



Hewlett Packard
Enterprise

HPE StoreEver Data Verification Integration with QStar Archive Manager

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Introduction

Everywhere we turn, we are inundated with information. The amount of data created and exchanged in today's business environment is enormous. While exponential data growth is no longer a phenomenon, many organizations are faced with the challenge of retaining copious amounts of data for extended periods of time to deliver storage optimization and cost efficiencies, address compliance objectives, and meet information re-use requirements. While today's tape media is generally accepted as the most reliable and cost-effective technology for long-term storage, verifying the quality of archived tape data over time and having confidence in accessing and retrieving business-critical data from the archived tape data throughout its lifecycle further complicates the challenge of long-term data retention. Organizations are looking for a simple way to store their data that also enables them to identify when that data is at risk of becoming unreadable.

Customers can now preserve the integrity and confidently access business-critical data stored on tape media throughout its lifecycle using HPE StoreEver Data Verification services with QStar Archive Manager (ASM) software.

Technology overview

HPE StoreEver Tape Libraries key features and benefits

HPE StoreEver Tape Libraries have the lowest cost per terabyte for longer term storage with limited power or energy requirements and are dependable and ideal storage technologies for archiving cold or active data with a media shelf-life of up to 30 years in normal ambient conditions. You can easily transport rugged LTO cartridges off-site for disaster recovery (DR) purposes, and use Write Once Read Many (WORM) media for protection against accidental overwrite. LTO data cartridges are portable, high-density storage, having a small footprint with up to 15 TB of compressed data on a single LTO-7 data cartridge. Administrators can manage, configure, and use HPE StoreEver ESL G3, MSL6480, MSL G3, and 1/8 G2 Autoloader Tape Libraries from across the room or across the globe with HPE-unique, web-based remote management and diagnostic tools that can proactively and intelligently monitor utilization, operational performance, and overall life and health of the library, drives, and media.

The HPE StoreEver ESL G3 Tape Library delivers enormous scalability to keep pace with unpredictable data growth. Choose from a range of base configurations and scale up to 12,006 tape cartridges in increments of 100 slots for capacity on demand that reaches up to 180 PB (compressed 2.5:1) of a backup or archive data. Supporting growth is only part of the story.

The HPE StoreEver ESL G3 also delivers high availability through redundant power supplies and dual-robotics capabilities, while host path connectivity failover provides optimal library performance. Management and control of multiple tape libraries is delivered by an intelligent command GUI.

Features:

- **Broad scalability for consolidated data protection with capacity on demand**

Quickly and easily add capacity without disruption, the StoreEver ESL G3 scales from 100 to 12,006 tape cartridges, from 1-192 LTO-5 or newer Ultrium Tape drives, and 1 to 16 library frames.

Customer configurable import/export slots from 24 to 528 for fast bulk load and unload. A 72 slot mailbox provides one of the largest import/export capabilities.

Each frame is equal to a standard 19-inch rack form factor for the most efficient use of floor space.

- **High availability features for near continuous data availability**

To make the most of your library performance, the HPE StoreEver ESL G3 includes both control path failover and drive to port failover. Delivering and supporting ongoing host and SAN connectivity under a variety of adverse conditions.

Active-active dual robotics capability paves the way for near continuous data access and even higher reliability.

- **Easing the management burden and reducing the total cost of operation (TCO) of Enterprise data protection**

Simplify managing complex environments with library partitioning. HPE Secure Manager Tape Library Software allows the user to logically divide the library into up to twelve virtual tape libraries. This function is especially useful when multiple SANs or backup software packages are present.

Advanced partitioning support is provided by an Automated Media Pool, which automatically reallocates partition space as data storage requirements grow without having to reconfigure software applications.

The HPE StoreEver MSL6480 Tape Library is the gold standard for midrange tape automation, delivering best-in-class scalability, density, and performance to meet your short-term backup and DR data protection needs, as well as long-term archival requirements. Keep pace with data growth by seamlessly scaling up to 7 modules—without disrupting daily data protection. Reduce TCO by reusing current MSL tape drives and adding more capacity and performance as you need it.

Features:

- **Driving the industry in scalability for a better tape solution**

Scale vertically from 80 to 560 cartridge slots to store up to 8.4 PB (assumes LTO-7 with 2.5:1 compression) in a single 19-inch rack; add in between 1 to 42 LTO-4 or newer half-height SAS or FC drives or 1 to 24 LTO-4 or newer full-height SAS or FC drives for speeds of up to 113.4 TB/hour (assumes LTO-7 with 2.5:1 compression).

You can easily manage expansion module installations as they are simple to configure and remove. The MSL6480 features a touch operator control panel with wizards for easy install and configuration.

HPE StoreEver MSL Tape Libraries easily manage your media either in or out of the tape library with a standard bar code reader and configurable 10-slot removable magazines.

- **Save money—reduce power, cooling, floor space, and hardware costs**

The HPE StoreEver MSL6480 Tape Library offers up to 195 TB/s (equivalent to 13 LTO-7 tape cartridges) per 1U of rack space using LTO-7 drives, providing flexible options to consider for your business.

For unmatched investment protection, you can reuse any MSL2024, 4048, 8048, and 8096 tape drive canisters in the MSL6480 Tape Library.

Partitioning allows each partitioned library to be presented to the host as an independent library, separate from other partitions in the library.

- **Reduce risk-dependable multi-year data protection and security**

Safeguard your data in the library, after export, and when it's offsite with several security encryption offerings. Select from either the low-cost security solution for small to medium business or leverage larger enterprise encryption options with the support of KMIP-compliant encryption key servers.

HA path failover uses host drivers in conjunction with library and drive firmware to manage multiple paths across multiple SANs, present a single drive or robot path to applications, and automatically transfer commands to the new path if the original path is lost.

HPE StoreEver Tape Manageability Software

HPE StoreEver Command View for Tape Libraries (Command View TL) software aggregates multiple HPE StoreEver Tape Libraries for centralized management. It is the nerve center for HPE StoreEver TapeAssure data collection and HPE StoreEver Data Verification. With Command View TL, you can quickly access and manage all of your HPE StoreEver Tape Libraries—monitor backup logs, check drive status, receive trouble alerts, diagnose problems and much more—through a simple browser interface from anywhere in the world.

To ensure that your business-critical data can be read for recovery, compliance audits, or monetization purposes, you need an efficient way to protect archived data stored on tape over long periods of time. HPE StoreEver Data Verification services of Command View TL provides the ability to periodically scan and validate the quality of data on LTO tape cartridges that are stored in a tape archive. You can periodically scan your infrequently accessed tapes to validate the quality of data on those LTO tapes which gives you confidence that a successful restore will be possible when that critical business data is needed. HPE Data Verification is a licensed feature of Command View TL software.

HPE StoreEver ESL G3 and MSL6480 Tape Libraries were designed to ease the management burdens of data protection in your SAN. HPE StoreEver Tape Libraries and Command View TL software make managing your data throughout its lifecycle more efficient and productive by delivering a simple, easy to use visual dashboard to quickly identify all aspects of every HPE StoreEver Tape Library in your environment.

QStar—the archiving experts

Founded in 1987, QStar Technologies is a leading global provider of enterprise-class data management and active archive software solutions. QStar's software platform is server and storage hardware independent. QStar is best known for its 3-2-1 Archiving and Data Protection Best Practice, is a founding member of the Active Archive Alliance, and is a leading provider of Linear Tape File System (LTFS) solutions for tape. QStar is also an HPE Data Agile Partner and the first Independent Software Vendor (ISV) to integrate with the HPE StoreEver Data Verification application programming interface (API) to create a self-managing, self-healing archive solution for Enterprise customers. For more information on QStar Technologies, visit: qstar.com.

HPE Data Agile Partner Program

Hewlett Packard Enterprise is dedicated to providing a rich portfolio of Backup, Recovery, and Archiving (BURA) Solutions for our customers. The HPE Data Agile Partner Program offers partners a programmatic framework to self-certify the interoperability of their applications across the entire HPE Storage portfolio of BURA products—including HPE StoreOnce Backup, HPE StoreAll Storage, and HPE StoreEver Tape.

The Data Agile Partner Program enables partners to learn about the HPE BURA portfolio, test and certify their applications in a dedicated HPE lab environment, and take advantage of unique marketing opportunities. Program members also have access to specialized trainings and technical assistance.

Provide powerful solutions to your customers and expand market opportunities through a partnership with HPE Storage. Learn more at: hp.com/storage/DataAgile.

HPE Data Agile—Backup, Recovery, and Archive

Leveraging the history of our extensive partnerships with leading software companies, Hewlett Packard Enterprise continues to develop a comprehensive approach to ensure that all hardware, firmware, driver, and software components are properly fitted into certified and supported data protection and archiving solutions. Refer to the following to ensure that your environment is up-to-date:

- **The StoreEver Tape Library Systems section, specifically the CVTL & SKM firmware Dependencies page, of the most recent version of the HPE Data Agile BURA Compatibility Matrix**—hpe.com/storage/BURACompatibility

A single point of reference for the latest HPE StoreEver interoperability and device compatibility details. The latest recommended versions of Command View for Tape Libraries, Adobe® Flash Player (minimum), Java Runtime Environment (minimum), Tape Library firmware, and so on are listed and it also contains tape device connectivity details including supported servers, operating systems, controllers and infrastructure components, as well as Backup and Archival ISV partner compatibility.

- **HPE SAN design guide**—Explains how HPE Storage systems, storage management tools, and Fibre Channel products can be used in open heterogeneous SANs.

HPE StoreEver Command View for Tape Libraries

Installing Command View for Tape Libraries

QStar and Hewlett Packard have collaborated to create a system that detects under-performing cartridges and allows the system administrator to take remedial action to keep the number of good copies of their data at the recommended level. In order to use QStar Archive Manager (ASM) software to identify tape media before it starts to degrade to a point where the data is unrecoverable, the HPE StoreEver Command View for Tape Libraries (Command View TL) software has to be installed then licensed to use the Data Verification feature.

The minimum version of Command View TL that is supported by QStar Archive Manager software for an ESL G3 Tape Library is 3.9.00. The minimum version of Command View TL that is supported by QStar Archive Manager software for an MSL6480 Tape Library is 3.9.01.

Command View TL version 3.7.00 or newer can be upgraded directly to versions 3.9.00 or 3.9.01. If you are upgrading to Command View TL 3.9.00 or 3.9.01 from versions older than 3.7.00, the migration upgrade sequence must be: 2.8.00 → 3.5.00 → 3.6.00 → 3.8.00 → 3.9.00/3.9.01. The release notes for Command View TL Software (access details provided below) provide critical information for system administrators:

- Supported operating systems
- Management station (server) minimum and recommended requirements including whether multiple management stations may be required
- Browser minimum requirements
- Compatibility/Interoperability with the ESL G3 or MSL6480 Tape Library
- HPE Command View TL database compatibility
- Installation instructions for new install or as an upgrade

Note

The primary management station (if more than one management station is required) collects and stores data from the libraries. For the best performance, the primary management station should be in the same physical location and on the same IP subnet as the HPE StoreEver Tape Libraries it will manage.

To install Command View TL and to review the release notes, from the server that will become your Command View TL management station, open the following link: hp.com/support/cvttl

1. Under **Download options**, click on **Get drivers, software & firmware**. You will be directed to the **Select a product** page.
2. Under **Results from all HPE products**, click on **HPE Command View for Tape Libraries Software**. This will direct you to the **Drivers & software** page for HPE Command View for Tape Libraries Software page.
3. Select the driver language and operating system that is installed on your management station. To use the Data Verification feature for HPE Command View TL with QStar Archive Manager software, the minimum required version of HPE Command View TL software is 3.9.00 for an ESL G3 Tape Library or 3.9.01 for an MSL6480 Tape Library. Refer to the **Release Notes**, outlined in Step 5, for HPE Command View for Tape Libraries to verify which operating systems HPE Command View TL 3.9.00 and 3.9.01 support. For this white paper, English and Microsoft® Windows Server® 2008 R2 were selected.
4. On the operating system downloads page, expand **Application**. The versions of Command View TL that are supported for the operating system that you selected will be listed including any available patches.
5. To view the release notes for HPE Command View for Tape Libraries, click on the **HPE Command View for Tape Libraries (American, International)** hyperlink then click on the **Release Notes** tab once the next page is displayed. The **Description** tab is selected by default. Review the release notes for critical information including but not limited to: supported operating systems, management station (server) minimum and recommended requirements, browser minimum requirements, compatibility/Interoperability with the ESL G3 or MSL6480 Tape Library, Command View TL database compatibility and Installation instructions for new install or when upgrading.
6. From your management station, click on the **Download** tab once you have reviewed the release notes. For this white paper, HPE Command View for Tape Libraries (American, International) version 3.9.01 was downloaded.

