hp StorageWorks Implementing Mixed Media in HP StorageWorks ESL and MSL Tape Libraries

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This application note describes how to implement mixed media functionality in an HP StorageWorks Enterprise Backup Solution (EBS) using HP hardware and several of today's leading data protection software applications.

For the latest version of these Application Notes and other tape library documentation, access the HP storage web site at: http://www.hp.com/country/us/eng/prodserv/storage.html.

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About this document

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Application notes information

These Application Notes cover the following major topics:

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Intended audience

This document is intended for customers who want to mix drive technologies and media types in the same HP tape automation library.

Prerequisites

Before implementing a mixed media configuration, make sure you have:

- Reviewed the EBS Compatibility Matrix
- Properly installed and configured your EBS hardware per the *HP StorageWorks EBS Design Guide*

Note: These two documents can be found at: http://www.hp.com/go/ebs.

- Properly installed your backup application per vendor documentation and recommendations

Other documentation

Additional documentation, including white papers and best practices documents, is available via the HP web site at: http://www.hp.com.

Overview

The current IT industry requires reduced budgets and cost savings, which can be achieved by consolidation and integration of staff and IT infrastructure. The challenges of this transition often include the merging of diverse backup solutions, data migration between various systems, and the assurance that data stored on differing technologies will always be accessible. Therefore, it is imperative to have a data protection solution that supports both new generations of tape drives with greater media capacities, as well as different drive technologies within the same tape library frame. HP understands the customer's need to easily increase backup capacity and to protect the customer's ability to decide between drive technologies as their IT strategy evolves.

HP enterprise and mid-range libraries support DLT8000, SDLT, and Ultrium tape drives in the same automated tape library. The customer's investment is further protected, because they are not locked into a specific drive technology. This capability in the hardware must be coupled with a backup application that supports mixed media and mixed tape drive technology.

HP StorageWorks OpenView Storage Data Protector allows the mixing of different drive technologies and media types. Additionally, there are many Independent Software Vendor (ISV) backup applications that also support this functionality. This application note describes how to implement this functionality in an Enterprise Backup Solution (EBS) environment using HP hardware and several of today's leading data protection applications.

Configurations

The hardware and software components of an HP EBS configuration may consist of:

- Server(s) containing Fibre Channel Host Bus Adapter(s)
- RAID Array Storage
- Fibre Channel SAN Switch(es)
- Router(s), such as the HP StorageWorks E2400-160 FC Interface Controller or the HP StorageWorks Network Storage Router E1200-160
- HP StorageWorks tape libraries
- HP EBS supported operating systems:
  - HP-UX
  - Microsoft® Windows® Server 2003
  - Microsoft Windows 2000
  - Microsoft Windows NT®
  - Novell NetWare®
  - Tru64 UNIX™
  - Linux
  - Sun Solaris
  - IBM AIX
- One of the following backup applications:
  - HP OpenView Storage Data Protector
  - VERITAS NetBackup™
  - VERITAS™ Backup Exec™
  - Computer Associates® BrightStor® ARCserve®

Tape Libraries

HP StorageWorks tape libraries that support mixed media and mixed drive technologies include:

■   ESL9000 Series

■   MSL6000 Series

■   MSL5000 Series

The ESL9000 Series tape libraries were first introduced in mid-1999 with the DLT7000 drive. Subsequently this library has been qualified with DLT8000, SDLT, and Ultrium drives. All of these drive types, with the exception of the DLT7000, are currently supported in this library family.

Note: DLT7000 drives are not supported in ESL9000 mixed media configurations.

The MSL5000 series tape libraries were first introduced with SDLT drives in mid-2001. Since that time the MSL6000 was added to the series. The MSL libraries support DLT8000, SDLT, and Ultrium drives.

Tape Drives

Tape drives supported in HP StorageWorks mixed media libraries include:

■   Ultrium 460

■   Ultrium 230

■   SDLT 320

■   SDLT 220

■   DLT8000

Supported Library and Drive Configurations

Tables 1 and 2 list the mixed media support in each model of the ESL9000 Series and MSL5000/6000 Series tape libraries.

