hp StorageWorks EBS with HP OpenView Storage Data Protector v5.1

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This guide provides recommendations and best practices for system administrators setting up an EBS using HP OpenView Storage Data Protector v5.1. For additional information related to online storage, refer to the *HP StorageWorks SAN Design Guide*.

Contents

About This Guide

This implementation guide provides information to help you configure HP OpenView Storage Data Protector v5.1 on an HP StorageWorks Enterprise Backup Solution.

"About this Guide" topics include:

- Overview, page 6
- Conventions, page 7
- Getting help, page 10

Overview

This section covers the following topics:

- Intended audience
- Prerequisites
- Related documentation

Intended audience

This guide is intended for use by system administrators implementing an EBS configuration who are experienced with the following:

- Tape backup technologies and tape libraries
- SAN environments and backup software
- Fibre Channel technology

Prerequisites

Before you install and configure Data Protector, make sure you have:

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

Related documentation

In addition to this guide, HP provides corresponding information:

- EBS Compatibility Matrix
- *HP StorageWorks EBS Design Guide*
- HP blueprints
- *HP StorageWorks SAN Design Guide*

Conventions

Conventions consist of the following:

- Document conventions
- Text symbols
- Equipment symbols

Document conventions

This document follows the conventions in Table 1.

Table 1: Document conventions

Convention	Element
Figure 1	Cross-reference links
Bold	Menu items, buttons, and key, tab, and box names
Italics	Text emphasis and document titles in body text
`Monospace font`	User input, commands, code, file and directory names, and system responses (output and messages)
`Monospace, italic font`	Command-line and code variables
Underlined sans serif font text (http://www.hp.com)	Web site addresses

Text symbols

The following symbols may be found in the text of this guide. They have the following meanings:

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.

Caution: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

Tip: Text in a tip provides additional help to readers by providing nonessential or optional techniques, procedures, or shortcuts.

Note: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Equipment symbols

The following equipment symbols may be found on hardware for which this guide pertains. They have the following meanings:

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of personal injury from a hot component, allow the surface to cool before touching.

Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of personal injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Getting help

If you still have a question after reading this guide, contact an HP authorized service provider or access our web site: http://www.hp.com.

HP technical support

Telephone numbers for worldwide technical support are listed on the following HP web site: http://www.hp.com/support/. From this web site, select the country of origin.

Note: For continuous quality improvement, calls may be recorded or monitored.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP storage web site

The HP web site has the latest information on this product, as well as the latest drivers. Access storage at: http://www.hp.com/country/us/eng/prodserv/storage.html. From this web site, select the appropriate product or solution.

HP authorized reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP web site for locations and telephone numbers: http://www.hp.com.

Introduction

1

Overview of Enterprise Backup Solutions

Properly setting up a Fibre Channel storage area network (SAN) backup solution can be challenging. Typically components are purchased at different times and arrive separately or the components are purchased from different vendors. Each piece of hardware arrives with its own documentation for setup and deployment.

These challenges may require additional time and money. HP is committed to keeping these challenges to a minimum by providing the *HP StorageWorks Enterprise Backup Solution Design Guide* and this implementation guide.

History

HP engineering teams have developed a comprehensive approach to ensuring that all hardware, firmware, and software components are properly fitted into an Enterprise Backup Solution (EBS). The teams test the supported configurations and they have developed many Best Practices to follow when setting up your own EBS. The teams also test backup solution software and provide many Best Practices to ensure that your EBS runs at optimum efficiency.

Documentation Goal

This guide is intended to address many of the integration issues that you may encounter when setting up your EBS, and to provide suggestions for the best solution. What this guide does not do is provide specific documentation for installing and configuring your data protection software. Within this document, HP will point you to the appropriate documentation when necessary. The guide covers areas where special configuration issues that might not be covered in the vendor documentation will help in your goal of setting up an efficient EBS.

Refer to the *HP StorageWorks Enterprise Backup Solutions Design Guide* for proper hardware setup and configuration.