7. You can either run the executable from the Web browser prompt or once the download completes, double-click on the application (CVTL_3_9_01 for this white paper) in the folder that you downloaded it to. This will start the installation process.
8. Follow the instructions on the screen to complete the installation of Command View TL. Command View TL runs on the management station as a service. By default, this service starts automatically whenever the management station is booted, and runs invisibly in the background. In most cases, the default installation settings are adequate. For this white paper, the default installation settings were used.
9. After successful installation of the software, the Command View TL browser interface can be launched on Microsoft Windows® operating systems by clicking on **Start > All Programs > HPE Command View TL > Command View TL**. This will open your default Web browser, Internet Explorer version 10 for this white paper, and the following URL: `http://<hostname>:4095/cvtl.html` (where hostname is the IP address or network name of your management station).

Note

If the management station is running firewall and/or anti-virus software, configure the firewall and/or anti-virus software to enable communication on the ports used by the management station. Refer to the following tables in the **HPE Interface Manager and Command View for Tape Libraries 3.9 User Guide** from hp.com/support/cvtl (click on the **Manuals** tab then click on **User guide**) for which ports to open or not block in the firewall and/or anti-virus software:

- Management station to Web browser network ports
- Management station to Interface Manager card network ports
- Interface Manager uses this port for SNMP
- Interface Manager uses this port for Network Time Protocol (NTP)
- SKM or ESKM network ports

-
10. Command View TL requires Adobe Flash Player 10.3 (or newer) plug-in. If the Adobe Flash Player 10.3 plug-in is not already installed on your Microsoft Windows management station, Command View TL attempts to download and install it for you. If prompted to install the Adobe Flash Player, click OK and follow the instructions provided. Otherwise, manually download and install Adobe Flash Player 10.3 (or newer) on the management station.
 11. Enter your username and password. The defaults are: username = admin; password = admin.
 12. Once you have successfully logged in, the Command View TL launcher window will be displayed. The launcher window has the following menu tabs in the lower left corner:
 - a. **Devices:** displays a list of HPE StoreEver Tape Libraries that you have added to be managed by Command View TL. You can add or delete libraries from this list, or select a library to manage. This is covered in the [next section](#).
 - b. **TapeAssure:** displays a consolidated summary of drive and tape utilization, health, and performance, for every drive and tape on every library using this management station as its primary management station. While the HPE StoreEver TapeAssure basic functionality of Command View TL is included with every HPE StoreEver MSL or ESL Tape Library at no additional charge, HPE StoreEver TapeAssure Advanced is a licensed feature of Command View TL that captures and analyzes an unparalleled quality and quantity of health metrics to proactively and predictively monitor the performance, health and utilization of every HPE StoreEver tape cartridge, drive and library in your infrastructure.
 - c. **Administration:** displays all of the network settings for the management station. You can configure these settings.
 - d. **Licensing:** provides a convenient way to track and safely store any additional license keys you have purchased for use with HPE StoreEver Tape Libraries.
 - e. **Data Verification:** displays all HPE StoreEver Tape Libraries with a Command View TL and Data Verification license. For each tape library, it lists the total number of slots, mail slots, and tape drives available in the data verification partition. The total purchased license quantity, number of data verification licenses available, and the current status of the data verification engine.

See **figure 1** as an example of the Command View TL Web browser interface launcher window.

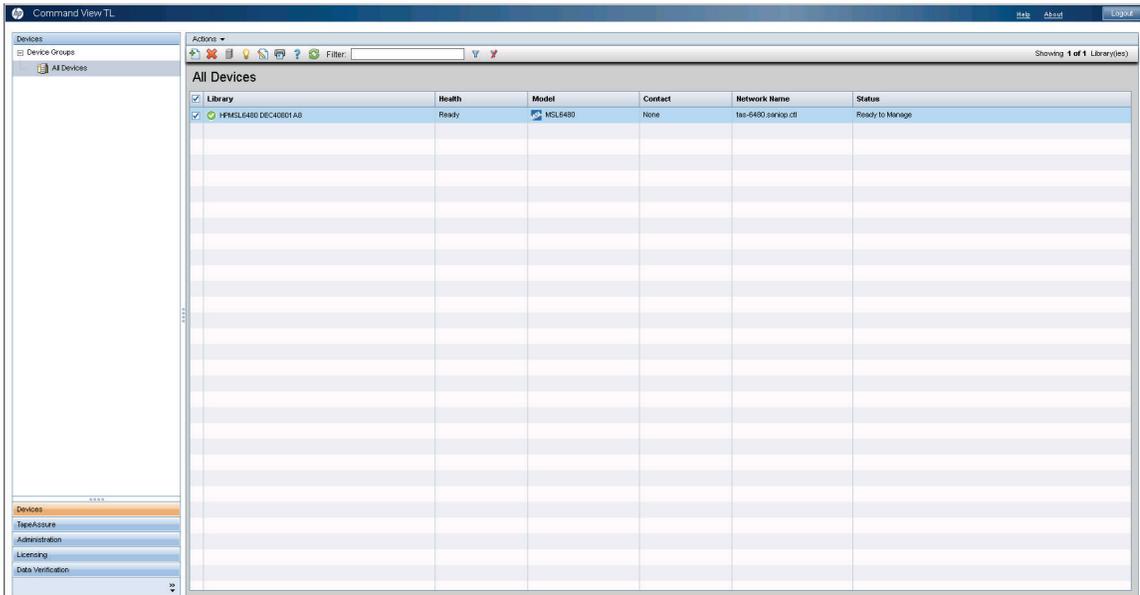


Figure 1. Command View TL Web browser interface

Managing HPE StoreEver Tape Libraries using Command View TL

To manage an HPE StoreEver Tape Library using Command View TL, do the following:

1. In the launcher window, click on **Actions > Add library (ies)**. The **Add Multiple Library Wizard** will open. Follow the onscreen instructions to add the HPE StoreEver ESL G3 or MSL6480 Tape Library that you will use with the QStar ASM software to the management station. You will need to know either the fully qualified DNS name or IP address for the library.
2. Once you have successfully added your HPE StoreEver Tape Library that you want to manage using Command View TL, you can manage that tape library by doing one of the following:
 - a. In the launcher window, with the **Devices** tab selected from the lower left hand corner, double-click on the library that you want to manage or click on the library that you wish to manage, and select **Actions > Manage Library**.
3. For an HPE StoreEver ESL G3 Tape Library, a new tab will open within the same browser and a Java prompt to run the Library Management Console (LMC) Applet will then be displayed.
4. A new browser window will open (ESL G3 Library Management Console), and you will be required to login to your ESL G3 using the same Name and Password that you use to login to your ESL G3 using the library's front panel.
5. For an HPE StoreEver MSL6480 Tape Library, a new tab will also open within the same browser and the library's Web Management Interface (WMI) will then be displayed. You can now login to your MSL6480 using the same Name and Password that you use to login to your MSL6480 using the library's front panel.
6. Now you can manage your HPE StoreEver Tape Library as though you were standing in front of it.
7. Refer to the **HPE Interface Manager and Command View for Tape Libraries 3.9 User Guide** from hp.com/support/cvctl (click on the **Manuals** tab then click on **User guide**) for more information on using HPE Command View TL and changing the network settings of the management station, changing management station passwords, changing library settings, removing libraries, changing email settings, configuring email alerts, etc.

Adding HPE StoreEver Software license keys

The “License Key Summary” window (with the **Licensing** tab selected) shows a summary of all of the license keys pertaining to the HPE StoreEver Tape Libraries that you’ve added to be managed by your system. You can add or delete license keys from this window. A detailed list of all of the license keys that the License Key Summary window can track is available in the **HPE Interface Manager and Command View for Tape Libraries 3.9 User Guide**.

The Data Verification feature is enabled in Command View TL by purchasing and installing the following licenses for your HPE StoreEver Tape Library:

1. HPE StoreEver ESL G3 Command View Tape Library license (TC347A)
2. HPE StoreEver ESL G3 Data Verification license for 100 cartridges (TC474A)
3. HPE StoreEver MSL6480 Command View Tape Library license (TC444A)
4. HPE StoreEver MSL6480 Data Verification license for 100 cartridges (TC443A)

You may have already purchased the required licensable features when you ordered the HPE StoreEver Tape Libraries. If not, visit h30580.www3.hp.com/poeticWeb/portalintegration/hppWelcome.htm or contact your HPE authorized reseller for purchasing information.

After purchasing the licenses, you will receive one or more Software Entitlement Certificates that show the HPE order number, the product number and name, and the quantity ordered. To obtain the license keys, fill out the required information and follow the instructions on the Software Entitlement Certificates. HPE generates a license key based on the HPE order number and the serial number of the library in which the key will be installed. HPE provides you with the license keys via whichever method you specified on the Software Entitlement Certificate.

Once you receive your license key(s), you must use Command View TL to install each license for the library having the serial number used to obtain the key. The license cannot be installed for a library with a different serial number. The process for adding license keys is the same for the ESL G3 and MSL6480 Tape Libraries.

To add a new license key:

1. With the **Licensing** tab selected in Command View TL, select **Actions > Add New License Key** from the License Key Summary page. The **Add License Key** wizard will open.
2. Specify the library model (MSL6480 was selected for this example which automatically selected the library identifier [serial number and IP] for the managed MSL6480 Tape Library), and browse to or enter the new license key in the provided text box. See **figure 2** as an example. Click **OK**. The new license key is added to the License Key Summary window.

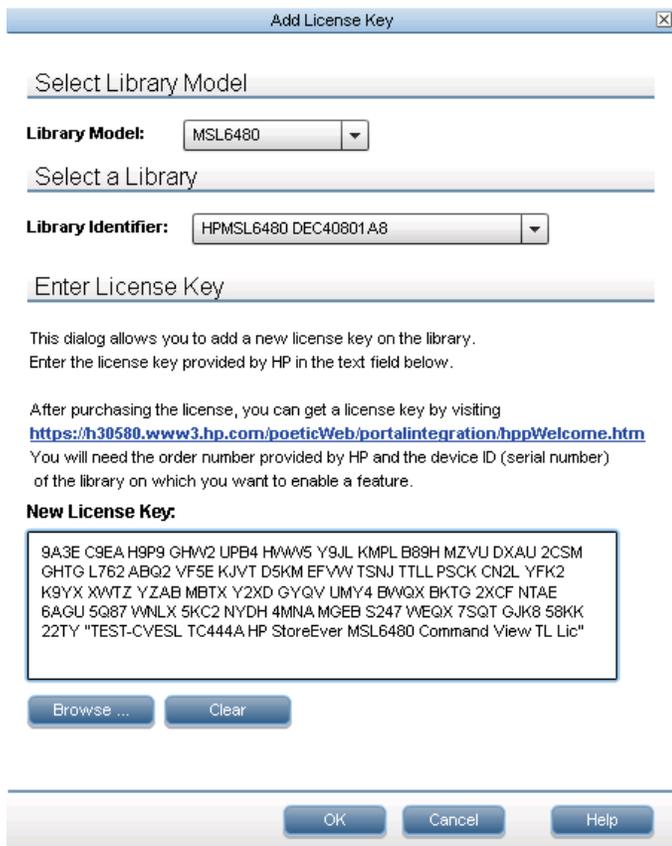


Figure 2. Adding a new license using Command View TL

Configuring an HPE StoreEver ESL G3 for Data Verification

Once you have installed your HPE StoreEver ESL G3 Data verification license for 100 cartridges (TC474A) using Command View TL, you can now setup your tape library for Data Verification. To do so, you must enable the CVTL User in your ESL G3 Tape Library otherwise data verification will not work.

To enable the CVTL User in your ESL G3 Tape Library:

1. In Command View TL, after you have successfully logged in, double-click on the ESL G3 Tape Library that you want to setup for Data Verification or alternatively, click on that library then select **Actions > Manage Library**. This will launch the Library Management Console (LMC).
2. Login to the LMC providing administrator credentials then click on the **Setup** tab. Choose **Network Configuration** then **Network Security Settings**.
3. Under the **Services** tab, set the **CVTL User** to **Enable**.
4. Click on **OK** to update the settings. If an attention message is displayed, read the message and click on **Yes** to acknowledge the warning. See **figure 3** as an example.

Note

If the **CVTL User** is not enabled for your ESL G3 Tape Library, the **Service Status** for the library in the Data Verification Control Panel for Command View TL will be **service unavailable**. Data Verification for your ESL G3 Tape Library will not work with QStar ASM until the CVTL User has been enabled.