Table 1: ESL Tape Libraries

Base Library	DLT8000 & SDLT*	Ultrium 230 & 460	SDLT* & Ultrium*
ESL9198DLX	Supported (LVD only)	Supported	Supported (LVD only)
ESL9198SL	Supported (LVD only)	Supported	Supported (LVD only)
ESL9326D/DX	Supported (HVD only)	n/a	n/a
ESL9326SL	Supported (LVD only)	Supported	Supported (LVD only)
ESL9595 (SDLT 220)	Supported (LVD only)	Supported	Supported (LVD only)
ESL9322 (Ultrium 230)	n/a	Supported	Supported (LVD only)
ESL9595 (Ultrium 230)	n/a	Supported	Supported (LVD only)
ESL9322 (SDLT 320)	Not supported	Supported	Supported (LVD only)
ESL9595 (SDLT 320)	Not supported	Supported	Supported (LVD only)
ESL9595 (Ultrium 460)	n/a	Supported	Supported (LVD only)
ESL9322 (Ultrium 460)	n/a	Supported	Supported (LVD only)

Table 2: MSL Tape Libraries

Base Library	DLT8000 & SDLT* (Single unit)	Ultrium 230 & 460 (Single unit)	SDLT* & Ultrium* (Stacked config**)
MSL5026DLX (opal)	Supported	n/a	Supported
MSL5026SL (opal)	Supported	n/a	Supported
MSL5026SL (graphite)	Supported	Supported	Supported
MSL5052SL	Supported	Supported	Supported
MSL5030 (Ultrium 230)	n/a	Supported	Supported
MSL5060 (Ultrium 230)	n/a	Supported	Supported
MSL5026 (SDLT 320)	Supported	Supported	Supported
MSL5052 (SDLT 320)	Supported	Supported	Supported
MSL6030	n/a	Not supported	Supported
MSL6060	n/a	Not supported	Supported

Notes: *Includes all drive generations, e.g. SDLT 220, SDLT 320, Ultrium 230, Ultrium 460.
**SDLT and Ultrium drives cannot be mixed within the same MSL unit.

For additional information about supported drive upgrades, go to:

http://h18006.www1.hp.com/products/storageworks/tapecompatibility.html

and then select "Enterprise class libraries drive upgrade matrix" for ESL9000 series libraries or "Business class libraries drive upgrade matrix" for MSL5000/6000 series libraries.

Tape Media

Media supported in a mixed media configuration are limited to three types:

■ Ultrium 1 and 2 media, with native capacity of 100 GB or 200 GB. These tapes can be written and read only by Ultrium drives.

■ DLT IV media, with native capacity of 20 GB, 35 GB, or 40 GB per cartridge, depending on the format written. These tapes can be read by the Backward Read Compatible SDLT drives.

■ SuperDLT1 media, with native capacity of 110 GB or 160 GB per cartridge. These tapes can be written and read only by SuperDLT drives.

For additional media compatibility information, go to:

http://www.hp.com/products1/storage/products/storagemedia/index.html

and then click "Storage media one stop compatibility matrix."

Supported Media and Drive Compatibility

Ultrium drives do not format media. Ultrium drives use Ultrium 1 and Ultrium 2 media.

■ Both Ultrium 230 and 460 drives can read and write to Ultrium 1 media regardless of which drive may have previously written to the media

■ Ultrium 2 media can only be used by Ultrium 460 drives and is not read or write compatible with Ultrium 230 drives

DLT8000 drives use DLT IV media only. SDLT 220 and 320 drives both use one type of SDLT media. Each drive formats media differently and has varying capabilities when reading or writing to non-native media. Table 3 provides an easy reference for tape compatibility:

Table 3: DLT IV and SDLT Media and Drive Compatibility

Drive	SDLT media not formatted	SDLT media formatted by SDLT 220 drive	SDLT media formatted by SDLT 320 drive	DLT IV media formatted by DLT8000 drive
SDLT 320	Read/Write	Read/Write	Read/Write	Read only
SDLT 220	Read/Write	Read/Write	Not compatible	Read only
DLT 8000	Not compatible	Not compatible	Not compatible	Read/Write

The Density Select application, available on the Density Select Software CD included in the SDLT kit, provides a way for you to write data cartridges with an SDLT 320 tape drive that are backward compatible with SDLT 220 tape drives.