The configuration rules and recommendations are made based on the solution integration testing conducted by HP. Certain limitations apply and are noted where applicable.

Solution Features

The EBS with HP OpenView Storage Data Protector v5.1 integrates data protection and disaster recovery, ensuring recovery from any disruption. The software provides instant recovery as well as several disaster recovery alternatives to eliminate unplanned downtime, allowing recovery of entire data centers in minutes.

Data Protector automates routine tasks to maximize the effectiveness of the data protection staff. Data Protector scales to a distributed enterprise, covering an extensive range of heterogeneous applications, operating environments and storage configurations with a single solution.

The servers can share one or more HP StorageWorks tape libraries interconnected through HP StorageWorks Fibre Channel SAN Switches. Online storage, such as the HP StorageWorks Disk Array xp1024 and xp48, and others, can also be attached to the switch.

To determine the compatible hardware components for this system, go to the HP EBS Compatibility Matrix at:

http://h18000.www1.hp.com/products/storageworks/tapecompatibility.html

Solution Components

- 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
- Tape Library, such as the MSL5000/6000 series or the ESL9000 series
- Data protection software, such as HP OpenView Storage Data Protector v5.1

Supported Operating Systems and Platforms

The EBS with Data Protector supports several operating systems and platforms.

The GUI and Cell Manager systems can run on HP-UX, Sun Solaris, Microsoft® Windows® NT®, Windows 2000, Windows XP, or Windows 2003 operating systems; they do not have to run on the same operating system.

Refer to the EBS Compatibility Matrix for a complete list of operating systems and platforms. Refer to the HP StorageWorks EBS Design Guide for detailed instructions on SAN configuration of each of these OSs.

Refer to the HP OpenView Storage Data Protector support matrices at:

http://www.openview.hp.com/products/datapro/spec_0001.html

Data Protector

The Data Protector cell is a network environment that has a Cell Manager, client systems, and devices. the Cell manager is the central control point where Data Protector software is installed. After installing Data Protector software, you can add systems to be backed up. These systems become Data Protector client systems that are part of the cell. When Data Protector backs up files, it saves them to media in backup devices.

The Data Protector internal database (IDB) keeps track of all the files that you back up so that you can browse and easily recover the entire system or single files.

Data Protector facilitates backup and restore jobs. You can do an immediate (or interactive) backup using the Data Protector user interface. You can also schedule your backups to run unattended.

Important Terms

- **Cell Manager**—The Cell Manager is the main system in the cell. The Cell Manager:
    - — Manages the cell from a central point
    - — Contains the Internal Database (IDB)
    - — Runs core Data Protector software
    - — Runs Session Managers that start and stop backup and restore sessions and write session information to the IDB
- **Disk Agent**—Install the Disk Agent on client systems you want to backup. The Disk Agent reads or writes data from a disk on the system and sends or receives data from the media agent. The Disk Agent is also installed on the Cell Manager, allowing you to backup data on the Cell Manager, the Data Protector configuration, and the IDB.
- **Media Agent**—(For servers that have tape devices connected.) During a backup session, the Media Agent receives data from the Disk Agent and sends it to the device for writing to the medium. During a restore session, the Media Agent locates data on the backup medium and sends it to the Disk Agent. The Disk Agent then writes the data to the disk. The Media Agent also manages the robotics control of a library.
- **Drive Servers**—Client systems with connected backup devices and the Media Agent installed.
- **Installation Server**—The Installation Server holds a repository of the Data Protector software packages for a specific architecture. The Cell Manager, by default, is also an Installation Server.

Note: At least two Installation Servers are needed for mixed environments: one for UNIX® systems and one for Windows systems.

Manager-of-Managers

Data Protector provides the Manager-of-Managers (MoM) for management of large environments with multiple cells. The MoM allows you to group multiple cells into a larger unit, which can be managed from a single point. New cells can be added, or existing cells can be split. MoM provides:

- **Centralized licensing repository**—This optional feature enables simplified licensing management.

