumes for LTFS-LE compatibility. If a volume is incompatible, LTFS-LE places it offline and unassigned, and an error is recorded in the LTFS-LE event log.

■ LTFS-LE checks whether volumes are formatted for LTFS-LE.

– If a volume is formatted for LTFS-LE, LTFS-LE assigns it to LTFS-LE, places it online, and adds it to the default volume pool. Volume and file information is added to the global namespace, and the volume is available for use.

– If a volume is not formatted for LTFS-LE, LTFS-LE leaves the volume unassigned and offline.

To use these volumes, assign them to LTFS-LE. When you assign a volume, it is automatically formatted for use with LTFS-LE. See "Assigning Volumes" on page 5-5.

Releasing the Library

LTFS-LE supports a *single* ACS/library, either a dedicated library or a zoned library partition. If a previously-created LTFS-LE library exists, you must release that library before adding a new one.

To successfully release a library, you are required to delete the library, shut down the LTFS-LE software, and reboot the LTFS-LE server. These tasks are included in the procedure below. You must reboot the LTFS-LE server before the next auto-rediscovery cycle occurs. Auto-rediscovery defaults to every 24 minutes unless you have changed this value.

To release a library using the LTFS-LE BUI:

1. Place all volumes offline.

See "Placing Volumes Offline" on page 5-7.

2. Remove all volumes from the default volume pool.

See "Removing Volumes from the Default Volume Pool" on page 5-8.

3. Unassign all volumes.

See "Unassigning Volumes" on page 5-5.

4. Place all drives offline.

See "Placing Drives Offline" on page 4-5.

5. Remove all drives from the default drive pool.

See "Removing Drives from the Default Drive Pool" on page 4-6.

6. Unassign all drives.

See "Unassigning Drives" on page 4-3.

7. Click the **Storage** tab and select **Library** from the selection panel.

The Manage Library page appears.

8. Click the **Action** drop-down menu and select **Assign/Release library**.

The Assign/Release Library page appears.

9. Select the library name from the **Assigned Library** column and click the single arrow button to move it to the **Released Library** column.

10. Click **Apply**. Your input is validated and the **OK** button becomes active.

11. Click **OK**. A confirmation dialog box appears.

12. Click **OK** to apply your changes and close the dialog box.

The Manage Library page is updated and the Assign Status indicates `Released`. If this fails to occur, you can click the **Refresh** button to reload the display.

13. Delete the library. See "Deleting the Library" on page 3-5.

14. Shut down the LTFS-LE software using the Linux command `manageLtfsleServices - t`.

15. Reboot the LTFS-LE server using the Linux command `shutdown -i 6 now`.

You must reboot the LTFS-LE server before the next auto-rediscovery cycle occurs. Auto-rediscovery defaults to every 24 minutes unless you have changed this value.

Deleting the Library

To delete the library using the LTFS-LE BUI:

1. Release the library. See "Releasing the Library" on page 3-4.

2. Click the **Storage** tab and select **Library** from the selection panel.

The Manage Library page appears.

3. Click the **Action** drop-down menu and select **Delete Library**.

A Warning dialog box appears.

4. Click **Yes** to delete the library, or click **No** to cancel the operation.

Once the library is deleted, the deleted library is no longer listed on the Manage Library page. Instead, this page indicates `No data to display`.

4

Managing Drives

This chapter describes how to use the LTFS-LE BUI to manage your tape drives. The following topics are included:

- "Drive Requirements" on page 4-1
- "Viewing Drives Using the Manage Drives Page" on page 4-1
- "Performing Drive Management Tasks" on page 4-2

Drive Requirements

LTFS-LE supports a *single* ACS/library, either a dedicated library or a zoned library partition, equipped with one or more Oracle StorageTek T10000C or T10000D tape drives, IBM LTO5, LTO6, or LTO7 tape drives, or HP LTO5, LTO6, or LTO7 tape drives.

> **Note:** LTFS-LE **does not support** a mixture of T10000C and T10000D tape drives within an LTFS-LE partition (or library if it is not partitioned).

Refer to the *StorageTek Linear Tape File System, Library Edition Planning and Installation Guide* for more details about supported tape drives.
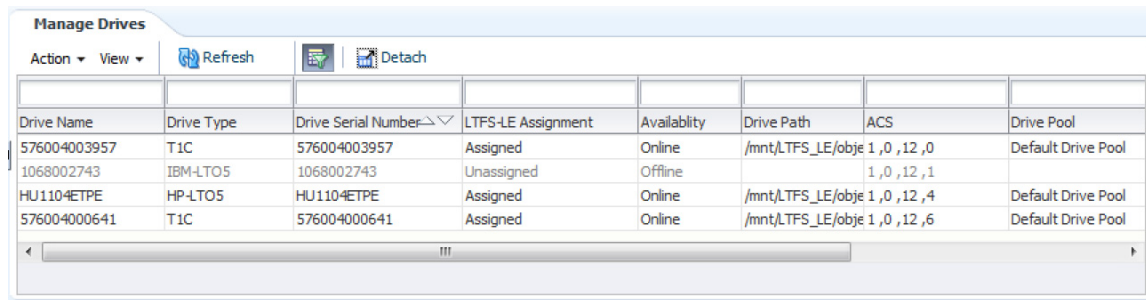
Refer to the *StorageTek T10000 Operator's Guide* for information about Oracle's StorageTek T10000C and T10000D tape drives.

Refer to your IBM or HP drive publications for information about IBM or HP LTO tape drives.

Viewing Drives Using the Manage Drives Page

Use the LTFS-LE BUI to view the status of your tape drives. To access the Manage Drives page, click the **Storage** tab and select **Library** from the selection panel.

The following figure shows the Manage Drives page:

Figure 4–1   LTFS-LE BUI Manage Drives page

As shown in Figure 4–1, this page displays the following columns of information for each drive:

- Drive Name
- Drive Type

  The drive type:

  - T10KC
  - T10KD
  - HP-LTO5
  - HP-LTO6
  - HP-LTO7
  - IBM-LTO5
  - IBM-LTO6
  - IBM-LTO7

- Drive Serial Number
- LTFS-LE Assignment

  Indicates whether the drive is assigned or unassigned to LTFS-LE.

- Availability

  Indicates whether the drive is online or offline.

- Drive Path

  The server drive path.

- ACS

  One or more ACS identifiers.

- Drive Pool

  Indicates whether the drive is included in the LTFS-LE default drive pool.

> **Note:**   *Only* LTFS-LE compatible drives are listed. See "Drive Requirements" on page 4-1 for more information.

Performing Drive Management Tasks

You can use the LTFS-LE BUI to perform the following drive management tasks:

- "Assigning or Unassigning Drives to LTFS-LE" on page 4-3
- "Placing Drives Online or Offline" on page 4-4
- "Adding or Removing Drives from the Default Drive Pool" on page 4-5
- "Defining Default Drive Pool Mount Settings" on page 4-7

Assigning or Unassigning Drives to LTFS-LE

Tape drives must be assigned to LTFS-LE before they may be used. When you create the library, LTFS-LE automatically assigns all LTFS-LE compatible drives. You can also use the LTFS-LE BUI to assign or unassign one or more drives as necessary.

Assigning Drives

When you assign a drive to LTFS-LE, it is automatically placed online and added to the default drive pool.

To assign one or more drives using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Drives** from the selection panel.

   The Manage Drives page appears.

2. Click the **Action** drop-down menu and select **Assign/Unassign Drives**.

   The Assign/Unassign Drives page appears.

3. Select one or more drive names from the **Unassigned Drives** column and use the arrow buttons to move the drives to the **Assigned Drives** column.

   - Click the single arrow button to move only the selected drives.
   - Click the double arrow button to move all drives.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Assign/Unassign Drives page, click **OK**.

   Once the drives are assigned, the Manage Drives page is updated to indicate that the drives are `Assigned` and `Online`. The drives are also added to the default drive pool.

   > **Note:** The Manage Drives page may indicate a `Pending` status until processing completes.

7. Adjust the LTFS-LE mount limit setting as desired to ensure that the proper number of drives are available to process data I/O. See Defining Default Drive Pool Mount Settings for more information about this setting.

Unassigning Drives

To unassign one or more drives using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Drives** from the selection panel.

   The Manage Drives page appears.

2. Ensure that the drives you want to unassign are offline.

See "Placing Drives Offline" on page 4-5.

3. Ensure that the drives you want to unassign are removed from the default drive pool.

See "Removing Drives from the Default Drive Pool" on page 4-6.

4. Click the **Action** drop-down menu and select **Assign/Unassign Drives**.

The Assign/Unassign Drives page appears.

5. Select one or more drive names from the **Assigned Drives** column and use the arrow buttons to move the drives to the **Unassigned Drives** column.

   ■ Click the single arrow button to move only the selected drives.

   ■ Click the double arrow button to move all drives.

6. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

7. Click **OK** to close the dialog box.

Once the drives are unassigned, the Manage Drives page is updated to indicate `Unassigned`.

> **Note:** The Manage Drives page may indicate a `Pending` status until processing completes.

Placing Drives Online or Offline

When you create the library, LTFS-LE automatically places all LTFS-LE compatible drives online. You can also use the LTFS-LE BUI to place one or more drives online or offline as necessary.

The following functions require the drive to be **offline**:

■ Assigning or unassigning the drive to LTFS-LE

■ Assigning or unassigning the drive to the default drive pool

Placing Drives Online

To place one or more drives online using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Drives** from the selection panel.

The Manage Drives page appears.

2. Click the **Action** drop-down menu and select **Change Online/Offline Status**.

The Change Drives Online/Offline Status page appears.

3. Select one or more drive names from the **Offline Drives** column and use the arrow buttons to move the drives to the **Online Drives** column.

   ■ Click the single arrow button to move only the selected drives.

   ■ Click the double arrow button to move all drives.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Change Drives Online/Offline Status page, click **OK**.

Once the operation is complete, The Manage Drives page is updated and the drive Availability indicates `Online`.

> **Note:** The Manage Drives page may indicate a `Pending` status until processing completes.

Placing Drives Offline

> **Note:** If you want to place all drives of a particular type (for example, all T10000C drives) offline simultaneously, you must first place all volumes of that type (for example, all T10000C volumes) offline. See "Placing Volumes Offline" on page 5-7 for more information.

To place one or more drives offline using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Drives** from the selection panel.

   The Manage Drives page appears.

2. Click the **Action** drop-down menu and select **Change Online/Offline Status**.

   The Change Drives Online/Offline Status page appears.

3. Select one or more drive names from the **Online** Drives column and use the arrow buttons to move the drives to the **Offline Drives** column.

   - Click the single arrow button to move only the selected drives.
   - Click the double arrow button to move all drives.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Change Drives Online/Offline Status page, click **OK**.

   Once the operation is complete, The Manage Drives page is updated and the drive Availability indicates `Offline`.

> **Note:** The Manage Drives page may indicate a `Pending` status until processing completes.

Adding or Removing Drives from the Default Drive Pool

LTFS-LE utilizes a default drive pool containing the drives LTFS-LE may use to read and write data.

LTFS-LE Release 1.0 does *not* support the creation of additional drive pools. You can include mixed drive types in the default drive pool.

When you create the library, LTFS-LE automatically adds all LTFS-LE compatible drives to the default drive pool. You can also use the LTFS-LE BUI to add or remove one or more drives as necessary.

Adding Drives to the Default Drive Pool

To add one or more drives to the default drive pool using the LTFS-LE BUI:

1. Click the **Settings** tab and select **Drive Pool Settings** from the selection panel.

   The Drive Pool Settings page appears.

2. Locate the **Drives not in Pool** and **Drives in Pool** columns.

   - The Drives not in Pool column displays drives that are eligible to be added to the default drive pool.

   - The Drives in Pool column includes drives that are included in the default drive pool.

   > **Note:** Drives must be offline to be visible in these columns. See "Placing Drives Offline" on page 4-5 for more information.

3. From the **Drives not in Pool** column, select one or more drives you want to add to the default drive pool and use the arrow buttons to move the drives to the **Drives in Pool** column.

   - Click the single arrow button to move only the selected drives.

   - Click the double arrow button to move all drives.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Drive Pool Settings page, click **OK**. A confirmation dialog box appears, indicating that your drive pool settings have been saved.

7. Click **OK** to close the dialog box.

8. Click the **Storage** tab and select **Drives** from the selection panel.

   The Manage Drives page appears, and the Drive Pool column indicates that the drives are now included in the default drive pool.

Removing Drives from the Default Drive Pool

To remove one or more drives from the default drive pool using the LTFS-LE BUI:

1. Click the **Settings** tab and select **Drive Pool Settings** from the selection panel.

   The Drive Pool Settings page appears.

2. Locate the **Drives not in Pool** and **Drives in Pool** columns.

   - The Drives not in Pool column displays drives that are eligible to be added to the default drive pool.

   - The Drives in Pool column includes drives that are included in the default drive pool.

   > **Note:** Drives must be offline to be visible in these columns. See "Placing Drives Offline" on page 4-5 for more information.

3. From the **Drives in Pool** column, select one or more drives you want to remove from the default drive pool and use the arrow buttons to move the drives to the **Drives not in Pool** column.

   - Click the single arrow button to move only the selected drives.

- ■ Click the double arrow button to move all drives.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Drive Pool Settings page, click **OK**. A confirmation dialog box appears, indicating that your drive pool settings have been saved.

7. Click **OK** to close the dialog box.

8. Click the Storage tab and select **Drives** from the selection panel.

   The Manage Drives page appears, and the Drive Pool column indicates that the drives are not included the default drive pool.

Defining Default Drive Pool Mount Settings

The **Drive Pool Settings** page enables you to define mount settings for all drives contained in the default drive pool.

To define mount settings using the LTFS-LE BUI:

1. Click the **Settings** tab and select **Drive Pool Settings** from the selection panel.

   The Drive Pool Settings page appears.

2. Enter a **Mount Limit** setting.

   Use this setting to limit the maximum number of drives that can be used for volume processing requests, such as import and export, to ensure that drives are always available to process data I/O.

   Enter a value between zero (0) and the maximum number of drives in the default drive pool. A value of zero (0) indicates that no drives exist in the drive pool.

   LTFS-LE automatically selects the appropriate drive type for a volume processing request, based on volume type. The mount limit setting defaults to the highest number of the LTFS-LE compatible drive type in the default drive pool. For example, if there are a total of six drives in the default drive pool, including four LTO-5 drives and two LTO-6 drives, the mount limit defaults to 4, reflecting the largest number of LTFS-LE compatible drives that can be used simultaneously to process LTFS-LE volumes.

3. Enter a **Mount Retention** setting.

   The maximum amount of time (in seconds) that a volume can remain idle in the drive. This value must be 90 seconds or greater. The default is 600 seconds.

   This setting enables LTFS-LE to automatically dismount volumes that are idle for a long period, to free up capacity on the drive.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Drive Pool Settings page, click **OK**. A confirmation dialog box appears, indicating that your drive pool settings have been saved.

7. Click **OK** to close the dialog box.

5

Managing Volumes

This chapter describes how to manage LTFS-LE volumes using the LTFS-LE BUI. The following topics are included:

- "Volume Requirements" on page 5-1.
- "Viewing Volumes using the Manage Volumes Page" on page 5-2.
- "Performing Volume Management Tasks" on page 5-3.