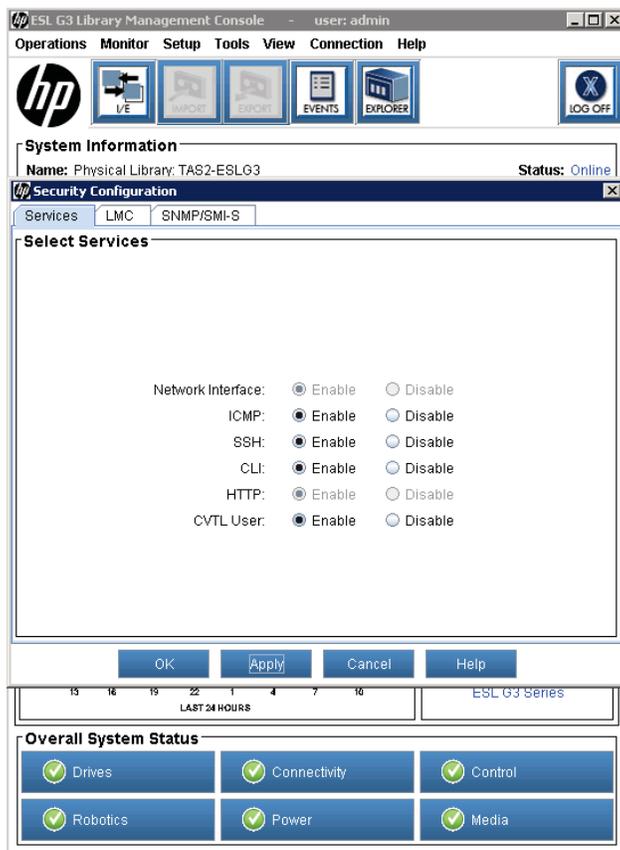


Figure 3. Enabling the CVTL User using the ESL G3 Library Management Console

Configuring an HPE StoreEver MSL6480 for Data Verification

Once you have installed your HPE StoreEver MSL6480 Data verification license for 100 cartridges (TC443A) using Command View TL, you can now setup your tape library for Data Verification. To do so, you must enable Data Verification for your MSL6480 Tape Library otherwise data verification will not work.

To enable Data Verification for your MSL6480 Tape Library:

1. In Command View TL, after you have successfully logged in, double-click on the MSL6480 Tape Library that you want to setup for Data Verification or alternatively, click on that library then select **Actions > Manage Library**. This will launch the library's Web Management Interface (WMI).
2. Login to the WMI providing administrator credentials then click on the **Configuration** tab on the main page. Choose **Command View TL** from the list of choices on the right side of the Configuration page.
3. Under **Data Verification (requires license be installed on Command View TL management station)**, click on the box next to **Enable Data Verification** then assign a **Data Verification Password**. The default Data Verification User Name is **cvtl**. Record these credentials as you will be using them to authenticate Command View TL with your MSL6480 Tape Library to allow the Data Verification service to work.
4. Click on **Submit** to update the settings. See **figure 4** as an example.

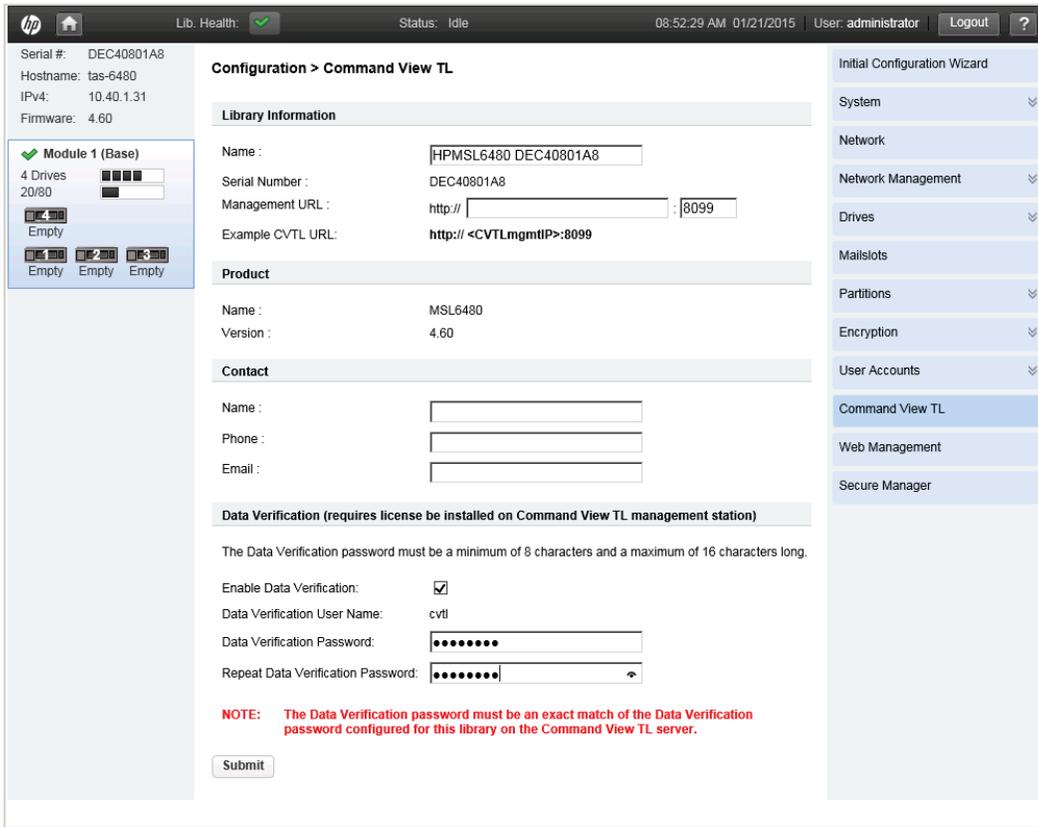


Figure 4. Enabling Data Verification for the MSL6480 Tape Library using the Web Management Interface

HPE StoreEver Data Verification feature

HPE StoreEver Data Verification is a licensed feature of Command View TL that provides the ability to periodically scan archived or DR tapes to validate tape media readability and data integrity. QStar ASM software has integrated with the data verification API to create a self-managing, self-healing archive solution for Enterprise customers.

To verify that the data verification feature for Command View TL can now be used by QStar ASM software, click on the **Data Verification** tab at the bottom left-side of the Command View TL GUI. You will be taken to the **Data Verification Control Panel**. For your ESL G3 Tape Library, a server status of Not configured should be displayed. See **figure 5** as an example.

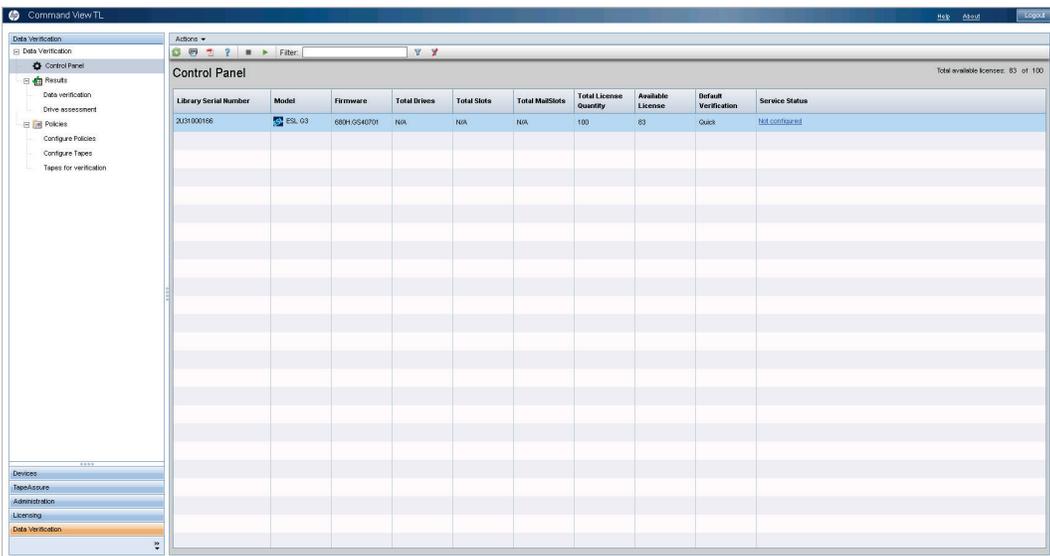


Figure 5. Data Verification Service successfully licensed with a status of Not configured for an ESL G3 Tape Library

For your MSL6480 Tape Library, a server status of Authentication Required should initially be displayed. See figure 6 as an example. Click on Authentication Required to enter the username and password that you assigned when enabling Data Verification for your MSL6480 in previous section. See figure 7 as an example.

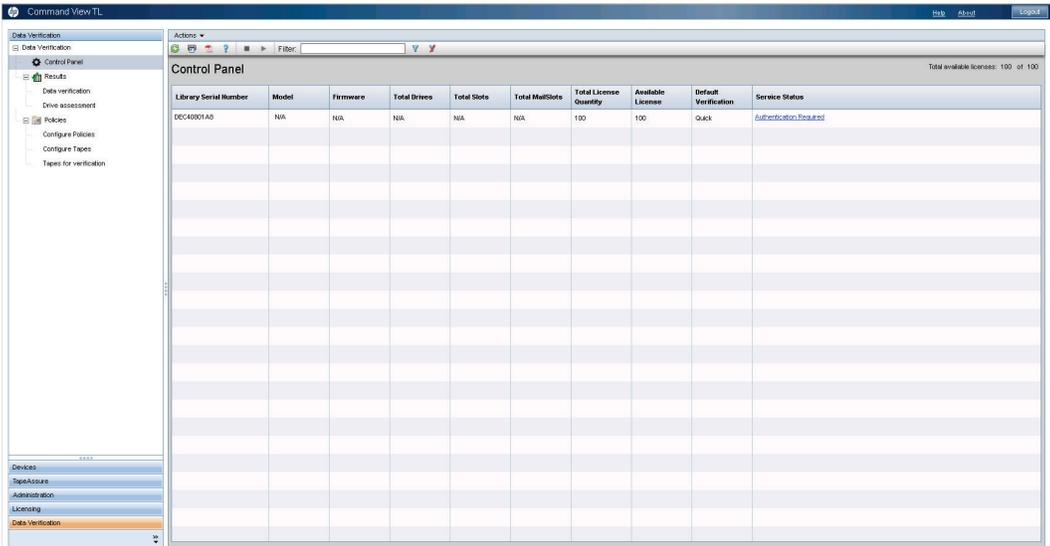


Figure 6. Data Verification Service successfully licensed with a status of Authentication Required for an MSL6480 Tape Library

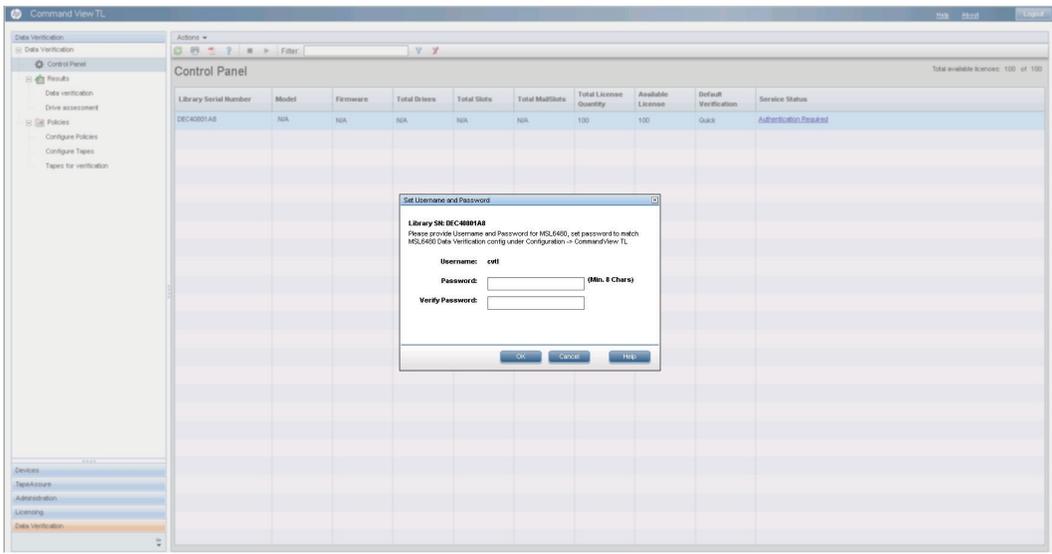


Figure 7. Set the Username and Password for your MSL6480 to allow Data Verification

Once you have completed the authentication, a server status of Not configured should now be displayed for your MSL6480. See figure 8 as an example.