- **Centralized Media Management Database (CMMDB)**—The CMMDB allows you to share devices and media across several cells in a MoM environment. Using CMMDB, devices in one cell are accessible to other cells that use the CMMDB.

  — With the CMMDB, you can share high-end devices between cells in the multi-cell environment. Once cell can control the robotics, serving several devices that are connected to systems in different cells. EVen the Disk Agent to Media Agent data path can go across cell boundaries.

- **Enterprise reporting**—The MoM can generate reports on a single-cell basis as well as for the entire enterprise environment.

EBS-Specific Requirements

EBS with Data Protector requires the Media Agent be installed on all clients that have access to SAN shared tape devices. One server must have the Cell Manager software installed while all other servers only require the Media Agent.

Shared Library and Tape Devices with Multiple Systems

Data Protector allows libraries and individual tape drives to be dynamically shared between multiple Data Protector clients that run the Media Agent. Each server can access any of the shared drives as needed and each server "owns" the drive it has active. Shared drives are allocated in Data Protector Backup Specifications. Shared drives must be configured with Device Locking to prevent two Data Protector Media Agents from accessing the same physical device at the same time. See the *HP OpenView Storage Data Protector Administrator's Guide* for more information on configuring Device Locking.

Data Protector provides the Device Auto Configuration Wizard to make configuring shared libraries and drives fast and easy. Using the wizard helps to eliminate mistakes that are made when shared devices are manually configured.

> **Note:** The Device Auto Configuration Wizard is not available on all platforms, for example Sun Solaris.

The wizard should be run from the Cell Manager. The wizard:

- Performs device discovery on each client with the Media Agent installed
- Adds robotic libraries and shared drives to the Data Protector Devices configuration
- Configures Device Locking for shared drives

Supported Configurations

Figure 1 shows a diagram of a basic storage domain configuration. Refer to the EBS Compatibility Matrix and the HP StorageWorks Enterprise Backup Solution Design Guide to be sure your system components are included in the compatibility matrix, and that your hardware is properly configured.

Basic Storage Domain Configurations

The basic EBS storage domain may consist of a heterogeneous connection of multiple servers sharing multiple libraries and RAID array storage systems.
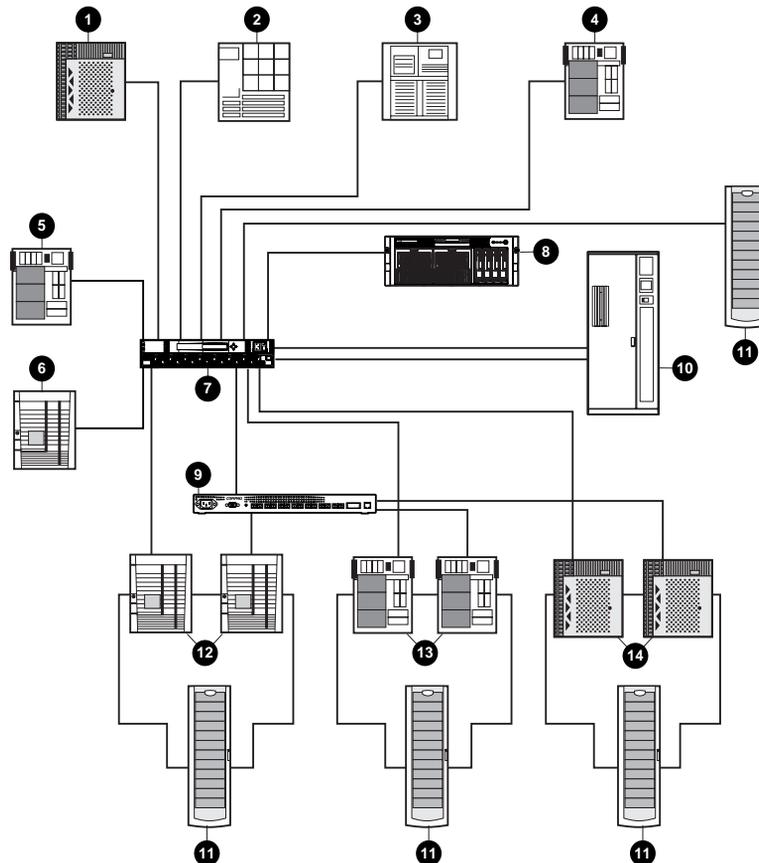
Figure 1: Basic storage domain configuration