Volume Requirements

LTFS-LE supports the following tape media:

- LTO-1.5T

  Oracle's StorageTek 1.5 Terabyte LTO cartridge, used with IBM and HP LTO5 tape drives.

- LTO-2.5T

  Oracle's StorageTek 2.5 Terabyte LTO cartridge, used with IBM and HP LTO6 tape drives.

- LTO-6.4T

  Oracle's StorageTek 6.4 Terabyte LTO cartridge, used with IBM and HP LTO7 tape drives.

- T10000T2

  Oracle's StorageTek 5 Terabyte T10000 cartridge used with Oracle's StorageTek T10000C and T10000D tape drives.

  > **Note:** LTFS-LE **does not support** a mixture of T10000C and T10000D tape drives within an LTFS-LE partition (or library if it is not partitioned).

Refer to the *StorageTek Linear Tape File System, Library Edition Planning and Installation Guide* for more details about supported tape drives and media.

Refer to the *StorageTek T10000 Operator's Guide* for information about the T10000C tape drive and associated media.

Refer to your IBM or HP drive publications for information about IBM or HP LTO tape drives and associated media.

LTFS Format Specification Version 2.2

LTFS-LE volumes must be formatted to meet version 2.2 of the open source LTFS format specification. This specification enables data to be written to tape in a self-describing manner, as required by LTFS-LE.

You can use the LTFS-LE BUI to format a compatible tape cartridge for use with LTFS-LE. You can also reformat an LTFS-LE volume, which erases all data from the physical cartridge.
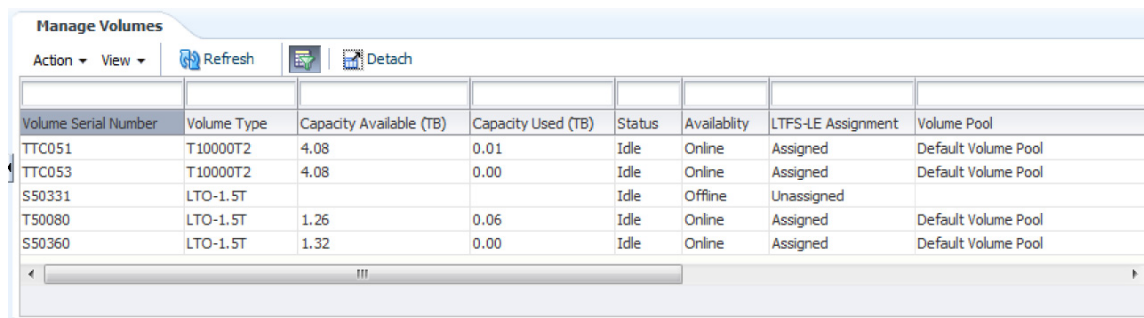
See "Formatting Volumes" on page 5-3 for more information.

Viewing Volumes using the Manage Volumes Page

Use the Manage Volumes page in the LTFS-LE BUI to view the status of your tape volumes. To access this page, click the **Storage** tab and select **Volumes** from the selection panel.

The following figure shows the Manage Volumes page:

Figure 5–1   LTFS-LE BUI Manage Volumes page

As shown in Figure 5–1, this page lists all tape volumes discovered in the library. For each volume, the following information is displayed:

- Volume Serial Number

- Volume Type

  The type of cartridge: T10000T2, LTO-1.5T, LTO-2.5T, or LTO-6.4.

- Capacity Available (TB)

  The amount of free space on the cartridge, in Terabytes.

- Capacity Used (TB)

  The amount of used space on the cartridge, in Terabytes.

- Status

  Indicates whether the volume is idle or processing.

- Availability

  Displays whether the volume is online or offline. LTFS-LE can only access data from online volumes.

  Initially, all LTFS-LE formatted volumes are automatically placed online. Non LTFS-LE formatted volumes are placed offline.

- LTFS-LE Assignment

Displays whether the volume is assigned or unassigned to LTFS-LE. LTFS-LE can only write data to assigned volumes.

Initially, all LTFS-LE formatted volumes are automatically assigned. Non LTFS-LE formatted volumes are unassigned.

- Volume Pool

  Displays whether the volume is included in the LTFS-LE default volume pool.

> **Note:** *Only* LTFS-LE compatible volumes are listed. See "Volume Requirements" on page 5-1 for more information.

Performing Volume Management Tasks

You can use the LTFS-LE BUI to perform the following volume management tasks:

- "Formatting or Unformatting Volumes for LTFS-LE" on page 5-3
- "Assigning or Unassigning Volumes to LTFS-LE" on page 5-5
- "Placing Volumes Online or Offline" on page 5-6
- "Adding or Removing Volumes from the LTFS-LE Default Volume Pool" on page 5-7
- "Importing Volumes" on page 5-9
- "Exporting Volumes" on page 5-10

Formatting or Unformatting Volumes for LTFS-LE

LTFS-LE volumes must be formatted in the LTFS 2.2 format. This open source specification enables data to be written to tape in a self-describing manner, as required by LTFS-LE.

You can use the LTFS-LE BUI to do the following:

- Format a compatible volume for use with LTFS-LE.
- Format an LTFS-LE volume, which deletes all data from the physical cartridge.
- Unformat an LTFS-LE volume to reuse the volume in a non LTFS-LE setting. LTFS-LE deletes all data from the volume.

> **Note:** When you assign an unformatted volume to LTFS-LE, the volume is automatically formatted. See "Assigning Volumes" on page 5-5 for more information.

Formatting Volumes

To format a volume using the LTFS-LE BUI:

> **Note:** If you re-format an LTFS-LE formatted volume, LTFS-LE deletes *all data* from the physical cartridge.

1. Place the volume offline.

   See "Placing Volumes Offline" on page 5-7.

2. Remove the volume from the default volume pool.

    See "Removing Volumes from the Default Volume Pool" on page 5-8.

3. Click the **Storage** tab and select **Volumes** from the selection panel.

    The Manage Volumes page appears.

4. Click a volume in the listing to select it.

5. Click the **Action** drop-down menu and select **Format Volume**.

    A confirmation dialog box appears.

6. When the confirmation message appears, click **OK**.

    The Select Drive dialog box appears.

7. From the Select Drive dialog box, use the drop-down menu to select a drive for the format operation and click **OK** to format the volume.

    The volume is formatted, and the event is recorded in the event logs displayed on the LTFS-LE Dashboard. See Chapter 6, "Monitoring the LTFS-LE System" for more information.

    Important T10000C/T10000D consideration:

    If you are reformatting an existing T10000C volume (T2-5000 volume type) as a T10000D volume, you will be presented with a series of confirmation messages before the volume is formatted. Remember that when you format a volume, **all data is removed from the volume**.

8. Assign the volume to LTFS-LE. See "Assigning Volumes" on page 5-5.

    When you assign a volume, LTFS-LE automatically places it Online and adds it to the default volume pool.

Unformatting Volumes

When you unformat an LTFS-LE volume, the LTFS-LE format headers (metadata and data partitions) are removed from the volume and it becomes a standard, non-LTFS-LE volume.

To unformat a volume using the LTFS-LE BUI:

1. Place the volume offline. See "Placing Volumes Offline" on page 5-7.

2. Remove the volume from the default volume pool. See "Removing Volumes from the Default Volume Pool" on page 5-8.

3. Unassign the volume from LTFS-LE. See "Unassigning Volumes" on page 5-5.

4. Click the **Storage** tab and select **Volumes** from the selection panel.

    The Manage Volumes page appears.

5. Click a formatted volume in the listing to select it.

6. Click the **Action** drop-down menu and select **Unformat Volume**.

    A confirmation dialog box appears.

7. Click **OK** to close the dialog box. or cancel to cancel

    The Select Drive dialog box appears.

8. From the Select Drive dialog box, use the drop-down menu to select a drive for the unformat operation and click **OK**.

A warning message appears.

9. When the warning message appears, click **OK** to unformat the volume or Cancel to cancel the operation.

The volume is unformatted, and the event is recorded in the LTFS-LE Dashboard.

Assigning or Unassigning Volumes to LTFS-LE

To manage volumes using LTFS-LE, you must assign the volumes to the LTFS-LE application.

When you assign a volume to LTFS-LE, it is automatically placed online and added to the default volume pool. When you assign a non-formatted volume, the volume is automatically formatted for use with LTFS-LE.

Assigning Volumes

To assign one or more volumes using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Volumes** from the selection panel.

   The Manage Volumes page appears.

2. Click the **Action** drop-down menu and select **Assign/Unassign Volumes**.

   The Assign/Unassign Volumes page appears.

3. Select one or more volume names from the **Unassigned Volumes** column and use the arrow buttons to move the drives to the **Assigned Volumes** column.

   - Click the single arrow button to move only the selected volumes.

   - Click the double arrow button to move all volumes.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Assign/Unassign Volumes page, click **OK**.

   The Manage Volumes page is updated to indicate that the volumes are `Assigned` and `Online`. The drives are also added to the default volume pool.

   > **Note:** The Manage Volumes page may indicate a `Pending` status until processing completes. When a volume is pending, no other action may be performed on that volume.

Unassigning Volumes

To unassign one or more volumes:

1. Click the **Storage** tab and select **Volumes** from the selection panel.

   The Manage Volumes page appears.

2. Place the volumes offline. See "Placing Volumes Offline" on page 5-7.

3. Remove the volumes from the default volume pool. See "Removing Volumes from the Default Volume Pool" on page 5-8.

4. Click the **Action** drop-down menu and select **Assign/Unassign Volumes**.

   The Assign/Unassign Volumes page appears.

5. Select one or more volume names from the **Assigned Volumes** column and use the arrow buttons to move the drives to the **Unassigned Volumes** column.

   ■ Click the single arrow button to move only the selected volumes.

   ■ Click the double arrow button to move all volumes.

6. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

7. Click **OK** to close the dialog box.

8. On the Assign/Unassign Volumes page, click **OK**.

   The Manage Volumes page is updated and to indicate that the volumes are Unassigned.

   > **Note:** The Manage Volumes page may indicate a Pending status until processing completes. When a volume is pending, no other action may be performed on that volume.

Placing Volumes Online or Offline

The LTFS-LE BUI enables you to place volumes online or offline.

The following functions require the volume to be **online**:

■ Reading or writing data

■ Finalizing a volume

The following functions require the volume to be **offline**:

■ Ejecting the volume

■ Vaulting the volume

■ Formatting the volume

■ Assigning or unassigning the volume to LTFS-LE

■ Assigning or unassigning the volume to the default volume pool

■ Placing all drives of a particular type offline simultaneously

Placing Volumes Online

To place one or more volumes online using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Volumes** from the selection panel.

   The Manage Volumes page appears.

2. Click the **Action** drop-down menu and select **Change Online/Offline Status**.

   The Change Volumes Online/Offline Status page appears.

3. Select one or more volume names from the **Offline Volumes** column and use the arrow buttons to move the drives to the **Online Volumes** column.

   ■ Click the single arrow button to move only the selected volumes.

   ■ Click the double arrow button to move all volumes.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Change Volumes Online/Offline Status page, click **OK**.

The Manage Volumes page is updated to indicate that the volume is `Online`. If this fails to occur, you can click the **Refresh** button to reload the display.

Note: The Manage Volumes page may indicate a `Pending` status until processing completes. When a volume is pending, no other action may be performed on that volume.

Placing Volumes Offline

To place one or more volumes offline using the LTFS-LE BUI:

1. Click the **Storage** tab and select **Volumes** from the selection panel.

The Manage Volumes page appears.

2. Click the **Action** drop-down menu and select **Change Online/Offline Status**.

The Change Volumes Online/Offline Status page appears.

3. Select one or more volume names from the **Online Volumes** column and use the arrow buttons to move the volumes to the **Offline Volumes** column.

- Click the single arrow button to move only the selected volumes.

- Click the double arrow button to move all volumes.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Change Volumes Online/Offline Status page, click **OK**.

The Manage Volumes page is updated to indicate that the volume is `Offline`. If this fails to occur, you can click the **Refresh** button to reload the display.

Note:

- The Manage Volumes page may indicate a `Pending` status until processing completes. When a volume is pending, no other action may be performed on that volume.

- An LTO7 drive can read an LTO5 cartridge. However, LTFS-LE does not support read only mode. If you have an LTO5 volume and take all LTO5 and LTO6 drives offline (with LTO7 drives online), LTFS-LE automatically places the LTO5 volume offline.

Adding or Removing Volumes from the LTFS-LE Default Volume Pool

LTFS-LE utilizes a default volume pool containing the volumes LTFS-LE may use to store data.

LTFS-LE Release 1.0 does *not* support the creation of additional volume pools. You can include mixed volume types in the default volume pool.

When you create the library, LTFS-LE automatically adds all LTFS-LE formatted volumes to the default volume pool. You can also use the LTFS-LE BUI to add or remove one or more volumes as necessary.

Adding Volumes to the Default Volume Pool

To add one or more drives to the default drive pool:

To use these columns:

1. Click the **Settings** tab and select **Drive Pool Settings** from the selection panel.

   The Drive Pool Settings page appears.

2. Locate the **Volumes not in Pool** and **Volumes in Pool** columns.

   ■ The Volumes not in Pool column displays volumes that are eligible to be added to the default volume pool.

   ■ The Volumes in Pool column includes volumes that are included in the default volume pool.

   > **Note:** Volumes must be offline to be visible in these columns. See "Placing Volumes Offline" on page 5-7 for more information.

3. Select one or more volume names from the **Volumes not in Pool** column and use the arrow buttons to move the volumes to the **Volumes in Pool** column.

   ■ Click the single arrow button to move only the selected volumes.

   ■ Click the double arrow button to move all volumes.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Volume Pool Settings page, click **OK**. A confirmation dialog box appears, indicating that your volume pool settings have been saved.

7. Click **OK** to close the dialog box.

8. Click the Storage tab and select Volumes from the selection panel.

   The Manage Volumes page appears, and the Volume Pool column indicates that the volumes are now included the default volume pool.

9. To begin using these volumes, place them online. See "Placing Volumes Online" on page 5-6 for more information.

Removing Volumes from the Default Volume Pool

To remove one or more volumes from the default drive pool:

1. Click the **Settings** tab and select **Volume Pool Settings** from the selection panel.

   The Volume Pool Settings page appears.

2. Locate the **Volumes not in Pool** and **Volumes in Pool** columns.

   ■ The Volumes not in Pool column displays volumes that are not included in the default volume pool.

   ■ The Volumes in Pool column includes volumes that are included in the default volume pool.

   > **Note:** Volumes must be offline to be visible in these columns. See "Placing Volumes Offline" on page 5-7 for more information.

3. Select one or more volume names from the **Volumes in Pool** column and use the arrow buttons to move the volumes to the **Volumes not in Pool** column.

   ■ Click the single arrow button to move only the selected volumes.

   ■ Click the double arrow button to move all volumes.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

6. On the Volume Pool Settings page, click **OK**. A confirmation dialog box appears, indicating that your volume pool settings have been saved.

7. Click **OK** to close the dialog box.

8. Click the Storage tab and select Volumes from the selection panel.

   The Manage Volumes page appears, and the Volume Pool column indicates that the volumes are not included the default volume pool.

Importing Volumes

You can use either of the following methods to import volumes into the LTFS-LE library:

■ Entering Volumes Using ACSLS

■ Entering Volumes Using the LTFS-LE BUI Enter Action

Entering Volumes Using ACSLS

To enter volumes using ACSLS:

1. The operator inserts one or more LTFS-LE compatible volumes into the library CAP.

2. Using the ACSLS "cmd_proc" the operator directs these volumes to the appropriate ACS or library partition dedicated to Oracle's LTFS-LE software.