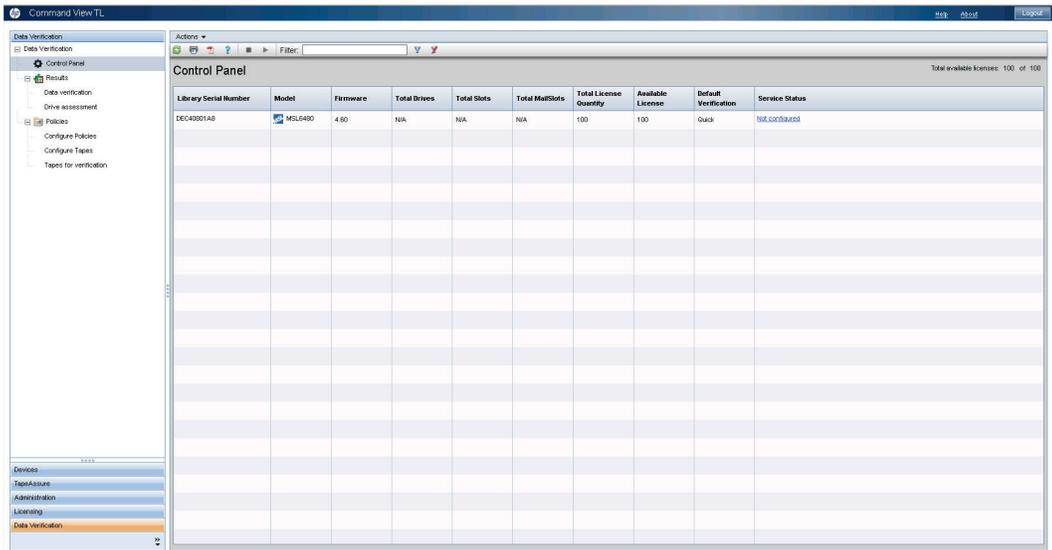


Figure 8. Data Verification Service successfully licensed and authenticated now displaying a status of Not configured for an MSL6480 Tape Library

QStar Archive Manager Software

QStar Archive Manager (ASM) software provides a tape-as-NAS (tNAS) interface for users or applications that need a simple way to store data to HPE StoreEver Tape Libraries. QStar ASM software is installed on a Windows or Linux® server and uses an “integral volume” combining disk and archive storage. This approach allows files to be cached to disk for short-term retrieval with file metadata remaining there permanently, while files are moved to lower cost StoreEver tape archive storage for long-term preservation.

QStar ASM software can be configured to use the HPE Data Verification services to periodically scan tape cartridges, using one of three granularities, based on a time interval and/or media insertions. Each cartridge scanned is given an approval rating and appropriate action can be automatically taken. If any cartridge is detected as having a lower than expected level of read back confidence, QStar ASM software provides options to copy data from that cartridge to a new cartridge.

Refer to the [QStar ASM HPE CVTL Support Manual](#) for specific details on configuring and using QStar ASM software with HPE StoreEver Data Verification services.

Installing QStar ASM software

QStar ASM software version 6.1.0 (ESL G3 Tape Library) or version 6.1.1 (MSL6480 Tape Library) or newer is required to configure and manage QStar ASM support for HPE StoreEver Data Verification services. You can obtain the QStar ASM software that supports Command View TL and data verification services by contacting your QStar reseller or by completing a product evaluation request form from qstar.com/support/product-evaluation/ and include in your comments that you have either an HPE StoreEver ESL G3 or MSL6480 Tape Library that you'd like to test with the tape media verification process. For this white paper, QStar ASM software version 6.1.1 was installed on a Windows 2008 R2 server.

For this white paper, the QStar ASM software was installed using the **QStar Archive Manager version 6 System Administrator's Guide for Windows**. Contact your QStar reseller or e-mail QStar support in North America (cs@qstar.com) or in Europe (info@qstar.com) to request the latest version of the QStar System Administrator's Guide for the operating system that you have QStar ASM software installed on.

Before installing the QStar ASM software, complete the following tasks:

1. Disable the Microsoft Removable Storage services.
2. Disable any Antivirus Software and if you intend to re-enable it after the installation of QStar ASM software, be sure that the QStar program and QStar Integral Volume Sets cache folders are excluded from antivirus check.
3. If QStar ASM software will be installed on a server where another library management software vendor other than QStar was previously installed, you must first uninstall that software and any device drivers that were installed by that library management software. Refer to the vendor specific instructions for uninstalling the software and devices drivers prior to installing QStar ASM software.

After you have completed the steps above, verify that the ESL G3 or MSL6480 Tape Library has been properly configured and is detected by the server that you will be installing the QStar ASM software on. To install the QStar ASM software, follow these steps:

1. Initiate the installation process by inserting the QStar CD-ROM into your drive or for downloaded software, select the **Start** menu button then click on **Run** and browse to the location of the downloaded file. Click **OK** to launch the program.
2. When using the CD-ROM, once the **Installation** menu appears, select the **Install QStar Software for Windows** button to install QStar ASM.
3. After choosing **Install QStar Software** or by manually running the downloaded file, select the appropriate language for the installer and click **OK** to continue the installation process.
4. The QStar Software Setup Wizard will be displayed. Click on **Next**.

5. Review the QStar software license agreement, agree to the terms of the license agreement by clicking the box then select **Next**.
6. On the following screen, you must provide a User and Company name then click on **Next**.
7. Specify the installation location. The default location is C:\ or you can click on **Browse** to choose an alternate location. For this white paper, the default installation location was used. Select **Next** to continue.
8. Now you will select which QStar product will be installed on your server. The following products can be selected:
 - a. **QStar ASM** (Full storage management product)
 - b. **QStar Data Director** (ASM + Mirroring capabilities)
 - c. **QStar Archive Replicator** (Synchronous file replicator) for this white paper, **QStar ASM** was selected.
9. After you select the product you will install, click on **Next** to continue.
10. The following screen allows you to specify which components you want to be installed and choose which archive technologies will be used by QStar software. A **Typical** installation, which is the default, will include NO components thus requiring the System Administrator to select the correct component and technologies. Once a choice is made, the installation will become **Custom**. For this white paper, the type of install was **Custom** as **Tape** was selected as the optional component to install since an MSL6480 Tape Library was being used. Descriptions for each component can be found in the [QStar ASM HPE CVTL Support Manual](#). See **figure 9** as an example. Once you have made your selections, select **Next**.

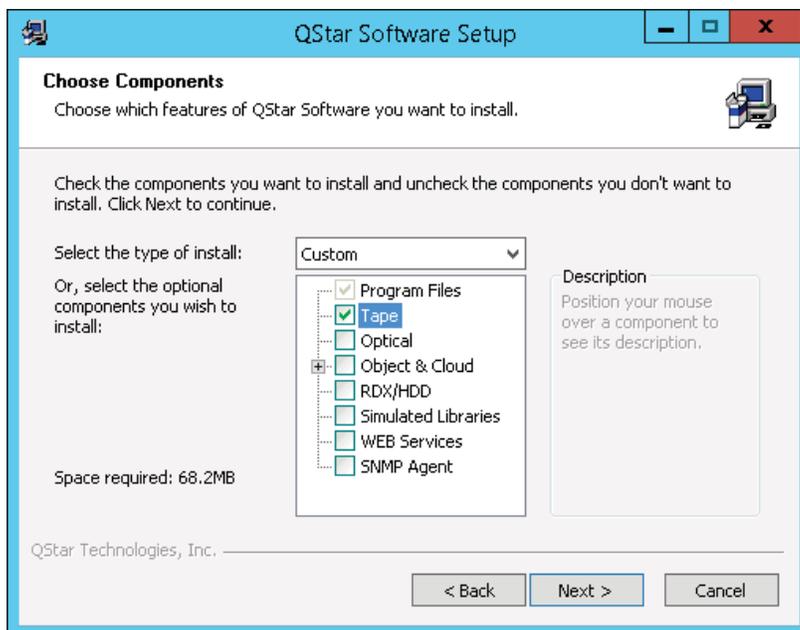


Figure 9. Choosing which components will be installed

11. Select the location for the QStar ASM software icons in the **Program** folder. Create a location for the software icons by filling in the blanks or accept the default location. The default location was used for this white paper. Click on **Install** which will start the installation of the software.
12. During the installation of the QStar ASM software, a QStar Device Claiming window will pop up. Mark the device(s) that are going to be controlled by QStar ASM then select **OK**. See **figure 10** as an example.

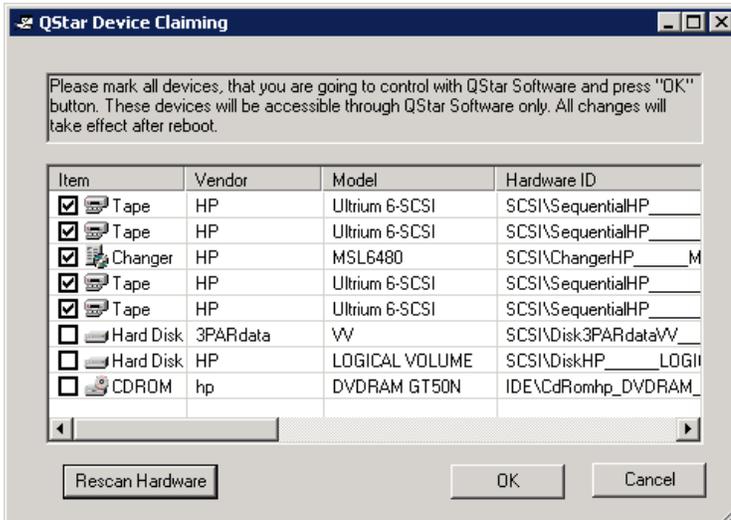


Figure 10. Selecting which devices you want to use with the QStar ASM software

13. After the installation completes, select **Reboot now** and select the **Finish** button.
14. Once the system has rebooted, you can verify that QStar ASM has successfully claimed the devices by opening the Windows Device Manager. All devices claimed by QStar ASM will be listed under **PassthroughDrv**. See **figure 11** as an example.
15. To launch the QStar Administrator Interface, click on **Start > All Programs > QStar ASM > QStar Administration Interface on Localhost**.

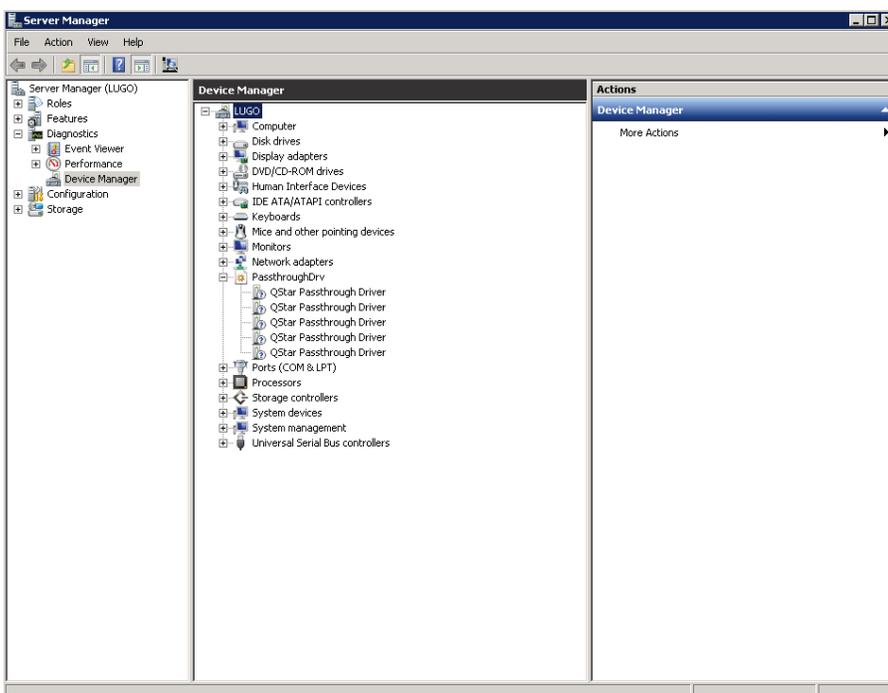


Figure 11. QStar pass-through driver installed for an MSL6480 Tape Library and four LTO-6 tape drives

Installing the QStar license key

You will not be able to start the QStar server, configure devices or create an integral volume without installing a valid QStar license key (demo or permanent). To install a license key for QStar ASM, select **License** in the QStar Administration Interface. This view pane contains information that you will need to provide when you call your QStar reseller or call the number listed to contact QStar directly. See **figure 12** as an example.

You can also submit the following form to obtain a license: qstar.com/support/license-key-transfer-request-form/

You will need to provide the **Host ID** (ac19cBce in **figure 12**) and **Platform** (Windows/64 in **figure 12**) along with other information to complete the form.

The license key is a file that needs to be copied to a specific directory (which is different for Windows or Linux). A QStar representative will provide your license key and guidance for installing the license key.