1	Sun Enterprise server	2	IBM RS/6000 server
3	Supported Intel third-party server	4	HP ProLiant server
5	HP PA-RISC server	6	HP AlphaServer
7	FC SAN Switch	8	HP NAS
9	FC SAN Switch	–	HP tape library with integrated router
q	RAID array storage	w	Clustered server
=	Clustered server	r	Clustered server

Installation and Configuration

<div style="text-align:right">**2**</div>

Before installing your backup software, refer to the *HP StorageWorks EBS Design Guide* for assistance in setting up your hardware.

Installation Checklist

To ensure that all components on the SAN are logged in and configured properly, you must be able to answer yes to each of the following questions:

- Are all hardware components at the minimum supported firmware revision (HBA, Fibre Channel switch, router, tape library drives, tape library robot)?
- Have the device drivers for each tape device been installed?
- Is the minimum patch level support for the OS installed?
- Is the minimum supported HBA driver loaded on the host?
- Is the tape library online?
- Are all tape and robotic devices mapped and configured on the router?
- Is the router correctly logged into the Fibre Channel switch?
- Is the host server correctly logged into the Fibre Channel switch?
- If the Fibre Channel switches are cascaded or meshed, are all Interswitch Links (ISL) ports correctly logged in?
- Are the router and the host server HBA in the same switch zone (either by World Wide Name (WWN) or Port)?
- Does the host server detect all of the tape and robotic devices intended to be used?

Note: HP recommends placing your devices in zones and then making them available to the server.

Installing HP StorageWorks Storage Data Protector v5.1

After all components on the SAN are logged in and configured, the system is ready for the installation of Data Protector. Refer to the *HP OpenView Storage Data Protector Installation and Licensing Guide* or contact HP customer support for detailed installation procedures and requirements.

Installing Data Protector Software

HP recommends that you install in the following order:

1. Cell Manager
2. Installation Server
3. Data Protector clients, and add-on products such as Open File Manager, Online Database Backup, and so on
4. Any additional Data Protector add-on products

Note: HP recommends that you remove any other backup software currently configured on your system before installing Data Protector. Other backup software, tape device applications that are part of the OS, and SAN or system management software can negatively affect how Data Protector installs and functions.

The Cell Manager and Installation Servers are installed directly from the CD. After you have installed the Cell Manager and Installation Servers you can then install the components on various client systems using the Data Protector Installation GUI.

There are certain hardware and software requirements that need to be met by Installation Servers and Cell Managers before you start installing the software. A dedicated port, generally port 5555, needs to be available throughout the cell. Refer to the *HP OpenView Storage Data Protector Installation and Licensing Guide* for details.

Installation Best Practices

- Follow the HP StorageWorks EBS Compatibility Matrix and the *HP StorageWorks Enterprise Backup Solution Design Guide*.

  — The matrix of hardware, software, and firmware is updated monthly and helps customers and support personnel maintain their EBS environment. It is not necessary to immediately update an environment to the latest revision on the matrix. However, you should be aware of updates and changes if you experience any problems that may be related to newer or older software, driver, and/or firmware versions.

  — The design guide describes currently supported EBS hardware configurations and how to efficiently and effectively provide shared tape library backup in a heterogeneous SAN environment.

- Limit the size of Data Protector cells.

  — The recommended maximum size for a Data Protector cell is 100 client systems.

Note: Multiple cells may be centrally managed using Manager-of-Managers.

- Do not create cells with multiple time zones. Each cell should be within one time zone.

- Limit rebooting during backup windows.

  — Rebooting hosts in an EBS environment during backup windows can cause job failures and configuration errors.