3. LTFS-LE detects the new volumes and processes the volumes.

4. LTFS-LE checks each new volume for LTFS-LE compatibility. If a volume is incompatible, LTFS-LE places it offline and unassigned, and an error is recorded in the LTFS-LE event log.

5. LTFS-LE checks whether each new volume is formatted for LTFS-LE.

   ■ If a volume is formatted for LTFS-LE, LTFS-LE assigns it to LTFS-LE, places it online, and adds it to the default volume pool. Volume and file information is added to the global namespace, and the volume is available for use.

   ■ If a volume is not formatted for LTFS-LE, LTFS-LE leaves the volume unassigned and offline.

     To use these volumes, assign them to LTFS-LE. When you assign a volume, it is automatically formatted for use with LTFS-LE. See "Assigning Volumes" on page 5-5.

Entering Volumes Using the LTFS-LE BUI Enter Action

To enter a volume using the Enter action in the LTFS-LE BUI:

1. From the LTFS-LE BUI, click the **Storage** tab and select **Volumes** from the selection panel.

The Manage Volumes page appears.

2. Click the **Action** drop-down menu and select **Enter Volume**.

   The Enter Volume dialog box appears.

3. Enter the ACS, LSM, and CAP location for the volumes you want to enter.

4. Click **OK** to signal LTFS-LE to detect and process the volumes, or click **Cancel** to exit the dialog box.

5. LTFS-LE checks each volume for LTFS-LE compatibility. If the volume is incompatible, LTFS-LE places it offline and unassigned, and an error is recorded in the LTFS-LE event log.

6. LTFS-LE checks whether each volume is formatted for LTFS-LE.

   ■ If a volume is formatted for LTFS-LE, LTFS-LE assigns it to LTFS-LE, places it online, and adds it to the default volume pool. Volume and file information is added to the global namespace, and the volume is available for use.

   ■ If a volume is not formatted for LTFS-LE, LTFS-LE leaves the volume unassigned and offline.

     To use these volumes, assign them to LTFS-LE. When you assign a volume, it is automatically formatted for use with LTFS-LE. See "Assigning Volumes" on page 5-5.

Exporting Volumes

You can use either of the following methods to export volumes from the LTFS-LE library using the LTFS-LE BUI:

■ Ejecting Volumes

  When you eject a volume, the volume and its associated files are removed from the LTFS-LE global namespace.

■ Vaulting Volumes

  When you vault a volume, the volume remains offline in the LTFS-LE global namespace, and indicates a vaulted status. After a volume is vaulted, you may reenter it into the LTFS-LE system if the volume data has not been modified in any way.

In both cases, it is recommended that you first finalize the volume.

Both export methods maintain the LTFS-LE volume format, allowing the cartridge to be read in any environment with Oracle's StorageTek LTFS, Open Edition (LTFS-OE) installed. IBM or HP LTFS applications may also be used, however, these applications may or may not read LTO6 cartridges.

Finalizing a Volume

As a best practice, always finalize a volume before exporting it from the library.

When a volume is finalized, any unwritten metadata or unapplied file deletes are applied to the volume. This action ensures that the actions on the global namespace are reflected on the physical volume.

To finalize a volume:

1. Click the **Storage** tab and select **Volumes** from the selection panel.

2. Ensure that the volume you want to finalize is Online. See "Placing Volumes Online" on page 5-6.

3. Click the volume in the listing to select it.

4. Click the **Action** drop-down menu and select **Finalize**.

   The volume is finalized. This event is recorded in the LTFS-LE Dashboard. See "Monitoring Recent Events" on page 6-7.

Ejecting Volumes

> **Note:** Ensure that you set the ACSLS mount retention time (for ejecting volumes) to zero. Refer to your Oracle StorageTek ACSLS publications for more information.

To eject a volume:

1. As a best practice, it is recommended that you finalize the volume before ejecting it. See "Finalizing a Volume" on page 5-10 for more information.

2. Place the volume offline. See "Placing Volumes Offline" on page 5-7.

3. Click the **Storage** tab and select **Volumes** from the selection panel.

   The Manage Volumes page appears.

4. Click the **Action** drop-down menu and select **Eject Volume**.

   The Eject Volume dialog box appears.

5. Under Volume Ejection Parameters, enter the ACS, LSM, and CAP for the eject.

6. In the Select Volumes column, click the volume you want to eject and use the arrow buttons to move it to the column on the right.

7. Click **Apply**.

8. When the confirmation message appears, click **OK**.

   Once the volume is ejected, it is no longer displayed on the Manage Volumes page.

9. Remove the ejected cartridge from the library CAP.

Vaulting Volumes

LTFS-LE enables you to vault a volume for offline storage.

To vault a volume:

1. As a best practice, it is recommended that you finalize the volume. See "Finalizing a Volume" on page 5-10 for more information.

2. Place the volume offline. See "Placing Volumes Offline" on page 5-7.

3. Click the **Storage** tab and select **Volumes** from the selection panel.

   The Manage Volumes page appears.

4. Click a volume in the listing to select it.

5. Click the **Action** drop-down menu and select **Vault Volume**.

   The Vault Volume dialog box appears.

6. Under Vault Volume Parameters, enter the ACS, LSM, and CAP for the vault.

The Manage Volumes page displays the updated information and the volume returns a Vault status. If this fails to occur, you can click the **Refresh** button to reload the display.

7. In the Select Volumes column, click the volume you want to vault and use the arrow buttons to move it to the column on the right.

8. Click **Apply**.

   A confirmation dialog box appears.

9. Click **OK** to close the dialog box.

10. In the Vault Volume dialog box, click **OK** to vault the volume.

    Once the volume is vaulted, the Manage Volumes page is updated to indicate a Vaulted status for the volume.

11. Remove the vaulted cartridge from the library CAP.

    After a volume is vaulted, you may reenter it into the LTFS-LE system if the volume data has not been modified in any way.

Deleting Unavailable Volumes

LTFS-LE enables you to remove volumes with a status of Unavailable from the LTFS-LE system, including the LTFS-LE BUI and global namespace.

To remove one or more unavailable volumes:

1. Click the **Storage** tab and select **Volumes** from the selection panel.

   The Manage Volumes page appears.

2. Click the **Action** drop-down menu and select Delete Unavailable Volumes.

   The **Delete Unavailable Volumes** page appears. All unavailable volumes are listed in the Unavailable Volumes column.

3. Select one or more unavailable volume names from the Unavailable Volumes column and use the arrow buttons to move these volumes to the Volumes to Delete column.

   ■ Click the single arrow button to move only the selected volumes.

   ■ Click the double arrow button to move all volumes.

4. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

5. Click **OK** to close the dialog box.

   An information dialog box appears, confirming successful deletion.

6. Click **OK** to close the dialog box.

   The Manage Volumes page appears, and the deleted volumes are no longer included in the listing.

6

Monitoring the LTFS-LE System

This chapter describes how to use the LTFS-LE BUI Dashboard to monitor the LTFS-LE system.

The following topics are included:

- "Dashboard Overview" on page 6-1
- "Monitoring Online Capacity" on page 6-2
- "Monitoring Drive Availability" on page 6-3
- "Monitoring Volume Availability" on page 6-4
- "Monitoring Recent Events" on page 6-7
- "Monitoring Critical Events" on page 6-5

Dashboard Overview

The LTFS-LE BUI includes the Dashboard, used to monitor LTFS-LE library, drive, and volume capacity along with LTFS-LE event logs.

To view the Dashboard, click the Dashboard tab in the LTFS-LE BUI.

> **Note:** When you launch the LTFS-LE BUI, the Dashboard page is displayed by default.

The following figure shows the Dashboard:

Figure 6–1   LTFS-LE Dashboard
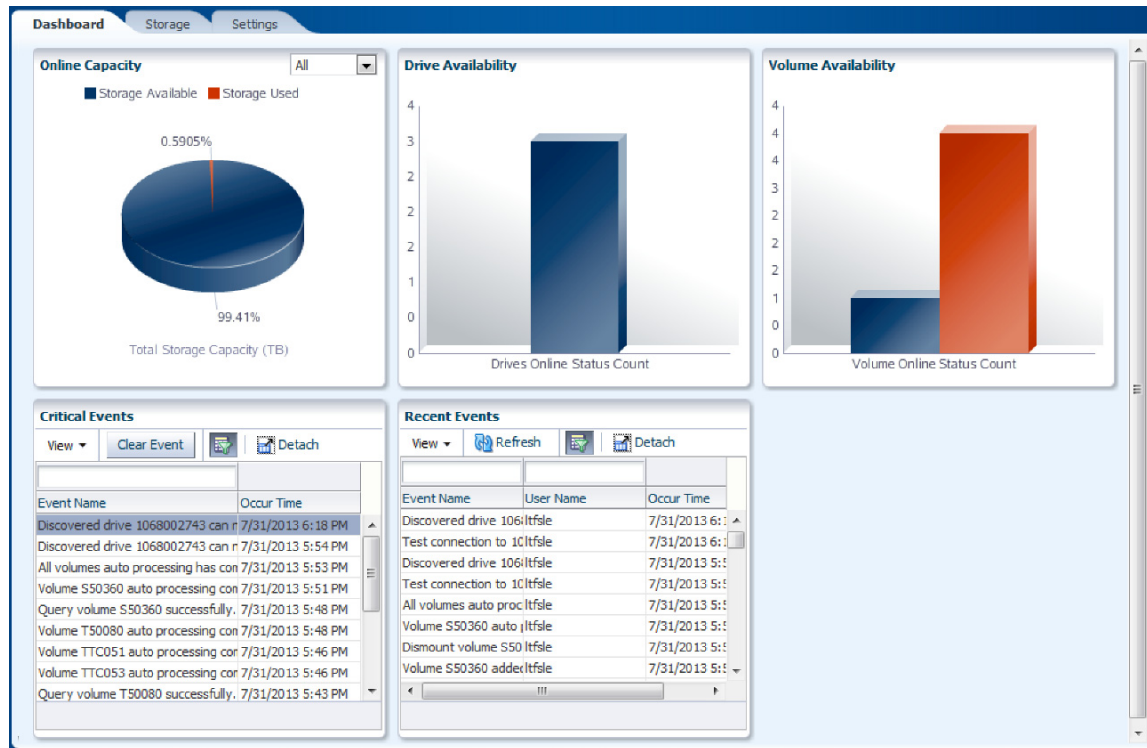
As shown in Figure 6–1, the Dashboard consists of the following panes:

- Online Capacity
- Drive Availability
- Volume Availability
- Critical Events
- Recent Events

Monitoring Online Capacity

The following figure shows the Online Capacity pane included on the LTFS-LE Dashboard page:

Figure 6–2   Online Capacity

As shown in Figure 6–2, the Online Capacity pane displays a pie chart indicating the following information:

- Storage Available (displayed in blue)

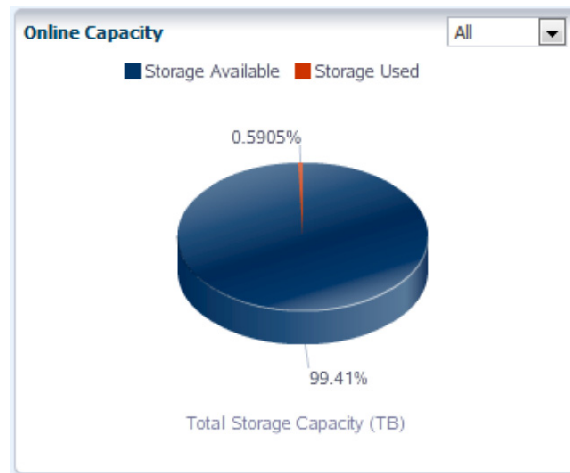 The percentage of volume storage that is currently unused and available for LTFS-LE data storage. Place your mouse over this region of the chart to display the value in actual Terabytes (TB).

- Storage Used (displayed in red)

  The percentage of volume storage that is currently used. Place your mouse over this region of the chart to display the value in actual Terabytes (TB).

By default, the chart displays volume information for ALL volumes in the LTFS-LE library, regardless of media type.

If you want to adjust the chart to display volume information for a specific media type, click the menu in the upper right corner of the panel and select one of the following media types:

- LTO-1.5T (Oracle's StorageTek 1.5 Terabyte LTO cartridge)

- LTO-2.5T (Oracle's StorageTek 2.5 Terabyte LTO cartridge)

- LTO-6.4T (Oracle's StorageTek 6.4 Terabyte LTO cartridge)

- T10000T2:

  - Oracle's StorageTek 5 Terabyte T10000 cartridge formatted with a T10000C tape drive

  - Oracle's StorageTek 8 Terabyte T10000 cartridge formatted with a T10000D tape drive

Monitoring Drive Availability

The following figure shows the Drive Availability pane included on the LTFS-LE Dashboard page:

Figure 6–3   Drive Availability
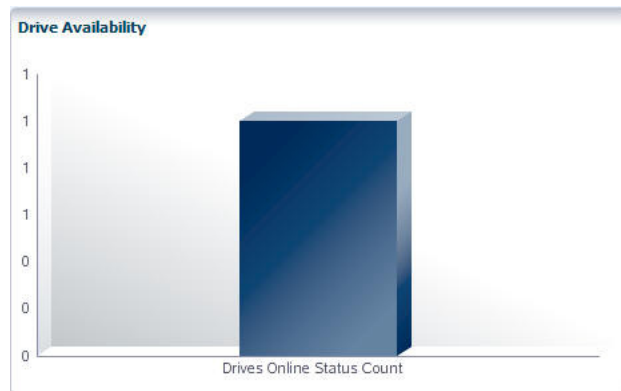
As shown in Figure 6–3, The Drive Availability pane includes a bar graph indicating the number of drives that are online and offline.

- The Drives Online Status Count is displayed in blue.

- The Drives Offline Status Count is displayed in red.

> **Note:**   This graph only accounts for drives that are assigned to LTFS-LE. If a drive is not assigned to LTFS-LE, it is not included in the Drives Offline Status Count.

Monitoring Volume Availability

The following figure shows the Volume Availability pane included on the LTFS-LE Dashboard page:
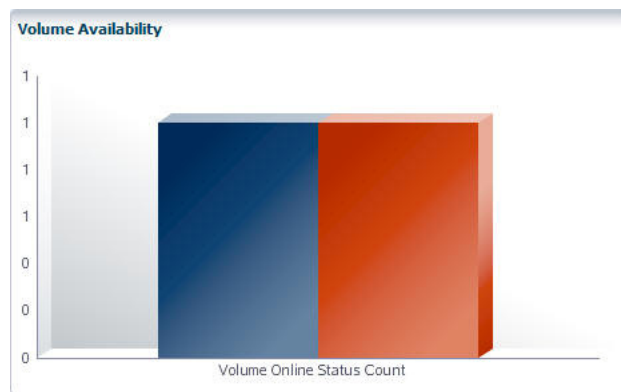
Figure 6–4   Volume Availability

As shown in Figure 6–4, the Volume Availability pane includes a bar graph indicating the number of LTFS-LE volumes that are online or offline.

- The Volumes Online Status Count is displayed in blue.

- The Volumes Offline Status Count is displayed in red.