Note: The orange light on an SDLT 320 drive illuminates when reading media formatted by an SDLT 220 drive.

Supported Backup Applications

The backup applications that can be used to implement mixed media with HP StorageWorks tape libraries are:

■   HP OpenView Storage Data Protector

■   VERITAS NetBackup

■   VERITAS Backup Exec

■   Computer Associates BrightStor ARCserve

Note: All supported ESL and MSL hardware configurations (including multi-unit scaling) are compatible with the drive and media partitioning features of supported backup applications.

HP OpenView Storage Data Protector

To configure an HP tape library with Data Protector in a mixed media environment:

■   Configure several sub-libraries for the library. One library definition per media type.

■   Configure at least one media pool (or use the default pool) per media type.

■   Configure the library robotics once per media type, including the slot range for the media type. Make sure that only one host is controlling the robot, that is, the robotic control for each of the sub-library robotic definitions are identical.

■   Configure all the drives for a media type and link them to the related library robotic and media pool. Make sure the drive index is unique for each physical device, regardless of media type.

The "Autoconfigure Devices" wizard is not supported for mixed media operation. To configure mixed media operation, you must create and configure the sub-libraries manually using the following steps.

1.   Create the first sub-library by selecting the **Devices and Media** context. Right-click on **Devices** and then click **Add Device**.

2.   Enter the library name in **Device Name**. The device name should reference the media type.

3.   Select the **Device Type**, which is **SCSI-II library**.

4.   Select the server you want to use as the robotic host. This should be the same for other sub-libraries. Click **Next** to continue.

5.   Enter the SCSI address of the library robotic if known. You can also let Data Protector discover the robotic address by clicking the down arrow. Select the proper robotics address from the list. Click **Next** to continue.

6.   The next page displays all the slots available from the library (MSL or ESL). Delete the slots or a range of slots for the different media type. Click **Next** to continue.

7.   Select the proper media type for this sub-library. Click **Finish** to continue.

8.   You will be prompted to configure the drives. Configure the drives for this media type.

9.   When all the drives are configured for this sub-library, repeat step 1 for the next sub-library.

VERITAS NetBackup

To configure an HP tape library with VERITAS NetBackup in a mixed media environment:

1. Set up the SAN components. Ensure operating system correctly recognizes the tape and robotic devices.

2. Install NetBackup and any necessary patches.

Note: If installing NetBackup for the first time, there is a wizard that launches to configure NetBackup. Auto Inventory is a step in this wizard and should be skipped, unless steps 4 through 6 have already been performed.

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3. Configure tape and robotic devices with the Device Configuration Wizard. For each different drive type, there should be a corresponding storage unit created. Verify that all devices were properly detected and configured, multi-hosted (if applicable), and that the corresponding storage units were created.

4. Each piece of media must be physically labeled with a barcode. Each type of media (LTO-1 (Ultrium-1), LTO-2 (Ultrium-2), SDLT (SDLT Type 1), SDLT-2 (SDLT Type 2), and 40/80 (DLT Type 4)) should have the same first 3 letters in their barcode and be different from the other labeled media types. Each type of media will have a unique barcode family. For example, all Ultrium-1 tape barcodes would start with BJZ (for example, BJZ001, BJZ002…), and all Ultrium-2 tape barcodes would start with AJK (for example, AJK001, AJK002…).

5. Create a volume pool for each different type of media that is present:

   a. In the navigation pane (left pane) of the NetBackup Management window, expand the "Media" section under "Media and Device Management."

   b. Right-click **Volume Pools**.

   c. Select **New Volume Pool**.

   d. Create volume pools for each different type of media present. In this example, one pool is for Ultrium-1 and another pool is for Ultrium-2.

