



Hewlett Packard
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Installation Guide

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Chapter 1: Overview of the Installation procedure

This chapter provides an overview of the Data Protector installation procedure and introduces concepts that apply to the installation. The chapter also introduces Data Protector Cell Manager and Data Protector user interfaces.

Overview of the Installation procedure

A Data Protector backup environment is a set of systems with a common backup policy located in the same time zone and existing on the same LAN/SAN. This network environment is referred to as a Data Protector **cell**. A typical cell consists of a Cell Manager, Installation Servers, clients, and backup devices.

The **Cell Manager** is the main system that manages the cell from a central point. It contains the Data Protector Internal Database (IDB) and runs core Data Protector software and session managers.

The IDB keeps track of backed up files and the cell configuration.

The **Installation Server** is a separate system or a Cell Manager component that contains the Data Protector software repository used for remote client installations. This Data Protector feature greatly facilitates the software installation process, particularly for remote clients.

A cell typically consists of one Cell Manager and several clients. A computer system becomes a Data Protector **client** as soon as one of the Data Protector software components is installed on the system. The client components installed on a system depend on the role of that system in your backup environment. Data Protector components can be installed either locally on a single system, or onto several systems from Installation Servers.

The **User Interface** component is needed to access the Data Protector functionality and is used to perform all configuration and administration tasks. It must be installed on systems used for backup administration. Data Protector provides a graphical user interface (GUI) and command-line interface (CLI).

Client systems with disks that need to be backed up must have appropriate Data Protector **Disk Agent** components installed. The Disk Agent enables you to back up data from the client disk or restore it.

Client systems with applications and virtual environments that need to be backed up must have appropriate Data Protector integration agent components installed. The integration agent enables you to back up data from an application or virtual environment or restore it.

Client systems that are connected to a backup device must have a **Media Agent** component installed. This software manages backup devices and media. Data Protector features two Media Agents: the **General Media Agent** and the **NDMP Media Agent**. The NDMP Media Agent is only needed on client systems that control the backup of an NDMP server (on client systems controlling NDMP dedicated drives). In all other cases the two Media Agents are interchangeable.

Before installing Data Protector on your network, define the following:

- The system on which the Cell Manager will be installed. For supported operating systems and versions, see the latest support matrices at <https://softwaresupport.hpe.com/>.

There can only be one Cell Manager per cell. Data Protector cannot be run without a Cell Manager installed.

- Systems that will be used to access the Data Protector functionality through the user interface. These systems must have the User Interface component installed.
- Systems that will be backed up. These must have the Disk Agent component installed for filesystem backup and the relevant application agent component for online database integrations.
- Systems to which the backup devices will be connected. These must have a Media Agent component installed.
- One or more systems on which the Data Protector Installation Server will be installed. Two types of Installation Servers are available for remote software installation: one for UNIX clients and the other for Windows clients.

The choice of system for the Installation Server is independent of the Cell Manager and the systems on which the User Interface is installed. The Cell Manager and Installation Server can be installed on the same system or on different systems.

An Installation Server can be shared between multiple Data Protector cells.

Note: The Installation Server for Windows must be installed on a Windows system. The Installation Server for UNIX must be installed on an HP-UX or Linux system. For supported operating system versions, see the latest support matrices at <https://softwaresupport.hpe.com/>.

When installing a Data Protector client on Solaris systems, make sure to save all your files from the `/usr/omni` directory to some other directory. The Data Protector installation deletes all the files from the `/usr/omni` directory.

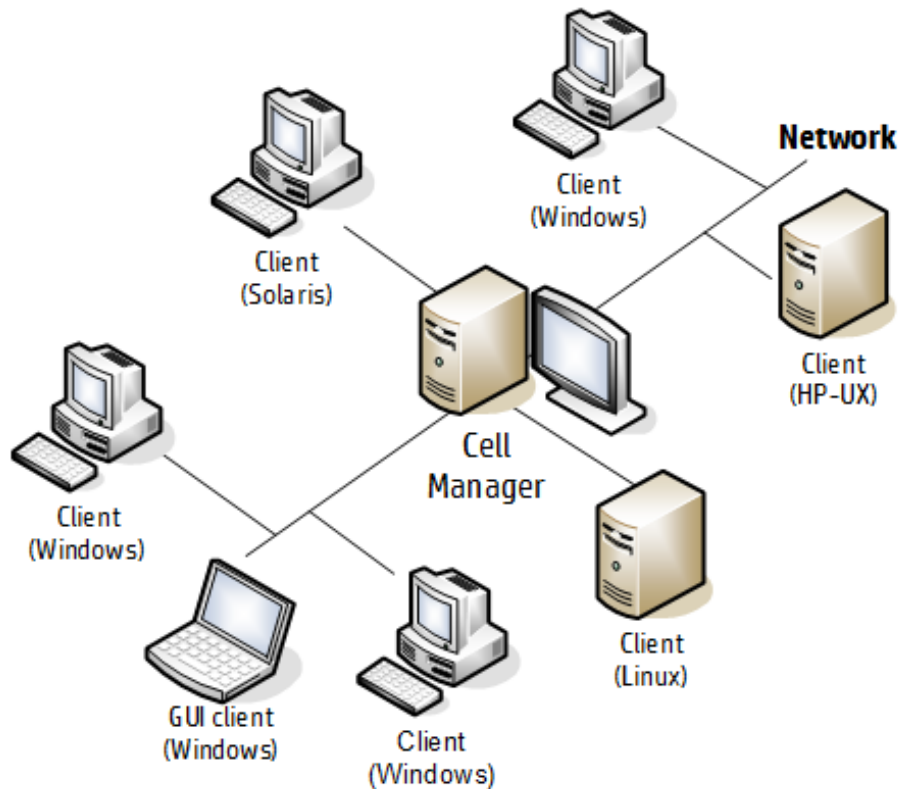
After you have defined the roles of the systems in your future Data Protector cell, the installation procedure comprises the following general steps:

1. Checking the prerequisites for installation.
2. Installing the Data Protector Cell Manager.
3. Installing the Installation Server(s) and the User Interface.
4. Installing client systems either remotely (recommended option, where possible), or locally from the installation DVD-ROM.

Note: You cannot remotely install a Data Protector client on a Windows system if an Installation Server has already been installed on this system. To install an Installation Server and client component(s) on the same system, you must perform a local client installation from the Data Protector Windows installation DVD-ROM. In the Custom Setup window, select all desired client components and the Installation Server component.

Remote installation is also not possible for Windows XP Home Edition and HP OpenVMS clients. These have to be installed locally.

Data Protector Cell



The remote Installation concept

Once you have installed the Data Protector Cell Manager, User Interface, and Installation Server(s) (at least one Installation Server is needed for each platform, UNIX and Windows), you can distribute Data Protector software to clients using operating systems on which remote installation is supported. See ["Data Protector Installation concept "](#) on the next page.

Every time you perform a remote installation, you access the Installation Server through the GUI. The User Interface component may be installed on the Cell Manager, although this is not a requirement. It would be prudent to install the User Interface on several systems so that you can access the Cell Manager from different locations.

Client software can be distributed to any Windows system, except Windows XP Home Edition, from an Installation Server for Windows.

Windows XP Home Edition client systems must be installed locally from the Data Protector Windows installation DVD-ROM.

Client software can be installed remotely on HP-UX, Solaris, Linux, AIX, and other supported UNIX operating systems from an Installation Server for UNIX systems. For a list of supported platforms, see the HPE Data Protector Product Announcements, Software Notes, and References. Even though Installation Server is not required for local installation of clients, it is required to keep the clients up to date with patches.

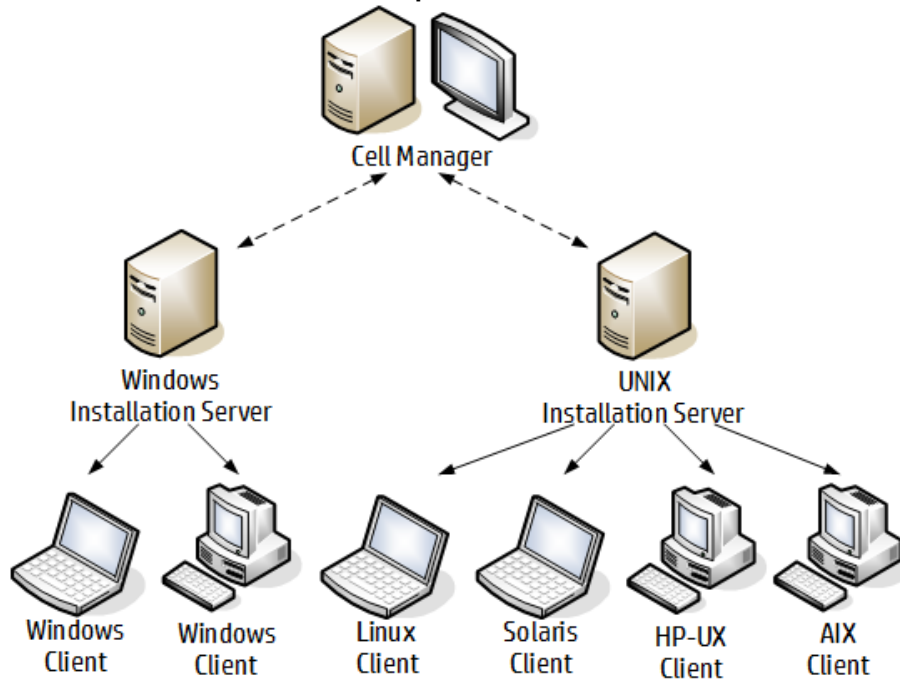
For UNIX operating systems on which remote installation is not supported, or if you do not install an Installation Server for UNIX, you can install UNIX clients locally, from the Data Protector UNIX installation DVD-ROM.

Note that there are some exceptions that require remote installation only.

For further information on available installation methods for the various Data Protector clients, see ["Installing Data Protector clients" on page 55](#).

For the procedure for deinstalling UNIX clients locally, see ["Local installation on UNIX and Mac OS X systems" on page 98](#).

Data Protector Installation concept



Data Protector Installation media

Data Protector supports various operating systems and several processor architectures. The software is delivered on either three DVD-ROMs (physical) or three ISO image files (electronic). ["Data Protector DVD-ROM/ISO image list" on the next page](#) lists the components found on the DVD-ROMs or ISO images.

Note: Data Protector installation files for Windows Vista, Windows 7, Windows 8, Windows Server 2008, and Windows Server 2012 systems are digitally signed by HPE.

Note: Ensure to install the latest Data Protector 9.09 patches.

Data Protector DVD-ROM/ISO image list

DVD num.	DVD-ROM title/ISO image	Contents
1	Data Protector software 9.00 Windows (TD586-15022.iso)	<ul style="list-style-type: none"> • Cell Manager and Installation Server for Windows 64-bit (AMD64/Intel EM64T) systems • The complete set of English and Localized guides in the electronic PDF format. • Windows 64-bit clients • HP OpenVMS clients (Alpha and Itanium systems) • Product information • HPE software integration packages
2	Data Protector software 9.00 HP-UX (TD586-15023.iso)	<ul style="list-style-type: none"> • Cell Manager, Installation Server, and clients for HP-UX systems • Clients for other UNIX systems • Clients for Mac OS X systems • The complete set of English and Localized guides in the electronic PDF format. • HPE software integration packages
3	Data Protector software 9.00 Linux (TD586-15024.iso)	<ul style="list-style-type: none"> • Cell Manager, Installation Server, and clients for Linux systems • Clients for other UNIX systems • Clients for Mac OS X systems • The complete set of English and Localized guides in the electronic PDF format. • HPE software integration packages

Choosing the Cell Manager system

The Cell Manager is the main system in a Data Protector cell. It manages the cell from one central point. The Cell Manager does the following:

- Runs the core Data Protector software.
- Hosts the Data Protector Internal Database (IDB) server.
- Collects and maintains data with information about Data Protector sessions.
- Runs the Session Managers that start and stop different types of Data Protector sessions and store related information into the IDB.

Before deciding on which system in your environment to install the Cell Manager, be aware of the following:

- Supported platforms

The Cell Manager can be installed on Windows, HP-UX, or Linux platforms.

For details on supported versions or releases of these platforms, see the latest support matrices at <https://softwaresupport.hpe.com/>.

- Reliability of the Cell Manager system

Since the Cell Manager contains the IDB and since backup and restore cannot be performed if the Cell Manager is not functioning properly, it is important to choose a very reliable system in your environment for the installation.

- Database growth and required disk space

The Cell Manager holds the Data Protector Internal Database (IDB). The IDB contains information regarding the backed up data and its media, session messages and devices. The IDB can grow to a significant size, depending on your environment. For example, if the majority of backups are filesystem backups, then a typical IDB size would be 2% of the disk space used by the backed up data.

For information on planning and managing the size and growth of the database, see the *HPE Data Protector Help* index: "growth and performance of the IDB".

For minimum disk space requirements for the IDB, see the HPE Data Protector Product Announcements, Software Notes, and References.

Note: You do not have to use the Cell Manager as the user interface system. For example, you can have a UNIX Cell Manager system and the Data Protector user interface component installed on another system with a Windows platform.

Next steps

To determine the minimum requirements for your future Cell Manager system, see "[Installing the Data Protector Cell Manager and Installation Servers](#)" on page 28.

Choosing the Data Protector user interface system

Data Protector provides two user interfaces: a graphical user interface (GUI) and a command-line interface (CLI). The GUI is available for Windows platforms, and the CLI is available for Windows, HP-UX, Solaris, and Linux platforms. Both user interfaces are provided by and are installed as a single Data Protector software component.

The system selected to control the cell will be used by a network administrator or a backup operator. However, in a large computer environment, it may be desirable to run the user interface on several systems, and in case of a heterogeneous environment, on various platforms.

For details on supported operating systems (releases, versions, editions) for the user interface, see the latest support matrices at <https://softwaresupport.hpe.com/>. For more information on local language support and usage of non-ASCII characters in file names, see the *HPE Data Protector Help* index: "language settings, customizing".

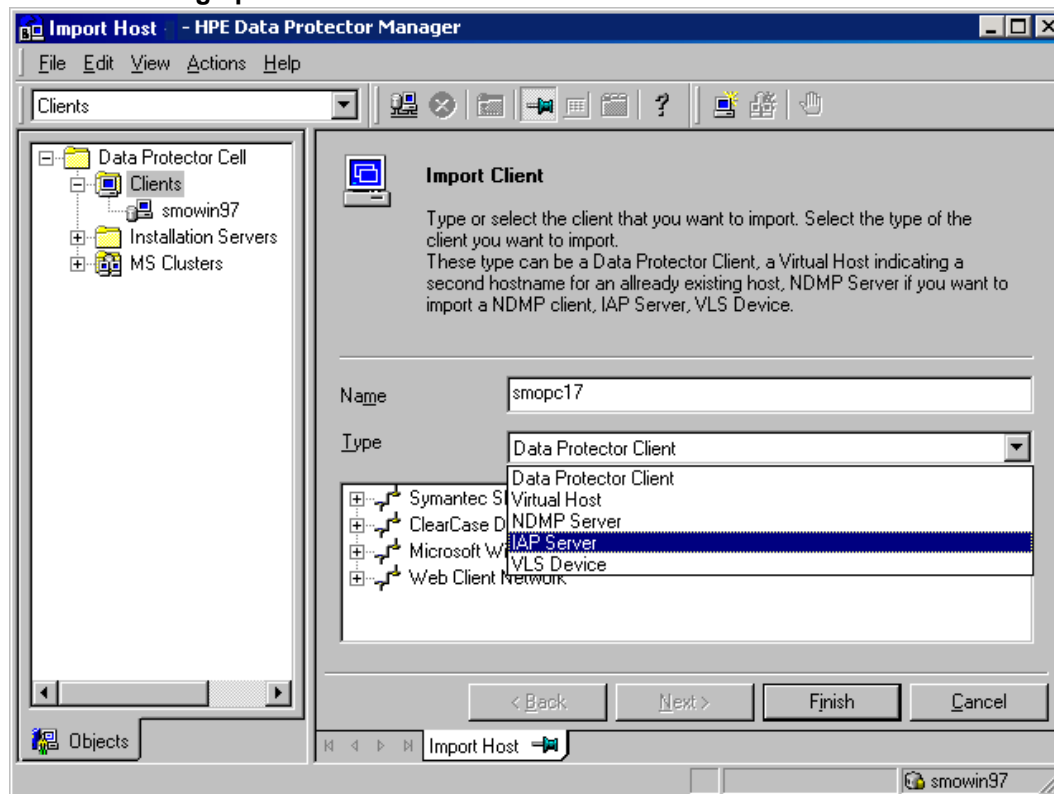
Once you have installed the user interface on a system in the cell, you can remotely access the Cell Manager from that system. You do not have to use the graphical user interface system on the Cell Manager.

The Data Protector graphical user interface

The Data Protector GUI is a powerful user interface that provides easy access to the Data Protector functionality. The main window contains several views, such as **Clients**, **Users**, **Devices & Media**, **Backup**, **Restore**, **Object Operations**, **Reporting**, **Monitor**, **Instant Recovery**, and **Internal Database**, allowing you to perform all related tasks.

For example, in the **Clients** view, you can remotely install (add) clients by specifying all the target systems and defining the installation paths and options which are sent to the specified Installation Server. When the setup on the client is running, only installation specific messages are displayed in the monitor window.

Data Protector graphical user interface



See also "[Data Protector graphical user interface](#)" on page 424, which defines the most important areas of the Data Protector GUI.

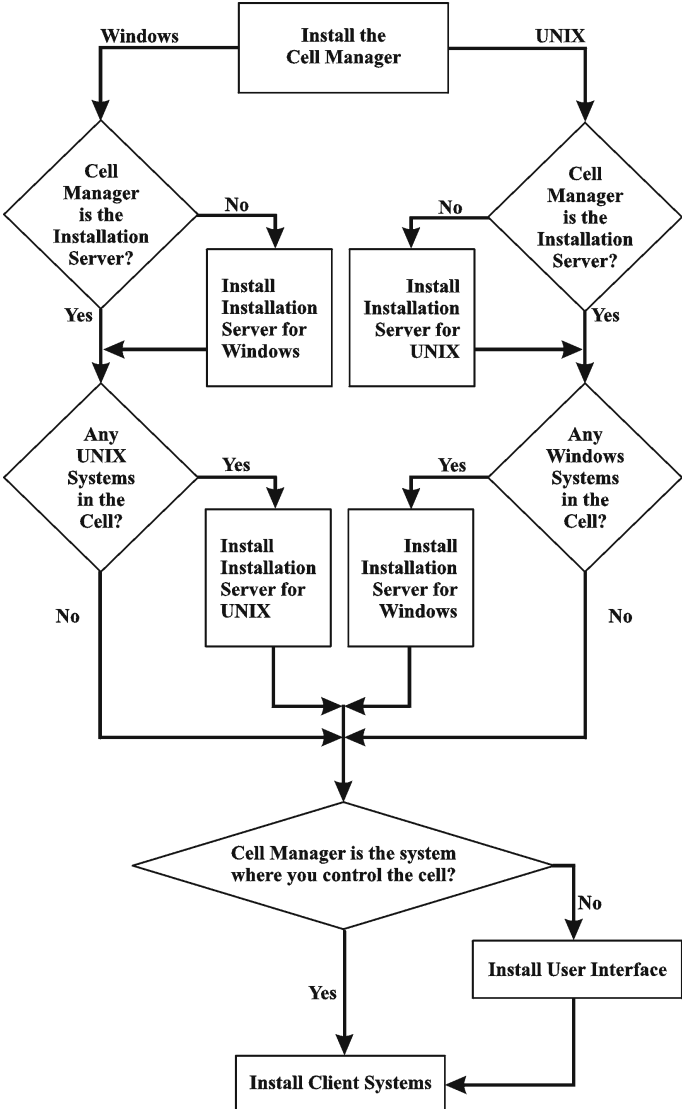
Chapter 2: Installing Data Protector

This chapter contains detailed instructions about:

- Installing the Data Protector Cell Manager and Installation Servers
- Installing the Data Protector Single Server Edition
- Installing the Data Protector web reporting

Installing the Data Protector Cell Manager and Installation Servers

Installation procedure



If you install the Cell Manager and the Installation Server on the same system, you can perform this task in one step.

All configuration and session information files in a Data Protector cell are stored on the Cell Manager. It is difficult to transfer this information to another system. Therefore, ensure that the Cell Manager is a reliable system in a stable, controlled environment.

Installing a UNIX Cell Manager

This section provides step-by-step instructions on how to install a UNIX Cell Manager. To install the Windows Cell Manager only, see "[Installing a Windows Cell Manager](#)" on page 35.

Prerequisites

- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.
- The default users `unmask` must be set to `022` otherwise some of the Data Protector services might fail to start.
- The user account used for the installation must have administrative (`root`) privileges on the selected target system.
- The system that will become the Cell Manager must:
 - Have a supported UNIX operating system installed. For a list of supported operating systems for the Cell Manager, see <https://softwaresupport.hpe.com/>.
 - Have access to a DVD-ROM drive or be able to mount an ISO image.
 - Have sufficient free disk space for the Data Protector Cell Manager software. The Cell Manager must meet the following minimum requirements:
 - The Soft File Limit per Process on the Cell Manager should be at least 1024.
 - **HP-UX systems:** 8 GB of total RAM; **Linux systems:** 4 GB of total RAM.

For each parallel backup session, 40 MB of RAM and 5-8 MB per data segment size are required. For example, if you want to run 60 parallel backup sessions, 3 GB of RAM plus 512 MB for data segments are needed.

You can overcome free disk space shortage by installing Data Protector to linked directories. Before creating the links, see "[The installed directory structure on HP-UX and Linux systems](#)" on page 32.

- Have sufficient free disk space for the Data Protector Internal Database (IDB). For recovery of the Internal Database, twice as much total RAM is required. Have 1.5 GB of free disk space + approximately 100 bytes for each backed up file (for use by the IDB) in the `/var` directory, where the IDB is stored. Note that the current IDB design allows the database binary files to be relocated if growth in database size makes it necessary.

If you have insufficient free storage space on the disk volume, you can use linked directories, but you should create the links before the installation and ensure that the destination directories exist.

- Have the TCP/IP protocol installed and running. The protocol must be able to resolve hostnames.
- Recognize the Cell Manager system if using a NIS server. See ["Preparing a NIS server" on page 363](#).
- Have the following ports free:
 - 5555 — the default port for Data Protector communication
 - 7112 — the Internal Database Service port
 - 7113 — the Internal Database Connection Pooler (IDB CP) port
 - 7116 — the Application Server (HTTPS AS) port
 - 9999 — the Application Server management port

To change the default communication port number, see ["Changing the default Data Protector Inet port" on page 359](#).