> **Note:** This graph only accounts for volumes that are assigned to LTFS-LE. If a volume is not assigned to LTFS-LE, it is not included in the Volume Offline Status Count.

Monitoring Critical Events

The LTFS-LE BUI Critical Events pane enables you to monitor critical LTFS-LE events that may require immediate user interaction with the system. These may be LTFS-LE system events, drive events, or volume events, and may include important error conditions.

The following figure shows the Critical Events pane:

Figure 6–5   Critical Events

As shown in Figure 6–5, the Critical Events pane lists significant LTFS-LE system events and indicates when they occurred.

Events Listed

The Critical Events pane lists the following types of events:

Critical LTFS-LE System Events

You can view the following types of general LTFS-LE drive events:

- LTFS-LE server warnings

- LTFS-LE server failures

- LTFS-LE server shutdowns

- LTFS-LE server reboots

- LTFS-LE job failures

- LTFS-LE connectivity problems

Critical Drive Events

You can view the following types of LTFS-LE drive events:

- Drives added to the LTFS-LE

- Drives removed from the LTFS-LE

- Incompatible drives added to the LTFS-LE

- Updates to drive assignments

- Unexpected loss of connectivity with drives

Critical Volume Events

You can view the following types of LTFS-LE volume events:

- Volumes added to the LTFS-LE

- Incompatible volumes added to the LTFS-LE

- Unformatted volumes added to the LTFS-LE

- Updates to volume assignments

- Volume pool assignment issues

- Warning for volume pool capacity watermarks

- Warning for volume pool capacity limit

- Volume incompatibility warnings

Editing the Critical Events Listing

Use the following controls to edit the Critical Events listing:

View

Use the View drop-down menu to customize the current listing. Click this menu and select one of the following:

- Columns

  Select **Show All** to display all columns, or select a specific column to show or hide it from the display.

- Detach

  Opens the panel in a separate window. You can also click the **Detach** icon to perform this action.

- Reorder columns

  Opens a dialog box you can use to specify the order in which the various columns appear.

- Query by Example

  Displays query fields above each column in the listing. Use these fields to filter the listing.

Clear Event

Select an event and click the Clear Event button to manually remove the event from the listing. For example, if you intentionally removed a drive from the LTFS-LE for repair, you may choose to clear the event from the listing.

By default, events are automatically cleared when issues are resolved. Events that are not cleared remain in the listing for 30 days.

Query by Example

Click the Query by Example icon to show or hide the empty query field above the Event Name column in the listing. You can enter a value in this field and press Enter to filter the listing. This field is visible by default.

Detach

Click Detach to display this panel in a separate window.

Monitoring Recent Events

The LTFS-LE BUI Recent Events pane enables you to monitor recent LTFS-LE activity, including general LTFS-LE events, drive events, and volume events.

The following figure shows the Recent Events pane:

Figure 6–6   Recent Events

As shown in Figure 6–6, the Recent Events Dashboard panel lists both LTFS-LE and user-initiated events. For each event, this listing indicates the associated user and the time when the event occurred.

Events Listed

The Recent Events pane lists the following types of events:

General Events

You can view the following types of general LTFS-LE events:

- All critical events
- Session login and logoff details
- Updates to LTFS-LE system settings
- LTFS-LE server shutdowns
- LTFS-LE server reboots
- Completion of scheduled jobs

Drive Events

You can view the following types of LTFS-LE drive events:

- Drives placed online
- Drives placed offline

- Drives assigned to LTFS-LE

- Drives unassigned to LTFS-LE

- Updates to drive pool assignments

- Updates to drive pool parameters

Volume Events

You can view the following types of LTFS-LE volume events:

- Volumes placed online

- Volumes placed offline

- Volumes assigned to LTFS-LE

- Volumes unassigned to LTFS-LE

- Updates to volume pool assignments

- Updates to volume pool parameters

Editing the Recent Events Listing

Use the following controls to edit the Recent Events listing:

View

Use the View drop-down menu to customize the current listing. Click this menu and select one of the following:

- Columns

  Select **Show All** to display all columns, or select a specific column to show or hide it from the display.

- Detach

  Opens the panel in a separate window. You can also click the **Detach** icon to perform this action.

- Reorder columns

  Opens a dialog box you can use to specify the order in which the various columns appear.

- Query by Example

  Displays query fields above each column in the listing. Use these fields to filter the listing.

Refresh

Click the Refresh button to reload the display.

Query by Example

Click the Query by Example icon to show or hide the empty display query fields above the Event Name and User Name columns in the listing. You can enter a value in these fields and press Enter to filter the listing. These fields are visible by default.
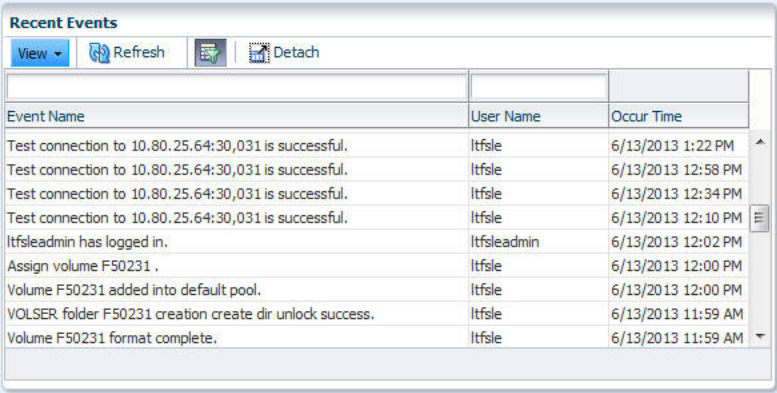
Detach

Click Detach to display this pane in a separate window.

7

Defining LTFS-LE System Settings

This chapter describes how to define general LTFS-LE system settings. The following topics are included:

- "Setting System Properties" on page 7-1
- "Scheduling the Background File Delete Task" on page 7-2
- "Displaying LTFS-LE Component Information" on page 7-3
- "Scheduling a Local LTFS-LE Backup" on page 7-3

Setting System Properties

Use the **System Properties** page in the LTFS-LE BUI to set general LTFS-LE system properties.

To access this page, click the **Settings** tab and then select **System Properties** from the selection panel.

The System Properties page includes the following settings:

- Auto Re-discover

  By default, ACSLS automatically pushes LTFS-LE notifications when there are changes to the library or devices. Additionally, you can set an Auto Re-discover value to direct LTFS-LE to query ACSLS for this information.

  Enter a value (in minutes) to specify how often LTFS-LE queries ACSLS for updated library and device information. This value must be greater than zero (0). The recommended value is 24 minutes.

- Resource Timeout

  In the Resource Timeout field, enter the maximum amount of time (in seconds) that LTFS-LE waits for a volume to be mounted before timing out and issuing a request failure message. This value must be 90 seconds or greater. The recommended value is 300 seconds.

- Storage Capacity Watermark

  Enter a minimum remaining volume capacity in MegaBytes. Once this watermark is reached, LTFS-LE cannot write additional files to this volume. **This value must be 16384 MB or greater**.

- The DB (database) Backup Path is also displayed.

  This path represents the database backup path from both the BUI and crontab, and the global namepsace backup path from the BUI.

The global namespace backup path from crontab is /MetadataBackup.

When you are finished, click **Apply**. A confirmation dialog box appears, indicating that your input has been validated. Click **OK** to close this dialog box.

On the System Properties page, click **OK** to commit your settings.

Scheduling the Background File Delete Task

When a user deletes a file, LTFS-LE deletes the metadata from the LTFS-LE global namespace while the data remains on the physical volume. Then, the next time the volume containing this file is mounted, the file is physically deleted from the volume as a background activity.

The Background File Delete page enables you to specify when this LTFS-LE file deletion is to occur.

To access this page, click the **Settings** tab and select **Background File Delete** from the selection panel.

1. Do one of the following:

    ■   In the Start Time field, enter a time for deletion to begin. For example, 3:45 pm.

    ■   Click the **Select Time** icon to select a specific deletion date and time from a calendar.

2. Under Recurring Frequency, select one of the following options to specify how often this deletion task occurs:

    ■   Daily

    ■   Weekly

    ■   Monthly

    ■   Yearly

3. When the Recur Details dialog box appears, select one of the following:

    ■   For a weekly frequency, select an option to indicate the day of the week when file deletion should occur.

    ■   For a monthly backup, specify the day of the month when file deletion should occur.

    ■   For a yearly backup, specify the day of the year when file deletion should occur. Enter a date in the format *mm/dd/yyyy* or click the **Select Date** icon to select the date from a calendar.

4. Click **OK**. The Recur Details dialog box closes.

5. From the Background File Delete page, click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

6. Click **OK** to close the dialog box.

7. From the Background File Delete page, click **OK**. A confirmation dialog box appears, indicating that your background file delete schedule has been successfully set.

8. Click **OK** to close the dialog box.

Displaying LTFS-LE Component Information

Use the About LTFS-LE page in the LTFS-LE BUI to view the following LTFS-LE component information:

To access this page, click the **Settings** tab and select **About LTFS-LE** from the selection panel.

This page displays the following LTFS-LE component information:

- Product Version
- BUI Version
- BackUP Service Version
- LTFS_COMM Version
- Global Namespace Version
- JMS Tape Utilities
- MySQL Database Data Version
- MySQL Database Server Version
- Tape Automation Version
- Tape Monitor Service
- Weblogic Server Version

Scheduling a Local LTFS-LE Backup

The LTFS-LE BUI **System Backup** page enables you to schedule a local backup of the LTFS-LE database and shadow namespace to the LTFS-LE server, outside of the LTFS-LE application. You define the server backup location during LTFS-LE installation. Refer to the *StorageTek Linear Tape File System, Library Edition Planning and Installation Guide* for more information.

To access this page, click the **Settings** tab and select **System Backup** from the selection panel.

> **Note:** For information about performing a remote backup in a disaster recovery situation, see Chapter 10, "Backing Up and Restoring LTFS-LE".

To schedule the LTFS-LE system backup:

1. Do one of the following:

   - In the Start Time field, enter a time for the backup to begin. For example, 3:10 pm.
   - Click the **Select Time** icon to select a specific date and time from a calendar.

2. Under Recurring Frequency, select one of the following options to specify how often the backup occurs:

   - Daily
   - Weekly
   - Monthly

- Yearly

3. When the Recur Details dialog box appears, select one of the following:

   - For a weekly backup, select an option to indicate the day of the week when the backup should occur.

   - For a monthly backup, specify the day of the month when the backup should occur.

   - For a yearly backup, specify the day of the year when the backup should occur. Enter a date in the format *mm/dd/yyyy* or click the **Select Date** icon to select the date from a calendar.

4. Click **OK**. The Recur Details dialog box closes.

5. Click **Apply**. A confirmation dialog box appears, indicating that your input has been validated.

6. Click **OK** to close the dialog box.

7. On the System Backup page, click **OK**. A confirmation dialog box appears, indicating that your backup schedule is set.

8. Click **OK** to close the dialog box.

8

Managing LTFS-LE BUI User Access

This chapter describes how to manage user access to the LTFS-LE BUI. The following topics are included:

- "Access Control and User Roles" on page 8-1
- "Viewing Users from the User Management Page" on page 8-2
- "Performing User Management Tasks" on page 8-2

Access Control and User Roles

When you add a new LTFS-LE user, you assign a specific role that determines the user's access to the functions provided by the LTFS-LE BUI.

There is no limit to the number of users the administrator can define. However, each user can be associated with only one role.

You may assign any of the following roles:

- **Admin**

  This role is reserved for the system administrator responsible for configuring and managing the LTFS-LE system. It provides access to all LTFS-LE system facilities.

- **Monitor**

  This role applies to a basic user who wants to monitor drives, volumes, and system resources. It provides limited access to the LTFS-LE system, with read-only permissions.

- **Service**

  This role applies to the Service Representative. It provides Administrator level access, but uses login credentials that are specific to Services. This role may include additional command-line interface (CLI) capabilities for servicing procedures.

It is important to note that these roles apply only to LTFS-LE BUI access. They do not apply to client-level access to LTFS-LE.

The ability to define which files can be accessed depends on data path user roles outside of the control of LTFS-LE. Customers may associate access to LTFS-LE with the credentials in an existing infrastructure (LDAP, Active Directory or NIS+). In this scenario, file system users are authenticated with passwords managed by the external security infrastructure. Refer to the appropriate networking documentation for more information about these strategies.
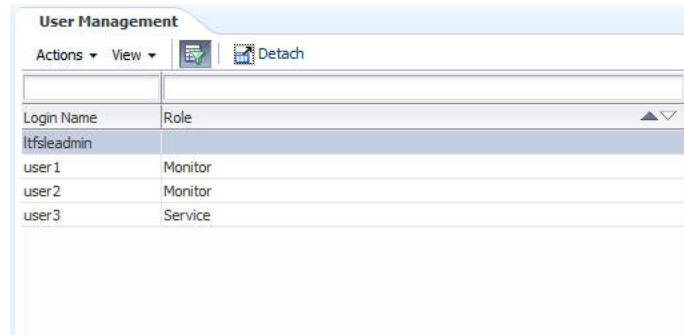
Viewing Users from the User Management Page

Use the User Management page in the LTFS-LE BUI to view a list of users.

To access this page, click the **Settings** tab and select **User Management** from the selection panel.

The following figure shows the User Management page:

Figure 8–1   LTFS-LE User Management page

As shown in Figure 8–1, the User Management page lists all LTFS-LE user login names and their assigned roles. In this example, the administrator has added three users.

Performing User Management Tasks

You can use the Action drop-down menu on the User Management page in the LTFS-LE BUI to perform the following user management tasks:

- Insert a user
- Edit a user
- Delete a user
- Change a password

Inserting a User

To insert a new user:

1. Click the **Settings** tab and select **User Management** from the selection panel.

   The User Management page appears.

2. From the User Management page, click the **Action** drop-down menu and select **Insert User**.

   The Insert User page appears.

3. In the Log in Name field, enter a name for the new user.

4. In the Password field, enter a password for the new user.

5. In the Confirm Password field, reenter the password.

6. Click the **Role** drop-down menu and select one of the following:

   - Admin
   - Monitor

■   Service

> **Note:**   See "Access Control and User Roles" on page 8-1 for
> information about these roles.

There is no limit to the number of users you can define. However, each user can be
associated with only one role.

7. Click **Apply**. Your settings are validated and the OK button becomes active.

8. Click **OK** to commit your settings or click **Cancel** to exit the page.

    Once you click **OK**, the User Management page appears and the new user is
    displayed in the listing.

Editing a User

To edit a user:

1. Click the **Settings** tab and select **User Management** from the selection panel.

    The User Management page appears.

2. From the User Management page listing, click the user name you want to edit.

3. Click the **Action** drop-down menu and select **Edit User**.

    The Edit User page appears.

4. Edit the Log in Name and Role as desired.

5. Click **Apply**. Your settings are validated and the OK button becomes active.

6. Click **OK** to commit your settings or click **Cancel** to exit the page.

    Once you click OK, the User Management page appears and your changes are
    displayed in the listing.

Deleting a User

To delete a user:

1. Click the **Settings** tab and select **User Management** from the selection panel.

    The User Management page appears.

2. From the User Management page listing, click the user name you want to delete.

3. Click the **Action** drop-down menu and select **Delete User**.

    A confirmation dialog box appears.