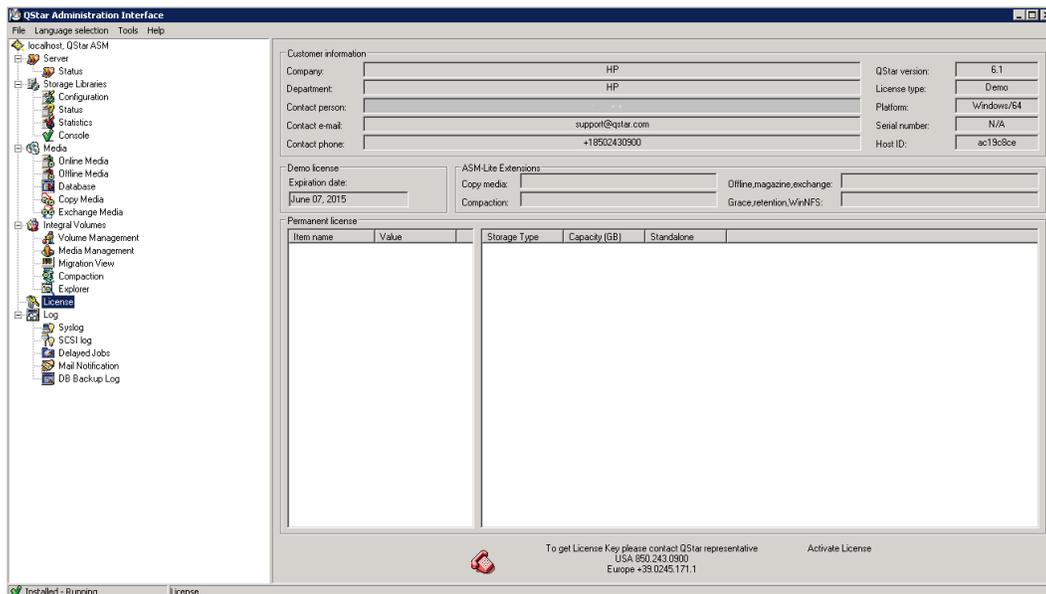


Figure 12. Adding a license key

Configuring the HPE StoreEver Tape Library to use with QStar ASM

Now that the QStar ASM software is properly licensed and the ESL G3 or MSL6480 Tape Library, including changer and drives, were claimed, you need to configure that tape library for use with QStar ASM.

1. In the QStar Administration Interface, click on **Configuration** under **Storage Libraries**.
2. Click on **Add**, which will then display all libraries connected to the system which are available for configuration. You should see the HPE StoreEver Tape Library and tape drives that you claimed during the installation process. See **figure 13** as an example.

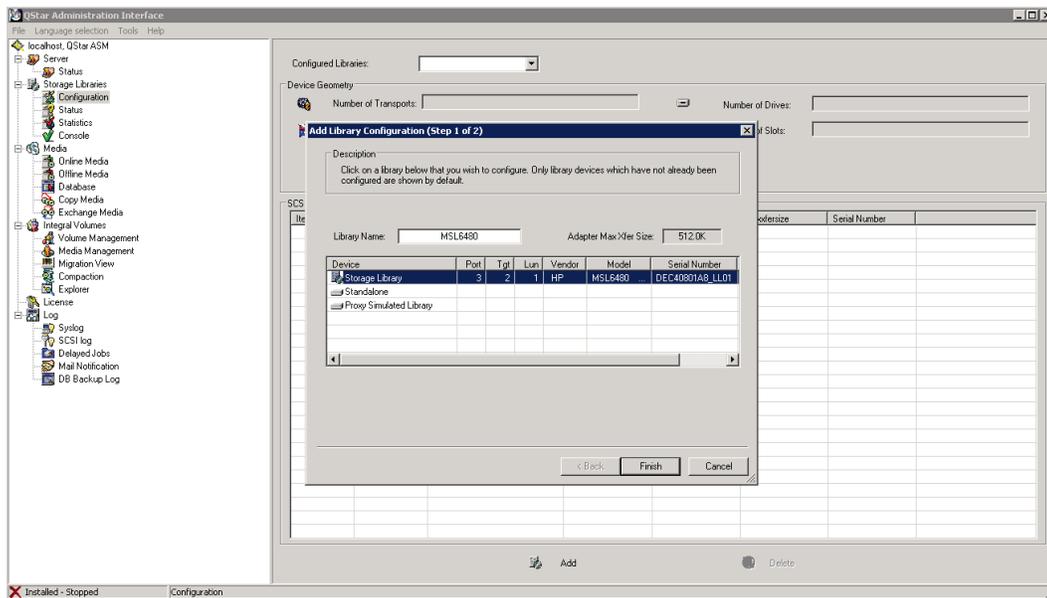


Figure 13. Adding a library to QStar ASM

3. Select the library you want to add. By default, the **Library Name** will be **JB0**. For this example, an MSL6480 Tape Library was selected and the library name was changed to MSL6480. Click **Finish** to add the library.
4. Prior to using a newly configured library, you must start the QStar server. You will not be able to start the QStar server until you have obtained a license key (demo or permanent) and added a storage library. After those steps have been completed, click on **Status** under **Server** in the QStar Administration Interface. Click on the **Start** button to start the QStar server. See **figure 14** as an example.

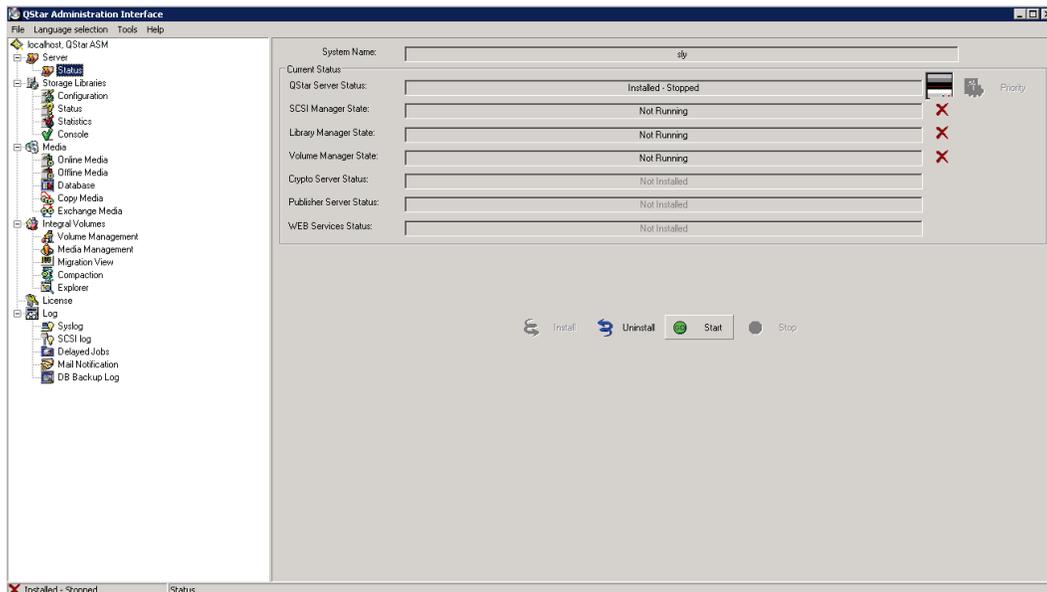


Figure 14. Starting the QStar server

5. You can verify that the library was successfully configured by clicking on **Status** under **Storage Libraries**. See **figure 15** as an example.

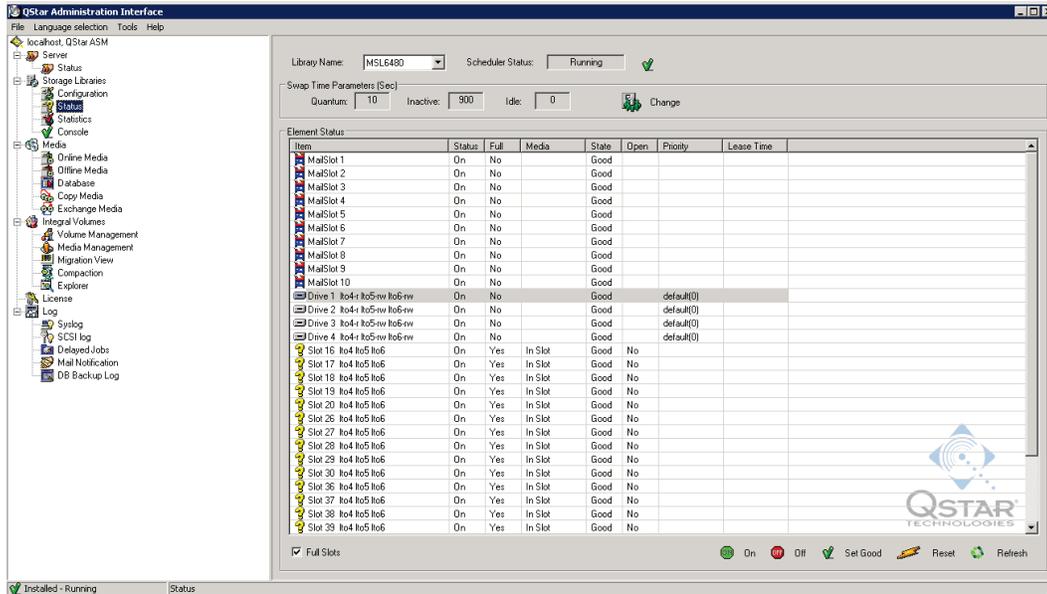


Figure 15. Viewing the library status

Configuring the media to use with QStar ASM

You can view the details for all the media in your HPE StoreEver Tape Library by selecting **Online Media** under **Media** in the QStar Administration Interface. The first time that you view the media for a tape library that you just added, all media will have a status of Unknown. For this white paper, the media already contained data so all media was selected then a **Refresh** operation was performed. See **figure 16** as an example. You can also **Import**, **Export**, or **Erase** media using the Online Media page.

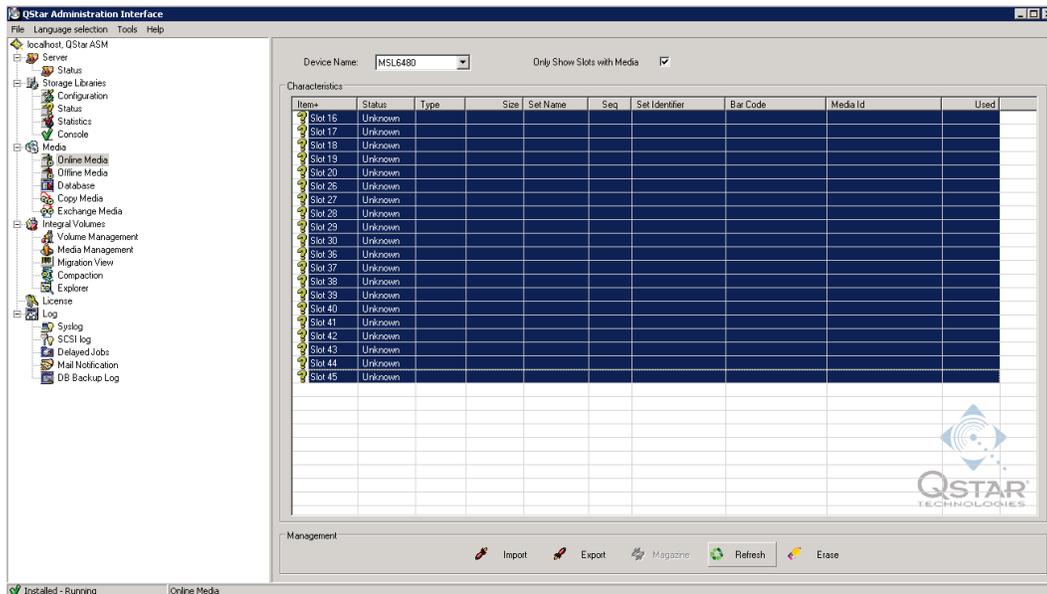


Figure 16. Refreshing the tape media

After the media refresh has completed, details for each piece of media should be available. See **figure 17** as an example.

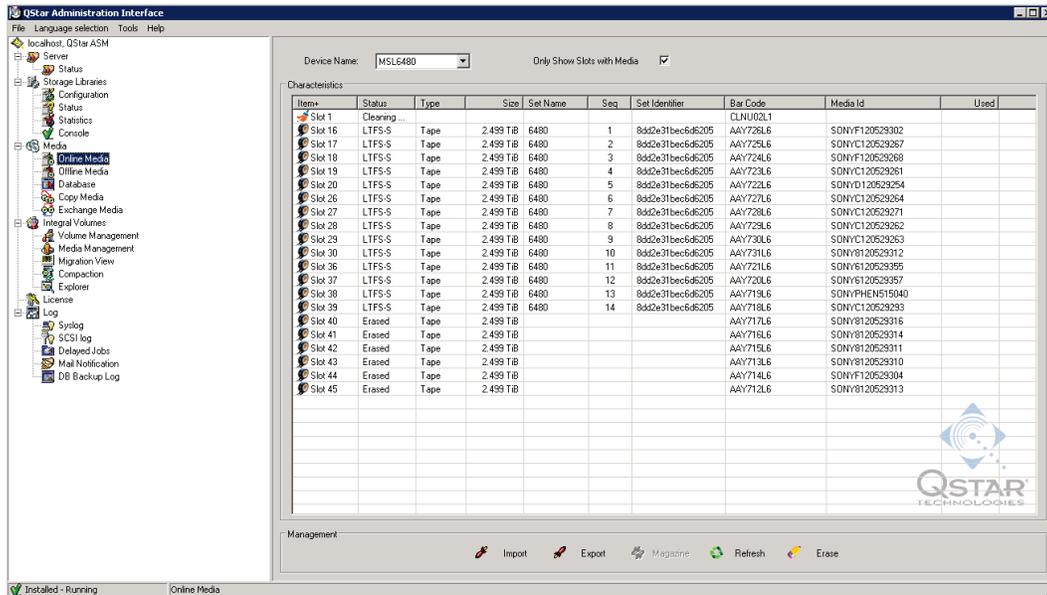


Figure 17. Viewing the media details following a refresh operation

Creating an integral volume

Now that media is associated with the MSL64-80 Tape Library, a shared LTFS volume can be created. QStar ASM allows creation of an integral volume, which is a tNAS interface for users or applications that need a simple way to store data to HPE StoreEver Tape Libraries.