  — When rebooting is necessary, verify the configuration of the host when maintenance or reboot is complete.

- Use the DNS Connection Check tool to verify if:

  — The Cell Manager properly resolves every other client of the cell

  — Every client of the cell properly resolves the Cell Manager

  — Every system, on which the Media Agent was installed, resolves every other client

  — Each system resolves every other system accommodating a Media Agent

- Be sure the latest Data Protector and OS patches have been installed.

■ Use the Device Auto Configuration Wizard for all supported platforms.

This wizard coordinates device configuration among all the hosts in a shared storage environment. It is essential that all hosts be configured properly with the appropriate device name, index, robot drive number, media, drive type, and Device Locking.

■ In Data Protector 5.x, there exists the ability to import the additional hostnames for multiple LAN interfaces using the "Virtual Host" feature in the GUI. For most customers it is much easier to import the additional hostname from the GUI (and less error-prone), than typing in complicated omnirc entries.

Note: Additional licenses are not needed when this feature is used.

To use this feature, first configure the client host that matches the hostname of the system. For the cell manager, it should be installed first using it's primary hostname. Next, import the additional hosts as follows:

1. From the Data Protector GUI (Manager.exe):

   Select **Clients** context, then right-click **Clients** and select **Import Client**. Type in the hostname assigned to additional LAN interface. Select **Virtual Host**, then **Finish**.

2. Configure correct hostnames in logical device settings to use alternate LAN interface for media agents (refer to the *HP OpenView Storage Data Protector Administrator's Guide* for details).

3. Configure correct hostnames in backup specifications to use alternate LAN interface for disk agents (refer to the *HP OpenView Storage Data Protector Administrator's Guide* for details).

Device Serialization

The Data Protector Setup Wizard uses device serialization, a firmware feature that allows device identification and configuration. Each robot and drive found in the configuration returns a unique serial number. For any robots in the configuration, an additional command is issued to the robot. The robot returns the number of drives and the serial number for each of the drives contained in the robot. This information is used by the wizard to determine the correct drive index for each drive in the robot.

> **Note:** If the setup wizard is unable to detect serial numbers of the robot or tape drives, which can happen when the drive or library firmware is upgraded, check via the library front panel to ensure the library reports a serial number for each device.

Using the Data Protector Setup Wizard is recommended, however it is not available on all platforms, for example Sun Solaris. Manual configuration is also available for users who do not want to use the default settings that Data Protector applies, such as block size, concurrency and so on.

> **Note:** Default settings can be adjusted after being configured by the wizard.

Backup Specifications

Data Protector has a wizard that allows the administrator to specify a backup source, destination, options, and schedule. Data Protector supports heterogeneous clients in one backup specifiction.

Configuring a backup consists of the following steps:

1. Selecting what to back up - the data sources on the Disk Agent clients.
2. Selecting where to back up to - the backup devices connected to the Media Agent clients.
3. Selecting how to back up - backup options.
4. Optionally, you can schedule an unattended backup.

Before setting the backup specifications, consider the following:

■ You need to have a Disk Agent installed on every system that is to be backed up, unless you use NFS (on UNIX) or Network Share Backup (on Windows) for backing up these systems.

■ You need to have at least one backup device configured in the Data Protector cell.

■ You need to have media prepared for your backup.

■ You need to have appropriate user rights for performing a backup.

Refer to the *HP OpenView Storage Data Protector Administrator's Guide* for complete instructions on configuring backup specifications.

Performance and Tuning

To analyze speed and performance, it is necessary to examine the entire backup process as a system. Although many factors contribute to the overall performance of the system, there are four main factors that must be thoroughly understood to determine the maximum performance in any specific situation. These factors are:

- Storage Connection—For the EBS, this is Fibre Channel connection.
- File (Data) Compression Ratio—The amount of compression has a direct impact on the rate at which a tape drive can read/write data.
- Source Disk and File Systems—Data source, local disk, RAID array storage, file system type, and volume type.
- Tape Drive—In the EBS, these are the various types of tape drives in HP StorageWorks Libraries.