4. Click **OK** to delete the user, or click **Cancel** to return to the User Management
    page.

    Once you click OK, the User Management page appears and the deleted user no
    longer appears in the listing.

Changing a Password

To change a password:

1. Click the **Settings** tab and select **User Management** from the selection panel.

    The User Management page appears.

2. From the User Management page listing, click the user name whose password you want to change.

3. Click the **Action** drop-down menu and select **Change Password**.

   The Password page appears.

4. In the Old Password field, enter the existing password.

5. In the New Password field, enter a new password.

6. In the Confirm New Password field, enter the new password again.

7. Click **Apply**. Your input is validated and the OK button becomes active.

8. Click **OK** to commit your settings or click **Cancel** to exit the page.

9

Configuring the LTFS-LE Client

This chapter describes how to connect a Windows or Linux client to the LTFS-LE server using the Samba (CIFS) network protocol. It presents examples of typical LTFS-LE client configurations.

The following topics are included:

- "Configuring Samba on the LTFS-LE Server" on page 9-1
- "Connecting a Client to the LTFS-LE Server" on page 9-2

Configuring Samba on the LTFS-LE Server

Ensure that you have installed Samba client and server software as part of the Linux operating system installation, as described in the *Linear Tape File System, Library Edition Planning and Installation Guide*.

Once you have installed the Samba software, you must perform the following steps to configure this software on the server:

> **Note:** The following represents a sample configuration. For complete configuration instructions you can use to customize and tune your Samba configuration, refer to the Samba documentation available at:
>
> http://www.samba.org

1. Add a share definition entry to the /etc/samba/smb.conf file pointing to the /LTFSLE directory.

   It is recommended that you first make a backup of the original:

   ```
   # cp /etc/samba/smb.conf /etc/samba/smb.conf.ORIG
   ```

2. Edit the etc/samba/smb.conf shared definitions entry.

   For example:

   ```
   #===== Share Definitions =====

   [LTFSLE]
       comment = Oracle StorageTek Library Tape Filesystem
       path = /LTFSLE
       browseable = yes
       writable = yes
       public = yes
       read only = no
       printable = no
   ```

```
    guest ok = yes
    strict locking = yes
#=============================
```

> **Note:** In the example above, the **LTFSLE** share definition entry is the name of the share that the client will connect to. It does not need to match the specified path. However, the path must exist on the server.

3. Add a Samba user to access the share.

   In the following example, user `root` is added with a password of `ltfs1234`:

   ```
   # smbpasswd -a root
   New SMB password: ltfs1234
   Retype new SMB password: ltfs1234
   ```

4. Enter the following command to start the Samba server services on the LTFS-LE server:

   ```
   # service smb start
   ```

   The following confirmation messages are displayed:

   ```
   Starting SMB services:    [  OK  ]
   Starting NMB services:    [  OK  ]
   ```

   Samba server configuration is complete.

Connecting a Client to the LTFS-LE Server

LTFS-LE supports both Windows and Linux clients. The following sections include examples of client connections using the Samba (CIFS) network protocol.

Connecting a Windows Client

Microsoft Windows includes Samba (CIFS) client capabilities that allow you to map to the /LTFSLE Samba share on the LTFS-LE server.

Once you create this client connection, you can use a Samba client session to access files included in the LTFS-LE library.

Mapping the Windows Client

To create the Windows client connection:

From a Windows 7 client system, perform the following steps:

1. From the Desktop, right-click the Computer icon and select **Map Network Drive**.

   The Map Network Drive dialog box appears.

2. Click the **Drive** menu and select a drive letter to dedicate to this client connection.

3. In the Folder field, enter the path to the LTFS-LE Samba share, using the following format:

   `\\`*`servername.domain`*`\`*`share`*

   where:

   ■ *servername.domain* is the path to the LTFSLE server.

- *share* is the LTFS-LE share name you defined as part of LTFS-LE Samba server configuration. See "Configuring Samba on the LTFS-LE Server" on page 9-1.

4. Click **Finish**.

The Windows Security dialog box appears.

5. Enter the User name and password you defined during LTFS-LE Samba server configuration. See "Configuring Samba on the LTFS-LE Server" on page 9-1.

6. Click **OK**.

The client connection is now mapped to the Samba share on the LTFS-LE server.

### Adjusting the Samba Client Session Timeout Value

By default, each Windows Samba client session features an automatic 45 second timeout period that takes effect after the precalculated Samba (CIFS) response time expires. This timeout value is specified by the SESSTIMEOUT parameter, included in the Windows registry.

To avoid undesired timeout events from occurring during LTFS-LE client/server processing, it is recommended that you increase the SESSTIMEOUT parameter value.

To increase the SESSTIMEOUT value:

1. From the Windows Start menu, select the Run command.

The Run dialog box appears.

2. Enter `regedit` and click **OK**.

The Registry Editor window appears.

3. Navigate to the following directory:

```
\HKEY_LOCAL_
MACHINE\SYSTEM\CurrentControlSet\Services\LanmanWorkstation\Parameters\
```

4. Right-click **Parameters** and select **New**, followed by **DWORD (32-bit) Value**, as shown in the following figure:

Figure 9–1   New DWORD Value
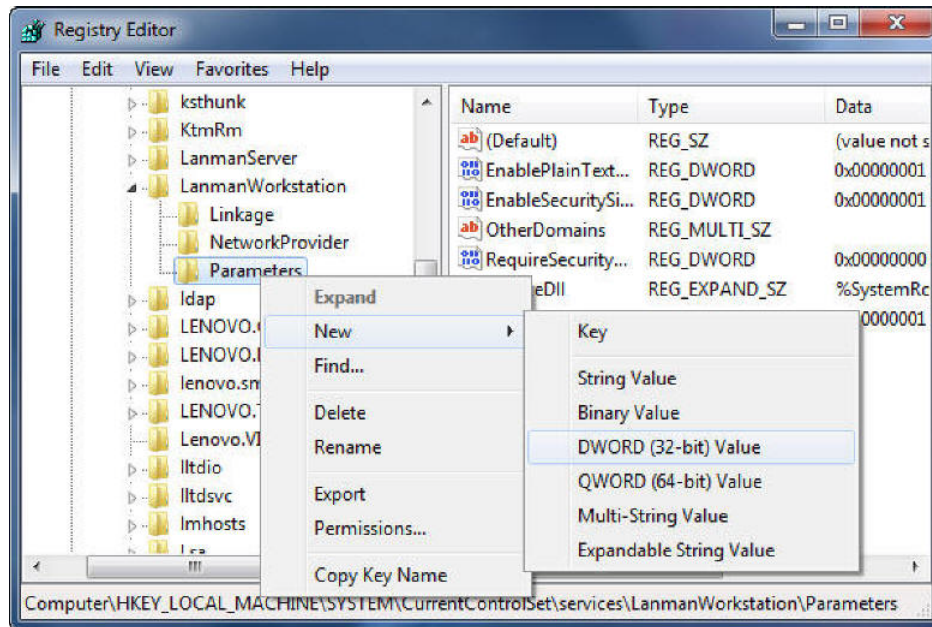
5. Rename `New Value #1` to `SessTimeout`.

6. Right-click **SessTimeout** and select **Modify**.

    The Edit DWORD (32-bit) Value dialog box appears.

7. Select **Decimal** under Base, and enter an integer value in the Value data field. This
    value represents the new client timeout value, in seconds.

    In the following example, this value is set to 1200 seconds (20 minutes):

*Figure 9–2   Edit DWORD Value Dialog Box*
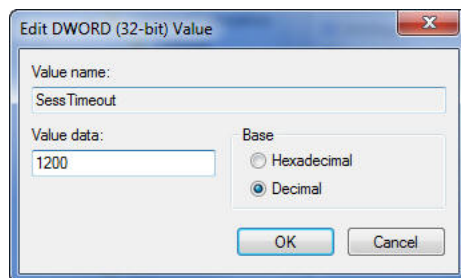
8. Click **OK**.

Starting a Samba Client Session

To start a Samba LTFS-LE client session:

1. In Windows, double-click the Computer icon and locate the mapped Samba share
    (drive).

2. Open the Samba share.

    A Windows security dialog box appears.

3. Enter the user name and password you defined during LTFS-LE Samba server
   configuration and click **OK**.

The LTFS-LE Samba share opens. It contains the LOST+FOUND+VOLUMES folder, as shown in the following figure:

*Figure 9–3 LTFS-LE Client LOST+FOUND+VOLUMES Folder*
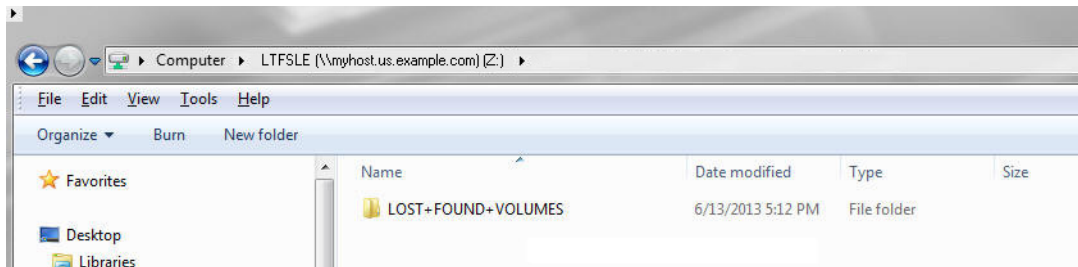
4. Open the LOST+FOUND+VOLUMES folder to display the LTFS-LE Volume folders. Each folder represents an LTFS formatted volume in the LTFS-LE library, as shown in the following figure:

Figure 9–4 LTFS-LE Client Volumes
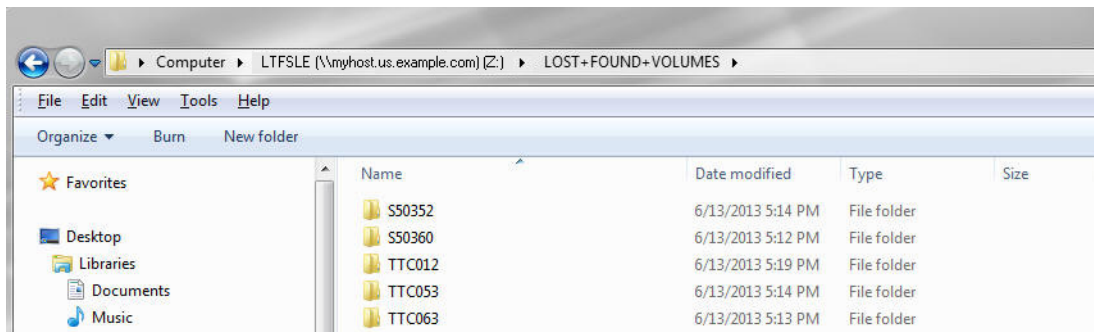
5. Open a volume folder to display its file contents, as shown in the following figure:

Figure 9–5 LTFS-LE Client Files
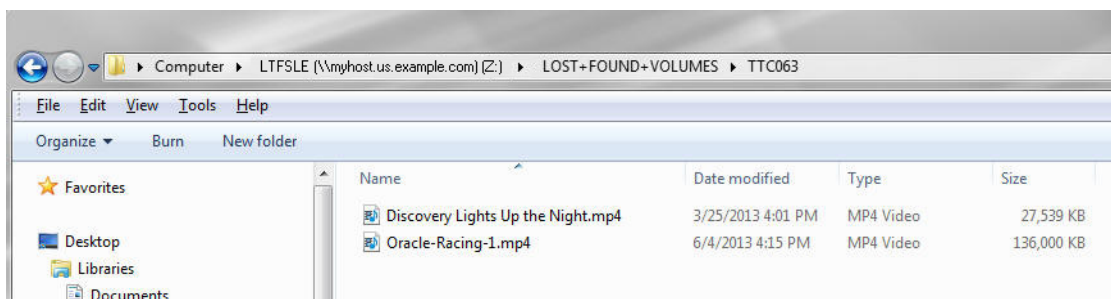
6. You can drag and drop individual files to your desktop. If you encounter a Windows Security message, click OK to proceed.

> **Note:** Though it is possible to open a file directly from a volume folder, Oracle strongly recommends that you only **copy** files to and from volume folders to preserve drive resources for other users.

Connecting a Linux Client

To configure the Linux client:

1. By default, the Samba client software package should already be installed on the Linux client system. For verification, enter the following command from the Linux client system:

    ```
    # rpm -qa |grep samba
    ```

    The installed packages are displayed:

    ```
    samba-common-version.platform
    samba-client-version.platform
    ```

    > **Note:** *version* and *platform* may vary depending on the Linux distribution you are using.

    > **Note:** You can install any of the required Samba software packages from the Oracle Enterprise Linux x86_64 DVD you used to install the operating system.

2. Create a mount point for the Samba share. For example:

    ```
    # mkdir /mnt/LTFSLE
    ```

3. Mount the LTFSLE share from the LTFS-LE server to the client. For example:

    ```
    # mount -t cifs //LTFSLE-server.domain.com/LTFSLE /mnt/LTFSLE
    -orw,noacl,rsize=1048576,wsize=1048576
    ```

    Where *LTFSLE-server.domain*.com is the name of your LTFS-LE server.

4. At the Password prompt, enter your password to access the Samba share on the LTFS-LE server.

5. Enter the following command to check the mount:

    ```
    # mount
    ```

    The following is displayed:

    ```
    //LTFSLE-server.domain.com/on /mnt/bohemia-LTFSLE-smb type cifs (rw,mand)
    ```

6. Enter the following command to view the volumes on the Samba share:

    ```
    # ls /mnt/LTFSLE
    ```

    The LTFS-LE LOST+FOUND+VOLUMES directory is listed:

    ```
    LOST+FOUND+VOLUMES   S50348   TTC063
    ```

    This directory contains a separate subdirectory for each LTFS-LE formatted volume. You can move files to and from these directories.

> **Note:**   Though it is possible to open a file directly from a volume folder, Oracle strongly recommends that you only **copy** files to and from volume folders to preserve drive resources for other users.

7. Optionally, disable opportunistic locking.

On Linux Samba clients, data transfers of large files or multiple smaller files to tape volumes can cause connection resets (producing I/O errors). To remedy this issue, you can disable opportunistic locking on the Linux Samba client by running the following command on the Linux Samba client machine:

```
# echo 0 > /proc/fs/cifs/OplockEnabled
```

To return to the default, issue the following command:

```
# echo 1 > /proc/fs/cifs/OplockEnabled
```

> **Note:**   No action is required on the Samba server (LTFS-LE server).

10

Backing Up and Restoring LTFS-LE

This chapter describes how to backup and restore the LTFS-LE system. The following topics are included:

Overview

The backup and restore procedure outlines the steps to follow to backup, uninstall, re-install and restore the LTFS-LE 1.0.*x* product, including the MySQL database and the global namespace metadata. This procedure can also be used when a complete system failure or disaster occurs.

The restore procedure may include a complete re-installation of the operating system and the LTFS-LE product components (complete system failure). The restore procedure may also be performed without re-installing the operating system. This recovery process relies on the retention of a complete database and global namespace metadata backups of the existing system and platform that is maintained externally from the current system.

This procedure is specific to only a complete LTFS-LE backup and restore where the hardware, library configuration and volume set have not changed. Other types of recovery have different procedures with different levels of completeness and point-in-time recovery service level goals.