To create the integral volume:

1. Select **Volume Management** under **Integral Volumes** in the QStar Administration Interface
2. Click on **Create New Integral Volume**. The following must be provided:
 - a. Integral Volume Name
 - b. File System Type
 - c. What to mount the volume as (can be a letter or as an SMB2 share)
 - d. Whether the drive is shared
 - e. Location of the cache folder
 - f. Cache size
 - g. Page size for the cache
3. Requirements for creating an integral volume:
 - a. The integral volume name cannot exceed 12 characters
 - b. The cache size must be at least 4 MB
 - c. The page size for the cache must be at least 64 KB (default)

Note

QStar strongly recommends that the cache size used for the integral volume, when using tape libraries, is at least larger than a single tape cartridge for the library being used. This prevents reads from the cartridge that is currently being written to. A cache larger than a single tape cartridge should ensure that all files read should be in cache.

Details for each of the new integral volume parameters are thoroughly covered in the **QStar Archive Manager version 6 System Administrator’s Guide** for the version of operating system on the server that the QStar ASM software has been installed on. See **figure 18** as an example. Click on **Create** once you have specified all of the parameters for the new integral volume.

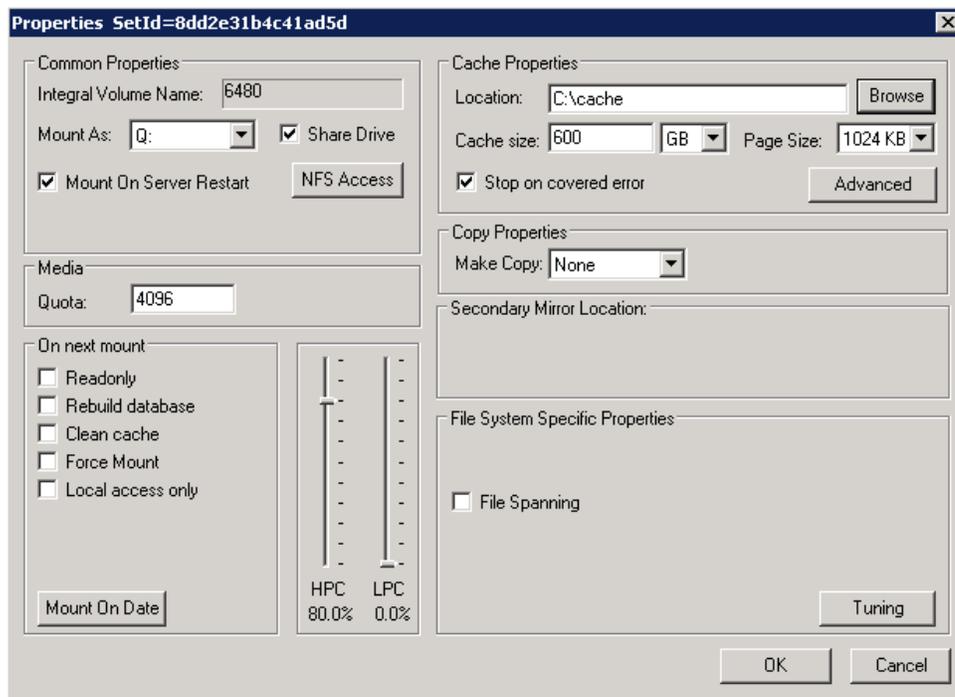


Figure 18. Parameters for the new integral volume

Adding media to the integral volume

Now that the creation process for the new integral volume has completed, the **Volume Management** view pane will display the characteristics of the integral volume. From here you can select **Properties** to view and or change the parameters for the integral volume. There will be no media associated with the integral volume because media has to be added to the integral volume. To add media to the LTFS integral volume:

1. Select **Media Management** under **Integral Volumes** in the QStar Administration Interface. The Media Management view pane displays all available media in the right list-box that can be added to the integral volume.
2. For **Integral Volume Name**, the integral volume that was created in the [previous section](#) should be selected. If not, select that volume. For this white paper, 6480 was the integral volume selected.
3. When using an LTFS Spanned File System, QStar will write sequentially from media 0 to media x, so you only need to select one media then click on the left arrow for the media to be added to the Integral Volume. After that, QStar will automatically claim new blank/erased media from the pool. See **figure 19** as an example.

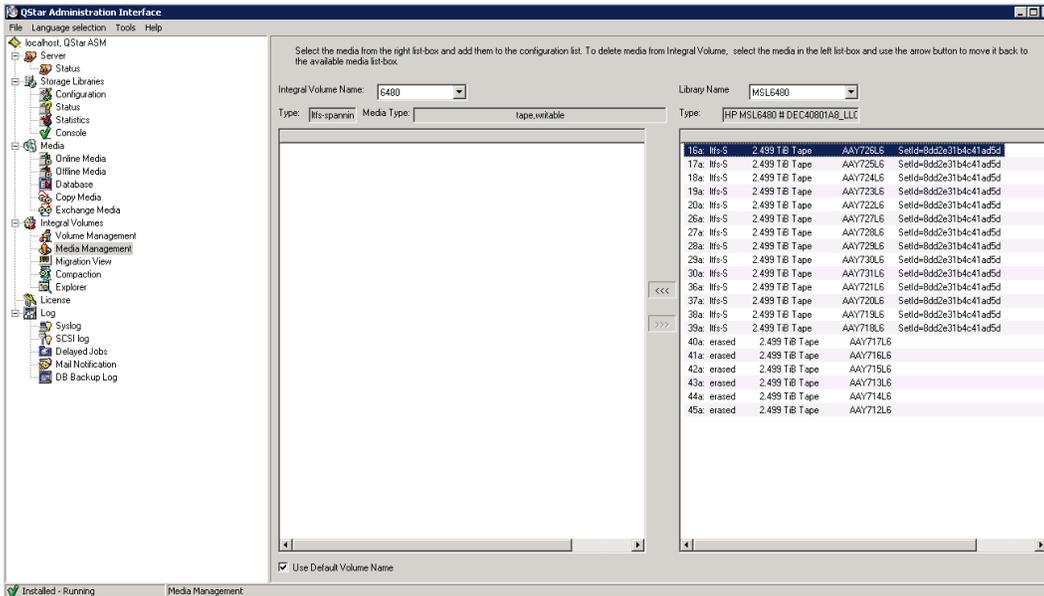


Figure 19. Adding media to the integral volume

4. All of the media that was successfully added to the integral volume will be displayed in the left list-box.
5. By selecting **Volume Management** under **Integral Volumes** then selecting the integral volume that you added the media to, you can confirm that the media is now associated with the integral volume. See **figure 20** as an example.

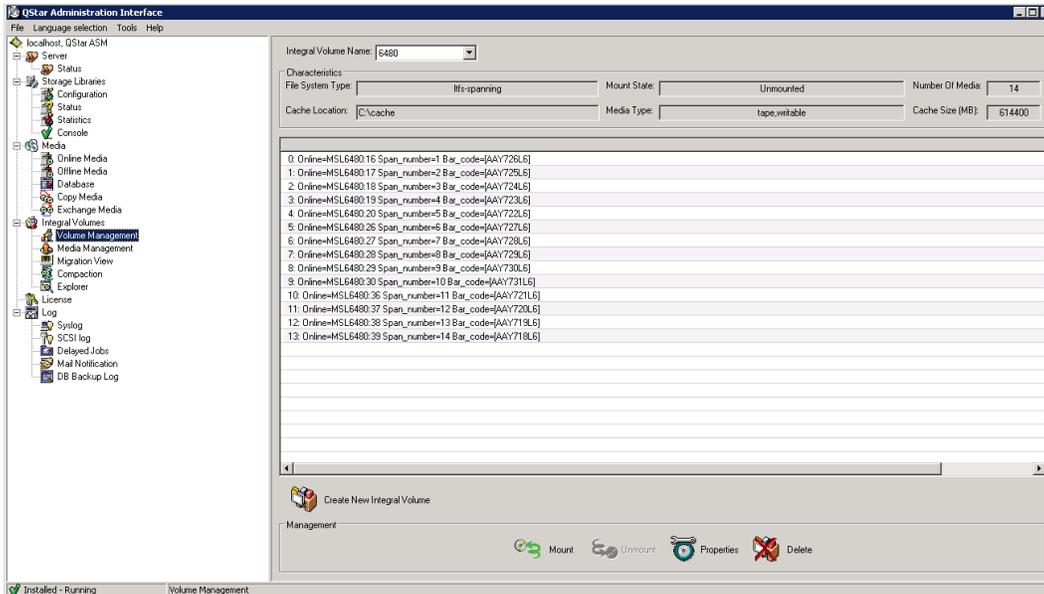


Figure 20. Integral volume with the media added

Mounting the integral volume

The final step to be able to use the simple tNAS interface provided by QStar ASM software for users or applications to store data to their HPE StoreEver Tape Library, is to mount the integral volume.

1. Select **Volume Management** under **Integral Volumes**.
2. Select the **Integral Volume Name** that you will be mounting from the drop down list.
3. Click on **Mount** and the LTFS integral volume will be mounted. See **figure 21** as an example of what an LTFS volume consisting of LTO-6 tape media looks like. Files can now be copied to and from the MSL6480 Tape Library the same as disk.

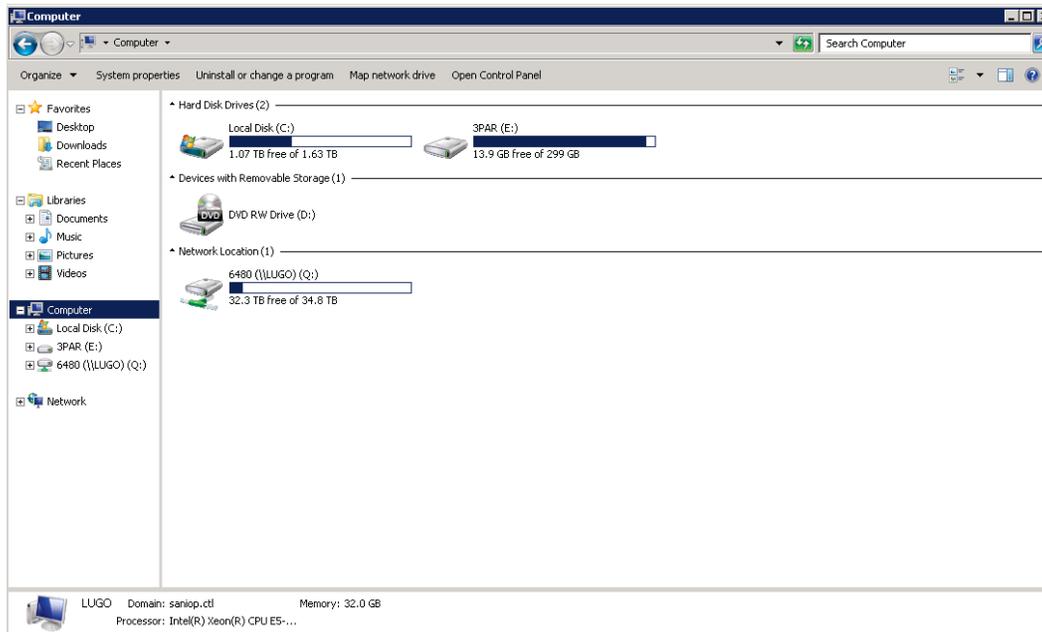


Figure 21. Mounted LTFS volume for an MSL6480 Tape Library with LTO-6 media

Configuring QStar ASM software to use the HPE StoreEver Data Verification services

If the QStar ASM software detects that a tape library supports HPE Command View TL, the library configuration page will provide an HPE CVTL button. To configure QStar ASM software to use the HPE StoreEver Data Verification services of HPE Command View TL, follow the steps below and refer to **figure 22** as an example:

1. Select **Configuration** under **Storage Libraries** in the QStar Administration Interface.
2. Click on the **HPE CVTL** button. This will launch the **QStar Advanced Configuration Editor**.
3. For **Library Name**, select your HPE StoreEver Tape Library from the drop down list. MSL6480 was selected for this white paper.
4. Under **<cvtl_config>**, expand the parameter **<cvtl_IP>**. This is the IP address of the server that you installed Command View TL on in a [previous section](#).
5. Right-click on **<value>** and change the listed IP address to the actual IP address of your Command View TL management station. Press enter to save this change.
6. Next expand **<lib_IP>** again under **<cvtl_config>**. This time you will specify the IP address of your HPE StoreEver Tape Library.
7. Right-click on **<value>** and change the listed IP address to the actual IP address of your HPE StoreEver Tape Library. Press enter to save this change.