6. Set up barcode rules.

   a. In the navigation pane click once on **Volume Pools** to highlight it, then select **Actions** from the NetBackup management window menu bar.

   b. Select **New Volumes**.

   c. Select the corresponding media type in the Type field. Select ½" cartridge tape for Ultrium-1 and ½" cartridge tape 2 for Ultrium-2.

   d. Select the appropriate robot and enter the number of volumes being used for that particular pool.

   e. Enter the first three letters of the barcode for one of the media types in the Media ID field.

   f. Select the proper pool for that media type in the Volume Pool field. Set a barcode rule for each unique barcode/media type, as well as one for the cleaning tapes (CLN).

   g. Select the appropriate Volume group.

7. Inventory the robot. The tapes should be recognized as the correct type and be placed into the correct volume pool, as defined by the barcode rules.

8. Set up a backup policy that specifies the storage unit and corresponding media pool to be used for that backup job.

VERITAS Backup Exec

To configure an HP tape library with VERITAS Backup Exec in a mixed media environment:

1. Set up SAN components. Ensure that the operating system correctly recognizes the tape and robotic devices.

2. Install Backup Exec and any necessary patches.

3. Configure tape and robotic devices with the Device Configuration Wizard.

4. Each piece of media must be physically labeled with a barcode. Each type of media (LTO-1 (Ultrium-1), LTO-2 (Ultrium-2), SDLT (SDLT Type 1), SDLT-2 (SDLT Type 2), and 40/80 (DLT Type 4)) should have the same first 3 letters in their barcode and be different from the other labeled media types. Each type of media will have a unique barcode family. For example, all Ultrium-1 tape barcodes would start with BJZ (for example, BJZ001, BJZ002…), and all Ultrium-2 (110/220) tape barcodes would start with AJK (for example, AJK001, AJK002…).

5. Set up barcode rules:

    a. On the Tools menu, click **Options**.

    b. In the Properties pane, under **Settings**, click **Bar Code Rules**.

    c. Click **Add**.

    d. Select a media type.

    e. Enter the library vendor (HP).

    f. Type in a barcode prefix that corresponds to the physical barcode labeling scheme from step 4.

6. Verify that the barcode rules are enabled for the robotic library. The barcode rules do not go into effect until you enable them for the robotic library.

7. Each drive must have the correct media type enabled for read/write access. To configure:

    a. In the Devices window, right-click the drive.

    b. Click **Properties**.

    c. Select the **Media Types** tab

    d. Enable or disable read and write access for the appropriate media types.

Note: VERITAS Backup Exec supports mixed media in a homogeneous Windows environment only.

Computer Associates BrightStor ARCserve

To configure an HP tape library with CA BrightStor ARCserve in a mixed media environment:

1. When installing BrightStor ARCserve, select Tape Library Option (TLO) from the BrightStor ARCserve products list. Select the Storage Area Network option if applicable.

2. After setting up TLO and SAN options, run the BrightStor ARCserve Device Configuration.

3. Select the Virtual Library option and click **Next**.

4. From the Virtual Library configuration screen click **New** and select the number of drives you want to assign to the virtual library from the list of drives displayed.

5. Select the number of slots assigned to the previously selected drives.

6. Assign the remaining slots to remaining drives accordingly.

The key to correctly creating virtual libraries is to remember that the first library to be created using the Virtual Library Option in the Device Configuration Utility uses the first "n" slots in the library. This means that the first "n" slots must contain the correct type of tapes for the drives that are assigned to this virtual library. Subsequently created virtual libraries use the next "m" slots, and these slots must contain the correct type of tapes for the type of drives that are assigned to this virtual library.

Note: Refer to the library owner's manual for both slot and drive numbering and identification.

Additional Resources

For additional information on implementing mixed media in an HP StorageWorks tape library, refer to the following web sites.

Enterprise Backup Solutions

http://www.hp.com/go/ebs

Click "Technical Documentation" to access the EBS Design Guide and implementation guides. Click "Compatibility and Tools" to access the EBS Compatibility Matrix.

Hardware

http://h18006.www1.hp.com/storage/tapestorage.html

Click on any product to view its specifications and other technical documentation.

Software

HP OpenView Storage Data Protector

http://h18006.www1.hp.com/products/storage/software/dataprotector/index.html

VERITAS NetBackup and VERITAS Backup Exec

http://www.veritas.com

Computer Associates BrightStor ARCserve

http://www.ca.com