> **Note:** It is very important that the expectation for the level of recovery is only up to the time of the backup being restored. For example, the database backup was taken at 1:14 AM. Any changes to the database after this time are stored in redo-logs and would be lost if a complete loss of the system (disaster) occurred.

> **Note:** No new product updates or versions can be introduced before the database recovery is complete. This would introduce unnecessary risk as results are unpredictable and may cause the product or platform to become unstable and not supportable.

Creating Your Backup Directory

Backup of the LTFS-LE 1.0.*x* MySQL database and LTFS-LE 1.0.*x* global namespace metadata must be automated and stored externally off the LTFS-LE system. To do this:

1. Supply the external NFS mountpoint and manage disk space and backup rotation.

   Example Exported NFS Mountpoint:

   /mnt/*backups*

   In the example above, *backups* is the name of your backup directory and will be used in the examples in this chapter.

2. Configure the off-system, external NFS mountpoint in the LTFS-LE BUI and schedule System Backups on at least a daily basis.

Backing Up LTFS-LE

For a known point-in-time backup of the LTFS-LE components, run:

```
# /var/opt/mysql/mysql/scripts/backupDBAndMetadata.sh /mnt/backups
```

Example Output:

```
/backups/LtfsleDB_SLV_Backup_1370896815.cur
/backups/LTFS-LE-metadata_Backup_1370896816.tar
```

Restoring LTFS-LE

1. Depending of the type of restore you need to perform, select one of the following:

   - Completely re-install the operating system and LTFS-LE components (when a system failure or disaster occurs).

     Refer to the *StorageTek Linear Tape File System, Library Edition 1.0 Planning and Installation Guide* for more information.

   - Re-install the LTFS-LE components (without re-installing the operating system) by running the LTFS-LE uninstall program.

     Note: This option relies on the retention of a complete database and global namespace metadata backups of the existing system and platform that is maintained externally from the current system.

     Refer to Uninstalling LTFS-LE in the *StorageTek Linear Tape File System, Library Edition 1.0 Planning and Installation Guide* for more information.

     To uninstall LTFS-LE (after you have backed up LTFS-LE), change to the downloads directory and run the following uninstall script:

     ```
     manageLtfsleServices -t
     manageLtfsleServices -i
     ```

> **Note:** Review the output from the `manageLtfsleServices -i` command to verify that all the LTFS-LE services have terminated.
>
> If they have terminated, continue with the uninstall script. If they have not terminated, reboot the system, then restart the uninstall process beginning with step 1.

```
./uninstallLTFSLE.sh
```

2. Complete a new installation of LTFS-LE 1.0.*x*.

> **Note:** No new product updates or versions can be introduced before the database recovery is complete. This would introduce unnecessary risk as results are unpredictable and may cause the product or platform to become unstable and not supportable.

Follow the *StorageTek Linear Tape File System, Library Edition 1.0 Planning and Installation Guide* as if you were installing for the first time. You do not have to install the operating system if you have already backed up LTFS-LE.

3. After the final restart of the LTFS-LE process, shutdown all LTFS-LE 1.0.*x* Linux services.

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices –t
```

4. Verify LTFS-LE 1.0.*x* services have been shutdown.

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices –i
```

5. Copy the most recent MySQL database and global namespace backups from the external mountpoint preserving the date and time of the file. Use -p (preserve original date and time stamp) as in the following example to a local temporary directory (example: tmp/database).

```
mkdir /tmp/database
cp -pr /backups/* /tmp/database
```

6. Disable all LTFS-LE services to prevent any premature startup of the database.

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices –d
```

7. Restore the MySQL database.

```
# /var/opt/mysql/mysql/scripts/restoreDB.sh /tmp/database
```

8. Force a new MySQL 1.0 database backup.

```
# /var/opt/mysql/mysql/scripts/backupDB.sh /backups
```

Example Output:

```
/backups/LtfsleDB_SLV_Backup_1366311254.cur
```

9. Restore the LTFS-LE 1.0.*x* global namespace metadata from the TAR image backup maintained externally from the system.

Example:

```
# cd /
```

```
# tar -xvpf /tmp/database/LTFS-LE-metadata_Backup_1363958591.tar
```

10. Enable all previously disabled LTFS-LE 1.0.*x* Linux services.

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -a
```

11. Restart the system using either of the following commands:

- `# reboot -n`

- `# shutdown -n` *X* `-r`

  where X is the number of minutes before the system reboots.

  Note: Enter `# shutdown --help` for additional options.

  ---

12. Verify that all services are started quickly (3-8 minutes after startup).

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -i
```

13. Verify that the database data has been restored by using the LTFS-LE BUI and navigating to the Storage tab.

The LTFS-LE software automatically executes auto rediscovery on restart. Verify that the drives are online and volumes are in the same state as when the last backup was taken.

11

Troubleshooting

This chapter includes information to help you troubleshoot the LTFS-LE system. The following topics are included:

- "Volume Processing Failure Due to File System Check Timeout" on page 11-1
- "Log Rotation and Orphan Logs" on page 11-3
- "Handling Unavailable Volumes" on page 11-3
- "Handling Drives in Pending State" on page 11-6
- "Linux Commands and Utilities" on page 11-7

Volume Processing Failure Due to File System Check Timeout

During library discovery, LTFS-LE processes each volume. As part of this process, LTFS-LE performs a file system check.

In certain instances, a volume may not be processed due to a file system check timeout. This is indicated in the Recent Events pane displayed in the LTFS-LE BUI Dashboard page, as shown in the following figure:

Figure 11–1   File System Check Timeout

As shown in Figure 11–1, the file system check for volume F52268 failed due to an auto processing event lasting more than two hours.

This is indicated by the following event entries near the top of the display:

```
Volume F52268 auto processing complete.
Dismount File System for Volume F52268 failed.
Check the system for volume F52268 failed.
Dismount File System for Volume F52268 failed.
```

When this condition occurs, perform the following steps to re-process the volume:

1. Log into the LTFS-LE server and issue the following command to check whether the file system check (ltfsck) command is still running:

    ```
    [root@ltfssrv LTFS_LE_TUTILS]# ps -elf | grep ltfsck
    ```

    Example output:

    ```
    0 S root     30029 29971  0  78   0 - 16485 wait   13:12 pts/12   00:00:00 sh
    ```

```
-c /usr/local/bin/ltfsck  -e orcltape /dev/st0 2>&1

4 S root    30030 30029  0  75   0 - 12804 sg_ioc 13:12 pts/12   00:00:00
/usr/local/bin/ltfsck -e orcltape /dev/st0

0 S root    30032 28601  0  78   0 - 15293 pipe_w 13:13 pts/18   00:00:00 grep
ltfsck
```

2. Once you confirm that there is no ltfsck process running, use ACSLS to dismount the volume.

3. Once the volume is successfully dismounted from ACSLS, use the LTFS-LE BUI to eject the volume. See "Ejecting Volumes" on page 5-11.

4. Once the volume is successfully ejected, transfer the volume to a standalone server with LTFS Open Edition (LTFS-OE) installed.

5. Issue one of the following file system check (ltfsck) commands to perform a manual file system check for the drive that has mounted the volume:

```
/usr/local/bin/ltfsck -e orcltape /dev/st?
/usr/local/bin/ltfsck -e ibmtape /dev/IBMTape?
/usr/local/bin/ltfsck -e ltotape /dev/st?
```

   Substitute the actual drive identifier for `st?` or `IBMTape?`.

   Refer to the *LTFS Open Edition Readme* for a list of available command options.

6. Once the ltfsck command succeeds, you may re-introduce the volume into the library. See "Entering Volumes Using ACSLS" on page 5-9.

7. Wait for LTFS-LE auto-processing to complete to begin using the volume.

Log Rotation and Orphan Logs

As with any normally functioning software system, LTFS-LE generates logging information that is persisted in the internal drives.

LTFS-LE utilizes standard Linux log rotating functionality to maintain disk usage at a manageable size while providing up to date information to help the service representative debug an issue. Once logs reach a certain size, they are rotated and old logs are purged.

To further manage disk space, the service representative may choose to change the number of logs retained in the system. This may result in old orphan logs being retained, but not rotated. In this situation, it is recommended that the service representative manually remove the orphan logs. These logs are identified by dated timestamps, and are larger than the new log rotate value.

Handling Unavailable Volumes

When a volume appears "greyed out" on the LTFS-LE BUI Manage Volumes page, this indicates that this volume is unavailable.

The following figure shows the LTFS-LE BUI Manage Volumes page, with the highlighted volume (ISR932) greyed-out.

Figure 11–2 Unavailable Volume

Volume Serial Number	Volume Type	Capacity Available (TB)	Capacity Used (TB)	Status	Availability	LTFS-LE Assignment	Volume Pool
SF6211	LTO-2.5T	2.21	0.00	Idle	Online	Assigned	Default Volume Pool
S50333	LTO-1.5T	1.28	0.03	Idle	Offline	Unassigned	
ISR932	T10000T2	7.24	0.00	Idle	Online	Assigned	Default Volume Pool
S50348	LTO-1.5T	0.40	0.92	Idle	Online	Assigned	Default Volume Pool

This condition can occur for the following reasons:

- A user opens the library and physically removes volume media. When the library is either manually or automatically rediscovered, LTFS-LE is out of sync with ACSLS. LTFS-LE marks the removed volume as unavailable in its database, and the volume is greyed out in the LTFS-LE BUI.

- LTFS-LE software cannot resolve errors on a tape or tape drive. The volume is left in the drive, but LTFS-LE marks the volume as unavailable in its database, and the volume is greyed out in the LTFS-LE BUI.

In both cases, an error message is displayed in the LTFS-LE Dashboard, indicating that manual intervention is required to correct the problem.

If this condition occurs, perform the following steps to remove the volume from the LTFSLE database:

1. From the Manage Volumes page in the LTFSLE BUI, record the Volume Serial Number for the unavailable volume that is greyed out.

2. Log in to the LTFSLE server as the root user.

3. Issue the following command to navigate to the LTFS-LE bin directory:

   ```
   # cd /var/opt/Oracle/LTFS_LE/bin
   ```

4. Issue the following command to run the LTFS-LE CLI tool:

   ```
   # java -jar LTFSLE_FixTool.jar

   Command List.
   .
           1. chgdrvpendingsta command.
   .

                   Usage: chgdrvpendingsta <Drive serial number>
                   Example 1: chgdrvpendingsta 576001000419
                   Example 2: chgdrvpendingsta 576001000421
           2. delunavailablevol command.
   .

                   Usage: delunavailablevol <Volume serial number>
                   Example 1: delunavailablevol ISR401
                   Example 2: delunavailablevol ISR402
   .
           3. quit.
   .
   ltfs>
   .
   ```

5. Run the `delunavailablevol` command on the Volume that is grayed out, supplying the Volume Serial Number you recorded in step 1.

   For example:

```
ltfs> delunavailablevol ISR213
.
Unavailable volume <ISR213> is deleted successfully!
.
```

6. Issue the following command to quit the LTFS-LE CLI Tool:

```
ltfs> quit
```

7. Issue the following command to stop LTFS-LE services:

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -t
```

8. Issue the following series of commands to check whether the back end LTFS file system is still mounted, and then dismount all file systems. Wait until the LTFS process completes.

```
# mount | grep -i LTFS_LE
# dismount -f <LTFS mount point>
# ps -elf | grep "/usr/local/bin/ltfs"
```

9. Issue the following series of commands to identify drives with mounted volumes, and rewind and unlock the volumes:

```
# sg_inq /dev/st?
# mt -f /dev/st?  rewind
# mt -f /dev/st?  unlock
```

10. Use the file system check (ltfsck) command to repair the volume's file system. Refer to the *LTFS Open Edition Readme* for a list of available command options.

If this action fails, issue the ltfsck command from a standalone system with LTFS Open Edition software installed.

11. Using ACSLS, manually remove the volume from the drive and eject it from the library. Use the Force option.

12. Issue the following command to restart LTFS-LE services:

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -s
```

13. Issue the following command to ensure that all LTFS-LE services are running:

```
# /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -i
```

14. Re-enter the volume with the repaired file system into the library.

Handling Drives in Pending State

When you want to place all drives of a specific type (for example, all T10000C drives) offline, it is important to first place all media of that type offline. Otherwise, the last drive matching that drive type may remain in an Availability "Pending" state on the Manage Drives page in the LTFS-LE BUI, as shown in the following figure:

Figure 11–3   Drive in Pending State

Drive Name	Drive Model	Drive Manufacturer	Drive Serial Number	LTFS-LE Assignment	Availability	Drive Path	ACS	Drive Pool
1068002719	IBM-LTO5	IBM	1068002719	Assigned	Online	/mnt/LTFS_LE/objects/loss_1068002719	1 ,0 ,12 ,0	Default Drive Pool
HU1104ETMH	HP-LTO5	HP	HU1104ETMH	Assigned	Online	/mnt/LTFS_LE/objects/loss_HU1104ETMH	1 ,0 ,12 ,1	Default Drive Pool
579001000425	T1D	STK	579001000425	Assigned	Pending	/mnt/LTFS_LE/objects/loss_579001000425	1 ,0 ,12 ,2	Default Drive Pool
1068014012	IBM-LTO6	IBM	1068014012	Assigned	Online	/mnt/LTFS_LE/objects/loss_1068014012	1 ,0 ,12 ,4	Default Drive Pool
HU1325W7BA	HP-LTO6	HP	HU1325W7BA	Assigned	Online	/mnt/LTFS_LE/objects/loss_HU1325W7BA	1 ,0 ,12 ,5	Default Drive Pool

As shown in Figure 11–3, the highlighted drive (579001000425) displays a "Pending" Availability state, and cannot be used.

If this condition occurs, perform the following steps to clear the drive from the "Pending" state:

1. From the Manage Drives page in the LTFSLE BUI, record the drive serial number for the drive that is in a "Pending" state.

2. Log in to the LTFSLE server as the root user.

3. Issue the following command to navigate to the LTFS-LE bin directory:

   ```
   # cd /var/opt/Oracle/LTFS_LE/bin
   ```

4. Issue the following command to run the LTFS-LE CLI tool:

   ```
   # java -jar LTFSLE_FixTool.jar

   Command List.
   .
           1. chgdrvpendingsta command.
   .

                   Usage: chgdrvpendingsta <Drive serial number>
                   Example 1: chgdrvpendingsta 576001000419
                   Example 2: chgdrvpendingsta 576001000421
       2. delunavailablevol command.
   .