8. For an MSL6480 only, expand **<cvtl_MSL6480_library_password>** under **<cvtl_config>**. You need to specify the password that you created when enabling your MSL6480 for Data Verification in a [previous section](#).
9. Once you have modified all of the required values for your Command View TL management station and HPE StoreEver Tape Library, click on **Save**.
10. Finally, click on **Exit** to close the QStar Advanced Configuration Editor.

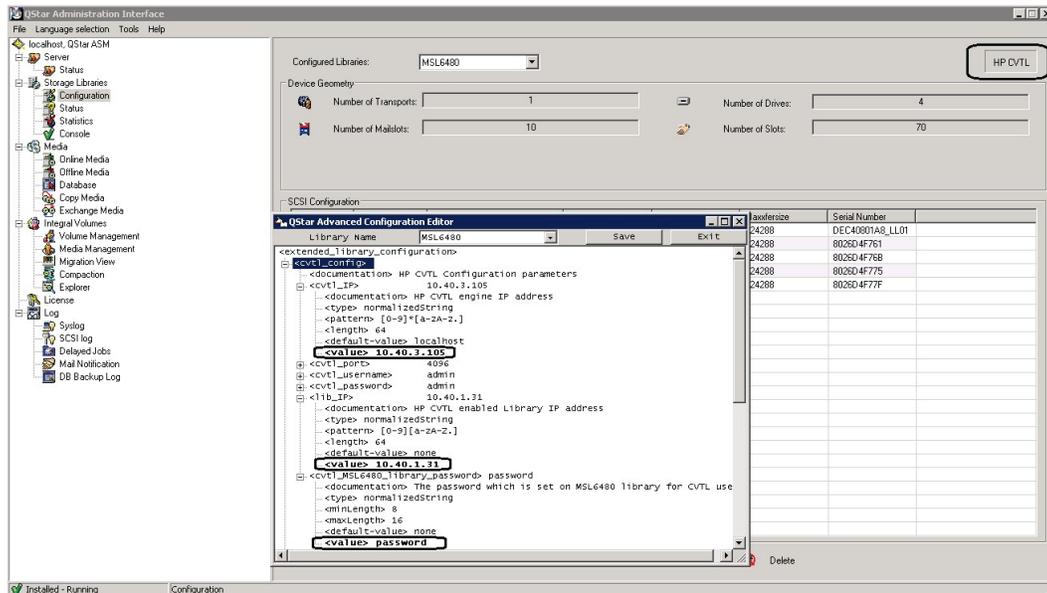


Figure 22. Configuring QStar ASM support for HPE StoreEver Data Verification services

11. When you select **Exit**, the CVTL Verification Schedule window will open. Refer to the [QStar ASM HPE CVTL Support Manual](#) for detailed information regarding using the CVTL Verification Schedule.

QStar ASM software is now configured to support HPE StoreEver Data Verification services to periodically scan tape cartridges and each scanned cartridge will now be given an approval rating related to its read back confidence.

Using QStar ASM software to verify the quality of archived tape data over time

To automatically verify the quality of archived tape data over time using QStar ASM software, you should refer to the [QStar ASM HPE CVTL Support Manual](#) to use the QStar Advanced Configuration Editor in conjunction with the CVTL Verification Schedule interface to schedule verification of archived tape data to run automatically. You can manually run verification jobs using the QStar DOS Prompt Commands. If your preference is to manually run verification jobs using the DOS Prompt Commands, again refer to the QStar ASM HPE CVTL Support Manual.

For this white paper, verification jobs were run manually using the QStar Administration Interface. To manually verify the quality of archived tape data using QStar ASM software:

1. Select **Statistics** under **Storage Libraries**. All of the tape drives and tape media configured for use with your HPE StoreEver Tape Library will be listed.
2. Right-click on any **Slot** (the barcode for each slot is also listed), which is your tape cartridge, and one of the available options listed will be **HPE CVTL Verification**. You can then choose to run a **Quick**, **Moderate**, or **Full** verification of the selected media. See [figure 23](#) as an example. For more information on how long each data verification test will take to complete, refer to the section **Example Verification Times** of the technical white paper on HPE StoreEver Data Verification titled [Protecting Your Data](#).

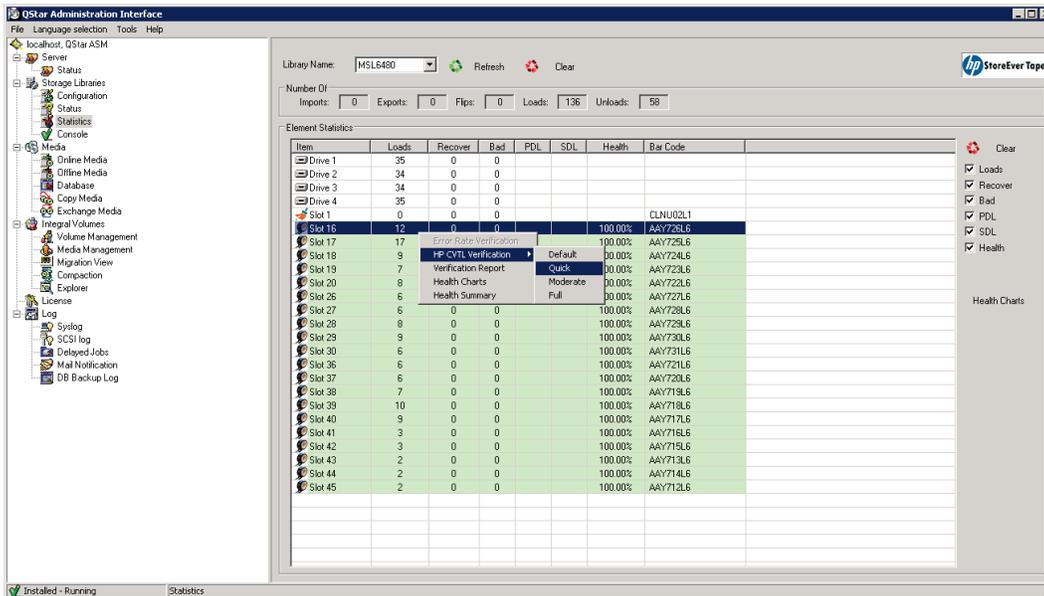


Figure 23. Manually running verification for tape media

- After you select the HPE CVTL Verification type, a message will be displayed stating that you can view the status for the verification job by selecting **Delayed Jobs** under **Log** in the QStar Administration Interface. The verification job will start on the top of the minute.
- Once the verification job has started, you can double-click on it to view details. See **figure 24** as an example. You can also return to the **Statistics** page under **Storage Libraries** and right-click on the slot that you selected for HPE CVTL Verification. The option **Verification Report** should now be available to select. See **figure 25** as an example for viewing the Verification Report. You can also view the results of the data verification job in the **Syslog** under **Log**. See **figure 26** as an example.

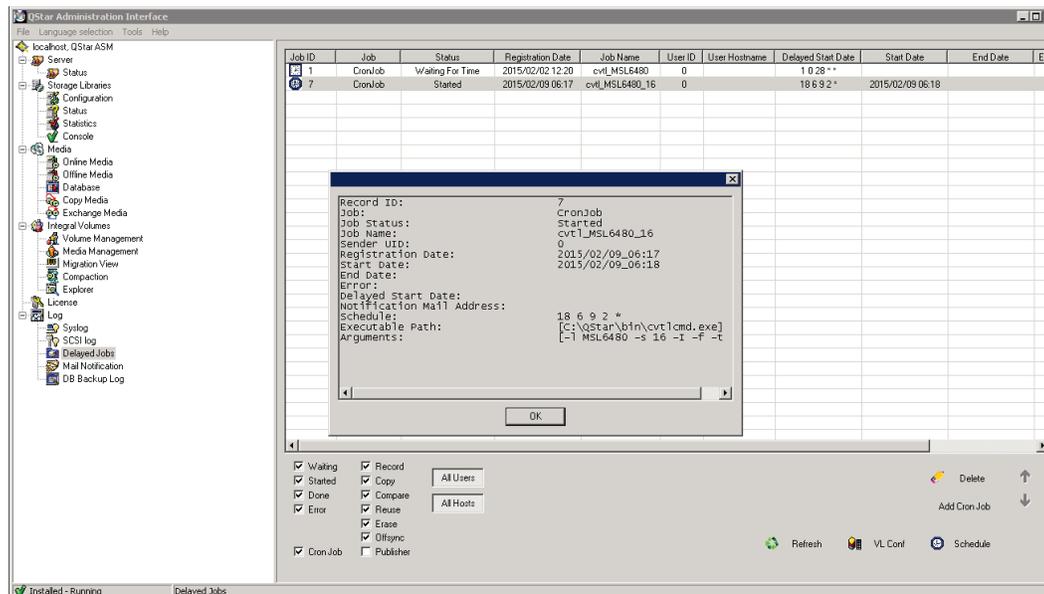


Figure 24. Viewing the status of a verification job

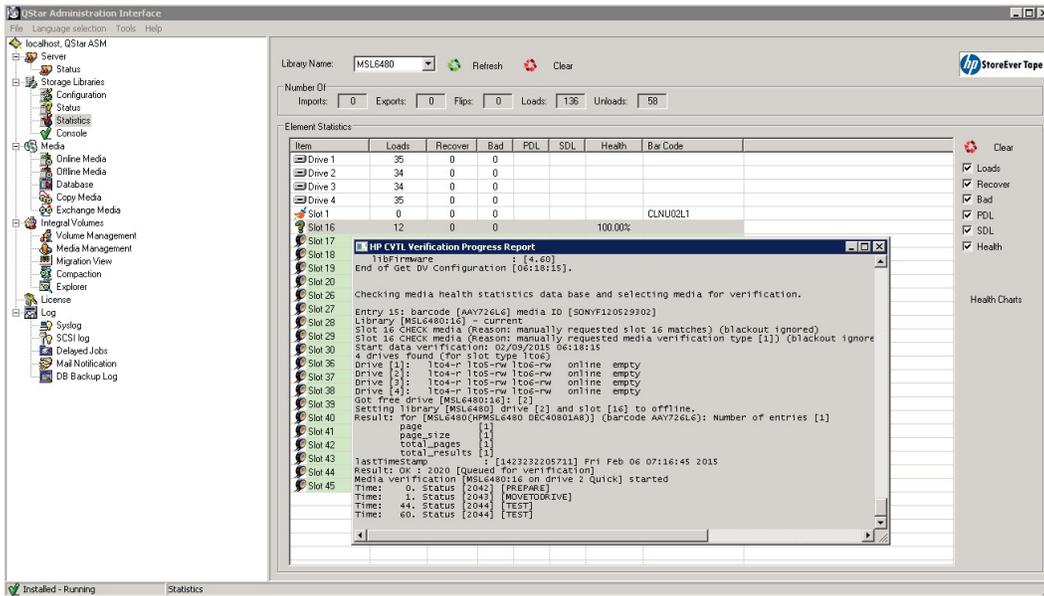


Figure 25. Viewing the verification report for a slot

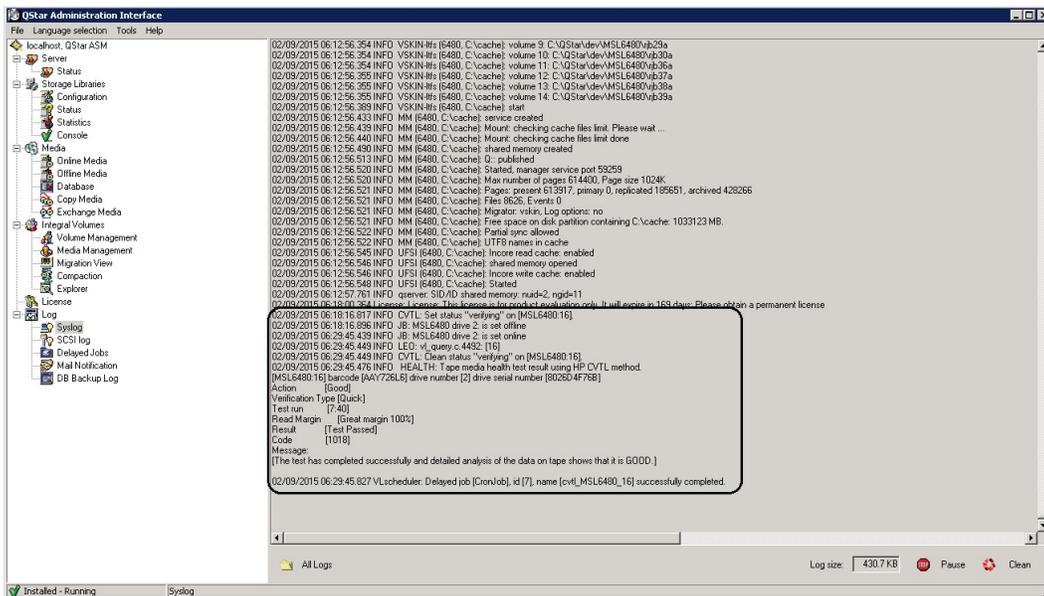


Figure 26. Viewing the verification job results in the Syslog

- You can view a graphical representation of various statistics for each media in your HPE StoreEver Tape Library while on the **Statistics** page under **Storage Libraries** in the QStar Administration Interface by right-clicking on the preferred **Slot** then choose **Health Charts** or select the preferred **Slot** then click on the **Health Charts** button (both Health Charts selections can be seen in **figure 23** above).