To change the default IDB and Application Server ports, see ["Changing the default Data Protector IDB ports and user accounts on UNIX systems" on page 360](#).

- Support long filenames. To check if your filesystem supports long filenames, execute the `getconf NAME_MAX DirectoryPath` command.
- Have the `inetd` or `xinetd` daemon up and running.
- Have the Basic command line calculator (`bc`) installed.
- Have the user group `hdp` and the dedicated user account `hdp` in this user group configured to be used by Data Protector. To change the default user account, see ["Changing the default Data Protector IDB ports and user accounts on UNIX systems" on page 360](#).
- Have the existing home folder configured for the `hdp` user otherwise some of the Data Protector services could fail to start.
- The `hdp` user must have access to any directory from the following paths that already exist in the system:
 - `/opt/omni/*`
 - `/etc/opt/omni/*`
 - `/var/opt/omni/*`

Linux systems:

- Have the 32-bit GNU C Library (`glibc`) installed on 64-bit Linux systems (`x86_64`).
- Have `net-tools` installed (some `net-tools` utilities are needed during installation).

HP-UX systems:

- Have the `auth` service up and running.

Cluster-aware Cell Manager

Additional prerequisites and steps are required for installing a cluster-aware Cell Manager. See ["Installing a cluster-aware Cell Manager" on page 160](#).

Note: In a multiple-cell environment (MoM), all Cell Managers must have the same Data Protector version installed.

Recommendations

- HPE recommends to use large file support (LFS) on the file systems which store the Data Protector Internal Database and the DC binary files that are expected to grow larger than 2 GB.

Setting kernel parameters

HP-UX systems:

- Set the kernel parameter `shmmmax` (maximum size of a shared memory segment) to at least 2.5 GB. To check the configuration, execute:

```
kcusage shmmmax
```
- HPE recommends to set the kernel parameter `maxdsiz` (max data segment size) or `maxdsiz_64` to at least 134217728 bytes (128 MB), and the kernel parameter `semnmu` (number of semaphore undo structures) to at least 4000. The `semnmu` parameter must allow maximum number of parallel backup or restore or copy sessions (1000) and the same number of database query sessions (1000). You need not change the value of `semnmu` parameter, if you do not plan to execute large number of parallel sessions.

After committing these changes, restart the system.

Linux systems:

- Set the kernel parameter `shmmmax` (maximum size of a shared memory segment) to at least 2.5 GB. To check the configuration, execute:

```
cat /proc/sys/kernel/shmmmax
```

For recovery of the Internal Database, the kernel parameter should be set to twice the above value.

Installation procedure

Tip: If you install the Cell Manager and Installation Server on the same system, you can perform the installation in one step by executing `omnissetup.sh -CM -IS`.

For a description of the `omnissetup.sh` command, see the `README` file located in the `Mount_point/LOCAL_INSTALL` directory on the DVD-ROM or the *HPE Data Protector Command Line Interface Reference* located in the `Mount_point/DOCS/C/MAN` directory on the DVD-ROM.

To install the Cell Manager on an HP-UX or Linux system

1. Insert and mount the appropriate UNIX installation DVD-ROM (for HP-UX or Linux) to a mount point or mount the ISO image directly.

Note that the DVD-ROM filesystem uses the Rock Ridge extensions.

Optionally, copy the following directories from the DVD-ROM to your local disk:

LOCAL_INSTALL

platform_dir /DP_DEPOT

Where *platform_dir* is:

hpux	for HP-UX systems
linux_x86_64	for Linux systems

2. Go to the LOCAL_INSTALL directory and execute:

```
./omnisetup.sh -CM
```

For details on the `omnisetup.sh` command, see the *HPE Data Protector Command Line Interface Reference*.

If you want to install an Installation Server for UNIX on your Cell Manager, you can do it at this point. For the required steps, see ["Installing Installation Servers for UNIX systems" on page 43](#).

Note: The installation of Data Protector 9.00 on Red Hat 7 system fails. For more information, see ["Troubleshooting installation on Red Hat 7 systems" on page 333](#).

The installed directory structure on HP-UX and Linux systems

When the installation completes, the core Data Protector software is located in the `/opt/omni/bin` directory and the Installation Server for UNIX in the `/opt/omni/databases/vendor` directory. The following list shows the Data Protector subdirectories and their contents:

To install Data Protector to linked directories, for instance:

```
/opt/omni/ -> /prefix/opt/omni/
```

```
/var/opt/omni/ -> /prefix/var/opt/omni/
```

```
/etc/opt/omni/ -> /prefix/etc/opt/omni/
```

you should create the links before the installation and ensure that the destination directories exist.

<code>/opt/omni/bin</code>	User commands
<code>/opt/omni/help/C</code>	Help
<code>/opt/omni/lbin</code>	Administrative commands, command-line utilities
<code>/opt/omni/sbin</code>	Administrative commands, command-line utilities

/opt/omni/sbin/install	Installation scripts
/etc/opt/omni	Configuration data
/opt/omni/lib	Shared libraries for compression, data encoding, and device handling
/opt/omni/doc/C	Guides in the electronic PDF format
/var/opt/omni/log /var/opt/omni/server/log	Log files
/opt/omni/lib/nls/C	Message catalog files
/opt/omni/lib/man	Man pages
/var/opt/omni/tmp	Temporary files
/var/opt/omni/server/db80	IDB files For details, see the <i>HPE Data Protector Help</i> index: "IDB, location of directories".
/opt/omni/AppServer	HPE Data Protector Application Server.
/opt/omni/idb	The HPE Data Protector internal database.
/opt/omni/jre	The Java Runtime Environment for use with Data Protector.

Configuring automatic startup and shutdown

The Data Protector installation procedure configures an automatic startup and shutdown of all Data Protector processes whenever a system is restarted. Some of this configuration is operating system dependent.

The following files are automatically configured:

HP-UX systems:

/sbin/init.d/omni	A script with startup and shutdown procedures.
/sbin/rc1.d/K162omni	A link to the /sbin/init.d/omni script that shuts down Data Protector.
/sbin/rc2.d/S838omni	A link to the /sbin/init.d/omni script that starts up Data Protector.
/etc/rc.config.d/omni	Contains an omni parameter defining: omni=1 Data Protector is automatically stopped and started at system restart. This is the default option. omni=0 Data Protector is not automatically stopped and started at system restart.

Linux systems:

/etc/init.d/omni	A script with startup and shutdown procedures.
/etc/rcinit_ level.d/K10omni	A link to the /etc/init.d/omni script that shuts down Data Protector. Where <i>init_level</i> is 1 and 6.
/etc/rcinit_ level.d/S90omni	A link to the /etc/init.d/omni script that starts up Data Protector. Where <i>init_level</i> is 2,3,4, and 5.

During the installation, the following system files on the Cell Manager system are modified:

HP-UX systems:

/etc/services	The Data Protector port number for the service is added to the file.
/opt/omni/sbin/crs	The Data Protector CRS service is added.

When the installation is finished, the following processes are running on the Cell Manager:

/opt/omni/sbin/crs	The Data Protector Cell Request Server (CRS) service runs on the Cell Manager system and is started when the Cell Manager software is installed on the system. The CRS starts and controls backup and restore sessions in the cell.
/opt/omni/sbin/mmd	The Data Protector Media Management Daemon (MMD) service runs on the Cell Manager and is started when the Cell Manager software is installed on the system. The MMD manages the device and media management operations.
/opt/omni/sbin/kms	The Data Protector Key Management Server (KMS) service runs on the Cell Manager and is started when the Cell Manager software is installed on the system. The KMS provides key management for the Data Protector encryption functionality.
/opt/omni/idb/bin/postgres	The Data Protector Internal Database Service (hdpd-idb) is the service under which the IDB runs. The service is accessed locally on the Cell Manager by processes that need information from the internal database. This service is accessed remotely only for media management information about transfer from the IDB on the Cell Manager to the IDB on the Manager-of-Manager (MoM).
/opt/omni/idb/bin/pgbouncer	The Data Protector Internal Database Connection Pooler (hdpd-idb-cp) service offers a pool of open connections to the hpd-idb which can

<code>/opt/omni/AppServer/bin/standalone.sh</code>	The Data Protector Application Server (hdp-as) service is used for connecting the GUI to the IDB through a HTTPS connection (web services). It runs on the Cell Manager and has a local connection to the hdp-idb-cp service.
--	---

Setting environment variables

Before using Data Protector, HPE recommends that you extend the values of specific environment variables in your operating system configuration:

- To enable the Data Protector man pages to be viewed from any location, add the `/opt/omni/lib/man` to the `MANPATH` variable.
- To enable the Data Protector commands to be invoked from any directory, add the command locations to the `PATH` variable. Procedures in the Data Protector documentation assume the variable value has been extended. The command locations are listed in the `omniintro` reference page in the *HPE Data Protector Command Line Interface Reference* and the `omniintro` man page.

Next steps

At this stage, the Cell Manager is installed and – if it was selected – also the Installation Server for UNIX systems. Your next tasks are:

1. If you have not installed an Installation Server for UNIX on the same system, see ["Installing a UNIX Cell Manager" on page 29](#).
2. Install an Installation Server for Windows, if you wish to remotely install software to Windows clients. See ["Installing an Installation Server for Windows systems" on page 45](#).
3. Distribute the software to clients. See ["Installing Data Protector clients" on page 55](#).

Installing a Windows Cell Manager

Prerequisites

- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.
- The user account used for the installation must:
 - Have administrative (Administrator) privileges on the selected target system.
 - Have network access user rights set in the Windows local security policy.
- The Data Protector Inet service by default runs under the Windows local user account SYSTEM. However, if for various reasons the Inet service runs under a Windows domain user account, you must additionally grant it the following Windows operating system Security Policy privileges:

- Impersonate a client after authentication
- Replace a process level token

For more information, see the *HPE Data Protector Help* index: "Inet user impersonation".

- The system that will become the Cell Manager must:
 - Have a supported Windows operating system installed. For a list of supported operating systems for the Cell Manager, see <https://softwaresupport.hpe.com/>.
 - Have access to a DVD-ROM drive or be able to mount an ISO image.
 - Have sufficient free disk space for the Data Protector Cell Manager software. The Cell Manager requires 4 GB of total RAM.
For recovery of the Internal Database, twice as much total RAM is required.
For each parallel backup session, 40 MB of RAM are required. For example, if you want to run 60 parallel backup sessions, 3 GB of RAM are needed.
 - Have sufficient free disk space for the Data Protector Internal Database (IDB). 1.5 GB of free disk space + approximately 100 bytes for each backed up file (for use by the IDB).
If you have insufficient free storage space on the selected disk volume, you can mount another volume to a directory on it, but you should do so before the installation.
 - Have $2 \times \text{size_of_the_biggest_package_to_be_installed} + 10$ MB of disk space on the system drive.
 - Have firewall configured to additionally accept "Remote Service Administration" (NP) connections (port 445).
 - Have the Microsoft implementation of the TCP/IP protocol installed and running. The protocol must be able to resolve hostnames. The computer name and the hostname must be the same.
 - Have a static IP address assigned. If the system is configured as a DHCP client, its IP address changes; therefore, it is required to either assign a permanent DNS entry for the system (and reconfigure it), or to configure a DHCP server to reserve a static IP address for the system (IP address is bound to the system's MAC address).
 - Have the following ports free:
 - 5555 — the default port for Data Protector communication
 - 7112 — the Internal Database Service port
 - 7113 — the Internal Database Connection Pooler (IDB CP) port
 - 7116 — the Application Server (HTTPS AS) port
 - 9999 — the Application Server management portYou can change the IDB and Application Server service ports during installation. To change the default communication port number, see "[Changing the default Data Protector Inet port](#)" on page 359.
- To run large number of sessions on a Windows Cell Manager, you must change the desktop heap

limit. The size of each desktop heap allocation is controlled by the following registry value:

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Session  
Manager\SubSystems\Windows
```

The default data for this registry value will look something like the following:

```
%SystemRoot%\system32\csrss.exe ObjectDirectory=\Windows  
SharedSection=1024,20480,768 Windows=On SubSystemType=Windows ServerDll=basesrv,1  
ServerDll=winsrv:UserServerDllInitialization,3 ServerDll=sxssrv,4  
ProfileControl=Off MaxRequestThreads=16
```

The numeric values following "SharedSection=" control how desktop heap is allocated. These SharedSection values are specified in kilobytes.

- 1024 - shared heap size common to all desktops
- 20480 - size of the desktop heap for each desktop that is associated with an interactive window station
- 768 - size of the desktop heap for each desktop that is associated with a non-interactive window station

You must change the SharedSection value that is associated with a non-interactive window station to 20480. A reboot is required for this change to take effect.

Microsoft Terminal Services Client

- To install Data Protector on Windows through Microsoft Terminal Services Client, ensure that the system you want to install Data Protector on has **Remote Administration** selected for the **Terminal Server Mode**:
 - a. In the Windows Control Panel, click **Administrative Tools** and then **Terminal Services Configuration**.
 - b. In the Terminal Services Configuration dialog box, click **Server Settings**. Ensure that the Terminal Services server is running in the Remote Administration mode.

Recommendations

- If you expect DC binary files to grow larger than 2 GB (their size is limited only by the file system settings), HPE recommends to use the NTFS file system for their storage.

Cluster-aware Cell Manager

Additional prerequisites and steps are required for installing a cluster-aware Cell Manager. See ["Installing a cluster-aware Cell Manager" on page 174](#).

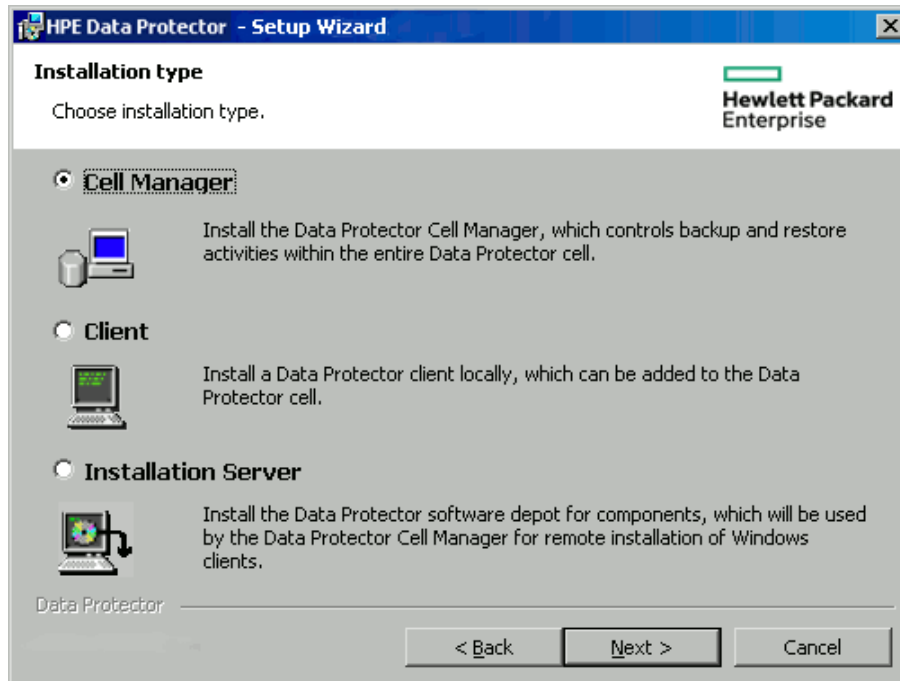
Note: In a multiple-cell environment (MoM), all Cell Managers must have the same Data Protector version installed.

Installation procedure

To perform a new installation on a Windows system

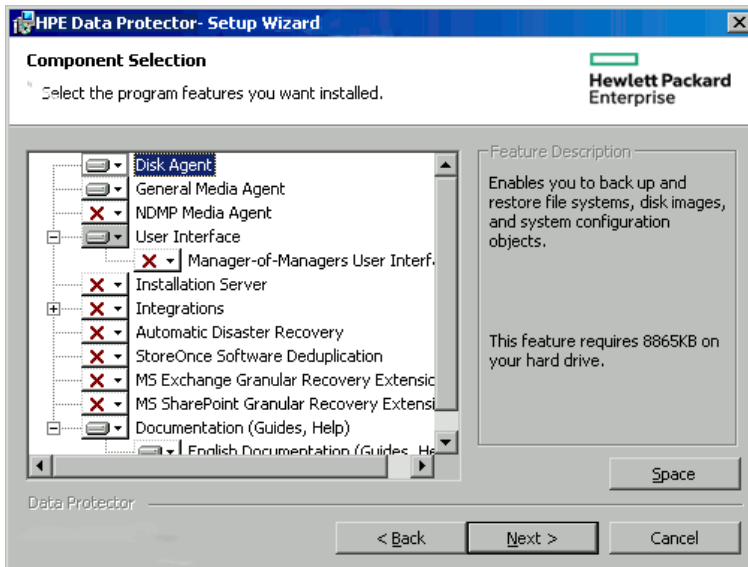
1. Insert the Windows installation DVD-ROM or mount the ISO image.
The User Account Control dialog is displayed. Click **Continue** to proceed with the installation.
2. In the HPE Data Protector window, select **Install Data Protector** to start the Data Protector Setup Wizard.
3. Follow the Setup Wizard and carefully read the license agreement. Click **Next** to continue, if you accept the terms of the agreement.
4. In the Installation Type page, select **Cell Manager** and then click **Next** to install Data Protector Cell Manager software.

Selecting the installation type



5. Provide the username and password for the account under which the Data Protector services will run.
Click **Next** to continue.
6. Click **Next** to install Data Protector into the default installation folders.
Otherwise, click **Change** to open the Change Current Destination Folder or Change Current Program Data Destination Folder dialog box, and change the installation folder as needed. The path to the program data installation folder should not exceed 80 characters.
7. In the Component Selection page, select the components you want to install. For a list and descriptions of the Data Protector components, see ["Data Protector components" on page 58](#).

Selecting software components

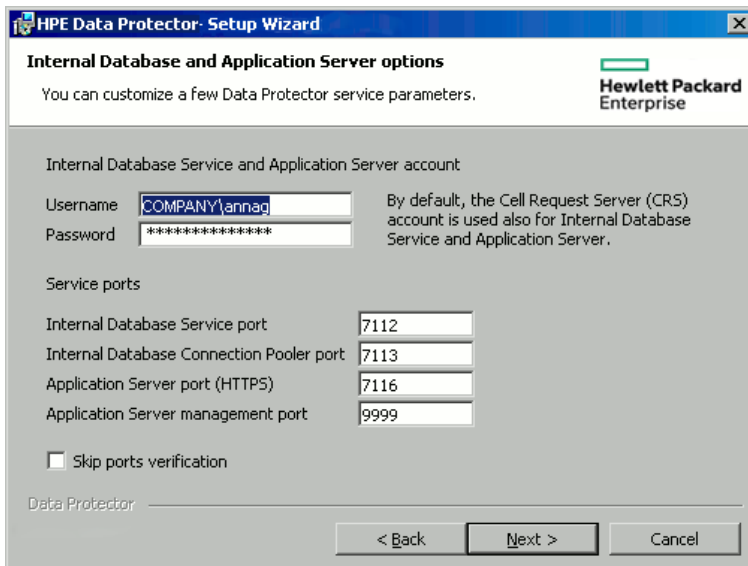


Disk Agent, **General Media Agent**, **User Interface**, and **Installation Server** are selected by default. Click **Next**.

8. Optionally, change the user account used by the Data Protector IDB and Application Server, and the ports used by these services.

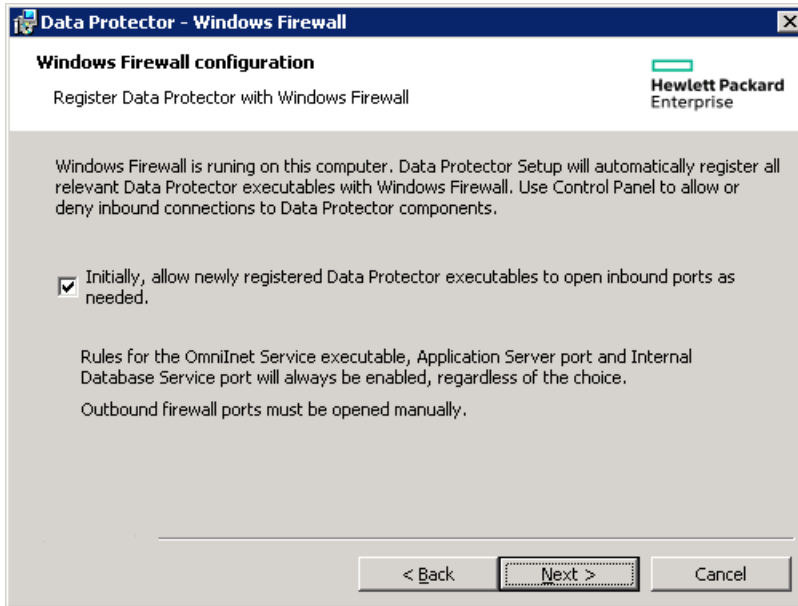
Click **Next**.

Changing the IDB and Application Server options



9. If Data Protector detects Windows Firewall on your system, the Windows Firewall configuration page is displayed. Data Protector setup registers all necessary Data Protector executables. By default, the **Initially, allow newly registered Data Protector executables to open inbound ports as needed** option is selected. If you do not want to enable Data Protector to open ports at the moment, deselect the option. For proper functioning of Data Protector with previous version of 9.09 clients, the Data Protector rules in Windows firewall must be enabled. Rules for the Omninet

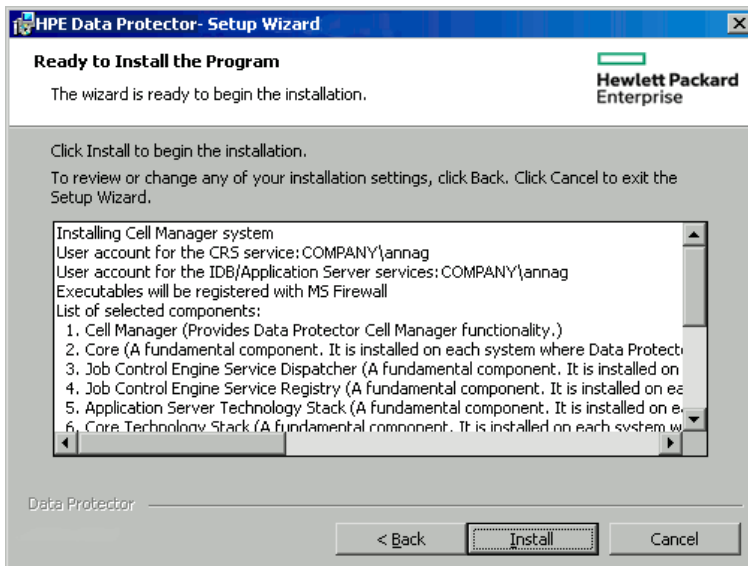
Service executable, Application Server port and Internal Database Service port will always be enabled, regardless of the choice.



Click **Next**.

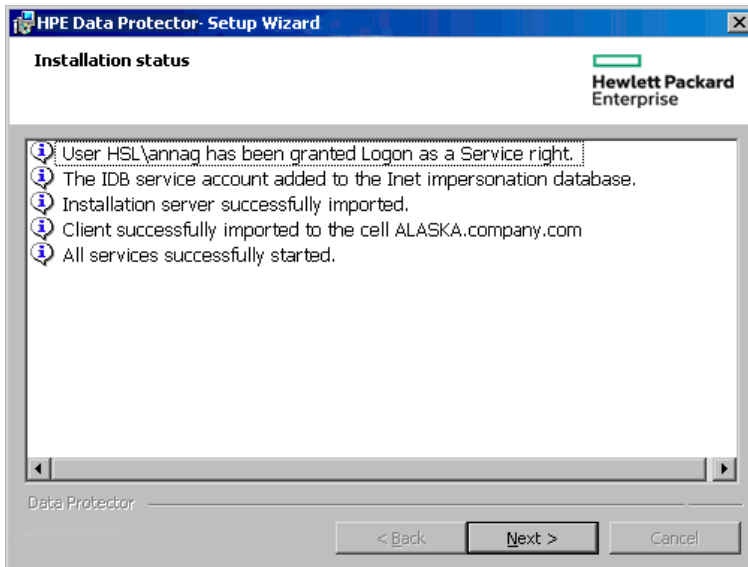
10. The component summary list is displayed. Click **Install** to start installing the selected components. This may take several minutes.

Component summary list



11. The **Installation status** page is displayed. Click **Next**.

Installation status page



12. If you have installed the User Interface component, to start using the Data Protector GUI immediately after setup, select **Launch Data Protector GUI**.

If you have installed the English Documentation (Guides, Help) component, to view the HPE Data Protector Product Announcements, Software Notes, and References immediately after setup, select **Open the Product Announcements, Software Notes, and References**.

Click **Finish**.

After the installation

The Cell Manager files are located in the *Data_Protector_home* directory and in *Data_Protector_program_data*.

The software depot is located in the *Data_Protector_program_data\Depot* directory.

The Data Protector commands are located in the directories, listed in the *omniintro* reference page in the *HPE Data Protector Command Line Interface Reference* and the *omniintro* man page.

HPE recommends that you enable invocations of the Data Protector commands from any directory by extending the value of the appropriate environment variable in your operating system configuration with the command locations. Procedures in the Data Protector documentation assume the value has been extended.

The following processes are running on the Cell Manager system:

crs.exe	The Data Protector Cell Request Server (CRS) service runs on the Cell Manager system and is started when the Cell Manager software is installed on the system. The CRS starts and controls backup and restore sessions in the cell. It runs in the <i>Data_Protector_home\bin</i> directory.
mmd.exe	The Data Protector Media Management Daemon (MMD) service runs on the Cell Manager system and is started when the Cell Manager software is installed on the

	system. The MMD manages the device and media management operations. It runs in the <i>Data_Protector_home\bin</i> directory.
omniinet.exe	The Data Protector client service that enables the Cell Manager to start agents on other systems. The Data Protector Inet service must run on all systems in the Data Protector cell. It runs in the <i>Data_Protector_home\bin</i> directory.
kms.exe	The Data Protector Key Management Server (KMS) service runs on the Cell Manager system and is started when the Cell Manager software is installed on the system. The KMS provides key management for the Data Protector encryption functionality. It runs in the <i>Data_Protector_home\bin</i> directory.
hdp-idb	The Data Protector Internal Database Service (hdp-idb) is the service under which the IDB runs. The service is accessed locally on the Cell Manager by processes that need information from the internal database. This service is accessed remotely only for media management information about transfer from the IDB on the Cell Manager to the IDB on the Manager-of-Manager (MoM).
hdp-idb-cp	The Data Protector Internal Database Connection Pooler (hdp-idb-cp) service offers a pool of open connections to the hdp-idb which can be used on request instead of opening a new connection for every request, thus ensuring hdp-idb connection scalability. The service runs on the Cell Manager and is accessed only by local processes.
hdp-as	The Data Protector Application Server (hdp-as) service is used for connecting the GUI to the IDB through a HTTPS connection (web services). It runs on the Cell Manager and has a local connection to the hdp-idb-cp service.

Note: If you intend to use the Data Protector user interface to perform backups or restores across platforms, see the HPE Data Protector Product Announcements, Software Notes, and References for the limitations incurred.

Tip: You can install additional code page conversion tables to correctly display filenames, if the appropriate encoding is not available from the Data Protector GUI. For detailed steps, see the operating system documentation.

Troubleshooting

In case of an unsuccessful setup, try to verify the requirements that are checked by Setup itself and what could have caused the failure if they had not been fulfilled. See "[Prerequisites](#)" on page 35.

This is the list of the requirements checked by Setup:

- Service Pack version
- nslookup, so that Data Protector is able to expand hostnames
- disk space
- administrative rights

Next steps

At this stage, the Cell Manager is installed and – if it was selected – also the Installation Server for Windows. Your next tasks are:

1. Install the Installation Server for UNIX, if you have a mixed backup environment. See "[Installing the Data Protector Cell Manager and Installation Servers](#)" on page 28. Skip this step if you do not need the Installation Server for UNIX system.
2. Distribute the software to clients. See "[Installing Data Protector clients](#)" on page 55.

Installing Installation Servers

Installation Servers can be installed on the Cell Manager system or any supported system that is connected to the Cell Manager by a LAN. For details on supported operating systems for the Installation Server, see <https://softwaresupport.hpe.com/>.

To keep the Installation Servers on systems separate from the Cell Manager, install the corresponding software depot locally. The detailed procedure is described in this section.

Note: When using the Encrypted Control Communication in a cell, the Installation Server must also have the Secure Communication enabled to update clients.

Installing Installation Servers for UNIX systems

Prerequisites

The system that will become your Installation Server must meet the following requirements:

- Have the HP-UX or Linux operating system installed. For details on supported operating systems for the Installation Server, see the HPE Data Protector Product Announcements, Software Notes, and References.
- Have the `inetd` or `xinetd` daemon up and running.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.
- Have the port number 5555 (default) free. If this is not the case, see "[Changing the default Data Protector Inet port](#)" on page 359.
- Have the TCP/IP protocol installed and running. The protocol must be able to resolve hostnames.
- Have enough disk space for the complete Data Protector software depot. The following are the minimum requirements:
 - 512 MB of total RAM
 - 1.5 GB of free disk space

- Have a DVD-ROM drive or be able to mount ISO images.
- You need either root access or an account with root privileges.
- The Cell Manager in the Data Protector cell must be of the 9.00 version.

To install Data Protector to linked directories, for instance:

```
/opt/omni/ -> /prefix/opt/omni/  
/etc/opt/omni/ -> /prefix/etc/opt/omni/  
/var/opt/omni/ -> /prefix/var/opt/omni/
```

Create the links before the installation and ensure that the destination directories exist.

Note: To install software from a device across the network, first mount the source directory on your computer.

Recommendations

Installing Data Protector using a UNIX Installation Server is the preferred method for UNIX clients.

Although local installation of Data Protector to UNIX clients is possible, it is not recommended as there is no supported procedure to patch UNIX clients without the use of an Installation Server.

Because an Installation Server is required to patch UNIX clients, it is recommended to use the same Installation Server to first install Data Protector on the UNIX clients.

Installation procedure

To install the Installation Server for UNIX systems on an HP-UX or Linux system

1. Insert and mount the appropriate UNIX installation DVD-ROM or ISO image (for HP-UX or Linux) to a mount point.

Note that the DVD-ROM filesystem uses the Rock Ridge extensions.

Optionally, copy the following directories from the DVD-ROM to your local disk:

LOCAL_INSTALL

platform_dir/DP_DEPOT

Where *platform_dir* is:

hpux	for HP-UX systems
linux_x86_64	for Linux systems

2. Go to the LOCAL_INSTALL directory and execute:

```
./omnisetup.sh -IS
```

For a description of the `omnisetup.sh` command, see the README file located in the *Mount_point/* directory on the DVD-ROM or to the *HPE Data Protector Command Line Interface Reference* located in the *Mount_point/DOCS/C/MAN* directory on the DVD-ROM.

When the installation is finished, the software depot for UNIX is located in the `/opt/omni/databases/vendor` directory.

The `omnisetup.sh` command installs the Installation Server with all packages. To install only a subset of the packages, use `swinstall` (for HP-UX) or `rpm` (for Linux). See "[Installing on HP-UX and Linux systems using native tools](#)" on page 348.

If you do not install the Installation Server for UNIX on your network, you will have to install every UNIX client locally from the UNIX installation DVD-ROM (for HP-UX or Linux). Furthermore, patching of components on Data Protector clients will not be possible.

Next steps

At this point, you should have the Installation Servers for UNIX installed on your network. Your next tasks are:

1. If you installed the Installation Server on a different system than the Cell Manager, you must manually add (import) the system to the Data Protector cell. See "[Importing an Installation Server to a cell](#)" on page 189.

Note: When an Installation Server is imported, the file `/etc/opt/omni/server/cell/installation_servers` on the Cell Manager is updated to list the installed remote installation packages. This can be used from the CLI to check the available remote installation packages. For this file to be kept up to date, you should export and re-import an Installation Server whenever remote installation packages are installed or deleted. This applies even if an Installation Server is installed on the same system as the Cell Manager.

2. If you have any Windows systems in your Data Protector cell, install the Installation Server for Windows. See "[Installing an Installation Server for Windows systems](#)" below.
3. Distribute the software to clients. See "[Installing Data Protector clients](#)" on page 55.

Installing an Installation Server for Windows systems

Prerequisites

A Windows system that will become your future Installation Server must meet the following requirements:

- Have one of the supported Windows operating systems installed. For details on supported operating systems for the Installation Server, see <https://softwaresupport.hpe.com/>.
- Have enough disk space for the complete Data Protector software depot. The following are the minimum requirements:
 - 512 MB of total RAM
 - 2 GB of free disk space

- Have access to a DVD-ROM drive.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.
- TCP/UDP 445. For new Data Protector client push installation (without any Data Protector components on the client), accessible installation server share is required. Alternatively, if the Installation Server depot share cannot be accessed, initial Data Protector client installation must be done locally. For upgrades, in cases where the Installation Server depot is not accessible as a share (UDP 445 traffic is blocked), Data Protector uses internal FTP mechanism as a fallback. Internal FTP uses inet communication port (5555 by default).
- 5555 — the default port for Data Protector communication. If this is not the case, see ["Changing the default Data Protector Inet port" on page 359](#).
- Have the Microsoft implementation of the TCP/IP protocol up and running. The protocol must be able to resolve hostnames. The computer name and the hostname must be the same.

Limitations

- Due to the security restrictions imposed by the Windows operating system, Installation Server can be used to remotely install clients only in the same domain.

If you do not install the Installation Server for Windows on your network, you will have to install every Windows client locally from the DVD-ROM.

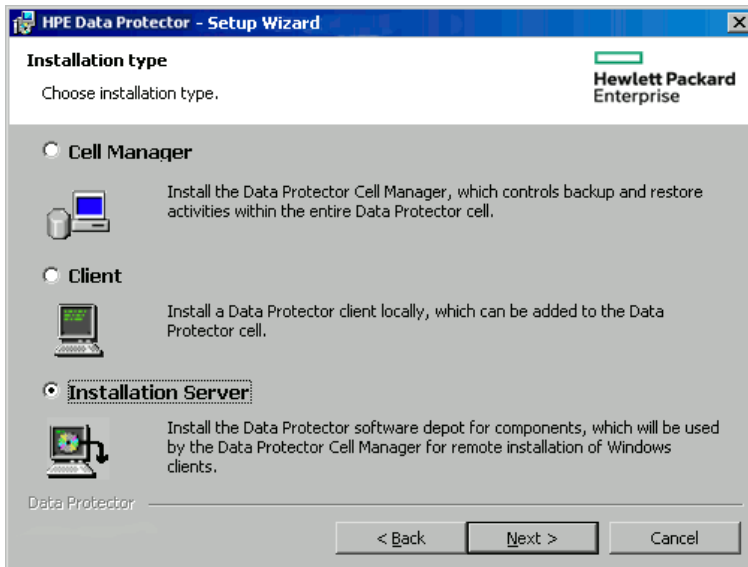
Note: You cannot remotely install a Data Protector client on the Windows system after an Installation Server has been installed on this system. To install an Installation Server and client component(s) on the same system, you must perform a local client installation. During the installation procedure, select all desired client components and the Installation Server component. See ["Installing Data Protector clients" on page 55](#).

Installation procedure

To install the Installation Server for Windows systems

1. Insert the Windows installation DVD-ROM.
The User Account Control dialog is displayed. Click **Continue** to proceed with the installation.
2. In the HPEData Protector window, select **Install Data Protector** to start the Data Protector Setup Wizard.
3. Follow the Setup Wizard and carefully read the license agreement. Click **Next** to continue, if you accept the terms of the agreement.
4. In the **Installation Type** page, select **Installation Server** and then click **Next** to install Data Protector software depot.

Selecting the installation type



5. Click **Next** to install Data Protector on the default folder.
Otherwise, click **Change** to open the Change Current Destination Folder window and enter a new path.
6. If Data Protector detects Windows Firewall on your system, the Windows Firewall configuration page is displayed. Data Protector setup registers all necessary Data Protector executables. By default, the **Initially, allow newly registered Data Protector executables to open inbound ports as needed** option is selected. If you do not want to enable Data Protector to open ports at the moment, deselect the option. For proper functioning of Data Protector with previous version of 9.09 clients, the Data Protector rules in Windows firewall must be enabled. Rules for the Omninet Service executable, Application Server port and Internal Database Service port will always be enabled, regardless of the choice.



Next steps

At this point, you should have Installation Server for Windows installed on your network. Now you should perform the following tasks:

1. If you have set up an independent Installation Server (for example, not on the Cell Manager) you must manually add (import) the system to the Data Protector cell.
See ["Importing an Installation Server to a cell" on page 189](#).
2. Install an Installation Server for UNIX on HP-UX or Linux if you have a mixed backup environment. See ["Installing Installation Servers for UNIX systems" on page 43](#).
3. Distribute the software to clients. See ["Installing Data Protector clients" on page 55](#).

Installing the Data Protector Single Server Edition

The Single Server Edition (SSE) of Data Protector is designed for small environments where backups run on only one device connected to a Cell Manager. It is available for supported Windows and for HP-UX platforms.

To install the Cell Manager and (optionally) Installation Server, follow the instructions in ["Installing the Data Protector Cell Manager and Installation Servers" on page 28](#).

Limitations of SSE for Windows

- SSE supports backups to only one device concurrently, connected to a single Cell Manager.
- One 10-slot DDS autochanger only is supported.
- UNIX (also HP-UX) clients and servers are not supported. If a backup is attempted to a UNIX machine, the session is aborted.
- Adding extension products is not supported with SSE.
- Clustering is not supported with SSE.
- Disaster Recovery is not supported with SSE.

The number of Windows clients is not limited.

For supported devices, see the HPE Data Protector Product Announcements, Software Notes, and References.

Limitations of SSE for HP-UX

- SSE supports backups to only one device concurrently, connected to a single Cell Manager.
- One 10-slot DDS autochanger only is supported.
- On a UNIX Cell Manager, you cannot back up servers - only UNIX clients, Windows clients and Solaris clients.

- Adding extension products is not supported with SSE.
- Clustering is not supported with SSE.

The number of clients (UNIX, Windows) is not limited.

For supported devices, see the HPE Data Protector Product Announcements, Software Notes, and References.

Installing a password

For the step-by-step instructions on how to install a password on the Cell Manager, see "[Data Protector passwords](#)" on page 318.

Installing the Data Protector web reporting

Data Protector Web Reporting is installed with other Data Protector components by default, and as such, you can use it locally from your system.

You can also install it on a Web server and in that way make it available on other systems which do not need to have any of the Data Protector software components installed.

Prerequisites

To use Data Protector Java Web Reporting on your system, the following prerequisites must be fulfilled:

- A supported Web browser must be installed on the system

The supported Web browsers are the same as for viewing the Data Protector Help. For details, see "[Requirements for viewing Data Protector documentation](#)" on page 419.

- **Windows Internet Explorer:**

The default web browser security settings prevent webpages from running scripts or using ActiveX controls. To allow the web browser to run scripts and use ActiveX controls in order to enable Data Protector Web Reporting, click **Allow blocked content** in the Internet Explorer Information bar. To permanently allow blocked content, select **Tools > Internet Options > Advanced**, locate the Security section and select the option **Allow active content to run in files on My Computer**.

- A supported Java runtime environment must be installed on the system and enabled in the Web browser

The supported Java runtime environment is Java Runtime Environment (JRE) 1.5.0_06 or newer update (for example, 1.5.0_07). You can download JRE at <http://www.oracle.com/technetwork/java/index-jsp-141438.html>.

Installation Procedure

To install Data Protector Web Reporting to a Web server

1. Copy the following Data Protector Java reporting files to the server. The server does not have to be a Data Protector client. On systems with the Data Protector User Interface component installed, the files are located in the following directory:

Windows systems:

`Data_Protector_home\java\bin`

UNIX systems:

`/opt/omni/java/bin`

2. Open the `WebReporting.html` file in your browser to access the Data Protector Web Reporting. You must make the file available to the users of the Web reporting in the full URL form. For example, you can put a link to this file from your Intranet site.

Tip: By default, no password is needed to use Data Protector Web Reporting. It is strongly recommended to set password on Cell Manager and in that way restrict the access to the Web reporting. For the procedure, see the *HPE Data Protector Help* index: "Web reports, configuring a password".

Next steps

When the installation has been completed, see the *HPE Data Protector Help* index: "Web reporting interface, configuring notifications" for more information on configuration issues and creating your own reports.

Verifying the Installation

When you need to check if the Data Protector software components are up and running on the Cell Manager or the client systems, you can verify the installation using the Data Protector graphical user interface.

Prerequisite

You must have the Installation Server for the type of the client system (UNIX system or Windows system) available.

Steps

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **Clients**, right-click the Cell Manager or client system, and then click

Check Installation to open the wizard.

3. All client systems of the same type (UNIX systems or Windows systems) are listed. Select the clients for which you want to verify the installation and click **Finish** to start the verification.

The results of the verification will be displayed in the Check Installation window.

About the Data Protector Inet Service Configuration

On Windows systems, backup and restore sessions are started by the Data Protector Inet service, which by default runs under the Windows local user account SYSTEM. Consequently, a backup or restore session is performed using the same user account.

Integrations

Some of the Data Protector integrations require that backup and restore sessions are started under a Windows domain user account. On a Windows Server 2003 system, this can be achieved by simply restarting the Data Protector Inet service under a different user account. For other supported Windows operating systems, this is no longer allowed. Therefore, Data Protector uses an alternative concept: user impersonation. It means that, although the Data Protector Inet service runs under the Windows local user account SYSTEM, the service can impersonate a Windows domain user account and can consequently start the integration agent under that user account.

To enable the Data Protector Inet service impersonation, Windows domain user account must be specified in the backup specification or in the restore wizard and the user account (including its password) must be saved in the Windows Registry.

Running the Inet service under a Windows domain user account

In some cases, the Data Protector Inet service must run under a Windows domain user account:

- **Cluster environments**

In a cluster, you must configure the Data Protector Inet service for all cluster nodes. This means that you need to use a Windows domain user account as the Inet account.

When the Inet service runs under a Windows domain user account, you must grant it the following Windows operating system Security Policy privileges:

- Impersonate a client after authentication
- Replace a process level token

Setting Up a User Account for the Data Protector Inet Service User Impersonation

You can specify that the Data Protector Inet service, which by default runs under the Windows local user account SYSTEM, uses a different Windows domain user account to start a session.

- Configure the user account as follows:
 - Grant the user appropriate permissions to access data (for example, application data).
 - Ensure that the user is added to the Data Protectoradmin or operator user group.

Using the Data Protector GUI

Steps

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **Data Protector Cell** and then **Clients**.
3. Right-click the client and click **Add Impersonation**.

Note: To modify or delete a user, click **Modify Impersonation** or **Delete Impersonation**, respectively.

4. In the Select Client Systems page, select the client systems for which you want to configure the Data Protector Inet service user impersonation and click **Next**.
5. In the Add, delete or modify impersonation page, add a new user account, or modify or delete an existing one, and click **Finish**.

The user account saved in the Windows Registry will be used by the Data Protector Inet service when needed.

Using the Data Protector CLI

- To set up a user account for the user impersonation on one Data Protector client, use the `omniinetpasswd` command.
Log in to the client and run:

```
omniinetpasswd -add User@DomainPassword
```
- To set up a user account for the user impersonation on multiple Data Protector clients, use the `omnicc` command.
Log in to the Cell Manager and run:

```
omnicc -impersonation -add_user -user User@Domain -host ClientName1 -host ClientName2 -host ClientName3 -passwd Password
```

For details on the `omniinetpasswd` and `omnicc` commands, see the *HPE Data Protector Command Line Interface Reference*.

Changing the Data Protector Inet Account

To ensure that the Data Protector Inet service starts processes needed for backup and restore under a specific user account, you must restart the service under that user account.

Prerequisites

- Microsoft Cluster Server: Before changing the account, take the `OBVS_HPDP_AS`, `OBVS_HPDP_IDB`, `OBVS_HPDP_IDB_CP`, and `OBVS_MCRC` cluster groups offline. Once the Data Protector Inet service is restarted under a different account, put the cluster groups online again.

On Windows systems

1. In the Control Panel, click **Administrative Tools** and then double-click **Services**.
2. Double-click **Data Protector Inet**.
3. In the General Data Protector Inet Properties click **Stop** and then click the **Log On** tab.
4. Select the **This Account** button.
5. Enter or browse for the account that has the correct permission (to access the shared disk).
6. Enter and then confirm the password.
7. Click **OK** to exit these property pages.
8. Make sure that you still have Data Protector Inet selected, right-click it, and then click **Start**.
9. Exit this dialog box.

Chapter 3: Installing Data Protector clients

You can install the Data Protector clients remotely, by distributing them using the Installation Server, or locally, from the appropriate installation DVD-ROM or mounted ISO image.

For the list of Data Protector installation DVD-ROMs and ISO images, see ["Data Protector Installation media" on page 24](#).

Installing Data Protector using a UNIX Installation Server is the preferred method for UNIX clients.

Although local installation of Data Protector to UNIX clients is possible, it is not recommended as there is no supported procedure to patch UNIX clients without the use of an Installation Server.

Because an Installation Server is required to patch UNIX clients, it is recommended to use the same Installation Server to first install Data Protector on the UNIX clients.

Note: A Windows Installation Server targets a client's port 445 during a remote installation, while a HP-UX/Linux Installation Server targets a client's port 22 (secure remote install) or ports 512 / 514 (non-secure remote install). On the Installation Server side, ephemeral ports are used to make connections to these target ports.

After you have installed the clients, HPE recommends that you enable invocations of the Data Protector commands from any directory by adding the command locations to the appropriate environment variable on each client. Procedures in the Data Protector documentation assume the variable value has been extended. Command locations are listed in the *omniintro* reference page in the *HPE Data Protector Command Line Interface Reference* and the *omniintro* man page.

After installing and importing the Data Protector clients into the cell, it is also highly recommended to verify the installation and to protect clients from unwarranted access. For procedure on verifying the client installation, see ["Verifying Data Protector client installation" on page 338](#). For more information on security protection, see ["Security considerations" on page 194](#).

Installing Data Protector client systems

Client system	Installation type and reference
Windows	Remote and local installation; see "Installing Windows clients" on page 62
HP-UX	Remote and local installation; see "Installing HP-UX clients" on page 68
Solaris	Remote and local installation; see "Installing Solaris clients" on page 71
Linux	Remote and local installation; see "Installing Linux clients" on page 77
ESX Server	Remote and local installation; see "Installing ESX Server clients" on page 81
Mac OS X	Remote and local installation; see "Installing Mac OS X clients" on page 83
IBM AIX	Remote and local installation; see "Installing IBM AIX clients" on page 81

Client system	Installation type and reference
HP OpenVMS	Local installation; see "Installing HP OpenVMS clients" on page 85
other UNIX system	Local installation; see "Local installation on UNIX and Mac OS X systems" on page 98
DAS Media Agent client	Remote and local installation; see "Installing a Media Agent to use the ADIC/GRAU Library or the StorageTek Library" on page 102.
ACS Media Agent client	Remote and local installation; see "Installing a Media Agent to use the ADIC/GRAU Library or the StorageTek Library" on page 102

Integrations

Data Protector integrations are software components that allow you to back up database applications with Data Protector. The systems running database applications are installed the same way as any Windows or UNIX client systems, provided that the appropriate software component has been selected (for example, the MS Exchange Integration component for backing up the Microsoft Exchange Server database, Oracle Integration component for backing up an Oracle database, and so on).

Installing integrations

Software application or disk array family	Reference
Microsoft Exchange Server	See "Microsoft Exchange Server clients" on page 112.
Microsoft SQL Server	See "Microsoft SQL Server clients" on page 118
Microsoft SharePoint Server	See "Microsoft SharePoint Server clients" on page 118
Microsoft Volume Shadow Copy Service (VSS)	See "Microsoft Volume Shadow Copy Service clients" on page 122.
Sybase Server	See "Sybase Server clients" on page 123
Informix Server	See "Informix Server clients" on page 123
SAP R/3	See "SAP R/3 clients" on page 124
SAP MaxDB	See "SAP MaxDB clients" on page 124

Software application or disk array family	Reference
SAP HANA Appliance	See "SAP HANA Appliance clients" on page 124
Oracle Server	See "Oracle Server clients" on page 125
MySQL	See "MySQL clients" on page 125
PostgreSQL	See "PostgreSQL clients" on page 125
IBM DB2 UDB	See "IBM DB2 UDB clients" on page 126
Lotus Notes/Domino Server	See "Lotus Notes/Domino Server clients" on page 126
VMware	See "VMware clients" on page 126
Microsoft Hyper-V	See "Microsoft Hyper-V clients" on page 136
Network Data Management Protocol (NDMP) Server	See "NDMP Server clients" on page 137
HPE P4000 SAN Solutions	See "HPE P4000 SAN Solutions clients" on page 138
HPE P6000 EVA Disk Array Family	See "HPE P6000 EVA Disk Array Family clients" on page 138
HPE P9000 XP Disk Array Family	See "HPE P9000 XP Disk Array Family clients" on page 143
HPE 3PAR StoreServ Storage	See "HPE 3PAR StoreServ Storage clients" on page 149
EMC Symmetrix	See "EMC Symmetrix clients" on page 149
EMC VNX Storage Provider	See "Non-HPE Storage Arrays" on page 154
EMC VMAX Storage Provider	See "Non-HPE Storage Arrays" on page 154
NetApp Storage Provider	See "Non-HPE Storage Arrays" on page 154

Other installations

Installation	Reference
Integrated Archive Platform (IAP)	See "Installing the Data Protector Integration clients" on page 109.
Web reporting	See Installing Data Protector web reporting.
HPE Serviceguard	See "Installing Data Protector on an HPE Serviceguard" on page 160.
Symantec Veritas Cluster Server	See "Installing Data Protector on a Symantec Veritas Cluster Server" on page 170.
Microsoft Cluster Server	See "Installing Data Protector on a Microsoft Cluster Server" on page 173.
IBM HACMP Cluster	See "Installing Data Protector on an IBM HACMP Cluster" on page 184.
Microsoft Hyper-V cluster	See "Installing Data Protector on a Microsoft Hyper-V cluster" on page 184.

Data Protector components

For the latest information on the supported platforms, visit the HPE Data Protector home page at <https://softwaresupport.hpe.com/manuals>.

These are the Data Protector components you can select and their descriptions:

User Interface	<p>The User Interface component includes the Data Protector graphical user interface on Windows systems and part of the command-line interface on Windows and UNIX systems. The software is needed to access the Data Protector Cell Manager and must be installed at least to the system that is used for managing the cell.</p> <p>Note: Specific commands of the Data Protector command-line interface are included in other Data Protector components. For details, see the <i>HPE Data Protector Command Line Interface Reference</i>.</p> <p>Before using the Data Protector User Interface in heterogeneous environments, see the HPE Data Protector Product Announcements, Software Notes, and References for the limitations incurred.</p>
English Documentation	This is the Data Protector English language documentation file set.

(Guides, Help)	
French Documentation (Guides, Help)	This is the Data Protector French language documentation file set.
Japanese Documentation (Guides, Help)	This is the Data Protector Japanese language documentation file set.
Simplified Chinese Documentation (Guides, Help)	This is the Data Protector Simplified Chinese language documentation file set.
Manager-of-Managers User Interface	The Manager-of-Managers User Interface includes the Data Protector graphical user interface. The software is needed to access the Data Protector Manager-of-Managers functionality and control the multicell environment. The Manager-of-Managers User Interface and the Manager User Interface are available as a common application.
Disk Agent	The Disk Agent component must be installed on systems that have disks that will be backed up with Data Protector.
General Media Agent	The General Media Agent component must be installed on systems that have backup devices connected or have access to a library robotics and will be managed by Data Protector.
Automatic Disaster Recovery	The Automatic Disaster Recovery component must be installed on systems for which you want to enable recovery using any of the automatic disaster recovery methods and on systems where the DR CD ISO image for Enhanced Automated Disaster Recovery (EADR) or One Button Disaster Recovery (OBDR) will be prepared to provide automatic preparation for the disaster recovery.
SAP R/3 Integration	The SAP R/3 Integration component must be installed on systems that have an SAP R/3 database that will be backed up with Data Protector.
SAP MaxDB Integration	The SAP MaxDB Integration component must be installed on systems that have an SAP MaxDB database that will be backed up using Data Protector.
SAP HANA Integration	The SAP HANA Integration component must be installed on systems that represent or constitute an SAP HANA Appliance that you want to protect using Data Protector.
Oracle Integration	The Oracle Integration component must be installed on systems that have an Oracle database that will be backed up with Data Protector.
MySQL Integration	The MySQL Integration Integration component must be installed on systems that have a MySQL database that will be backed up with Data Protector.
Virtual Environment Integration	The Virtual Environment Integration component must be installed on the systems which you will use as backup hosts to control the

	backup and restore of virtual machines using the Data Protector Virtual Environment integration.
DB2 Integration	The DB2 Integration component must be installed on all systems that have a DB2 Server that will be backed up with Data Protector.
Sybase Integration	The Sybase Integration component must be installed on systems that have a Sybase database that will be backed up with Data Protector.
Informix Integration	The Informix Integration component must be installed on systems that have an Informix Server database that will be backed up with Data Protector.
MS Exchange Integration	The MS Exchange Integration component must be installed on Microsoft Exchange Server 2007 systems that you intend to back up using the Data Protector Microsoft Exchange Server 2007 integration or the Data Protector Microsoft Exchange Single Mailbox integration. It must also be installed on Microsoft Exchange Server 2010 systems that you intend to back up using the Data Protector Microsoft Exchange Single Mailbox integration.
MS Exchange Server 2010+ Integration	The MS Exchange Server 2010+ Integration component must be installed on Microsoft Exchange Server 2010 or Microsoft Exchange Server 2013 systems that you intend to back up using the Data Protector Microsoft Exchange Server 2010 integration.
MS SQL Integration	The MS SQL Integration component must be installed on the systems that have an Microsoft SQL Server database which will be backed up with Data Protector.
MS SharePoint 2007/2010/2013 Integration	The MS SharePoint 2007/2010/2013 Integration component must be installed on Microsoft SharePoint Server 2007/2010/2013 systems that will be backed up with Data Protector.
MS Volume Shadow Copy Integration	The MS Volume Shadow Copy Integration component must be installed on the Windows Server systems where you want to run backups coordinated by Volume Shadow Copy Service.
HPE P4000 VSS Agent	The HPE P4000 VSS Agent component must be installed on both the application system and the backup system to integrate HPE P4000 SAN Solutions with Data Protector.
HPE P6000 / HPE 3PAR SMI-S Agent	The HPE P6000 / HPE 3PAR SMI-S Agent component must be installed on both the application system and the backup system to integrate Data Protector with HPE P6000 EVA Disk Array Family, or to integrate Data Protector with HPE 3PAR StoreServ Storage.
HPE P9000 XP Agent	The HPE P9000 XP Agent component must be installed on both the application system and the backup system to integrate Data Protector with HPE P9000 XP Disk Array Family.
HPE 3PAR VSS Agent	The HPE 3PAR VSS Agent component must be installed on both the

	application system and the backup system to integrate Data Protector with HPE 3PAR StoreServ Storage in configurations where the application and backup systems are Windows systems and you want to use the Volume Shadow Copy Service to backup and restore your data.
EMC Symmetrix Agent	The EMC Symmetrix Agent component must be installed on both the application system and the backup system to integrate Data Protector with EMC Symmetrix.
EMC VNX Storage Provider	The EMC VNX Storage Provider component on both the application system and the backup system to integrate Data Protector with EMC VNX. The EMC VNX Storage Provider component is a plug-in to the Data Protector SMI-S Agent.
EMC VMAX Storage Provider	The EMC VMAX Storage Provider component on both the application system and the backup system to integrate Data Protector with EMC VMAX. The EMC VMAX Storage Provider component is a plug-in to the Data Protector SMI-S Agent.
NetApp Storage Provider	The NetApp Storage Provider component on both the application system and the backup system to integrate Data Protector with NetApp Storage. In case of Virtual Environment Integration, this component must be installed only on the backup system. The NetApp Storage Provider component is a plug-in to the Data Protector SMI-S Agent.
NDMP Media Agent	The NDMP Media Agent component must be installed on all systems that will be backing up data to NDMP dedicated drives through an NDMP server.
IAP Deduplication Agent	The IAP Deduplication Agent component must be installed on systems that will perform backups directly to the IAP appliance using Data Protector.
Lotus Integration	The Lotus Integration component must be installed on all systems in the Data Protector cell that have Lotus Notes/Domino Server databases that you plan to back up with Data Protector.
MS Exchange Granular Recovery Extension	The Data Protector Granular Recovery Extension for Microsoft Exchange Server must be installed on each Microsoft Exchange Server system to enable the granular recovery feature. In a Microsoft Exchange Server Database Availability Group (DAG) environment, it must be installed on any of the Exchange Server systems in DAG.
MS SharePoint Granular Recovery Extension	The Data Protector Granular Recovery Extension for Microsoft SharePoint Server must be installed on the Microsoft SharePoint Server Central Administration system.
VMware Granular Recovery Extension Web Plug-In	The Data Protector VMware Granular Recovery Extension Web Plug-In component must be installed on the VMware Virtual Server system to enable the granular recovery feature of the VMware virtual

	machines. Only remote installation is supported.
VMware Granular Recovery Extension Agent	The Data Protector VMware Granular Recovery Extension Agent component must be installed on the mount proxy system to enable restore and granular recovery of the VMware virtual machines. Only remote installation is supported.

Note: You cannot install the General Media Agent and the NDMP Media Agent on the same system.

Data Protector services

Data Protector uses five services:

Inet	Backup client service
CRS	Cell Manager Service
hpdp-ldb	Internal Database Service
hpdp-ldb-cp	Internal Database Connection Pooler
hpdp-as	Application Server

By default, Inet and the hpdp-* services are running under the Local System account, and CRS is running under the Administrator account.

You can change the account information for any of these services. However, the following are minimum requirements that must be met by the new accounts:

Service	Resource	Minimum resource permission required by service
CRS	<i>Data_Protector_program_data</i>	Full access
	HKLM\SOFTWARE\Hewlett-Packard\OpenView\OmniBackII	Full access
Inet	Backup and Restore	-
	Take Ownership	-

Installing Windows clients

For details on supported platforms and components for a particular Windows operating system, see <https://softwaresupport.hpe.com/>.

Prerequisites

To install a Windows client, you must have the Administrator rights. The Windows system that will become your future Data Protector client system must meet the following requirements:

- Have sufficient disk space for the Data Protector client software. For details, see the HPE Data Protector Product Announcements, Software Notes, and References.
- Have port number 5555 (default) free.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.
- Have the Microsoft implementation of the TCP/IP protocol installed and running. The protocol must be able to resolve hostnames. The computer name and the hostname must be the same.
- Ensure that network access user rights are set under the Windows local security policy for the account performing the installation.

Limitations

- Due to the security restrictions imposed by the Windows operating system, Installation Server can be used to remotely install clients only in the same domain.
- On Windows XP Home Edition, Data Protector clients can only be installed locally.
- When installing clients remotely to Windows Vista, Windows 7, Windows 8, Windows Server 2008, or Windows Server 2012, use one of the following accounts:
 - A built-in administrator account on the remote system. The account must be enabled and with disabled *Admin Approval Mode*.
 - A domain user account, which is a member of the local Administrators user group on the remote system.

Recommendations

- Prior to installing Data Protector, check if Microsoft Installer (MSI) 2.0 is installed on the system. If an earlier version is installed, it is recommended to upgrade it to the version 2.0 before starting the Data Protector installation. If you do not upgrade MSI beforehand, the Data Protector Setup Wizard automatically upgrades it to the required version. In this case, Data Protector informs you appropriately about the MSI upgrade.

If MSI is upgraded, it is highly recommended to restart the system.

Automatic disaster recovery

The *Automatic Disaster Recovery* component must be installed on systems for which you want to enable recovery using Enhanced Automated Disaster Recovery (EADR), One Button Disaster Recovery (OBDR), or Automated System Recovery (ASR), and on systems where the DR CD ISO image for EADR or OBDR will be prepared.

Cluster-aware clients

Additional prerequisites are required for installing cluster-aware clients. For more details, see ["Installing cluster-aware clients" on page 181](#).

Before starting the installation procedure, decide which components you need to install on your client system. For the list of the Data Protector software components and their descriptions, see ["Data Protector components" on page 58](#).

Local installation

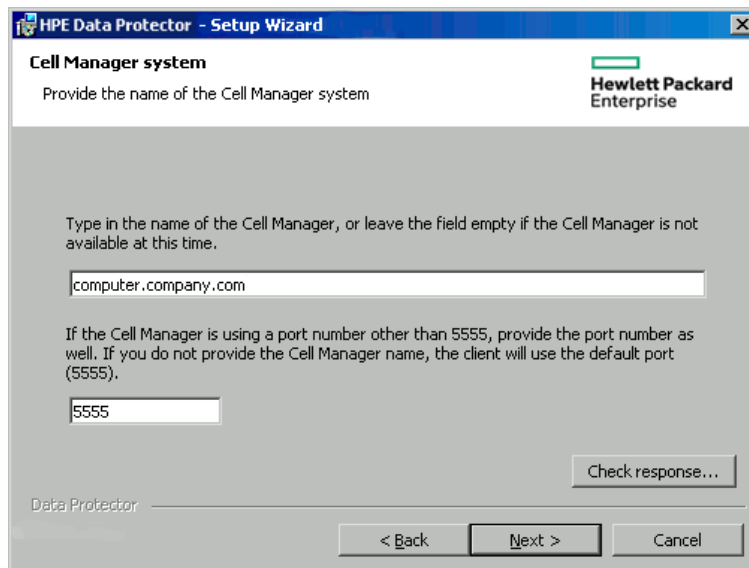
Windows clients can be installed locally, from the Windows installation DVD-ROM or ISO image:

1. Insert the DVD-ROM or mount the ISO image.
On Windows Vista, Windows 7, Windows 8, Windows Server 2008, and Windows Server 2012, the User Account Control dialog box is displayed. Click **Continue** to proceed with the installation.
2. In the HPEData Protector window, select **Install Data Protector** to start the Data Protector Setup Wizard.
3. Follow the Setup Wizard and carefully read the license agreement. Click **Next** to continue.
4. In the Installation Type page, select **Client**. For Itanium clients, the type is selected automatically.
5. Enter the name of the Cell Manager.

If your Cell Manager uses a different port than the default 5555, change the port number. Test if the Cell Manager is active and uses the selected port by clicking **Check response**.

Click **Next**.

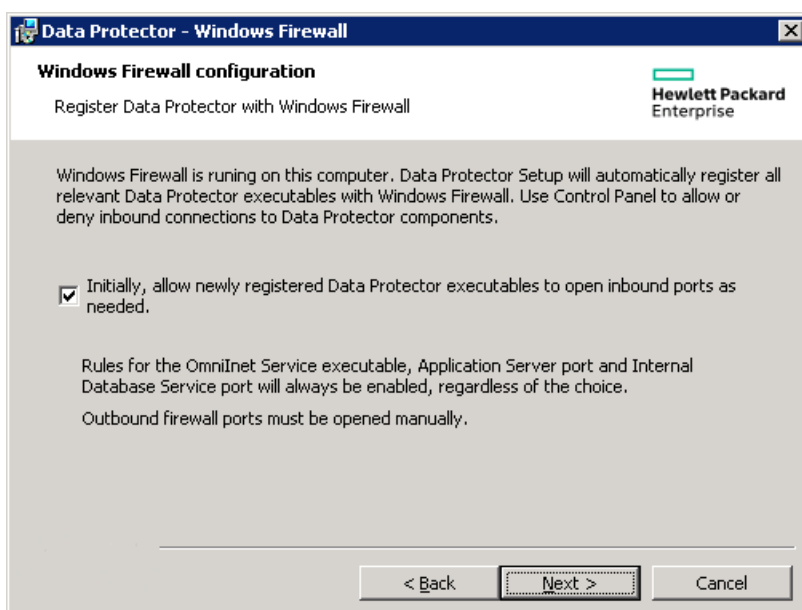
Choosing the Cell Manager



The screenshot shows a Windows dialog box titled "HPE Data Protector - Setup Wizard". The main heading is "Cell Manager system" with the instruction "Provide the name of the Cell Manager system". The Hewlett Packard Enterprise logo is in the top right. Below the heading, there is a text input field containing "computer.company.com". A note reads: "Type in the name of the Cell Manager, or leave the field empty if the Cell Manager is not available at this time." Below this is another text input field containing "5555". A note reads: "If the Cell Manager is using a port number other than 5555, provide the port number as well. If you do not provide the Cell Manager name, the client will use the default port (5555)." At the bottom right is a "Check response..." button. At the bottom left, the text "Data Protector" is visible. At the bottom center are three buttons: "< Back", "Next >", and "Cancel".

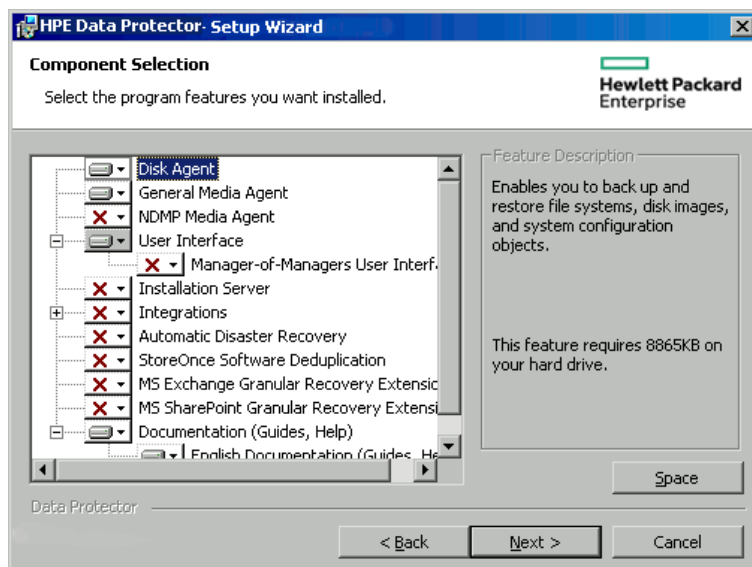
6. Click **Next** to install Data Protector on the default folder.
Otherwise, click **Change** to open the Change Current Destination Folder page and enter the path.

7. Select the Data Protector components that you want to install.
For information on other Data Protector components, see ["Data Protector components" on page 58](#).
Click **Next**.
8. If Data Protector detects Windows Firewall on your system, the Windows Firewall configuration page is displayed. Data Protector setup registers all necessary Data Protector executables. By default, the **Initially, allow newly registered Data Protector executables to open inbound ports as needed** option is selected. If you do not want to enable Data Protector to open ports at the moment, deselect the option. For proper functioning of Data Protector with previous version of 9.09 clients, the Data Protector rules in Windows firewall must be enabled. Rules for the OmniInet Service executable, Application Server port and Internal Database Service port will always be enabled, regardless of the choice.



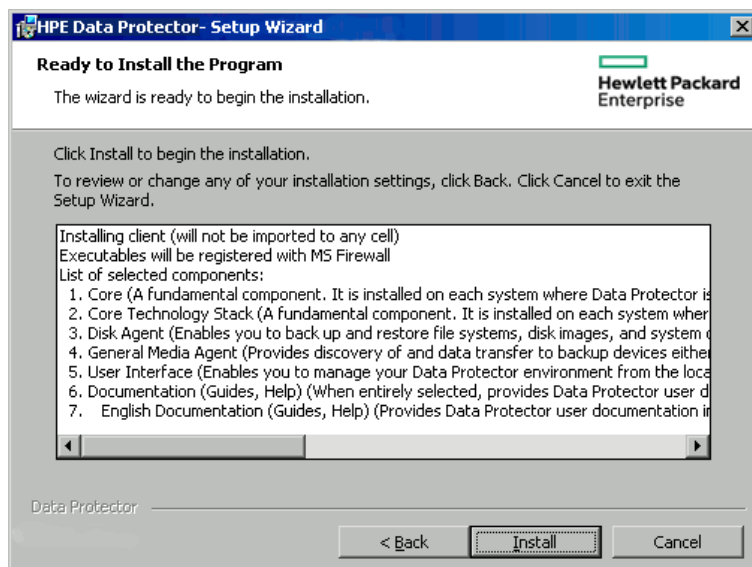
- Click **Next**.
9. The component selection summary page is displayed. Click **Install** to install the selected components.

Component selection summary page



10. The Installation status page is displayed. Click **Next**.

Installation summary page



11. If you have installed the User Interface component, to start using the Data Protector GUI immediately after setup, select **Launch Data Protector GUI**.

If you have installed the English Documentation (Guides, Help) component, to view the *HPE Data Protector Product Announcements, Software Notes, and References* immediately after setup, select **Open the Product Announcements, Software Notes, and References**.

12. Click **Finish**.

Note: If encrypted control communication is enabled on a Cell Manager and you run a local installation of Data Protector on a client and specify this Cell Manager as the cell that you want to

import the client into, the import fails. This is expected behavior. An external client has to be imported to the Cell Manager from the Cell Manager.

Connecting a backup device to Windows systems

Once you have installed a Media Agent component, you can attach a backup device to a Windows system by performing the following steps:

1. Find the available SCSI addresses (referred to as *SCSI Target IDs* on Windows) for the drives and control device (robotics) of the backup device you want to connect.

See "[Finding unused SCSI target IDs on Windows systems](#)" on page 388.

2. Set unused SCSI Target IDs for the drives and control device (robotics). Depending on the device type, this can usually be done with switches on the device. For details, see the documentation that comes with the device.

For information about supported devices, see <https://softwaresupport.hpe.com/>.

3. Switch off your computer and connect your backup device to the system.
4. Switch on the device, then the computer, and wait until the boot process completes.
5. To verify that the system correctly recognizes your new backup device, in the *Data_Protector_home\bin* directory, run the `devbra -dev` command.

See a new device listed in the output of the command. For example, you might get the following output from the `devbra -dev` command:

- If the tape driver for your device is loaded:

```
HP:C1533A  
tape3:0:4:0  
DDS  
...
```

The first line represents the device specification, the second one is the device filename.

The path format says that an HPE DDS tape device has Drive instance number 3 and is connected to SCSI bus 0, SCSI Target ID 4, and LUN number 0.

- If the tape driver for your device is unloaded:

```
HP:C1533A  
scsi1:0:4:0  
DDS  
...
```

The first line represents the device specification, the second one provides the device filename.

The path format says that an HPE DDS tape device is connected to SCSI port 1, SCSI bus 0, and the tape drive has the SCSI Target ID 4, and LUN number 0.

For loading or unloading the native tape driver for your device, see "[Using tape and robotics drivers on Windows systems](#)" on page 373.

For more information on creating a device filename, see "[Creating device files \(SCSI Addresses\) on Windows systems](#)" on page 375.

Next steps

At this stage, you should have client components installed and backup devices connected, so that you are able to configure backup devices and media pools. For information on configuration tasks, see the *HPE Data Protector Help* index: “configuring, backup devices”.

Installing HP-UX clients

HP-UX clients can be installed remotely using the Installation Server for UNIX, or locally from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).

Before starting the installation procedure, decide which components you need to install on your client system. For the list of the Data Protector software components and their descriptions, see ["Data Protector components" on page 58](#).

Prerequisites

- At this point, you should have the Cell Manager and Installation Server for UNIX installed on your network. If not, for instructions see ["Installing the Data Protector Cell Manager and Installation Servers" on page 28](#).
- You will need either *root* access or an account with *root* capabilities.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.
- For HP-UX 11.11, the IPv6NCF11i bundle or TOUR/IPv6 support is required to enable the Internet Protocol version 6 (IPv6).

For details, see ["HP-UX system patches" on page 244](#)

RAM and disk space requirements for the Data Protector client components on UNIX systems

The following table presents the minimum RAM and disk space requirements for different Data Protector client components on UNIX systems:

RAM and disk space requirements

Client system component	RAM (MB) ¹	Free disk space (MB) ²
Disk Agent	64 for each (recommended 128)	20 for each
Media Agent		
Integration components		
English Documentation (Guides, Help)	N/A	100

Remote installation

You install the client software from the Installation Server for UNIX to clients using the Data Protector graphical user interface. For the step-by-step procedure for remotely installing the software, see ["Remote installation" on page 90](#).

After the remote installation, the client system automatically becomes a member of the Data Protector cell.

If you have installed a Media Agent on your client, you must physically connect the backup device to the system. To see if the device drivers, appropriate for the type of your device, are already build in the kernel, check your kernel configuration before running a backup.

Local installation

If you do not have an Installation Server for UNIX installed in your environment, you have to perform local installation from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux). For instructions, see ["Local installation on UNIX and Mac OS X systems" on page 98](#).

After the local installation, the client system has to be manually imported into the cell. See ["Importing clients to a cell " on page 187](#).

Cluster-aware clients

Additional prerequisites and steps are required for installing cluster-aware clients. For more details, see ["Installing cluster-aware clients" on page 164](#).

Checking the kernel configuration on HP-UX

The following procedure explains how to check and build your kernel configuration on the HP-UX 11.x, using the *HPE System Administration Manager (SAM)* utility. For instructions on how to build the kernel manually, see ["SCSI robotics configuration on HP-UX systems" on page 376](#).

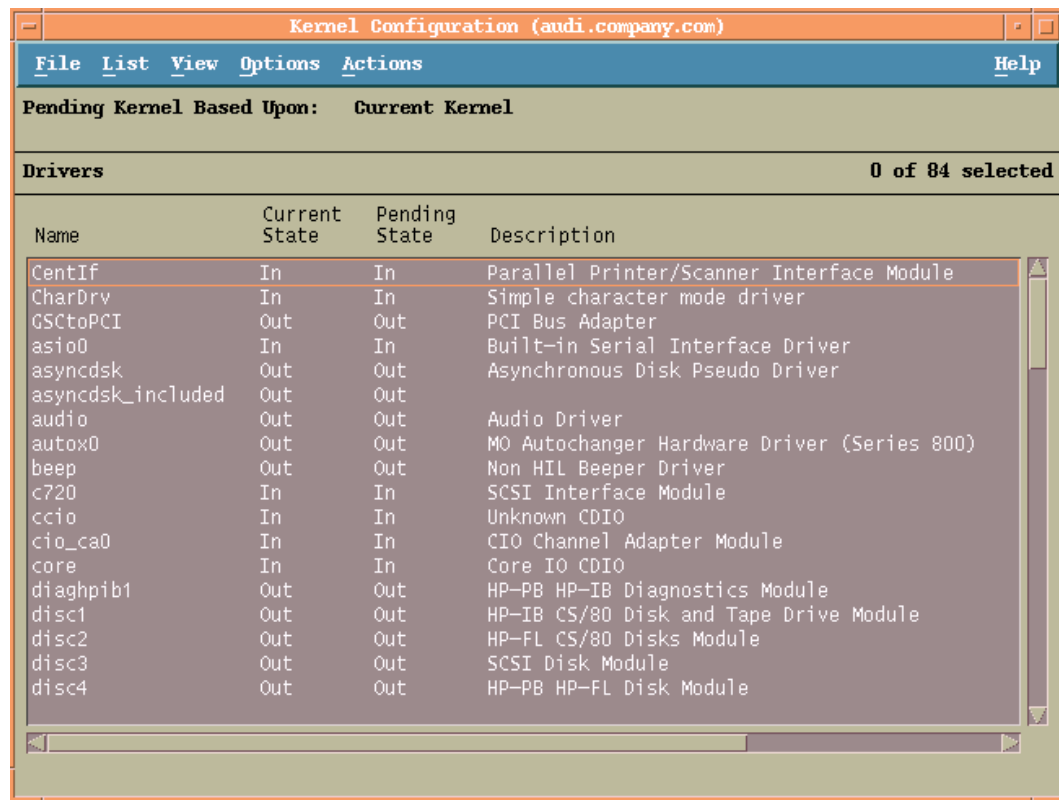
¹ The figures indicate requirements for the components only. The figure does not include space allocation for the operating system, paging file, or other applications.

² The figures indicate requirements for the components only. The figure does not include space allocation for the operating system, paging file, or other applications.

Follow this procedure to build the kernel configuration using the *HPE System Administration Manager (SAM)* utility:

1. Log in as a root user, open the terminal and type `sam`.
2. In the **System Administration Manager** window, double-click **Kernel Configuration**, and then **Drivers**.
3. In the **Kernel Configuration** window, verify the following:
 - The drivers for the devices you will be using must be listed among the installed drivers. See ["Kernel configuration Window "](#) below. If the driver you are looking for is not listed, you have to install it using the `/usr/sbin/swinstall` utility. For example:
 - A Tape Device Driver is required for tape devices and must be installed if you have connected a tape device to the system. For example, for generic SCSI tape drives, like DLT or LTO, the `stape` driver is used, and for DDS devices the `tape2` driver.
 - A SCSI Pass-Through driver named `sctl` or `spt`, or an autochanger robotics driver named `schgr` (depending on the hardware) is required to control robotics in Tape library devices. For details, see ["SCSI robotics configuration on HP-UX systems"](#) on page 376.

Kernel configuration Window



- The status of a driver that is displayed in the **Current State** column must be set to **In**. If the status value is set to **Out**, proceed as follows:
 - i. Select the driver in the list. Click **Actions** and select **Add Driver to Kernel**. In the **Pending State** column, the status will be set to **In**. Repeat this for each driver for which the **Current State** is **In**.

- ii. Click **Actions** and select **Create a New Kernel** to apply the changes, that is to build a **Pending Kernel** into the **Current Kernel**. The action requires a restart of the system.

Once you have all the required drivers built in the kernel, you can continue by connecting a backup device to your system.

Connecting a backup device to HP-UX systems

1. Determine the available SCSI addresses for the drives and control device (robotics). Use the `/usr/sbin/ioscan -f` system command.
For more information, see ["Finding the unused SCSI addresses on HP-UX systems" on page 382](#).
2. Set the SCSI address on the device. Depending on the device type, this can be usually done with switches on the device. For details, see the documentation that comes with the device.
For details about supported devices, see <https://softwaresupport.hpe.com/>.
3. Connect the device to the system, switch on the device, and then the computer, and wait until the boot process completes. The device files are usually created during the boot process.
4. Verify that the system correctly recognizes your new backup device. Use the `ioscan` utility:

```
/usr/sbin/ioscan -fn
```

so that you can see the device files listed for each connected backup device. If the device file has not been created automatically during the boot process you must create it manually. See ["Creating device files on HP-UX systems" on page 380](#).

Once the installation procedure has been completed and the backup devices have been properly connected to the system, see the *HPE Data Protector Help* index: "configuring, backup devices" for detailed information about configuring devices and media pools or other Data Protector configuration tasks.

Installing Solaris clients

Solaris clients can be installed remotely using the Installation Server for UNIX, or locally from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).

Before starting the installation procedure, decide which components you need to install on your client system. For the list of the Data Protector software components and their descriptions, see ["Data Protector components" on page 58](#).

Prerequisites

- When installing a Media Agent, make sure that the following entry is in the file `/etc/system`:

```
set semsys:seminfo semmni=100
```
- At this point, you should have the Cell Manager and Installation Server for UNIX already installed on your network.
For instructions, see ["Installing the Data Protector Cell Manager and Installation Servers" on page 28](#).

- To install a Solaris client, you will need either *root* access or an account with *root* capabilities.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.

Remote installation

You install the client software from the Installation Server for UNIX to clients using the Data Protector graphical user interface. For the step-by-step procedure for remotely installing the software, see ["Remote installation" on page 90](#).

Note: If you install the User Interface component, you should update your environment variables before using it. For more information, see ["Setting environment variables" on page 35](#).

As soon as the client components have been installed, the target system automatically becomes a member of the Data Protector cell.

To install Data Protector to linked directories, for instance:

```
/opt/omni/ -> /prefix/opt/omni/  
/etc/opt/omni/ -> /prefix/etc/opt/omni/  
/var/opt/omni/ -> /prefix/var/opt/omni/
```

you should create the links before the installation and ensure that the destination directories exist.

Note: When installing or upgrading remotely, the available disk space in folders `/tmp` and `/var/tmp` should be at least the size of the biggest package being installed.

Local installation

If you do not have an Installation Server for UNIX installed in your environment, you have to perform local installation from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux). For instructions, see ["Local installation on UNIX and Mac OS X systems" on page 98](#).

Cluster-aware clients

Additional prerequisites are required for installing cluster-aware clients. For more details, see ["Installing cluster-aware clients" on page 173](#).

Post-installation configuration

Configuration files

Once you have a Media Agent component installed on the client system, you have to check your configuration to determine the required changes, depending on the platform and the device type you will be using.

- If your Solaris system is a patched Solaris 9 or Solaris 10 system, the tape device driver may already support your device by default. To check this, use the `strings` command.

For example, to check whether your HPE DAT-72 device can be used without additional configuration steps, execute:

Solaris (SPARC) systems:

```
strings /kernel/drv/sparcv9/st | grep HP
```

Solaris (x86, x64) systems:

```
strings /kernel/drv/st | grep HP
```

Inspect the command output. If your device is present in it, no additional steps are necessary. In the opposite case, follow the instructions below.

- For an HPE DAT (4 mm) device, add the following lines to your `/kernel/drv/st.conf` file:

```
tape-config-list =  
"HP    HP35470A", "HP DDS 4mm DAT", "HP-data1",  
"HP    HP35480A", "HP DDS-DC 4mm DAT", "HP-data1",  
"HP    C1533A", "HP DDS2 4mm DAT", "HP-data2",  
"HP    C1537A", "HP DDS3 4mm DAT", "HP-data3",  
"HP    C1553A", "HP DDS2 4mm DATloader", "HP-data2",  
"HP    C1557A", "HP DDS3 4mm DATloader", "HP-data3";  
HP-data1 = 1,0x34,0,0x8019,3,0x00,0x13,0x03,2;  
HP-data2 = 1,0x34,0,0x8239,4,0x0,0x13,0x24,0x3,3;  
HP-data3 = 1,0x34,0,0x8239,4,0x0,0x13,0x24,0x3,3;
```

These HPE data entries differ from the default entries that are usually suggested by HPE Support. Specify these lines exactly, or Data Protector will not be able to use your drive.

- For DLT, DLT1, SuperDLT, LTO1, LTO2 and STK9840 devices, add the following lines to the `/kernel/drv/st.conf` file:

```
tape-config-list =  
"HP    Ultrium 1-SCSI", "HP Ultrium 1-SCSI", "LTO-data",  
"HP    Ultrium 2-SCSI", "HP_LTO", "HP-LTO2",  
"DEC DLT2000", "Digital DLT2000", "DLT2k-data",  
"Quantum DLT4000", "Quantum DLT4000", "DLT4k-data",  
"QUANTUM DLT7000", "Quantum DLT7000", "DLT7k-data",  
"QUANTUM DLT8000", "Quantum DLT8000", "DLT8k-data",  
"HP C9264CB-VS80", "HP DLT vs80 DLTloader", "HP_data1"  
"QUANTUM SuperDLT1", "QUANTUM SuperDLT", "SDLT-data",  
"TANDBERG SuperDLT1", "TANDBERG SuperDLT", "SDL-data",  
"STK    9840", "STK 9840", "CLASS_9840";  
  
DLT2k-data = 1,0x38,0,0x8639,4,0x17,0x18,0x80,0x81,3;  
DLT4k-data = 1,0x38,0,0x8639,4,0x17,0x18,0x80,0x81,3;  
DLT7k-data = 1,0x38,0,0x8639,4,0x82,0x83,0x84,0x85,3;  
DLT8k-data = 1,0x77,0,0x1D639,4,0x84,0x85,0x88,0x89,3;  
HP_data1 = 1,0x3a,0,0x8639,4,0x40,0x86,0x87,0x7f,0;  
LTO-data = 1,0x7a,0,0x1d679,4,0x00,0x00,0x00,0x40,3;  
HP-LTO2 = 1,0x7a,0,0xd639,4,0x00,0x00,0x00,0x42,3;
```

```
SDLT-data = 1,0x79,0,0x8639,4,0x90,0x91,0x90,0x91,3;  
CLASS_9840 = 1,0x78,0,0x1d679,1,0x00,0;
```

- For an HPE StorageWorks 12000e (48AL) autoloader (HPE C1553A), add the following entries in addition to HPE data entries in your `/kernel/drv/st.conf` file:

```
name="st" class="scsi"  
target=ID lun=0;  
name="st" class="scsi"  
target=ID lun=1;
```

Replace the *ID* symbol with the autoloader's SCSI address and set the autoloader option number to 5 (the switch is located on the device's rear panel) and the drive's DIP switch setting to 11111001 (the switches are accessible from the bottom side of the autoloader).

Note: The HPE StorageWorks 12000e library does not have a dedicated SCSI ID for the picker device but accepts both data drive access commands and picker commands through the same SCSI ID. However, the data drive access commands must be directed to SCSI lun=0 and the picker commands to SCSI lun=1.

For all other devices, check the `st.conf.template` (located in `/opt/omni/spt`) for required entries in the `st.conf` file. This is only a template file and is not meant as a replacement for the `st.conf` file.

- For each tape device you want to use, check if the following line is present in the file `/kernel/drv/st.conf` and add it if necessary. Replace the *ID* placeholder with the address of the device:

SCSI devices:

```
name="st" class="scsi" target=ID lun=0;
```

Fibre channel devices:

```
name="st" parent="fp" target=ID
```

Note that the value for the `parent` parameter may differ for your tape device. For more information, see your tape device documentation.

- To enable controlling the SCSI Exchanger devices on Solaris 9 and earlier Solaris versions, you have to install the SCSI Pass-Through driver first, and then install the SCSI device.

Install the SCSI Pass-Through driver using the following steps:

- a. Copy the `sst` module into the `/usr/kernel/drv/sparcv9` directory and the `sst.conf` configuration file into the `/usr/kernel/drv` directory:

32-bit Solaris systems:

```
$cp /opt/omni/spt/sst /usr/kernel/drv/sst  
$cp /opt/omni/spt/sst.conf /usr/kernel/drv/sst.conf
```

64-bit Solaris systems:

```
$cp /opt/omni/spt/sst.64bit /usr/kernel/drv/sparcv9 /sst  
$cp /opt/omni/spt/sst.conf /usr/kernel/drv/sst.conf
```

- b. Add the following line to the `/etc/devlink.tab` file:

When editing the `/etc/devlink.tab` file, do not use [space] characters. Use only [TAB]

characters.

```
"type=ddi_pseudo;name=sst;minor=character rsst\A1"
```

This will cause devlinks (1M) to create link(s) to devices with names of the /dev/rsstX form, where X is the SCSI target number.

- c. For each SCSI Exchanger device that you want to control, check if the following line is present in the file /kernel/drv/sst.conf and add it if necessary. Replace the *ID* placeholder with the address of the device:

SCSI devices:

```
name="sst" class="scsi" target=ID lun=0;
```

Fibre channel devices:

```
name="sst" parent="lpfc" class="scsi" target=ID lun=0;
```

Note that the value for the parent parameter may differ for your tape device. For more information, see your tape device documentation.

- d. Install the driver on the system by entering the following command:

```
add_drv sst
```

- e. At this stage, you are ready to install the SCSI device. Before the installation, you must assign the correct SCSI address to each drive and the robotics (picker) of the exchanger device. The chosen addresses must not be used by any other device of the system.

To check the SCSI configuration, shut down the system by running the following command (Solaris (SPARC)-specific step):

```
shutdown -i0
```

then run the probe-scsi-all command at the ok prompt to check the assigned addresses:

```
ok probe-scsi-all
```

When you have finished, restart the system with:

```
ok boot -r
```

To prepare your system for using a SCSI device, follow the steps as shown in the example below:

- i. Edit /kernel/drv/st.conf to set up the device parameters for using the assigned SCSI ports. For details, see the device documentation. Modify the tape-config-list parameter only if the tape device driver does not already support your device by default.
 - ii. Edit /kernel/drv/sgen.conf to set up the device's drive parameters in order to use the assigned SCSI ports (refer to the appropriate device's documentation).
 - iii. Edit /usr/kernel/drv/sgen.conf to set up the ADIC SCSI control device in order to use the assigned SCSI port 4. Add the following data for the ADIC SCSI Exchanger drive to the /usr/kernel/drv/sst.conf file:

```
name="sst" class="scsi" target=4 lun=0;
```
- To enable controlling the SCSI Exchanger devices on Solaris 10 (SPARC, x86, x64), configure the in-built sgen driver and then install the SCSI device. Follow the steps:
 - a. Open the file /kernel/drv/sgen.conf.

If the parameter device-type-config-list is present in the file, add a reference for the changer device to the already existing line, for example:

```
device-type-config-list="scanner", "changer";
```

If the parameter is not defined yet, add the following line to the file:

```
device-type-config-list="changer";
```

- b. For each SCSI Exchanger device that you want to control, check if the following line is present in the file `/kernel/drv/sgen.conf` and add it if necessary. Replace the `ID` placeholder with the address of the device:

```
name="sgen" class="scsi" target=ID lun=0;
```

- c. At this stage, you are ready to install the SCSI device. Before the installation, you must assign the correct SCSI address to each drive and the robotics (picker) of the exchanger device. The chosen addresses must not be used by any other device of the system.

To check the SCSI configuration, shut down the system by the following command (SPARC system-specific step):

```
shutdown -i0
```

then run the `probe-scsi-all` command at the `ok` prompt to check the assigned addresses:

```
ok probe-scsi-all
```

When you have finished, restart the system with:

```
ok boot -r
```

To prepare your system for using a SCSI device, follow the steps as shown in the example below:

- i. Edit `/kernel/drv/st.conf` to set up the device parameters for using the assigned SCSI ports. For details, see the device documentation. Modify the `tape-config-list` parameter only if the tape device driver does not already support your device by default.
- ii. Edit `/kernel/drv/sgen.conf` to set up the ADIC SCSI control device in order to use the assigned SCSI port 4. Add the following data for the ADIC SCSI Exchanger drive to the `/kernel/drv/sgen.conf` file:

```
name="sgen" class="scsi" target=4 lun=0;
```

When you have modified the `/kernel/drv/st.conf` file and the `/usr/kernel/drv/sst.conf` file (Solaris 9 and earlier Solaris versions) or the `/kernel/drv/sgen.conf` file (Solaris 10), you are ready to physically connect a backup device to your system.

Connecting a backup device to a Solaris system

To connect a backup device to a Solaris system

1. Create a reconfigure file:

```
touch /reconfigure
```
2. Shut down the system by entering the `$shutdown -i0` command, and then switch off your computer and physically connect the device to the SCSI bus. Check that no other device is using the same SCSI address you have selected for the device.

See <https://softwaresupport.hpe.com/manuals> for details about supported devices.

Note: Data Protector does not automatically recognize cleaning tapes on a Solaris system. If Data Protector detects and inserts a cleaning tape in the StorageWorks 12000e (48AL) device, the tape driver enters an undefined state and may require you to restart your system.

Load a cleaning tape manually, when Data Protector issues a request for it.

3. If your system is a Solaris (SPARC) system, switch the system back on and interrupt the startup process by pressing the Stop-A key.
4. Verify that the new device is recognized correctly by entering the `probe-scsi-all` command at the `ok` prompt:

```
ok > probe-scsi-all
```

Then, enter:

```
ok > go
```

to continue.
5. The device should work properly at this stage. The device files must be located in the `/dev/rmt` directory for the drives and in the `/dev` directory for the SCSI control device (picker).

Note: On Solaris 9 and earlier Solaris versions (especially in case of 64-bit Solaris), links to the SCSI control device (picker) are not always created automatically. On Solaris 10, such links are never created. Under such circumstances, create symbolic links to join suitable device files to `/dev/rsstNum` where *Num* is a number of your choice. For example:

When *sst* is used:

```
ln -s /devices/pci@1f,4000/scsi@3,1/sst@4,1:character /dev/rsst4
```

When *sngen* is used:

```
ln -s /devices/pci@1e,600000/QLGC,qla@3/sngen@8,2:changer /dev/rsst4
```

You can use the `Data Protector uma` utility to verify the device. To check the picker of the SCSI Exchanger device from the previous example (using the SCSI port 4), enter:

```
echo "inq" | /opt/omni/sbin/uma -ioctl /dev/rsst4
```

The picker must identify itself as a SCSI-2 device library. The library can be checked by forcing it to initialize itself. The command is:

```
echo "init" | /opt/omni/sbin/uma -ioctl /dev/rsst4
```

Make sure you use Berkeley-style device files, in this case, `/dev/rmt/0cbn` (not `/dev/rmt/0h`) for the tape drive and `/dev/rsst4` for the SCSI control device (picker).

Next steps

Once the installation procedure has been completed and the backup devices are properly connected to the Solaris client, for additional information about configuring backup devices, media pools, and other configuration tasks, see the *HPE Data Protector Help* index: "configuring, backup devices".

Installing Linux clients

Linux client systems can be installed remotely using the Installation Server for UNIX, or locally by using the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).

Before starting the installation procedure, decide which components you need to install on your client system. For the list of the Data Protector software components and their descriptions, see "[Data Protector components](#)" on page 58.

Prerequisites

- The 32-bit GNU C Library (glibc) package must be installed on 64-bit Linux systems (x86_64).
- At this point, you should have the Cell Manager and Installation Server for UNIX already installed on your network.

For instructions, see "[Installing the Data Protector Cell Manager and Installation Servers](#)" on page 28.

- The rpm utility must be installed and set up. Other packaging systems, for example, deb, are not supported.
- To install Data Protector components on a remote system, the following prerequisites must be met on the remote system:
 - The inetd or xinetd service must be running or set up so that Data Protector is able to start it.
 - Either the ssh or, if ssh is not installed, the rexec service must be enabled.
- Ensure that the kernel supports SCSI devices (modules SCSI support, SCSI tape support, SCSI generic support). The parameter Probe all LUNa on each SCSI device is optional.
For more details on SCSI support in the Linux kernel, see the documentation of your Linux distribution or the Linux kernel documentation.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.

Note: Data Protector uses the default port number 5555. Therefore, this particular port number should not be used by another program. Some Linux operating system distributions use this number for other purposes.

If the port number 5555 is already in use, you should make it available for Data Protector or you can change the default port number to an unused port number. See "[Changing the default Data Protector Inet port](#)" on page 359.

Automatic disaster recovery

The Automatic Disaster Recovery component must be installed on systems for which you want to enable recovery using Enhanced Automated Disaster Recovery (EADR) or One Button Disaster Recovery (OBDR), and on systems where the DR CD ISO image for EADR or OBDR will be prepared.

HPE Serviceguard cluster

With HPE Serviceguard clusters, the Data Protector agents (Disk agent, Media Agent) must be installed separately *on each cluster node* (local disk) and not on the shared disk.

After the installation, you need to import the *virtual host* (application package) to the cell as a client. Therefore the application package (for example Oracle) must run on the cluster with its *virtual IP*. Use the command `cmviewcl -v` to check this before importing the client.

You can use the passive node to install an Installation Server.

Novell Open Enterprise Server (OES)

On Novell OES systems, Data Protector automatically installs the OES aware Disk Agent. However, there are some Novell OES specific aspects:

- If you install Novell OES on 32-bit SUSE Linux Enterprise Server 9.0 (SLES), after installing a Data Protector Linux client on a system, you have to upgrade the Data Protector client as well.
Note that the new Novell OES aware Disk Agent will be remotely installed to the client system during the upgrade.
- If you remove the Novell OES component from SLES, you have to reinstall the Data Protector client.

Remote installation

You remotely install a Linux client system by distributing the Data Protector components from the Installation Server for UNIX to the Linux system, using the Data Protector graphical user interface. For the step-by-step procedure for distributing the software, see ["Remote installation" on page 90](#).

As soon as the client components have been installed, the target system automatically becomes a member of the Data Protector cell.

Troubleshooting remote installation

If you run into problems with remote installation on a Linux client system, ensure that the `root` account has rights to access the system either by using `exec` or `shell` services. To achieve this, do the following:

1. Edit the `/etc/xinetd.conf`. Find the definitions for `exec` and `shell` services and add the following line to the definition of these two services:

```
server_args = -h
```

For example:

```
service shell
{
  socket_type = stream
  protocol = tcp
  wait = no
  user = root
  server = /usr/sbin/in.rshd
  server_args = -L -h
}
service exec
{
  socket_type = stream
```

```
protocol = tcp
wait = no
user = root
server = /usr/sbin/in.rexecd
server_args = -h
}
```

Note: Some Linux distributions have these services configured in separate files in the `/etc/xinetd.d` directory. In this case, locate the appropriate file (`/etc/xinetd.d/rexec` and `/etc/xinetd.d/rsh`) and modify it as described above.

2. Terminate the `inetd` process with the HUP signal:

```
kill -HUP $(ps ax|grep inet|grep -v grep|cut -c1-6)
```

3. Create a `~root/.rhosts` file with the entry: `SystemNameOfMyInstallationServer root`
It will enable administrative access from the Installation Server.

After you have installed Data Protector, you can remove the entry from the `~root/.rhosts` file, and the `-h` flag from the `/etc/xinetd.conf` (`/etc/inetd.conf` for Red Hat Enterprise Linux) file. Then repeat the `kill` command from the "Terminate the `inetd` process with the HUP signal:" above.

For more information, see the `rexecd(8)`, `rexec(3)`, `rshd(8)`, `rsh(1)`, or `pam(8)` man pages. If this fails, see "Local installation on UNIX and Mac OS X systems" on page 98.

Local installation

If you do not have an Installation Server for UNIX installed in your environment, you have to perform local installation from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux). For instructions, see "Installing Installation Servers for UNIX systems" on page 43.

Connecting a backup device to the Linux system

Once you have a Media Agent component installed on the Linux client, follow the steps below to connect a backup device to the system:

1. Run the `cat /proc/scsi/scsi` command to determine the available SCSI addresses for the drives and control device (robotics).
2. Set the SCSI address on the device. Depending on the device type, this can be done by switching on the device. For details, see the documentation that comes with the device.

For details about supported devices, see <https://softwaresupport.hpe.com/>.

3. Connect the device to the system, switch on the device, then switch on the computer, and wait until the boot process completes. The device files are created during the boot process.

On Red Hat Enterprise Linux systems, an application, Kudzu, is launched during the boot process when a new device is connected to the system. Press any key to start the application, and then click the `Configure` button.

4. To verify if the system correctly recognizes your new backup device, run `cat /proc/scsi/scsi` and then `dmesg |grep scsi`. The device files are listed for each connected backup device.

Examples

For robotics, the output of the `dmesg |grep scsi` command is:

```
Detected scsi generic sg2 at scsi2, channel 0, id 4, lun 0, type 8  
and for drives:
```

```
Detected scsi tape st0 at scsi2, channel 0, id 5, lun 0
```

5. Device files are created in the `/dev` directory. To check if the links to the device files were created, execute:

```
ll /dev | grep device_file
```

For example:

```
ll /dev | grep sg2
```

The output of this command is:

```
lrwxrwxrwx 1 root root 3 Nov 27 2001 sg2 -> sgc
```

where `/dev/sg2` is a link to the device file `/dev/sgc`. This means that the device files to be used by Data Protector are `/dev/sgc` for robotics and `/dev/st0` for drive. Device files for robotics are `sga`, `sgb`, `sgc`,... `sgh`, and for the drives `st0`, `st1`,... `st7`.

Next steps

Once the installation procedure has been completed and the backup devices have been properly connected to the Linux client system, see the *HPE Data Protector Help* index: “configuring, backup devices” for information about configuring backup devices and media pools, or other configuration tasks.

Installing ESX Server clients

ESX Server is a modified Linux operating system. For details on how to install Data Protector components on ESX Server systems, see ["Installing Linux clients" on page 77](#).

Installing IBM AIX clients

IBM AIX clients can be installed remotely using the Installation Server for UNIX, or locally from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).

Before starting the installation process, decide which components you need to install on your client system. For the list of the Data Protector software components and their descriptions, see ["Data Protector components" on page 58](#).

Prerequisites

- For system requirements, disk space requirements, supported platforms, and Data Protector components, see the HPE Data Protector Product Announcements, Software Notes, and

References.

- At this point, you should have the Cell Manager and Installation Server for UNIX already installed on your network.

For instructions, see ["Installing the Data Protector Cell Manager and Installation Servers" on page 28](#).

- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.
- Before installing the Disk Agent component, check that the port mapper is up and running on the selected system. In the `/etc/rc.tcpip` file, there must be the line that starts the port mapper:

```
start /usr/sbin/portmap "$src_running"
```

The `src_running` flag is set to 1 if the `srcmstr` daemon is running. The `srcmstr` daemon is the System Resource Controller (SRC). The `srcmstr` daemon spawns and controls subsystems, handles short subsystem status requests, passes requests on to a subsystem, and handles error notifications.

IBM HACMP cluster

In IBM High Availability Cluster Multi-Processing environment for AIX, install the Data ProtectorDisk Agent component on all the cluster nodes. For information on how to install Data Protector in a cluster environment with a cluster-aware application database installed, see ["Installing the Data Protector Integration clients" on page 109](#).

After the installation, import the cluster nodes and the *virtual server* (virtual environment package IP address) to the Data Protector cell.

Remote installation

You install the AIX client software from the Installation Server for UNIX to clients using the Data Protector graphical user interface. For the step-by-step procedure for remotely installing the software, see ["Installing Data Protector clients" on page 55](#).

Local installation

If you do not have an Installation Server for UNIX installed in your environment, you have to perform local installation from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux). For instructions, see ["Installing Data Protector clients" on page 55](#).

As soon as the client components have been installed, the target system automatically becomes a member of the Data Protector cell.

Connecting a backup device to an AIX client

Once you have a Media Agent component installed on an AIX client, proceed as follows:

1. Shut down the computer and connect your backup device to the SCSI bus. Check that no other device is using the same SCSI address which has been selected for your backup device.
For details about supported devices, see <https://softwaresupport.hpe.com/>.
2. Switch on the computer and wait until the boot process completes. Start the AIX system `smit` management tool and verify that the system correctly recognizes your new backup device.
Use `smit` to change the device's default block size to 0 (variable block size).
3. Select the appropriate device files from the `/dev` directory and configure your Data Protector backup device.

Use only non-rewind-style device files. For example, select `/dev/rmt0.1` instead of `/dev/rmt0`.

Next steps

Once the installation procedure has been completed and your backup devices have been properly connected to the AIX system, see the *HPE Data Protector Help* index: "configuring, backup devices" for information on configuring backup devices, media pools, or other Data Protector configuration tasks.

Installing Mac OS X clients

Mac OS X clients can be installed remotely using the Installation Server for UNIX, or locally from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).

Only the Disk Agent (DA) is supported.

Prerequisites

- For system requirements, disk space requirements, supported OS versions, and Data Protector components, see "[RAM and disk space requirements](#)" on the next page, "[Installing Mac OS X clients](#)" above, and "[Installing Mac OS X clients](#)" above.
- The following are the prerequisites for Windows user interface and remote installations on the client:
 - On Microsoft Windows XP Professional systems, Service Pack 3 must be installed.
 - On Microsoft Windows Server 2003 systems, Service Pack 2 must be installed.
- At this point, you should have the Cell Manager and Installation Server for UNIX already installed on your network.
For instructions, see "[Installing the Data Protector Cell Manager and Installation Servers](#)" on page 28.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.

RAM and disk space requirements for the Data Protector client components on Windows systems

The following table presents the minimum RAM and disk space requirements for different Data Protector client components on Windows systems:

RAM and disk space requirements

Client system component	Total RAM (MB) ¹	Free disk space (MB) ²
User Interface	512 ³	150 ⁴
Disk Agent	64 each (recommended 128)	20 each
Media Agent		
Integration components		
English Documentation (Guides, Help)	N/A	100

The figures indicate requirements for the components only. For example, the "disk space" figure does not include space allocation for the operating system, paging file, or other applications.

Recommendation

- If you increase the default block size, HPE recommends to set the kernel parameter `kern.sysv.shmmax` (maximum size of a shared memory segment) to 32 MB.

Remote installation

You install the Mac OS X client software from the Installation Server for UNIX to clients using the Data Protector graphical user interface. For the step-by-step procedure for remotely installing the software, see ["Installing Data Protector clients" on page 55](#).

Note: When installing remotely, a UNIX based Installation Server (Linux or HP-UX) is required for accommodating the Mac OS X remote installation packages (Core and Disk Agent).

¹ The figures indicate requirements for the components only. The figure does not include space allocation for the operating system, paging file, or other applications.

² The figures indicate requirements for the components only. The figure does not include space allocation for the operating system, paging file, or other applications.

³ Memory requirements for the GUI system vary significantly with the number of elements that need to be displayed at a time. This consideration applies to the worst case (like expanding a single directory). You do not need to consider all directories and file names on a client, unless you want to expand all directories while viewing. It has been shown that 2 MB memory are required per 1000 elements (directories or file names) to display plus a base need for about 50 MB. So the 512 MB of RAM are enough to display about the maximum number of file names.

⁴ Regarding the disk space, keep in mind that the page file alone should be able to grow to about 3 times the physical memory.

Local installation

If you do not have an Installation Server for UNIX installed in your environment, you have to perform local installation from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux). For instructions, see ["Installing Data Protector clients" on page 55](#).

As soon as the client components have been installed, the target system automatically becomes a member of the Data Protector cell.

Installing HP OpenVMS clients

The installation procedure for OpenVMS clients has to be performed locally on a supported OpenVMS system. Remote installation is not supported.

You can install the Data Protector Disk Agent, General Media Agent, and the User Interface (command-line interface only) on systems running OpenVMS 7.3-2/IA64 8.2-1. You can also install the Oracle Integration component on systems running OpenVMS 7.3-2 or later. For information on Data Protector components, see ["Data Protector components" on page 58](#).

For information on supported devices, OpenVMS platform versions, as well as for limitations, known problems and workarounds, see the HPE Data Protector Product Announcements, Software Notes, and References.

For more OpenVMS specific information, see the *OpenVMS Release Notes* located in the default help document directory on OpenVMS, for example: `SYS$COMMON:[SYSHLP]DPA0800.RELEASE_NOTES`.

Prerequisites

Before you install a Data Protector client on the OpenVMS platform, check the following:

- Make sure the HPE TCP/IP transport protocol is installed and running.
- Set the TIMEZONE features of your system by executing the command `SYS$MANAGER:UTC$TIME_SETUP.COM`.
- Log in to the SYSTEM account of the OpenVMS system. Note that you must have appropriate permissions.
- Make sure that you have access to the Data Protector installation DVD-ROM or ISO image containing the HP OpenVMS client installation package.
- Reverse DNS lookup for host name resolution is required for all Data Protector components in the Data Protector cell.

Installation Procedure

The installation procedure can be performed from the Data Protector Windows installation DVD-ROM or ISO image.

To install a Data Protector client on an OpenVMS system

1. If you already have the PCSI installation file go to "[Installing Data Protector clients](#)" on page 55. To get the PCSI installation file, mount the installation DVD-ROM or ISO image on an OpenVMS Server and copy it to the desired location. You may also ftp the PCSI file from a Windows system.

2. Run the following command:

```
$ PRODUCT INSTALL DP /SOURCE=device:[directory]
```

where *device:[directory]* is the location of the .PCSI installation file.

3. Verify the version of the kit by responding YES to the prompt:

```
The following product has been selected: HPE AXPVMS DP A08.00-xx Layered  
Product Do you want to continue? [YES]
```

4. Choose the software components you wish to install. Take the defaults and the Disk Agent, General Media Agent, and User Interface will be installed. You may also select each component individually.

You will be asked to choose options, if any, for each selected product and for any product that may be installed to satisfy software dependency requirements.

Example

```
HP IA64VMS DP A08.00-xx: HP OpenVMS IA64 Data Protector V8.00  
COPYRIGHT HEWLETT-PACKARD COMPANY 2013  
Do you want the defaults for all options? [YES] NO  
Do you wish to install Disk Agent for this client node?  
[YES] YES  
Do you wish to install Media Agent for this client node?  
[YES] YES  
Do you wish to install Command Language Interface for this client node?  
[YES] YES  
Do you wish to install Oracle Integration Agent for this client node?  
[YES] YES  
Do you want to review the options?  
[NO] YES  
HP IA64VMS DP X08.00-xx: HP OpenVMS IA64 Data Protector V8.00 [Installed]  
Do you wish to install Disk Agent for this client node?  
YES  
Do you wish to install Media Agent for this client node?  
YES  
Do you wish to install Command Language Interface for this client node?  
YES  
Do you wish to install Oracle Integration Agent for this client node?  
[YES] YES  
Are you satisfied with these options?
```

[YES] YES

The default and only location for the Data Protector directories and files is:

```
SYS$SYSDEVICE : [VMS$COMMON.OMNI]
```

The directory structure will be created automatically and the files will be placed in this directory tree.

The Data Protector startup and shutdown command procedures will be placed in

```
SYS$SYSDEVICE : [VMS$COMMON.SYS$STARTUP]
```

There are four files that are always present for an OpenVMS client and a fifth file that only exists if you chose the CLI option. The five files concerned are:

- `SYS$STARTUP:OMNI$STARTUP.COM` This is the command procedure that starts Data Protector on this node.
- `SYS$STARTUP:OMNI$SYSTARTUP.COM` This is the command procedure that defines the `OMNI$ROOT` logical name. Any other logical names required by this client may be added to this command procedure.
- `SYS$STARTUP:OMNI$SHUTDOWN.COM` This is the command procedure that shuts down Data Protector on this node.
- `OMNI$ROOT:[BIN]OMNI$STARTUP_INET.COM` This is the command procedure that is used to start the TCP/IP `INET` process, which then executes the commands sent by the Cell Manager.
- `OMNI$ROOT:[BIN]OMNI$CLI_SETUP.COM` This is the command procedure that defines the symbols needed to invoke the Data Protector CLI. It will only exist on the system if you chose the CLI option during installation.

Execute this command procedure from the `login.com` procedures for all users who will use the CLI interface. Several logical names are defined in this procedure which are necessary to execute the CLI commands correctly.

5. Insert the following line in `SYS$MANAGER:SYSTARTUP_VMS.COM`:

```
@sys$startup:omni$startup.com
```

6. Insert the following line in `SYS$MANAGER:SYSHUTDWN.COM`:

```
@sys$startup:omni$shutdown.com
```

7. Ensure that you can connect from the OpenVMS client to all possible TCP/IP aliases for the Cell Manager.
8. Import the OpenVMS client to the Data Protector cell using the Data Protector graphical user interface as described in ["Importing clients to a cell " on page 187](#).

An account with the name `OMNIADMIN` gets created during the installation. The `OMNI` service runs under this account.

The login directory for this account is `OMNI$ROOT:[LOG]` and it holds the log file `OMNI$STARTUP_INET.LOG` for each startup of a Data Protector component. This log file contains the name of the process executing the request, the name of Data Protector image used and the options for the request.

Any unexpected errors are logged in the `DEBUG.LOG` in this directory.

Note: On OpenVMS 8.3 and later, the Data Protector installation displays the following message:

```
%PCSI-I-CANNOTVAL, cannot validate [PATH]HP-AXPVMS-DP-A0800  
-XXX-1.PCSI;1 -PCSI-I-NOTSIGNED, product kit  
is not signed and therefore has no manifest file
```

To avoid the warning being issued, run the product install command using `/OPTION=NOVALIDATE_KIT`.

Installation in a cluster environment

If you use a common system disk, the client software needs to be installed only once. However, the `OMNI$STARTUP.COM` procedure needs to be executed for each node to be usable as a Data Protector client. If you do not use a common system disk the client software needs to be installed on each client.

If you use a cluster TCP/IP alias name, you can define a client for the alias name as well if you are using a cluster common system disk. With the alias client defined you do not have to configure the individual client nodes. You can choose either client definition or alias definition to run your backups and restores in a cluster. Depending on your configuration, the save or restore may or may not use a direct path to your tape device or tape library.

Disk Agent configuration

The Data Protector Disk Agent on OpenVMS supports mounted `FILES-11 ODS-2` and `ODS-5` disk volumes. There is no need to configure the OpenVMS Disk Agent. There are, however, some points to bear in mind when setting up a backup specification that will use it. These are described below:

- The file specifications entered into the GUI or passed to the CLI must be in UNIX style syntax, for instance:
`/disk/directory1/directory2/.../filename.ext.n`
 - The string must begin with a slash, followed by the disk, directories and filename, separated by slashes.
 - Do not place a colon after the disk name.
 - A period should be used before the version number instead of a semi-colon.
 - File specifications for OpenVMS files are case-insensitive, except for the files residing on `ODS-5` disks.

Example

An OpenVMS file specification of:

```
$1$DGA100: [USERS.DOE]LOGIN.COM;1
```

must be specified to Data Protector in the form:

```
/$1$DGA100/USERS/DOE/LOGIN.COM.1
```

Note: There is no implicit version number. You must always specify a version number and only the

file version specified for the backup will be backed up.

For some options which allow wildcards the version number can be replaced with an asterisk '*'.

To include all versions of the file in a backup, you should select them all in the GUI or, in the CLI, include the file specifications under the `-only` option, using wildcards for the version number, as follows:

```
/DKA1/dir1/filename.txt.*
```

Media Agent configuration

You should configure devices on your OpenVMS system using OpenVMS and hardware documentation as a guide. The pseudo devices for the tape library must be created first using `SYSMAN`, as follows:

```
$ RUN SYS$SYSTEM:SYSMAN
```

```
SYSMAN&gt; IO CONNECT gcan/NOADAPTER/DRIVER=SYS$GcDRIVER
```

where:

- `c` = K for direct connected SCSI tape libraries.
- `a` = A,B,C, ...the adapter character for the SCSI controller.
- `n` = the unit number of the tape library's robotic control device.

Note: This command sequence must be executed after a system boot.

For SAN attached tape libraries the tape drives and robot device name should show up automatically under OpenVMS once the SAN devices have been configured according to SAN guidelines.

If you are installing tape jukeboxes for use with Data Protector, you should verify that the hardware is working correctly before configuring it within Data Protector. You may use the Media Robot Utility (MRU), available from Hewlett-Packard, to verify the hardware.

Note: You can generally use the Data Protector GUI to manually configure or auto-configure these devices.

However, certain older tape libraries and all tape libraries connected to HSx controllers cannot be auto-configured. Use manual configuration methods to add these devices to Data Protector.

Media Agent in a cluster

When dealing with devices attached to cluster systems:

1. Configure each tape device and tape library so that it can be accessed from each node.
2. Add the node name to the end of the device name to differentiate between the devices.
3. For tape devices, set a common `Device Lock Name` under `Devices/Properties/Settings/Advanced/Other`.

Example

In a cluster with nodes A and B, a TZ89 is connected to node A and MSCP served to node B. Configure a device named `TZ89_A`, with node A as the client and configure a device named `TZ89_B`, with node B as the client. Both devices get a common device lock name of `TZ89`. Now Data Protector can use the

devices via either path, knowing that this is actually only one device. If you run a backup on node B using TZ89_A, Data Protector moves the data from node B to the device on node A. If you run a backup on node B using TZ89_B the OpenVMS MSCP server moves the data from node B to the device on node A.

Note: For MSCP served tape devices in a cluster, for all tape devices connected via an HSx controller and for all tape devices connected via Fibre Channel, follow the guidelines for SAN configurations in the *HPE Data Protector Help* index: "SAN environment, configuring devices in".

Command-line interface

Before you can use the Data Protector command-line interface on OpenVMS you must run the CLI command setup procedure, as follows:

```
$ @OMNI$ROOT:[BIN]OMNI$CLI_SETUP.COM
```

For a description of the available CLI commands, see the *HPE Data Protector Command Line Interface Reference*.

Oracle integration

After you installed the Oracle integration and configured it as described in the *HPE Data Protector Integration Guide*, verify that the `-key Oracle8` entry is present in `OMNI$ROOT:[CONFIG.CLIENT]omni_info`, for example:

```
-key oracle8 -desc "Oracle Integration" -nlsset 159 -nlsId 12172 -flags 0x7 -ntpath  
"" -uxpath "" -version 9.00
```

If the entry is not present, copy it from `OMNI$ROOT:[CONFIG.CLIENT]omni_format`. Otherwise, the Oracle integration will not be shown as installed on the OpenVMS client.

Next steps

For information on additional configuration tasks, see the *HPE Data Protector Help* index: "HP OpenVMS".

Remote installation

This section describes the procedure for distributing the Data Protector software to clients using the Installation Server (remote installation or upgrade).

Distribute the software to clients using the Data Protector user interface. Cross-platform client installation is supported.

Prerequisites

- For prerequisites and recommendations on the installation, see the section that describes the installation procedure for that particular client. The references are listed in "[Installing Data Protector client systems](#)" on page 55 and in "[Installing integrations](#)" on page 56.

- For the information on supported platforms, Data Protector components, and for disk space requirements, see <https://softwaresupport.hpe.com/> and "Remote installation" on the previous page.
- At this point, you should have the Cell Manager and the Installation Server(s) installed on your network.
- For a clean remote installation, the Installation Server for Windows must reside in a shared directory so that it is visible throughout the network.
- **Windows 2012:** To remotely install to a Windows 2012 system, complete one of the following steps:

Configure the domain user who is also the administrator of the remote host (`omniinetpasswd - inst_srv_user`) on the **Installation Server host**. Remote installation is started under this account and the connection to the remote host is established without any additional user intervention.

OR

Block the following services within firewall on the **remote host**.

- Remote Service Management (RPC)
- Remote Service Management (RPC-EPMAP)

OR

Switch off the RPC/TCP (client side) on the **Installation Server host**.

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control
```

```
DWORD SCMApiConnectionParam = 0x80000000
```

Combine the SCMApiConnectionParam registry value with the mask value 0x80000000.

Note: A system restart is not required.

Configuring the firewall for successful remote installation

During the installation of a new Data Protector client or upgrade of an older Data Protector client using the Installation Server, the installation agent is started on the remote computer. The Installation Server then connects to this agent through the Data Protector cell port (by default 5555). However, if Microsoft Firewall or any third party firewall software is running on the client, the connection cannot be established, and the installation fails. To resolve this, perform one of the following steps:

- Configure Windows Firewall to allow connection through a specific port.
- For Microsoft Firewall: If the omnirc option OB2FWPASSTHRU is set on the Installation Server, the installation agent automatically registers itself with Windows Firewall, and the installation continues normally.

Recommendations

- **UNIX systems:** For security reasons, it is recommended to use secure shell for the Data Protector remote installation. If secure shell is not available, the legacy UNIX tools `rsh` and `rexec` are automatically used by the Data Protector remote installation.

To use secure shell, install and set up OpenSSH on both, the client and Installation Server. If your private key is encrypted, install and set up keychain on the Installation Server. See "[Installing Data Protector clients](#)" on page 55.

Note: You cannot distribute software to clients in another Data Protector cell. However, if you have an independent Installation Server, you can import it into more than one cell. You can then distribute software within different cells by using the GUI connected to each Cell Manager in turn.

- **Administrator Accounts:** To use local users who are members of the Administrators group on the remote host, where the remote host has UAC enabled, complete either of the following steps on the **remote host**:

Disable User Account Control (UAC)

Note: A system restart is required.

OR

Set the registry value:

```
HKLM\Software\Microsoft\Windows\CurrentVersion\Policies\System  
DWORD LocalAccountTokenFilterPolicy = 1
```

Note: A system restart is not required.

Remote installation using secure shell

Secure shell installation helps you protect your client and Installation Server by installing Data Protector components in a secure way. High level of protection is achieved by:

- Authenticating the Installation Server user to the client in a secure way through the public-private key pair mechanism.
- Sending encrypted installation packages over the network.

Note: Secure shell installation is supported on UNIX systems only.

Setting up OpenSSH

Install and set up OpenSSH on both, the client and Installation Server:

1. Ensure that OpenSSH is installed on your system. For details, see the documentation of your operating system or distribution.

If the OpenSSH package is not a part of your OS distribution, download OpenSSH from <http://www.openssh.org> and install it on both the Data Protector client and Installation Server.

Alternately, on HP-UX, you can use the HP-UX Secure Shell.

Note: The default location for the secure shell installation is `/opt/ssh`.

2. On the Installation Server, run `ssh-keygen` to generate a public-private key pair. Keep the private key on the Installation Server while transferring the public key to the client. Note that if you use an encrypted private key (that is, protected by a passphrase), you need to set up keychain on the

Installation Server (for details, see "[Installing Data Protector clients](#)" on page 55).

For information on ssh-keygen, see <http://www.openbsd.org/cgi-bin/man.cgi?query=ssh-keygen&sektion=1>.

3. Store the public key in the `$HOME/.ssh` directory on the client under the name `authorized_keys`.

Note: `$HOME/.ssh` is usually the home directory of the root user.

To set an SSH protocol version (SSH1 or SSH2), modify the `protocol` parameter in the following files:

- a. **On the Installation Server:**

```
ssh_install_directory /ssh/etc/ssh_config
```

This file will be used by the `ssh` command.

- b. **On the client:**

```
ssh_install_directory /ssh/etc/sshd_config
```

This command will be used by the `ssh` daemon (`sshd`).

Note that these two files must be in sync.

Note: The default SSH protocol version is SSH2.

4. On the client, start the `ssh` daemon:

```
ssh_install_directory /ssh/sbin/sshd
```

5. Add the client to a list of known hosts (located in `$HOME/.ssh/known_hosts` on the Installation Server) by running:

```
ssh root@client_host
```

where `client_host` must be the fully qualified DNS name, for example:

```
ssh root@client1.company.com
```

6. On the Installation Server, set the `omnirc` option `OB2_SSH_ENABLED` to 1. For more information on `omnirc` options, see the *HPE Data Protector Troubleshooting Guide*.

Setting up a keychain

Keychain is a tool eliminating the need to manually supply a passphrase when decrypting the private key. It is needed only if the private key is encrypted.

To set up keychain:

1. Download keychain from <http://www.gentoo.org/proj/en/keychain/index.xml> to the Installation Server.
2. Add the following two lines to `$HOME/.profile`:

HP-UX and Solaris systems:

```
keychain_install_directory /keychain-keychain_version/keychain
```

```
$HOME/.ssh/private_key
```

```
. $HOME/.keychain/'hostname' -sh
```

Linux systems:

```
/usr/bin/keychain $HOME/.ssh/private_key
```

```
. $HOME/.keychain/'hostname' -sh
```

3. On the Installation Server, set the `OB2_ENCRYPT_PVT_KEY` omnirc option to 1. For more information on omnirc options, see the *HPE Data Protector Troubleshooting Guide*.

If secure shell installation cannot be performed because the execution of its command fails, a warning will be issued. However, the installation will continue using the standard Data Protector remote installation method.

Next steps

After you set up OpenSSH and keychain, add clients to the cell using the GUI as described on "[Installing Data Protector clients](#)" on page 55 or using the CLI by running the `ob2install` command. For information on CLI commands and their parameters, see the *HPE Data Protector Command Line Interface Reference*.

Note: If secure shell installation cannot be performed because the execution of its command fails, a warning message is issued. However, the installation continues using the standard Data Protector remote installation method.

Adding clients to the cell

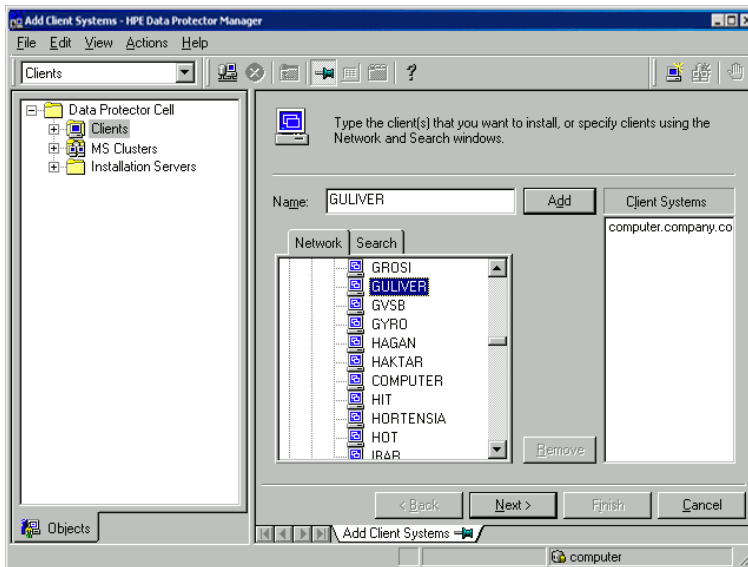
To distribute the Data Protector software to the clients that are not in the Data Protector cell yet

1. Start the Data Protector GUI by clicking **Start > Programs > HPE Data Protector > Data Protector Manager**.

Note: For details on the Data Protector graphical user interface, see "[The Data Protector graphical user interface](#)" on page 27 and the *HPE Data Protector Help*.

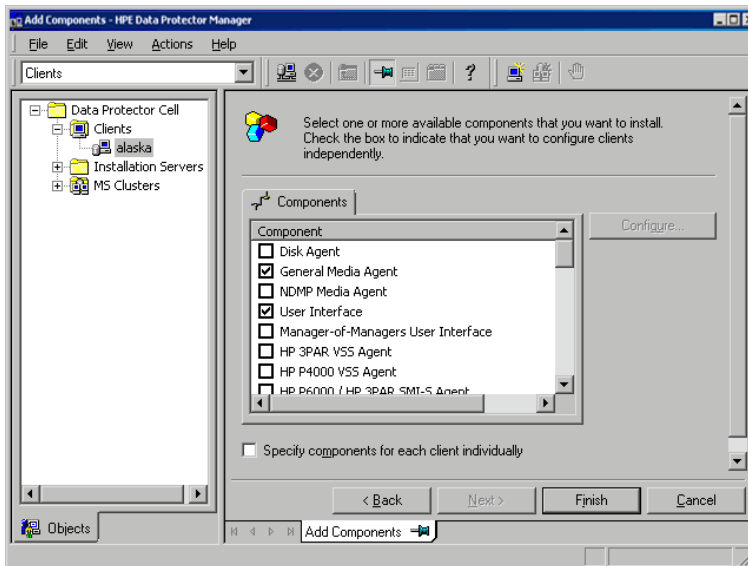
2. In the Data Protector Manager, switch to the **Clients** context.
3. In the Scoping Pane, right-click **Clients** and click **Add Clients**.
4. If you have more than one Installation Server configured, select the platform of the clients you want to install (UNIX or Windows) and the Installation Server to be used for installing the clients. Click **Next**.
5. Type the names of the clients or search for the clients (on Windows GUI only) you want to install as shown in "[Installing Data Protector clients](#)" on page 55. Click **Next**.

Selecting clients



6. Select the Data Protector components you want to install as shown in ["Installing Data Protector clients"](#) on page 55. Note that you can select only one type of Media Agent. See ["Data Protector components"](#) on page 58.

Selecting components



7. To change the default user account and target directory (on Windows only) for the installation, click **Options**.
8. If you selected more than one client and you would like to install different components on each client, click **Specify components for each client individually** and then click **Next**. Select the components you want to install for each client independently.
9. Click **Next**.

Encrypted control communication page

10. In the Configure encrypted control communication page, you can enable or disable encrypted control communication for the client.
 - **Encrypted control communication** - This option is selected by default if encrypted control communication is enabled on the Cell Manager. Otherwise, it is cleared and encrypted control communication is disabled. Select this option to enable or disable encrypted control communication for the selected client. Data Protector will generate or regenerate the required certificates automatically.
 - **Use Existing certificates** - If this option is selected, Data Protector skips the certificates generation process and uses the certificates that already exist in the certificates directory on the Cell Manager.

Use this option if you want to create the certificates manually. Alternatively, use it if you want to keep the certificates that were generated previously by Data Protector.

However, if you generate the certificates manually, you have to place the certificates in the following certificates directory on the Cell Manager :

Windows: Data_Protector_program_data\Omniback\Config\Server\certificates ;
UNIX: /etc/opt/omni/server/certificates directory.

In addition, the certificates have to comply with the following naming convention:

 - <computer.company.com>_cert.pem for the certificate
 - <computer.company.com >_key.pem for the private key
 - <CellManager.company.com>_cacert.pem for the trusted certificate

For more information on creating the certificates manually, see [Encrypted control communication with user-created certificates](#).

If the **Use Existing certificates** option is selected, but the certificates are missing in the certificates folder or if they are not named properly, then Data Protector generates them anyway.
11. Click **Finish** to start the installation.
12. During the installation and when asked, provide the data required (username, password, and on Windows also domain) to access the specific client system and click **OK**.

As soon as a system has the Data Protector software installed and is added to the Data Protector cell, it becomes a Data Protector client.

Note: Before you start using the Data Protector GUI on the client system, add a user from that system to an appropriate Data Protector user group. For the procedure and the descriptions of available user rights, see the *HPE Data Protector Help*.

Troubleshooting

When the remote installation is finished, you can restart any failed installation procedures using the GUI by clicking **Actions** and **Restart Failed Clients**. If the installation fails again, see "[Troubleshooting Installation and Upgrade](#)" on page 326.

Adding components to clients

You can install additional Data Protector software components on your existing clients and the Cell Manager. Components can be added remotely or locally. For local installation, see ["Changing Data Protector software components" on page 254](#).

Prerequisite

The corresponding Installation Server must be available.

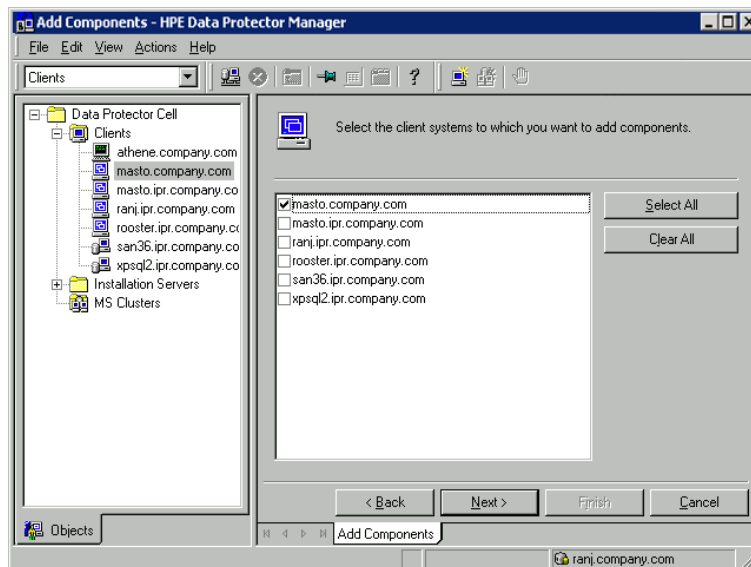
HPE Serviceguard clients

In the HPE Serviceguard cluster environment, make sure that the node to which you add the components is active.

To distribute the Data Protector software to clients in the Data Protector cell

1. In the Data Protector Manager, switch to the **Clients** context.
2. In the Scoping Pane, expand Clients, right-click a client, and then click **Add Components**.
3. If you have more than one Installation Server configured, select the platform of the clients on which you want to install the components (UNIX or Windows) and the Installation Server to be used for installing the components. Click **Next**.
4. Select the clients on which you want to install the components as shown in ["Selecting clients" below](#). Click **Next**.

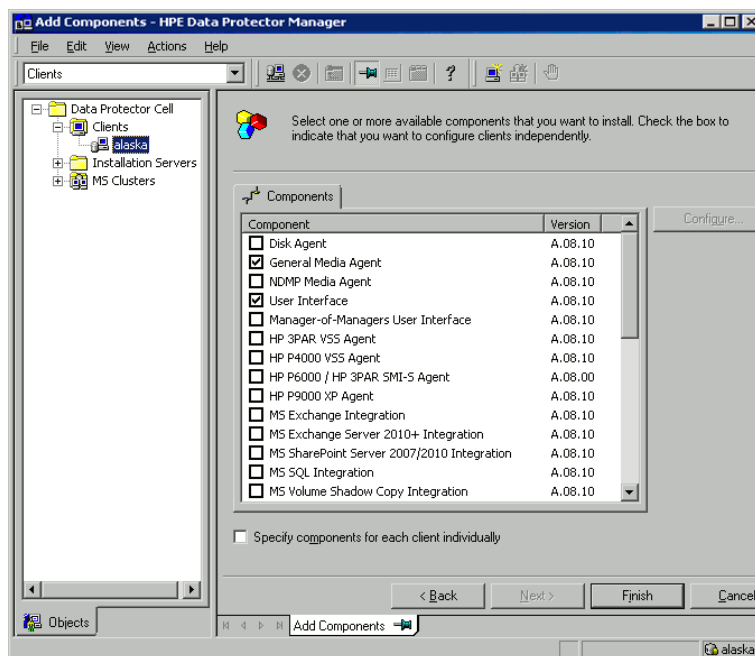
Selecting clients



5. Select the Data Protector components you want to install as shown in ["Installing Data Protector clients" on page 55](#). Note that you can select only one type of Media Agent. See ["Data Protector](#)

[components" on page 58.](#)

Selecting components



If you selected more than one client and you want to install different components on each client, click **Specify components for each client individually** and then click **Next**. Select the components for each client independently.

Click **Finish** to start the installation.

Local installation on UNIX and Mac OS X systems

If you do not have an Installation Server for UNIX installed on your network, or if for some reason you cannot remotely install a client system, Data Protector clients can be installed locally from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).

Before starting the installation procedure, decide which components you need to install on your client system. For the list of the Data Protector software components and their descriptions, see "[Data Protector components" on page 58.](#)

Note: Windows XP Home Edition and HP OpenVMS clients can be installed locally. Remote installation is not supported.

Prerequisites

- For system requirements, disk space requirements, supported platforms, processors, and Data Protector components, see the HPE Data Protector Product Announcements, Software Notes, and References.

- You must have root permissions on every target system.
- A POSIX shell (sh) must be used for the installation.

Note: You can also use the following procedure to upgrade the UNIX clients locally. The script will detect a previous installation and will prompt you to perform the upgrade.

Installation Procedure

To install UNIX and Mac OS X clients locally

1. Insert and mount the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).
Note that the DVD-ROM filesystem uses the Rock Ridge extensions.
2. From the *MountPoint*/LOCAL_INSTALL directory execute the `omnisetup.sh` command.

The syntax of the command is as follows:

```
omnisetup.sh [-source directory] [-server name] [-install component_list]
```

where:

- *directory* is the location where the installation DVD-ROM or ISO image is mounted. If not specified, the current directory is used.
- *name* is a full hostname of the Cell Manager of the cell to which you want to import the client. If not specified, the client will not be automatically imported to the cell.

Note: In case of upgrading the client that resides on the Cell Manager or Installation Server, you do not need to specify `-install component_list`. In this case, the setup will select the same components that were installed on the system before the upgrade without issuing a prompt.

- *component_list* is a comma-separated list of component codes to be installed. No spaces are allowed. If the `-install` parameter is not specified, Setup will prompt you separately about installing each available component on the system.

Note: In case of upgrading the client, the setup will select the same components that were installed on the system before the upgrade started, without issuing a prompt.

The list of the components is presented in the table below. The exact list of the components is subject to the availability on the particular system. For the description of the components, see ["Data Protector components" on page 58](#).