                   Usage: delunavailablevol <Volume serial number>
                   Example 1: delunavailablevol ISR401
                   Example 2: delunavailablevol ISR402
   .
           3. quit.
   .
   ltfs>
   .
   ```

5. Run the `chgdrvpendingsta` command on the drive that is a "Pending" state, supplying the serial number you recorded in step 1.

   For example:

   ```
   ltfs> chgdrvpendingsta HU1104ETMM
   .
   Drive Status was set to Offline state if previous state is Pending.(Current
   @ Status is Offline.)
   ```

```
.
ltfs>
.
```

6. Issue the following command to quit the LTFS-LE CLI Tool:

   ```
   ltfs> quit
   ```

7. Issue the following command to stop LTFS-LE services:

   ```
   # /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -t
   ```

8. Issue the following command to restart LTFS-LE services:

   ```
   # /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -s
   ```

Linux Commands and Utilities

The following Linux commands and utilities may be useful when troubleshooting LTFS-LE server issues.

Managing LTFS-LE Services

Issue the following command to start, stop, or disable LTFS-LE services, or to display information about LTFS-LE services:

Command

/var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices [-h] [-s] [-t] [-i] [-r] [-a] [-d] [-l]

-h displays this (help) message

-s starts LTFS-LE services

-t terminates/stops/shuts down LTFS-LE services

-i displays information/status LTFS-LE services

-r is reserved for future services use

-a adds an LTFS-LE service

-d deletes/disables an LTFS-LE service

-l lists service by name in start order

Sample Output

The following is sample output of this command with the -i option specified:

```
Wed Jul 17 17:18:56 MDT 2013 - INFO: Beginning Management of LTFS-LE Services...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE MySQL Replication Master: LTFS-LE MySQL
Replication Master instance is up and running, pid=6225...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE MySQL Replication Slave: LTFS-LE MySQL
Replication Slave instance is up and running, pid=6282...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE Global Namespace Service: INFO: LTFS-LE
Global Namespace Service filesystem is mounted and available, filesystem(s)=/mnt/LTFS_LE/metadata
on /LTFSLE type LTFS_LE (rw,dir=/mnt/LTFS_LE/metadata/,debug=1)...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE Weblogic Application Server: INFO: LTFS-LE
Weblogic Server process is up and running, pid(s)=6496...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE Backup Service: LTFS-LE Backup Service
instance is up and running, pid=6763...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE Tape Automation Service: INFO: LTFS-LE Tape
Automation Main Service process is up and running, pid(s)=6977...
```

```
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE Tape Monitor Service: LTFS-LE Tape
Automation Monitor Service process is up and running, pid(s)=7014...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE JMS Utils Service: INFO: LTFS-LE JMS Tape
Utils Service process is up and running, pid(s)=7114...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Statusing LTFS-LE Comm Service: INFO: LTFS-LE Comm Service
process is up and running, pid(s)=7249...
Wed Jul 17 17:18:56 MDT 2013 - INFO: Finishing Management of LTFS-LE Services...
```

Terminating LTFS-LE Services Prior to Server Reboot

Before rebooting the LTFS-LE server, use the following commands to gracefully shut down LTFS-LE services.

1. Issue the following command to stop LTFS-LE services:

    ```
    # /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -t
    ```

2. Issue the following command to confirm that LTFS-LE has shut down without error (no "manual intervention" messages):

    ```
    # /var/opt/Oracle/LTFS_LE/bin/manageLtfsleServices -i
    ```

    If the manageLtfsleServices command has not completed without error and the -i information option does not indicate "Not running" for all services, then you must manually interrogate LTFS-LE and ACSLS to determine whether any tapes remain loaded in the tape drives.

3. Once you confirm that LTFS-LE services have successfully terminated and that all volumes are in their home slots (via ACSLS), it is safe to reboot the server.

Listing Drives on the Linux System

Issue the following commands to obtain drive information, including vendor, model, device path, and firmware version:

Command
```
# lsscsi -g | grep tape
```

Sample Output
```
[7:0:0:0]    tape    STK    T10000C         1.57  /dev/st0  /dev/sg2
[7:0:1:0]    tape    STK    T10000C         1.57  /dev/st1  /dev/sg3
[7:0:2:0]    tape    HP     Ultrium 5-SCSI  I3CS  /dev/st2  /dev/sg4
[7:0:3:0]    tape    HP     Ultrium 5-SCSI  I59S  /dev/st3  /dev/sg5
[7:0:4:0]    tape    IBM    ULTRIUM-TD5     B173  -         /dev/sg6
[7:0:5:0]    tape    IBM    ULTRIUM-TD5     BBN2  -         /dev/sg7
[7:0:6:0]    tape    HP     Ultrium 5-SCSI  I59S  /dev/st4  /dev/sg8
[7:0:7:0]    tape    IBM    ULTRIUM-TD5     BBN2  -         /dev/sg9
[7:0:8:0]    tape    STK    T10000D         406.  /dev/st5  /dev/sg10
[7:0:9:0]    tape    STK    T10000D         406.  /dev/st6  /dev/sg11
#
```

Command
```
# cat /proc/scsi/scsi
```

Sample Output
```
Attached devices:
Host: scsi0 Channel: 00 Id: 00 Lun: 00
```

```
     Vendor: SEAGATE  Model: ST973402SSUN72G  Rev: 0603
       Type:   Direct-Access                  ANSI SCSI revision: 05
Host: scsi0 Channel: 00 Id: 01 Lun: 00
     Vendor: SEAGATE  Model: ST973402SSUN72G  Rev: 0603
       Type:   Direct-Access                  ANSI SCSI revision: 05
Host: scsi7 Channel: 00 Id: 00 Lun: 00
     Vendor: STK      Model: T10000C           Rev: 1.57
       Type:   Sequential-Access              ANSI SCSI revision: 05
Host: scsi7 Channel: 00 Id: 01 Lun: 00
     Vendor: STK      Model: T10000C           Rev: 1.57
       Type:   Sequential-Access              ANSI SCSI revision: 05
Host: scsi7 Channel: 00 Id: 02 Lun: 00
     Vendor: HP       Model: Ultrium 5-SCSI    Rev: I3CS
       Type:   Sequential-Access              ANSI SCSI revision: 06
Host: scsi7 Channel: 00 Id: 03 Lun: 00
     Vendor: HP       Model: Ultrium 5-SCSI    Rev: I59S
       Type:   Sequential-Access              ANSI SCSI revision: 06
Host: scsi7 Channel: 00 Id: 04 Lun: 00
     Vendor: IBM      Model: ULTRIUM-TD5       Rev: B173
       Type:   Sequential-Access              ANSI SCSI revision: 06
Host: scsi7 Channel: 00 Id: 05 Lun: 00
     Vendor: IBM      Model: ULTRIUM-TD5       Rev: BBN2
       Type:   Sequential-Access              ANSI SCSI revision: 06
Host: scsi7 Channel: 00 Id: 06 Lun: 00
     Vendor: HP       Model: Ultrium 5-SCSI    Rev: I59S
       Type:   Sequential-Access              ANSI SCSI revision: 06
Host: scsi7 Channel: 00 Id: 07 Lun: 00
     Vendor: IBM      Model: ULTRIUM-TD5       Rev: BBN2
       Type:   Sequential-Access              ANSI SCSI revision: 06
Host: scsi7 Channel: 00 Id: 08 Lun: 00
     Vendor: STK      Model: T10000D           Rev: 406.
       Type:   Sequential-Access              ANSI SCSI revision: 05
Host: scsi7 Channel: 00 Id: 09 Lun: 00
     Vendor: STK      Model: T10000D           Rev: 406.
       Type:   Sequential-Access              ANSI SCSI revision: 05
#
```

Listing IBM Tape Devices

Issue the following command to list IBM tape device numbers and driver versions:

Command

```
# cat /proc/scsi/IBMtape
```

Sample Output

```
lin_tape version: 1.76.0
lin_tape major number: 252
Attached Tape Devices:
Number  model        SN             HBA            SCSI          FO Path
0       ULTRIUM-TD5 1068008446      lpfc           7:0:4:0       NA
1       ULTRIUM-TD5 9068800738      lpfc           7:0:5:0       NA
2       ULTRIUM-TD5 9068800775      lpfc           7:0:7:0       NA
#
```

Determining Drive Communications

Issue this command to determine whether a drive is communicating. The drive serial number is also returned.

Command

```
# sg_inq /dev/sg3
```

Sample Output

```
standard INQUIRY:
  PQual=0  Device_type=1  RMB=1  version=0x05  [SPC-3]
  [AERC=0]  [TrmTsk=0]  NormACA=0  HiSUP=0  Resp_data_format=2
  SCCS=0  ACC=0  TPGS=1  3PC=0  Protect=1  BQue=0
  EncServ=0  MultiP=1 (VS=0)  [MChngr=0]  [ACKREQQ=0]  Addr16=0
  [RelAdr=0]  WBus16=0  Sync=0  Linked=0  [TranDis=0]  CmdQue=0
  [SPI: Clocking=0x0  QAS=0  IUS=0]
    length=74 (0x4a)   Peripheral device type: tape
 Vendor identification: STK
 Product identification: T10000C
 Product revision level: 1.57
 Unit serial number: 576001000504
#
```

Displaying Drive Status

Issue this command to obtain current drive status details.

Command

```
# mt -f /dev/st2 status
```

Sample Output

```
SCSI 2 tape drive:
File number=0, block number=0, partition=0.
Tape block size 0 bytes. Density code 0x4c (no translation).
Soft error count since last status=0
General status bits on (41010000):
 BOT ONLINE IM_REP_EN
#
```

Viewing LTFS-LE Error Messages

Issue this command to search for LTFS-LE error messages.

Command

```
# view /var/log/messages
```

Sample Output

```
Search for "LTFS" and "ltfs"
#
```

Listing LTFS-LE Drive Dumps

LTFS-LE drive dumps are located in /var/log.

Command

```
# ls /var/log/ltfs*
```

Sample Output

```
# ls /var/log/ltfs*
/var/log/ltfs_20130522_063813_HU1246T79Y.ltd  /var/log/ltfs_20130610_094800_HU1246T79Y.ltd
/var/log/ltfs_20130522_083536_HU1246T79Y.ltd  /var/log/ltfs_20130610_094828_HU1246T7B4.ltd
/var/log/ltfs_20130522_093815_HU1246T79Y.ltd  /var/log/ltfs_20130610_144131_HU19477N8F.ltd
/var/log/ltfs_20130523_114650_HU1246T7B4.ltd  /var/log/ltfs_2013_0610_144600.dmp
/var/log/ltfs_20130523_114917_HU1246T7B4.ltd  /var/log/ltfs_2013_0610_144600_f.dmp
#
```

Obtaining Detailed SCSI Traces in /var/log/messages

Issue this series of commands to obtain SCSI traces.

Commands and Sample Output

Display current level:

```
# sysctl dev.scsi.logging_level
dev.scsi.logging_level = 0
```

If not level 128, enable level 128:

```
# sysctl -w dev.scsi.logging_level=128
dev.scsi.logging_level = 128
```

For very detailed scsi logging for short periods of time, enable level -1:

```
# sysctl -w dev.scsi.logging_level=-1
dev.scsi.logging_level = -1
```

Log output will be in /var/log/messages.

Displaying Oracle Enterprise Linux (OEL) Version

Issue this command to display information about the OEL version currently running.

Command

```
# uname -a &&  cat /etc/*release
```

Sample Output

```
Linux busch.central.sun.com 2.6.18-194.el5 #1 SMP Tue Mar 16 21:52:39 EDT 2010
x86_64 x86_64 x86_64 GNU/Linux
Red Hat Enterprise Linux Server release 6.5 (Santiago)
```

Displaying Detailed Drive and Media Status

Issue this command to display detailed drive and media status details.

Command

```
# tapeinfo -f /dev/sg2
```

Sample Output

```
Product Type: Tape Drive
        Vendor ID: 'HP      '
        Product ID: 'Ultrium 5-SCSI  '
        Revision: 'I59S'
        Attached Changer: No
        SerialNumber: 'HU19477N8F'
        MinBlock:1
        MaxBlock:16777215
        SCSI ID: 0
        SCSI LUN: 0
        Ready: yes
        BufferedMode: yes
        Medium Type: Not Loaded
        Density Code: 0x58
        BlockSize: 0
        DataCompEnabled: yes
        DataCompCapable: yes
        DataDeCompEnabled: yes
        CompType: 0x1
        DeCompType: 0x1
        BOP: yes
        Block Position: 0
#
```

Displaying Mounted File Systems

Issue this command to display file system information, along with used space and available space.

Command

```
# df
```

Sample Output

```
Filesystem          1K-blocks       Used Available Use% Mounted on
/dev/mapper/VolGroup00-LogVol00
                    525579536  18681380 479769532   4% /
/dev/sda1              988088      29736    907348   4% /boot
tmpfs               12265656          0  12265656   0% /dev/shm
/mnt/LTFS_LE/metadata
                    525579536  18681380 479769532   4% /LTFSLE
ltfs              4383036416          0 4383036416   0% /mnt/LTFS_LE/objects/loss_576004000641
#
```

> **Note:** The file system labeled ltfs is mounted on the drive with serial number 576004000641.

```
# mount
/dev/mapper/VolGroup00-LogVol00 on / type ext3 (rw)
proc on /proc type proc (rw)
sysfs on /sys type sysfs (rw)
devpts on /dev/pts type devpts (rw,gid=5,mode=620)
/dev/sda1 on /boot type ext3 (rw)
tmpfs on /dev/shm type tmpfs (rw)
none on /proc/sys/fs/binfmt_misc type binfmt_misc (rw)
```

```
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw)
/mnt/LTFS_LE/metadata on /LTFSLE type LTFS_LE (rw,dir=/mnt/LTFS_LE/metadata/,debug=1)
ltfs on /mnt/LTFS_LE/objects/loss_HU19477NE4 type fuse (rw,nosuid,nodev,default_permissions,allow_
other)
ltfs on /mnt/LTFS_LE/objects/loss_576004000641 type fuse (rw,nosuid,nodev,default_
permissions,allow_other)
#
```

Listing Processes with Open Files

Issue this command to determine which processes currently have files open on a file system.

Command

```
# lsof /mnt/LTFS_LE/objects/loss_576004000641
```

Sample Output

```
COMMAND   PID USER    FD   TYPE DEVICE SIZE/OFF NODE NAME
vi      21155 root    3u   REG   0,23    12288    7 /mnt/LTFS_LE/objects/loss_576004000641/.mjg.swp
#
```

Displaying the LTFS Open Edition (LTFS-OE) Version

Issue this command to display the LTFS-OE version that is currently running.

Command

```
# ltfs -V
```

Sample Output

```
LTFS version 2.0.0 (20130108_orcl)
LTFS Format Specification version 2.0.0
#

# rpm -q ltfs
ltfs-1.2.5_lto6-20130501_orcl_oels_5_5_t10kd
#
```

Determining the Cause of a Unit Attention on a Drive

Issue this command when a unit attention occurs on a drive.

Command

```
# sg_turs -v /dev/sg5
```

Sample Output

```
      test unit ready cdb: 00 00 00 00 00 00
   test unit ready:  Fixed format, current;  Sense key: Unit Attention
    Additional sense: Import or export element accessed
   Completed 1 Test Unit Ready commands with 1 errors
# sg_logs --verbose /dev/sg5
      inquiry cdb: 12 00 00 00 24 00
     STK       SL150            0182
     log sense cdb: 4d 00 40 00 00 00 00 00 04 00
     log sense cdb: 4d 00 40 00 00 00 00 00 08 00
```

```
            log sense: requested 8 bytes but got 7 bytes
        Supported log pages:
            0x00        Supported log pages
            0x07        Last n error events
            0x2e        TapeAlert (smc-3)
    #
```

Displaying Additional Log Details

To get all bytes, add -H to the sg_logs command.

Command

`# sg_logs --all /dev/sg5`

Sample Output

```
STK         T10000C             1.57

Supported log pages:
    0x00        Supported log pages
    0x02        Error counters (write)
    0x03        Error counters (read)
    0x06        Non-medium errors
    0x0c        Sequential access device (ssc-2)
    0x17        ??
    0x2e        TapeAlert (ssc-2)
    0x31        [unknown vendor specific page code]
    0x3b        [unknown vendor specific page code]
    0x3c        [unknown vendor specific page code]