File (Data) Compression Ratio

HP tests show that not all data can be compressed equally. The compression ratio affects the amount of data that can be stored on each tape cartridge, as well as the speed at which the tape drives can read or write the data.

Table 2 shows typical compression ratios of various applications.

Table 2: Typical File Compression Ratios

Data Type	Typical Compression
CAD	3.8:1
Spreadsheet/Word Processing	2.5:1
Typical File/Print Server	2.0:1
Lotus Notes Databases	1.6:1
Microsoft Exchange/SQL Server Databases	1.4:1
Oracle®/SAP Databases	2.5:1

Source Disk and File Systems

In the past, tape performance was typically identified as a bottleneck. However, tape performance has now surpassed may of the source systems available today. Items to take into account when calculating desired throughput and performance metrics are:

■　Source Hardware (disk subsystems)

■　Source Filesystem status

It is essential that the hardware you use for disk or online storage be able to adequately provide data for the application online along with the backup application and tape devices.

In environments deploying large tape subsystems using HP StorageWorks ESL9000 Series Libraries and Ultrium 460 tape drives, disk subsystems become an increasingly important performance component. One ESL9595 with 16 Ultrium 460 tape drives can easily maintain 500 MB/s of total system throughput. In this scenario, it is recommended that your disk subsystems be able to maintain a 2:1 ratio of disk-to-tape throughput. That would be approximately 1 GB/s of disk I/O required to stream data to one ESL9595 tape library.

The impact of file systems on backup performance can be significant. Highly fragmented systems only allow disk and tape subsystems to run at a fraction of stated or desired performance. In some cases they can cause a device rated to stream at 16 MB/s native to only perform at 3 MB/s.

Tape Drive

The tape drive is the fifth piece in determining backup and restore performance. HP tape drives have varying levels of performance. Factors such as file size (larger is better), directory depth, and data compressibility all affect system performance. Data interleaving during backup also affects restore performance. Use of the router and its connections to HP StorageWorks tape libraries is a simple way to scale backup performance.

Table 3 shows performance information for various tape drives.

Table 3: Tape Drive Throughput Speed (native)

Tape Drive	Throughput MB/s
Ultrium 460	30
Ultrium 230	15
SDLT 160/320 GB	16
SDLT 110/220 GB	11
DLT8000 40/80 GB	6

Performance Assessment Tool

Additionally, the Performance Assessment Tool (PAT) can assist in evaluating local disk and network storage performance of Microsoft Windows based systems. It can help identify potential system limitations that could interfere with achieving expected tape backup performance.

PAT accesses the file systems in ways comparable to the operation of tape backup software. The performance assessment does not precisely model any specific backup application. It does provide an indication of how fast data can be read from storage on the system under test. This allows matching of the system to the appropriate performance class tape backup solution.

PAT does not address tape solution issues such as whether HBA choices or system bus topology would adversely affect backup performance. PAT results will be a reflection of the system's performance as configured. This will be affected by various configuration details such as:

■   specific disk sub-systems attached

■   type of RAID configuration in use (i.e. 0 vs 1 vs 5, etc)

■   performance of the data bus (SCSI, Fibre Channel)

■   file system type and configuration

■   server characteristics (speed, memory, internal busses

This tool can be downloaded from:

http://www.hp.com/cgi-bin/cposupport/swdl.pl?c=co557&i=co557en

Note: This version of the PAT tool is only designed to work on the Microsoft Windows platform.