Using QStar ASM software to run a drive verification test

When a data verification test returns an error but you believe the media is healthy and the error was the result of a faulty tape drive, you can now verify the health of your tape drives. The requirements for executing a drive verification test are:

- Command View TL 3.9.01 or newer must be installed
- QStar ASM 6.1.1 or newer must be installed
- One or more known-to-be-good media, preferably HPE-branded media, that have a status of “Erased” (verify under **Media > Online Media** in the QStar Administration Interface)

Warning

The drive verification test destroys all data on the media. The recommendation is to keep a set of good media, preferably HPE-branded, in known library slots and then use these media only for drive verification tests.

To start a drive verification test using the QStar Administration Interface:

1. Right-click on the drive you intend to test on the **Statistics** page under **Storage Libraries** and select **Drive Verification**. See **figure 27** as an example.
2. A list of erased media will be displayed. Select one of the media listed that is known-to-be-good and click **OK**. See **figure 28** as an example. A warning message will be displayed reminding you that the media content will be destroyed. After you acknowledge the warning message, another message will be displayed stating that you can view the status for the verification job by selecting **Delayed Jobs** under **Log** in the QStar Administration Interface.
3. Once the drive verification test has started and a job log file is created in the QStar log directory, a Progress Report menu item becomes enabled for this drive and you can view the progress of the operation as it runs. See **figure 29** and **figure 30** as examples.

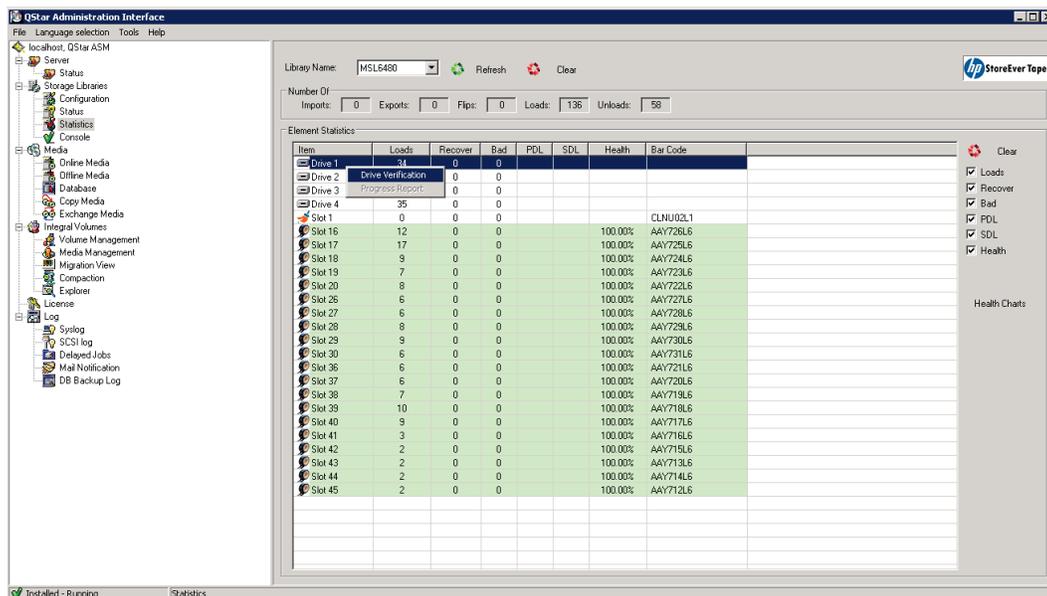


Figure 27. Selecting a drive for drive verification

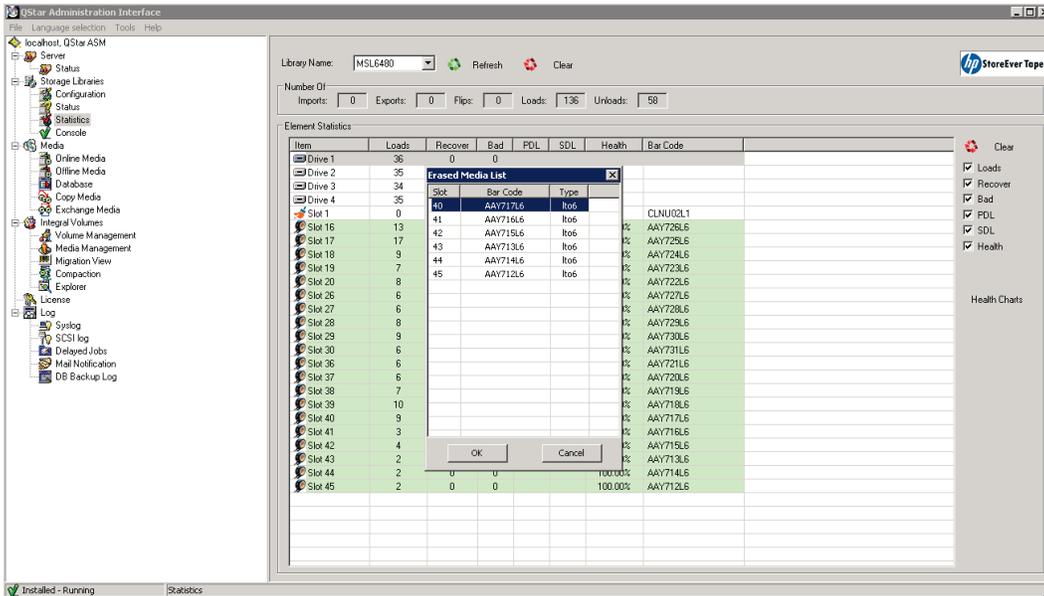


Figure 28. Selecting media that erased to use for the drive verification test

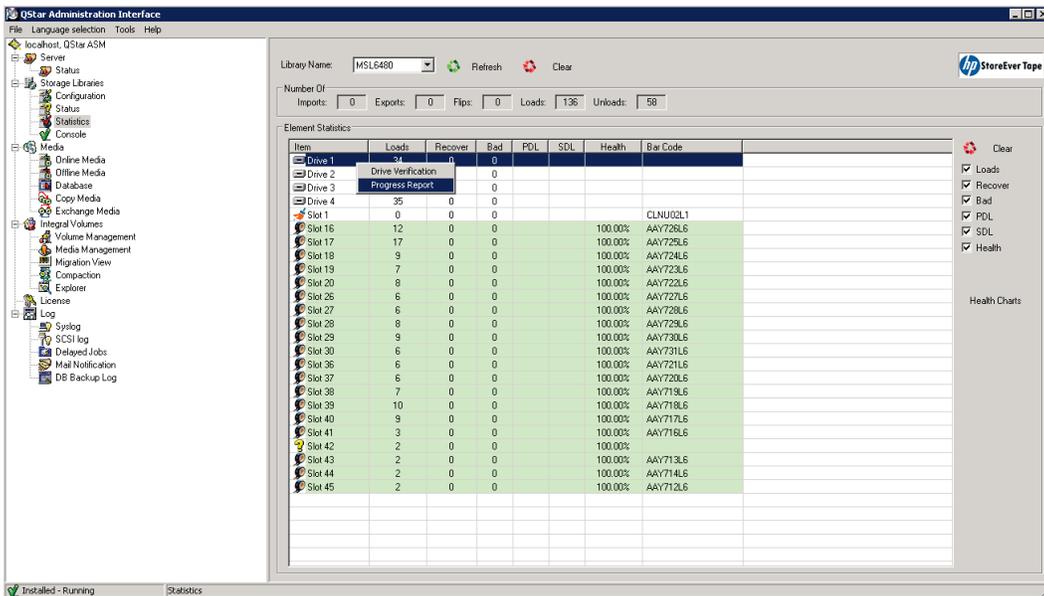


Figure 29. Selecting to view the progress report for a drive verification test

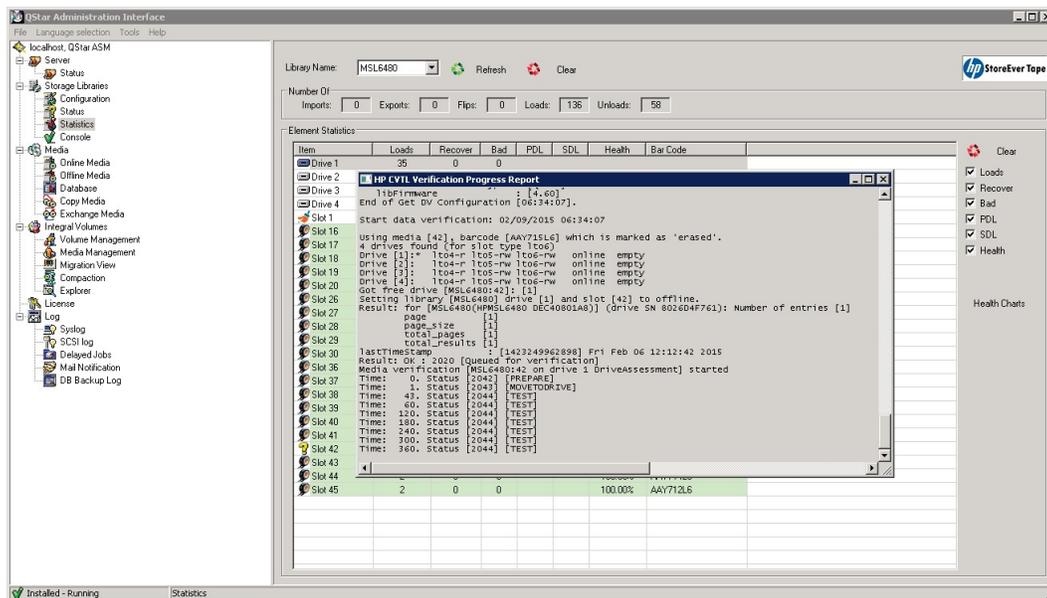


Figure 30. Viewing the HPE CVTL Verification Progress Report

Copying media content from degraded media

If a verification job indicates that you should consider copying the media content, please refer to the section **The Copy and Compare Media Utilities** in the **QStar Archive Manager version 6 System Administrator's Guide** for the version of operating system on the server that the QStar ASM software has been installed on. The QStar ASM will start an automatic media copy only when there are at least two free drives and the total number of the drives configured for use with QStar ASM is at least 4, although higher numbers (8+ drives) are ideal. The system administrator may also manually schedule a media copy job for a particular time or manage the media otherwise (for example, delete the media if the content is no longer needed).

You can use the **Copy Media** view pane under **Media** in the QStar Administration Interface to copy media that has been written to then compare the duplicate media with the original media using the Compare procedure once the copying process is complete. For more detailed information regarding copying data from one media to another media, refer to the section **The Copy and Compare Media Utilities** in the **QStar Archive Manager version 6 System Administrator's Guide** for the operating system of the server that the QStar ASM software has been installed on.

Conclusion

Enterprise business customers are looking for a simple way to archive their data but while today's tape media is generally accepted as the most reliable and cost-effective technology for long-term storage, verifying the quality of archived tape data over time and having confidence in accessing and retrieving business-critical data from the archived tape data throughout its lifecycle further complicates the challenge of long-term data retention. Customers can now preserve the integrity and confidently access business-critical data stored on tape media throughout its lifecycle using HPE StoreEver Data Verification services with QStar Archive Manager (ASM) software. HPE and QStar have collaborated to create a solution that can identify when that archived data is at risk of becoming unreadable and then provide options to take remedial action against degraded tape media.

Useful links

[HPE Backup, Recovery and Archive Solutions](#)

[HPE Command View for Tape Libraries Software](#)

[HPE StoreEver Data Verification Software](#)

[HPE StoreEver Data Verification Technical White Paper](#)

[QStar Archive Manager](#)

[QStar Archive Manager Tape Media Verification](#)

[QStar and Hewlett Packard Technology Partnership](#)

[HPE StoreEver MSL6480 Tape Library](#)

[HPE StoreEver ESL G3 Tape Libraries](#)

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