Write error counter page
  Errors corrected without substantial delay = 0
  Errors corrected with possible delays = 0
  Total rewrites or rereads = 0
  Total errors corrected = 0
  Total times correction algorithm processed = 0
  Total bytes processed = 2929
  Total uncorrected errors = 0

Read error counter page
  Errors corrected without substantial delay = 0
  Errors corrected with possible delays = 0
  Total rewrites or rereads = 0
  Total errors corrected = 0
  Total times correction algorithm processed = 0
  Total bytes processed = 3875
  Total uncorrected errors = 0

Non-medium error page
  Non-medium error count = 0

Sequential access device page (ssc-3)
  Data bytes received with WRITE commands: 0 GB

  Data bytes written to media by WRITE commands: 0 GB

  Data bytes read from media by READ commands: 0 GB

  Data bytes transferred by READ commands: 0 GB
```

```
   Cleaning action not required (or completed)

   Vendor specific parameter [0x8000] value: 2257920


No ascii information for page = 0x17, here is hex:
 00     17 00 00 14 02 03 43 10  07 00 00 00 00 00 00 7a
 10     07 00 00 01 00 00 00 01

Tape alert page (ssc-3) [0x2e]
  Read warning: 0
  Write warning: 0
  Hard error: 0
  Media: 0
  Read failure: 0
  Write failure: 0
  Media life: 0
  Not data grade: 0
  Write protect: 0
  No removal: 0
  Cleaning media: 0
  Unsupported format: 0
  Recoverable mechanical cartridge failure: 0
  Unrecoverable mechanical cartridge failure: 0
  Memory chip in cartridge failure: 0
  Forced eject: 0
  Read only format: 0
Tape directory corrupted on load: 0
  Nearing media life: 0
  Cleaning required: 0
  Cleaning requested: 0
  Expired cleaning media: 0
  Invalid cleaning tape: 0
  Retension requested: 0
  Dual port interface error: 0
  Cooling fan failing: 0
  Power supply failure: 0
  Power consumption: 0
  Drive maintenance: 0
  Hardware A: 0
  Hardware B: 0
  Interface: 0
  Eject media: 0
  Microcode update fail: 0
  Drive humidity: 0
  Drive temperature: 0
  Drive voltage: 0
  Predictive failure: 0
  Diagnostics required: 0
  Obsolete (28h): 0
  Obsolete (29h): 0
  Obsolete (2Ah): 0
  Obsolete (2Bh): 0
  Obsolete (2Ch): 0
  Obsolete (2Dh): 0
  Obsolete (2Eh): 0
  Reserved (2Fh): 0
  Reserved (30h): 0
  Reserved (31h): 0
```

```
          Lost statistics: 0
          Tape directory invalid at unload: 0
          Tape system area write failure: 0
          Tape system area read failure: 0
          No start of data: 0
          Loading failure: 0
          Unrecoverable unload failure: 0
          Automation interface failure: 0
          Firmware failure: 0
          WORM medium - integrity check failed: 0
          WORM medium - overwrite attempted: 0
          Reserved parameter code 0x3d, flag: 0
          Reserved parameter code 0x3e, flag: 0
          Reserved parameter code 0x3f, flag: 0
          Reserved parameter code 0x40, flag: 0

No ascii information for page = 0x31, here is hex:
 00     31 00 00 20 00 01 c0 04  00 00 22 74 00 02 c0 04
 10     00 41 4f f5 00 03 c0 04  00 00 22 e7 00 04 c0 04
 20     00 41 4f f5

No ascii information for page = 0x3b, here is hex:
 00     3b 00 02 c8 01 00 74 04  00 00 00 00 01 01 74 04
 10     00 00 00 00 01 02 74 04  00 00 00 00 01 03 74 04
 20     00 00 00 00 01 04 74 04  00 00 00 00 01 05 74 04
 30     00 00 00 00 01 10 74 04  00 00 00 00 01 11 74 04
 .....  [truncated after 64 of 716 bytes (use '-H' to see the rest)]

No ascii information for page = 0x3c, here is hex:
 00     3c 00 0b e4 01 00 74 04  00 00 00 00 01 01 74 04
 10     00 00 00 00 01 02 74 04  00 00 00 00 01 03 74 04
 20     00 00 00 00 01 04 74 04  00 00 00 00 01 05 74 04
 30     00 00 00 00 01 06 74 04  00 00 00 00 01 07 74 04
 .....  [truncated after 64 of 3048 bytes (use '-H' to see the rest)]
 #
```

12

Remote Diagnostics Agent

LTFS-LE uses Remote Diagnostics Agent (RDA) to collect log files for the application, server, tape drives, and tape library.

Overview

The quality of the log files are somewhat dependent on the messaging of the hardware. If the log is from the tape hardware, LTFS-LE does not provide any diagnostics about the information in the log files or ask the hardware for mode sense pages. Nor will LTFS-LE be able to execute drive dumps. That functionality must be executed directly through the drives or the library. Regardless of the source of the error, LTFS-LE attempts to avoid recording the same information more than once. LTFS-LE also validates all values from external sources (files, registries, directories, arguments) and reports any values outside of expected data ranges or inconsistencies in data type On demand state captures shall be available through a CLI command, but will be dependent on the capabilities already provided by Oracle Enterprise Linux.

Downloading RDA

To obtain the RDA tool for LTFS-LE perform the following steps:

1. From the LTFSLE server, open Firefox and log in into the "My Oracle Support" page.

    https://support.oracle.com

2. In the Search Knowledge Base search term box, enter **remote diagnostic agen**t and click the search icon.

    Figure 12–1   Download Remote Diagnostic Agent
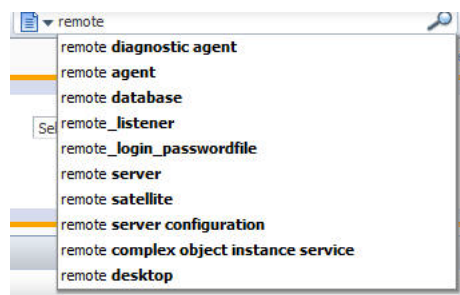
3. From the search results, select the **Remote Diagnostic Agent (RDA) – Getting Started** link.

4. From the Remote Diagnostic Agent (RDA) – Getting Started page, under the In This Document section, click **Download RDA** link.

Refer to the *Installation Instructions* and *Running RDA – UNIX* links for any changes on installing and running RDA that differ from this document.

5. From the download page, click the link for **Linux x86 (64-bit)**.

Figure 12–2   Download Linux x86 (64-bit)

RDA bundle (Released MON, D YYYY)	
Platform	**Download File**
Apple Mac OS X	Download Zip File
HP OpenVMS	Download Zip File
HP Tru64	Download Zip File
HP-UX Itanium	Download Zip File
HP-UX PA-RISC (32-bit)	Download Zip File
HP-UX PA-RISC (64-bit)	Download Zip File
IBM AIX on POWER Systems (32-bit)	Download Zip File
IBM AIX on POWER Systems (64-bit)	Download Zip File
IBM Dynix/Ptx	Download Zip File
IBM Linux on POWER	Download Zip File
IBM zSeries Based Linux	Download Zip File
Linux Itanium	Download Zip File
Linux x86 (32-bit)	Download Zip File
Linux x86 (64-bit)	Download Zip File

6. From the patchset page, make sure **Linux x86_64** is the selected platform option, and click **Download**.

7. In the Firefox download dialog box, select **Save File** and click **OK**.

By default, Firefox downloads the file to the desktop. It is recommended that you move the file to the location where you downloaded the LTFS-LE software (example: /downloads).

```
# mv /root/Desktop/p16469241_431_Linux-x86-64.zip /downloads
```

8. Once the file is downloaded and moved, extract the RDA zip file.

```
# cd /downloads
unzip p16469241_431_Linux-x86-64.zip
```

9. Change directory to the RDA home path.

```
# cd /downloads/rda
# ls -l
```

10. Verify RDA installed correctly.

```
# ./rda.sh -cv
```

Example Output:

```
--Output--

Loading the file list ...

Checking the directory [D_RDA] . ...
```

```
Checking the directory [D_RDA_CHK] APPS ...
.
No issues found
.
```

11. Configure RDA for collection of LTFS-LE information:

    ```
    # ./rda.sh -vSCRP OS INST LTFS
    ```

    Respond to the following prompts as indicated:

    ```
    Do you want RDA to collect StorageTek Linear Tape File System information
    (Y/N)? Hit "Return" to accept the default (Y)
    > Y

    Enter the Oracle WebLogic Server domain home to be used for data analysis (For
    example for UNIX, <BEA Home>/user_projects/domains/<Domain> or <Middleware
    Home>/user_projects/domains/<Domain>)
    > /var/opt/Oracle/Middleware/user_projects/domains/ltfsle_domain

    Server list for 'ltfsle_domain' domain:

    1  AdminServer

    Enter your selection, as a comma-separated list of item numbers or ranges Hit
    "Return" to accept the default (1)
    > 1

    Are custom scripts used to start Oracle WebLogic servers (Y/N)?
    Hit "Return" to accept the default (N)
    > Y

    Are these scripts located in the Domain home bin directory (Y/N)?
    Hit "Return" to accept the default (Y)
    > Y

    Do you want RDA to capture thread dumps when a data collection module requires
    on-line collections (Y/N)?
    Hit "Return" to accept the default (Y)
    > Y
    ```

12. Increase the number of lines collected in RDA logs by changing N_TAIL=1000 to
    N_TAIL=350000 in the [DEFAULT] section. To do this:

    ```
    # cp -p output.cfg output.cfg.ORIG
    vi output.cfg
    ```

    Find N_TAIL=1000 and change it to N_TAIL=350000.

13. Collect the LTFS-LE information:

    ```
    # ./rda.sh -vSCRP OS INST LTFS
    ```

A

Accessibility Settings

This appendix describes LTFS-LE accessibility settings and how to enable these settings using the LTFS-LE BUI.

Overview

The LTFS-LE Browser User Interface (BUI) provides the following accessibility settings for users with low vision, blindness, color blindness, or other visual impairments:

- Screen Reader mode

  This mode causes the screen display to be optimized for use with screen readers such as JAWS. It also enables you to perform all screen actions with the keyboard instead of a mouse.

- High Contrast mode

  Causes LTFS-LE screens to be compatible with high-contrast features provided by your browser. For best results, you may also want to enable large fonts mode, described below.

- Large Fonts mode

  Causes LTFS-LE screens to be compatible with larger font sizes and zoom capabilities provided by your browser. For best results, you may also want to enable high-contrast mode, described above.

  This mode is designed to be used with larger fonts or zoom capabilities in your browser (see your browser's documentation for details). You should disable this mode if you are not using these capabilities in your browser.

Enabling Accessibility Settings

Perform the following steps to customize the accessibility settings for your LTFS-LE username in current and future login sessions.

1. From the LTFS-LE BUI main toolbar, click **Preferences** and select **Accessibility**.

    The Accessibility Settings dialog appears.

2. Select any of the following settings to enable the accessibility modes you want to use:

    - Screen Reader

    - High Contrast

    - Large Fonts

■ Do not show these options again

Select this setting to specify that you do not want the Accessibility Settings dialog to be displayed automatically when you log in to the LTFS-LE BUI. You can use this procedure to change this setting at any time.

3. Verify your selections and then click **OK**.

Your settings are applied, and remain in effect for future login sessions, unless you change them again using this procedure.

Glossary

ACSLS

Oracle's StorageTek Automated Cartridge System Library Software. This software manages contents of multiple StorageTek tape libraries and controls library hardware to mount and dismount cartridges on StorageTek tape drives.

ACSLS assigns resources to LTFS-LE as if it were a logical library. LTFS-LE then issues commands to ACSLS to read and write files, much in the same way that backup software does today

API

Application Programming Interface. A source code interface that an operating system or library provides to support requests for services to be made of it by computer programs. It facilitates the exchange of data between two or more software applications and extends the capabilities of the software.

Application Programming Interface (API)

See **API**.

Automated Cartridge System Library Software (ACSLS)

See **ACSLS**.

Browser-Based User Interface (BUI)

See **BUI**.

BUI

Browser Based user Interface. A graphic user interface (GUI) that a user accesses using an internet browser such as Microsoft Internet Explorer.

LTFS-LE includes a BUI used to configure and manage the LTFS-LE system.

CIFS

In computer networking, Server Message Block (SMB), also known as Common Internet File System (CIFS) operates as an application-layer network protocol mainly used for providing shared access to files, printers, serial ports, and miscellaneous communications between nodes on a network. It also provides an authenticated inter-process communication mechanism. Most usage of SMB involves computers running Microsoft Windows, where it was known as "Microsoft Windows Network" before the subsequent introduction of Active Directory. Corresponding Windows services are the "Server Service" (for the server component) and "Workstation Service" (for the client component).

Global Namespace

Also known as the Synthetic File System (Synthetic FS). The global namespace stores the organization of all files in LTFS-LE.

Linear Tape File System, Library Edition (LTFS-LE)

See **LTFS-LE**.

LTO

Linear Tape Open (LTO) Ultrium tape drive, providing fast data transfer, high capacity, and energy savings for midrange tape automation environments, enabling you to meet stringent regulatory requirements.

LTFS-LE

Oracle's Linear Tape File System Library Edition. A library wide implementation of the Linear Tape File System. LTFS-LE makes a library of tape storage function as a single mount point, providing direct POSIX complaint file system access to data stored on tape.

Oracle Universal Installer (OUI)

See **OUI**.

OUI

Oracle Universal Installer. A Java application that performs component-based installations and enables different levels of integrated bundle, suite, and Web-based installations, and also complex logic in a single package. The installation engine is easily portable across all Java-enabled platforms, and platform-specific issues can be encapsulated from the overall installation process.

Portable Operating System Interface (POSIX)

See **POSIX**.

POSIX

Portable Operating System Interface. A family of standards specified by the IEEE for maintaining compatibility between operating systems. POSIX defines the application programming interface (API), along with command line shells and utility interfaces, for software compatible with variants of UNIX and other operating systems.

Remote Diagnostic Agent (RDA)

See **RDA**.

RDA

Remote Diagnostic Agent. A command-line diagnostic tool that is executed by an engine written in the Perl programming language. RDA provides a unified package of support diagnostics tools and preventive solutions. The data captured provides Oracle Support with a comprehensive picture of the customer's environment which aids in problem diagnosis.

Self Describing Format

A format where data is written in a manner that eliminates the need for a specific application to determine the contents of the data. LTFS-LE supports the open source LTFS 2.2 specification, which is self describing.

Shadow Namespace

The backup copy of the global namespace, stored on the LTFS-LE server, outside of the LTFS-LE application.

SL150

Oracle's StorageTek SL150 modular library offers a combination of ease of use and scalability ideal for growing businesses. It supports mixed environments, including mainframe and open systems, and is scalable from 30 to 300 cartridge slots.

SL3000

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

SL8500

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

SLC

StorageTek Library Console. Oracle's StorageTek Library Console (SLC) software, which comes with the StorageTek SL8500, SL3000 and SL500 Modular Library Systems, enables you to easily monitor and manage your StorageTek libraries through a remote, network-based operator panel or an optional local touch screen. As it relates to LTFS-LE, SLC is primarily used for managing the library's capacity and configuring the partition assigned to LTFS-LE.

StorageTek Library Console (SLC)

See **SLC**.

Synthetic File System

See **Global Namespace**.

T10000C

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

T10000D

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

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