High Availability

3

For information on configuring HP-MC/ServiceGuard, Microsoft Cluster Server, and VERITAS Cluster Server for Solaris, refer to the Data Protector website at:

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

Data Protector enables you to meet high availability needs by:

- Integrating with clusters (HP-MC/ServiceGuard, Microsoft Cluster Server, VERITAS Cluster Server) to ensure fail-safe operating with the ability to back up virtual nodes

- Enabling the Data Protector Cell Manager itself to run on a cluster

- Supporting online database Application Programming Interfaces

- Integrating with high availability solutions such as the HP StorageWorks Disk Array XP, HP StorageWorks Virtual Array, HP StorageWorks Enterprise Virtual Array, or EMC Symmetrix

- Providing various disaster recovery methods for Windows and UNIX platforms

Clustered EBS Configuration

The EBS with Data Protector supports backup and restore of the primary and secondary nodes of a clustered pair of HP-UX MC/Service Guard and Microsoft Windows servers with failover. In the EBS environment, Tru64 and Sun Solaris are supported without failover.
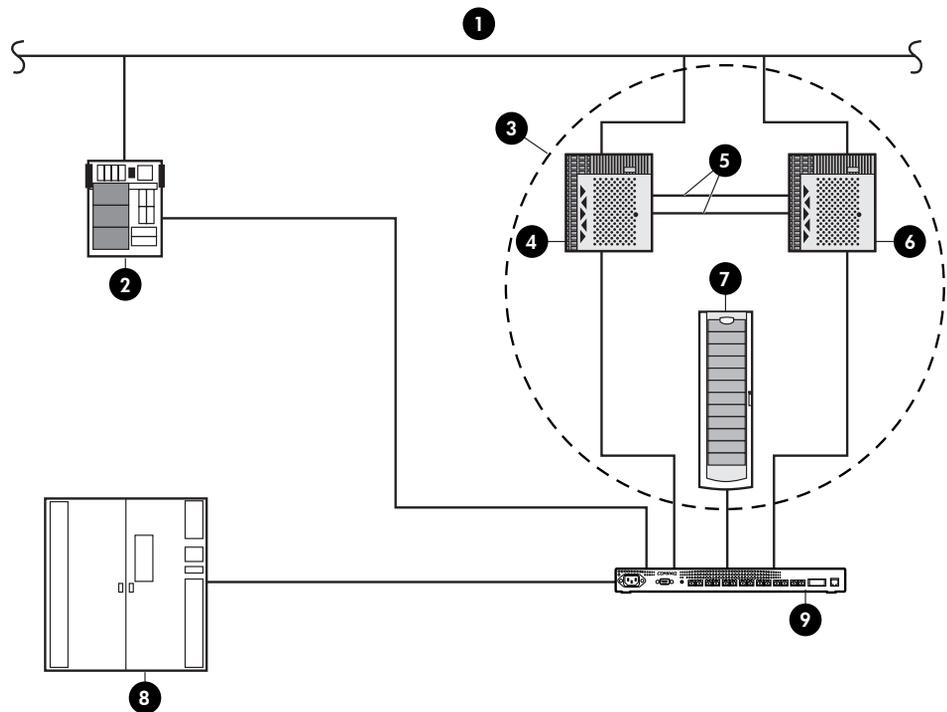
Figure 2: Clustered server EBS configuration

1. Ethernet
2. Master server
3. Microsoft Cluster servers
4. Server Node 1
5. Private Ethernet link
6. Server Node 2
7. RAID array storage
8. HP tape library with embedded FC Interface Controller
9. FC SAN Switch

Troubleshooting

4

This chapter lists issues and solutions for situations that can occur during installation, implementation, and administration of the HP StorageWorks Enterprise Backup Solution (EBS) with HP OpenView Storage Data Protector v5.1.

Additionally, you can refer to the HP OpenView support website available at http://support.openview.hp.com

Unable to execute wide SCSI commands

Tape Library: Unable to execute wide SCSI commands. For example, the library may respond to some, but not all SCSI commands. Typically indicates a bad electrical connection on pins used for wide commands. Replace cables, terminators, and devices located on the BUS where fault is located.

Data Protector Media Allocation Order

If receiving unexpected mount requests, or if it is confusing as to the order in which Data Protector is using tapes in the tape library or media pools, the following information should be helpful.

Solution

The sequence of media allocation is in the order of the following Data Protector media sets:

1. **Preallocated Media**—Media named in the datalist device options preallocation list. Preallocated media in "Poor" condition will not be used. The pool policy can be Strict or Loose. This media set is not sorted.

   Order of use: as specified in the datalist, provided that this will not break any other rules such as those relating to protection and appendable media.

2. **Appendable Media**—Media in "Good" condition, with some currently protected data objects, but the media is not full. The pool must be "appendable." This media set is sorted according to the time of the last write. The most recently written medium is listed first.

   Order of use: when one or more media have protected objects, the most recently written media is reused first.

3. **Uninitialized Media**—Media is assumed by Data Protector to not yet have a Data Protector header and that it can be auto-initialized as required, during backups. The pool policy must be Loose to allow auto-initialization and the global file needs InitOnLoosePolicy=1. This media set is only available in exchanger devices. This media set is sorted with "Blank" media ahead of media with an "Unknown" header.

   Order of use:

   a. "Blank" media is used first.

   b. "Unknown" media is only used when there is no "Blank" media.

4. **Free Media**—Media in 'Good' condition with no currently protected objects. This media set is sorted according to the time of the last write. The least recently written medium is listed first.

   Order of use: least recently medium is used first.

5. **Overflow Media**—Media in "Fair" condition with no currently protected objects. This media will only be used if no "Good" condition media are available. This media set is sorted according to the total number of overwrites. The medium with the least number of overwrites is listed first.

   Order of use: least recently medium is used first.

Refer to the *HP OpenView Storage Data Protector Administrator's Guide* for additional information.

Error when configuring EADR or OBDR

When attempting to configure Enhanced Automatic Disaster Recovery (EADR) or One Button Disaster Recovery (OBDR) on a Windows platform, the following message is displayed:

```
Automatic DR information could not be collected. Aborting the
collecting of system recovery data.
```

The above issue has been seen if:

1. Device manager shows an incorrectly configured device:

   Check if all storage devices are configured correctly. If Device Manager reports a device as "Unknown Device," you have to install the proper device drivers before you can perform EADR/OBDR.

   You could see a similar message such as:

   ```
   DRIM_WIN_ERROR 13 SetupDiGetDeviceRegistryProperty
   ```

   in the log file *<Data_Protector_home>\tmp\autodr.log*

2. There is insufficient registry space available.

   It is recommended to set the maximum registry size to at least twice that of the current registry size.

   The following message would be seen in the *autodr.log*:

   ```
   ERROR registry 'Exception while saving registry'

   ...

   WindowsError: [Errno 1450] Insufficient system resources exist
   to complete the requested service.
   ```

On Windows, the registry size can be changed as follows:

1. Right-click **My Computer**.
2. Select **Properties**.
3. Click the **Advanced** tab.
4. Select **Performance Options**.
5. Click **Change... for Virtual Memory**.

The displayed window has an option to set the maximum registry size.

Additional Resources

A

The HP StorageWorks Enterprise Backup Solution website has many useful white papers, tech notes, blueprints, and related user guides to assist in using backup software solutions in an EBS environment. View this information at:

http://h18004.www1.hp.com/products/storageworks/ebs/description.html

HP Guides

■ *HP StorageWorks Enterprise Backup Solutions Design Guide*

■ *HP StorageWorks Enterprise Backup Solution with HP OpenView Storage Data Protector v5.1 Implementation Guide* (this guide)

■ *HP StorageWorks SAN Design Guide*

■ *HP StorageWorks E2400-160 FC Interface Controller User Guide*

■ *HP OpenView Storage Data Protector Concepts Guide*

■ *HP OpenView Storage Data Protector Software Release Notes*

■ *HP OpenView Storage Data Protector 5.1 Quick and Easy Installation Guide*

■ *HP OpenView Storage Data Protector Administrator's Guid*e

Other HP Resources

Visit the HP OpenView support website at http://support.openview.hp.com. This site includes:

■ Searchable Knowledge Base

■ Discussion forum

■ E-mail notifications

■ HP software self healing services

Index