Data Protector component codes

Component code	Component
cc	User Interface
da	Disk Agent

Component code	Component
ma	General Media Agent
ndmp	NDMP Media Agent
informix	Informix Integration
lotus	Lotus Integration
oracle8	Oracle Integration
mysql	MySQL Integration
postgresql	PostgreSQL Integration
vmware	VMware Integration (Legacy)
vepa	Virtual Environment Integration
sybase	Sybase Integration
sap	SAP R/3 Integration
sapdb	SAP MaxDB Integration
saphana	SA HANA Integration
db2	DB2 Integration
emc	EMC Symmetrix Agent
smisa	HPE P6000 / HPE 3PAR SMI-S Agent
ssea	HPEP9000 XP Agent
emcvnx	EMC VNX Storage Provider
emcvmax	EMC VMAX Storage Provider
netapp	NetApp Storage Provider
StoreOnceSoftware	StoreOnce Software Deduplication
autodr	Automatic Disaster Recovery

Component code	Component
docs	English Documentation (Guides, Help)

Example

The example below shows how you can install the Disk Agent, General Media Agent, User Interface, and Informix Integration components on a client that will be automatically imported to the cell with the Cell Manager `computer.company.com`:

```
./omnisetup.sh -server computer.company.com -install da,ma,cc,informix
```

3. Setup informs you if the installation was completed and if the client was imported to the Data Protector cell.

The CORE component is installed the first time any software component is selected for installation.

The CORE-INTEG component is installed the first time any integration software component is selected for installation or reinstallation.

Running the installation from the hard disk

To copy the installation DVD-ROM image to your computer and run the installation or upgrade of UNIX and Mac OS X clients from the hard disk, copy at least the `hpux/DP_DEPOT` and the `LOCAL_INSTALL` directories.

Note: The Linux depot does not support local installation. You must copy the HP-UX depot, even on Linux systems.

For example, if you copy installation packages to `/var/dp80`, the directories must be a subdirectory of `/var/dp62`:

```
# pwd
/var/dp80
# ls
DP_DEPOT
LOCAL_INSTALL
```

After you have copied this to the hard disk, change to the `LOCAL_INSTALL` directory and execute the following command:

```
omnisetup.sh [-server name] [-install component_list]
```

For example:

```
./omnisetup.sh -install da
```

Note, that if you copied the `DP_DEPOT` directory to a different directory (for example due to disk space constraints), the `-source` option is also required.

Next steps

If you did not specify the name of the Cell Manager during the installation, the client will not be imported to the cell. In this case, you should import it using the Data Protector graphical user interface. For the procedure, see "[Importing clients to a cell](#)" on page 187. For information on additional configuration tasks, see the *HPE Data Protector Help*.

Installing a Media Agent to use the ADIC/GRAU Library or the StorageTek Library

Data Protector provides a dedicated ADIC/GRAU and StorageTek ACS library policies used to configure an ADIC/GRAU library or StorageTek ACS library as a Data Protector backup device. You need to install a Data Protector Media Agent (the General Media Agent or the NDMP Media Agent) on every system that will be physically connected to a drive in an ADIC/GRAU or StorageTek library. Also, for multihost configurations, you must install a Data Protector Media Agent on the systems that control the ADIC/GRAU or StorageTek library robotics. Note that multihost configuration is a configuration where the library and drive are not connected to the same computer.

For the ADIC/GRAU library, each system on which you install a Media Agent software and it accesses the library robotics through the GRAU/ADIC DAS Server is called a **DAS Client**. For the STK ACS integration, each system on which you install a Media Agent software and it accesses the library robotics through the STK ACS Server is called an **ACS Client**.

Note: You need special licenses that depend on the number of drives and slots used in the StorageTek library. For more information, see "[Data Protector Licensing](#)" on page 306.

Connecting library drives

Physically connect the library drives to the systems where you intend to install a Media Agent software.

For details about supported ADIC/GRAU or STK libraries, see <https://softwaresupport.hpe.com/>.

For information about how to physically attach a backup device to the system, see "[Installing Data Protector clients](#)" on page 55 and the documentation that comes with the ADIC/GRAU or StorageTek library.

For information on how to physically attach a backup device to a supported Windows system, see "[Installing Data Protector clients](#)" on page 55 and the documentation that comes with the ADIC/GRAU or StorageTek library.

Preparing Data Protector clients to use the ADIC/GRAU Library

The following steps pertain to configuring an ADIC/GRAU library, and should be completed before you install a Media Agent software:

1. If the DAS server is based on OS/2, before you configure a Data Protector ADIC/GRAU backup device, create/update the C:\DAS\ETC\CONFIG file on the DAS server computer. In this file, a list of all DAS clients must be defined. For Data Protector, this means that each Data Protector client that can control the library robotics must be defined in the file.

Each DAS client is identified with a unique client name (no spaces), for example DP_C1. For example, the contents of the C:\DAS\ETC\CONFIG file should look like this:

```
client client_name = DP_C1,  
#      hostname = AMU,"client1"  
      ip_address = 19.18.17.15,  
      requests = complete,  
      options = (avc,dismount),  
      volumes = ((ALL)),  
      drives = ((ALL)),  
      inserts = ((ALL)),  
      ejects = ((ALL)),  
      scratchpools = ((ALL))
```

2. On each Data Protector client with a Data Protector Media Agent installed that needs to access ADIC/GRAU DAS library robotics, edit the omnirc file and set the following options:

DAS_CLIENT	A unique GRAU client name defined on the DAS server. For example, if the name of the client is "DP_C1", the appropriate line in the omnirc file is DAS_CLIENT=DP_C1.
DAS_SERVER	The name of the DAS server.

3. You must find out how your ADIC/GRAU library slot allocation policy has been configured, either statically or dynamically. For information on how to check what type of allocation policy is used, see the *AMU Reference Manual*.

The static policy has a designated slot for each volser, while the dynamic allocation policy assigns the slots randomly. Depending on the policy that has been set, you need to configure Data Protector accordingly.

If the static allocation policy has been configured, you need to add the following omnirc option to your system controlling the robotics of the library:

```
OB2_ACIEJECTTOTAL = 0
```

Note: This applies to HP-UX and Windows.

For further questions on the configuration of your ADIC/GRAU library, contact your local ADIC/GRAU support or review your ADIC/GRAU documentation.

Installing a Media Agent to use the ADIC/GRAU Library

Prerequisites

The following prerequisites for installation must be met before installing a Media Agent on a system:

- The ADIC/GRAU library must be configured and running. See the documentation that comes with the ADIC/GRAU library.
- Data Protector must be installed and configured. For instructions, see "[Installing the Data Protector Cell Manager and Installation Servers](#)" on page 28.
- DAS server must be up and running.

To control the ADIC/GRAU library, the DAS software is required. Every DAS client must have DAS client software installed. Each media- and device-related action initiated by Data Protector first goes from the DAS client to the DAS server. Then, it is passed to the internal part (AMU - AML Management Unit) of the ADIC/GRAU library which controls the robotics and moves or loads media. After a completed action, the DAS server replies to the DAS client. See the documentation that comes with the ADIC/GRAU library.

- The following information must be obtained before you install a Media Agent:

- The hostname of the DAS Server (an application that runs on an OS/2 host).

- The list of available drives with the corresponding DAS name of the drive. The obtained drive names are to be used when configuring the ADIC/GRAU drives in Data Protector.

If you have defined the DAS clients for your ADIC/GRAU system, you can get this list with one of the following `dasadmin` commands:

```
dasadmin listd2 client
```

```
dasadmin listd client
```

where `client` is the DAS client for which the reserved drives are to be displayed.

The `dasadmin` command can be called from the `C:\DAS\BIN` directory on the OS/2 host, or, if installed on other systems, from the directory where the DAS client software has been installed. On a UNIX client system, this directory is usually the `/usr/local/aci/bin` system directory.

- The list of available Insert/Eject Areas, with corresponding format specifications.

You can get the list of available Insert/Eject Areas in the Graphical Configuration of AMS (AML Management Software) on an OS/2 host:

- i. Start this configuration from the menu `Admin > Configuration`.
- ii. Open the **EIF-Configuration** window by double-clicking the **I/O unit** icon, and then click the **Logical Ranges** field. In the text box, the available Insert/Eject Areas are listed.

Note: One Data Protector library device can handle only one media type. It is important to remember which media type belongs to each one of the specified Insert and Eject Areas, because you will need this data later for configuring Insert/Eject Areas for the Data Protector library.

- A list of UNIX device files for the drives, if you want to install a Media Agent on a UNIX system. Run the `ioscan -fn system` command on your system to display the required information. For more information on UNIX device files, see ["Installing Data Protector clients" on page 55](#).
- A list of SCSI addresses for the drives, if you want to install a Media Agent on a Windows system. For example, `scsi4:0:1:0`. For more information on SCSI addresses, see ["Installing Data Protector clients" on page 55](#).

Installation procedure

The installation procedure consists of the following steps:

1. Distribute a Media Agent component to clients, using the Data Protector graphical user interface and Installation Server. See ["Installing Data Protector clients" on page 55](#).
2. Install the ADIC/GRAU library:
 - On a Windows system, do the following:
 - i. Copy the `aci.dll`, `winrpc32.dll` and `ezipc32.dll` libraries to the `Data_Protector_home\bin` directory. (These three libraries are part of the DAS client software shipped with the ADIC/GRAU library. They can be found either on the installation media or in the `C:\DAS\AMU\` directory on the AMU-PC.)
 - ii. Copy these three files to the `%SystemRoot%\system32` directory as well.
 - iii. Copy `Portinst` and `Portmapper` service to the DAS client. (These requirements are part of the DAS client software shipped with the ADIC/GRAU library. They can be found on the installation media.)
 - iv. In the Control Panel, go to **Administrative Tools**, **Services** and start `portinst` to install `portmapper`. The DAS client needs to be restarted to run the `portmapper` service.
 - v. After restarting the system, check if `portmapper` and both `rpc` services are running (in the Control Panel, go to **Administrative Tools, Services** and check the status of the services).
 - On an HP-UX system, copy the `libaci.sl` shared library into the `/opt/omni/lib` directory. You must have permissions to access this directory. Make sure that the shared library has read and execute permissions for everyone (root, group and others). The `libaci.sl` shared library is part of the DAS client software shipped with the ADIC/GRAU library. It can be found on the installation media.
 - On an AIX system, copy the `libaci.o` shared library into the `/usr/omni/lib` directory. You must have permissions to access this directory. Make sure that the shared library has read and execute permissions for everyone (root, group and others). The `libaci.o` shared library is part of the DAS client software shipped with the ADIC/GRAU library. It can be found on the installation media.

At this stage, you should have your hardware connected and your DAS software properly installed.

From the default Data Protector administrative commands location, execute the `devbra -dev` command to check whether the library drives are properly connected to your system.

See the library drives with corresponding device files displayed in the list.

Next steps

Once a Media Agent is installed and the ADIC/GRAU library is physically connected to the system, see the *HPE Data Protector Help* index: “configuring, backup devices” for information about additional configuration tasks, such as configuring backup devices and media pools.

Preparing Data Protector clients to use the StorageTek Library

Prerequisites

The following prerequisites for installation must be met before installing a Media Agent:

- The StorageTek library must be configured and running. See the documentation that comes with the StorageTek library.
- Data Protector must be installed and configured. See ["Installing the Data Protector Cell Manager and Installation Servers" on page 28](#).
- The following information must be obtained before you start installing a Media Agent software:
 - The *hostname* of the host where ACSLS is running.

- A list of ACS drive IDs that you want to use with Data Protector. The obtained drive IDs are to be used when configuring the StorageTek drives in Data Protector. To display the list, log in on the host where ACSLS is running and execute the following command:

```
rlogin "ACSLS hostname" -l acssa
```

You will have to enter the terminal type and wait for the command prompt. At the ACSSA prompt, enter the following command:

```
ACSSA> query drive all
```

The format specification of an ACS drive must be the following:

```
ACS DRIVE: ID:##,##,##,## - (ACS num, LSM num, PANEL, DRIVE)
```

- A list of available ACS CAP IDs and the ACS CAP format specification. To display the list, login on the host where ACSLS is running and execute the following command:

```
rlogin "ACSLS hostname" -l acssa
```

Enter the terminal type and wait for the command prompt. At the ACSSA prompt, enter the following command:

```
ACSSA> query cap all
```

The format specification of an ACS CAP must be the following:

```
ACS CAP: ID:##,##,## - (ACS num, LSM num, CAP num)
```

- A list of UNIX device files for the drives, if you want to install a Media Agent on a UNIX system.

Run the `ioscan -fn` system command on your system to display the required information.

For more information on UNIX device files, see ["Installing Data Protector clients" on page 55](#).

- A list of SCSI addresses for the drives, if you want to install a Media Agent on a Windows system. For example, `scsi4:0:1:0`.

For more information on SCSI addresses, see ["Installing Data Protector clients" on page 55](#).

- Make sure that the drives that will be used for Data Protector are in the `online` state. If a drive is not in the `online` state, change the state with the following command on the ACSLS host: `vary drive drive_id online`
- Make sure that the CAPs that will be used for Data Protector are in the state `online` and in `manual` operating mode.

If a CAP is not in the `online` state, change the state using the following command:

```
vary cap cap_id online
```

If a CAP is not in `manual` operating mode, change the mode using the following command:

```
set cap manual cap_id
```

Installing a Media Agent to use the StorageTek Library

To install a Media Agent to use the StorageTek Library

1. Distribute a Media Agent component to clients using the Data Protector graphical user interface and Installation Server for UNIX systems. See ["Installing Data Protector clients" on page 55](#).
2. Start the ACS `ssi` daemon for every ACS client:

Windows systems:

Install the `LibAttach` service. For details, see the ACS documentation. Make sure that during the configuration of `LibAttach` service the appropriate ACSLS hostname is entered. After successful configuration, the `LibAttach` services are started automatically and will be started automatically after every system restart as well.

HP-UX, Solaris, and Linux systems:

Run the following command:

```
/opt/omni/acs/ssi.sh start ACS_LS_Hostname
```

AIX systems:

Run the following command:

```
/usr/omni/acs/ssi.sh start ACS_LS_Hostname
```

Note: After you have installed the `LibAttach` service, check if the `libattach\bin` directory has been added to the system path automatically. If not, add it manually.

For more information on the `LibAttach` service, see the documentation that comes with the StorageTek library.

3. From the default Data Protector administrative commands location, execute the `devbra -dev` command to check whether or not the library drives are properly connected to your system. See the library drives with corresponding device files/SCSI addresses displayed in the list.

Next steps

Once a Media Agent is installed and the StorageTek library is physically connected to the system, see the *HPE Data Protector Help* index: “configuring, backup devices” for information about additional configuration tasks, such as configuring backup devices and media pools.

Chapter 4: Installing the Data Protector Integration clients

Data Protector integrations are software components that allow you to run an online backup of the database applications, such as Oracle Server or Microsoft Exchange Server, with Data Protector. Data Protector ZDB integrations are software components that allow you to run zero downtime backup and instant recovery using disk arrays, such as HPE P6000 EVA Disk Array Family.

The systems running database applications are called **integration clients**; the systems using ZDB disk arrays for backing up and storing data are called **ZDB integration clients**. Such clients are installed with the same installation procedure as any other clients on Windows or UNIX systems, provided that the appropriate software component has been selected (for example, MS Exchange Integration component for backing up the Microsoft Exchange Server database, HPE P6000 / HPE 3PAR SMI-S Agent component for ZDB and IR with HPE P6000 EVA Disk Array Family or HPE StoreServ Storage, and so on).

Prerequisites

- For system requirements, disk space requirements, supported platforms, processors, and Data Protector components, see the HPE Data Protector Product Announcements, Software Notes, and References.
- You need a license to use the Data Protector integration with a database application (except for the VSS integration). For information about licensing, see ["Data Protector product structure and licenses" on page 323](#).
- At this point, you should have the Cell Manager and Installation Server (optionally, for remote installation) already installed on your network.

For instructions, see ["Installing the Data Protector Cell Manager and Installation Servers" on page 28](#).

Before starting the installation procedure, decide which other Data Protector software components you want to install on your client together with an integration component. For the list of the Data Protector software components and their descriptions, see ["Data Protector components" on page 58](#).

Note that in the cases stated below you need to install the following Data Protector components:

- The `Disk Agent` component to be able to back up filesystem data with Data Protector. You can use the `Disk Agent` for the following purposes:
 - To run a filesystem backup of important data that *cannot* be backed up using a database application backup.
 - To run a filesystem test backup of a database application server (for example, Oracle Server or Microsoft SQL Server). You need to test a filesystem backup *before* configuring the Data Protector integration with a database application and resolve communication and other problems related to the application and Data Protector.
 - To run zero downtime backup of filesystems or disk images.
 - To restore from backup media to the application system on LAN in case of SAP R/3 ZDB integrations.
- The `User Interface` component to gain access to the Data Protector GUI and the Data Protector CLI on

the Data Protector integration client.

- The General Media Agent component if you have backup devices connected to the Data Protector integration client. On Data Protector clients used to access an NDMP dedicated drive through the NDMP Server, the NDMP Media Agent is required.

Integration clients can be installed remotely using the Installation Server for Windows or for UNIX, or locally from the Windows or from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux).

For additional information on specific integration clients, see the corresponding sections below:

- ["Microsoft Exchange Server clients" on page 112](#)
- ["Microsoft SQL Server clients" on page 118](#)
- ["Microsoft SharePoint Server clients" on page 118](#)
- ["Microsoft Volume Shadow Copy Service clients" on page 122](#)
- ["Sybase Server clients" on page 123](#)
- ["Informix Server clients" on page 123](#)
- ["SAP R/3 clients" on page 124](#)
- ["SAP MaxDB clients" on page 124](#)
- ["SAP HANA Appliance clients" on page 124](#)
- ["Oracle Server clients" on page 125](#)
- ["MySQL clients" on page 125](#)
- ["PostgreSQL clients" on page 125](#)
- ["IBM DB2 UDB clients" on page 126](#)
- ["Lotus Notes/Domino Server clients" on page 126](#)
- ["VMware clients" on page 126](#)
- ["Microsoft Hyper-V clients" on page 136](#)
- ["NDMP Server clients" on page 137](#)
- ["HPE P4000 SAN Solutions clients" on page 138](#)
- ["HPE P6000 EVA Disk Array Family clients" on page 138](#)
- ["HPE P9000 XP Disk Array Family clients" on page 143](#)
- ["HPE 3PAR StoreServ Storage clients" on page 149](#)
- ["EMC Symmetrix clients" on page 149](#)
- ["Non-HPE Storage Arrays" on page 154](#)

After you have installed the integration clients, HPE recommends that you enable invocations of the Data Protector commands from any directory by adding the command locations to the appropriate environment variable on each client. Procedures in the Data Protector documentation assume the variable value has been extended. Command locations are listed in the *omniintro* reference page in the *HPE Data Protector Command Line Interface Reference* and the *omniintro* man page.

After the installation, also see the *HPE Data Protector Integration Guide*, the *HPE Data Protector Zero Downtime Backup Administrator's Guide*, or the *HPE Data Protector Zero Downtime Backup Integration Guide* to configure Data Protector integration clients.

Remote installation

You install the client software from the Installation Server to clients using the Data Protector graphical user interface. For the step-by-step procedure for remotely installing the software, see ["Remote installation" on page 90](#).

After the remote installation, the client system automatically becomes a member of the Data Protector cell.

Local installation

If you do not have an Installation Server for the respective operating system installed in your environment, you have to perform local installation from the Windows, or from the UNIX installation DVD-ROM or ISO image (for HP-UX or Linux), depending on the platform you install a client to.

If you do not choose a Cell Manager during the installation, the client system has to be manually imported into the cell after the local installation. See ["Importing clients to a cell " on page 187](#).

Installing cluster-aware integrations

The Data Protector cluster-aware integration clients must be installed locally, from the DVD-ROM or ISO image, on each cluster node. During the local client setup, install, in addition to the other client software components, the appropriate integration software components (such as Oracle Integration or HPE P6000 / HPE 3PAR SMI-S Agent).

You can also install a cluster-aware database application and a ZDB Agent on the Data Protector Cell Manager. Select the appropriate integration software component during the Cell Manager setup.

The installation procedure depends on a cluster environment where you install your integration client. See the clustering related sections corresponding to your operating system:

- ["Installing Data Protector on an HPE Serviceguard" on page 160](#)
- ["Installing Data Protector on a Symantec Veritas Cluster Server" on page 170](#)
- ["Installing Data Protector on a Microsoft Cluster Server" on page 173](#)
- ["Installing Data Protector on a Microsoft Hyper-V cluster" on page 184](#)
- ["Installing Data Protector on an IBM HACMP Cluster" on page 184](#)

For more information on clustering, *HPE Data Protector Concepts Guide*.

Next steps

When the installation has been completed, see the *HPE Data Protector Integration Guide* for information on configuring the integration.

Microsoft Exchange Server clients

Data Protector components that need to be installed on Microsoft Exchange Server systems vary depending on the backup and restore solution you want to use. You can choose among the following solutions:

- ["Data Protector Microsoft Exchange Server 2007 integration" below](#)
- ["Data Protector Microsoft Exchange Server 2010 integration" on page 114](#)
- ["Data Protector Microsoft Exchange Server Single Mailbox integration" on page 115](#)
- ["Data Protector Microsoft Volume Shadow Copy Service integration" on page 115](#)
- ["Data Protector Granular Recovery Extension for Microsoft Exchange Server" on page 115](#)

Data Protector Microsoft Exchange Server 2007 integration

To be able to back up the Microsoft Exchange Server databases, install the MS Exchange Integration component to the Microsoft Exchange Server system.

The Microsoft Exchange Single Mailbox integration agent will be installed as part of the Data Protector Microsoft Exchange Server integration component.

Prerequisites

- It is assumed that your Microsoft Exchange Server is up and running.
- You need to be familiar with basic architecture of Microsoft Exchange Server. For information on Microsoft Exchange Server, see the *Microsoft Exchange Server online help*.
- You must have an appropriate Data Protector on-line extension license-to-use (LTU) to be able to use the Data Protector Microsoft Exchange Server integration.
- If you plan to use the Microsoft Exchange Server integration on a disk array, install the Exchange Server services - Information Store, Key Management Service (optional), and Site Replication Service (optional) - on the disk array source volumes on the application system.

Steps

1. On the Exchange Server system, add the *Exchange_Server_home\bin* directory to the system path.
 - a. On your Windows desktop, right-click **My Computer** and click **Properties**.
 - b. In the System Properties window, click **Advanced** and then click **Environment Variables**.
 - c. In the System variables group box, in the list of variables, locate the **Path** entry and click **Edit**.
 - d. In the Edit System Variable window, in the Variable value text box, add the *Exchange_Server_home\bin* directory. Click **OK**.

If the Exchange Server is cluster-aware, add this directory to the system path on all cluster nodes.

2. Install the Microsoft Exchange Server integration software on your Exchange Server system (Data Protector client) either locally, from the DVD-ROM, or remotely, using the Data Protector GUI.

If the Exchange Server is cluster-aware, install the software components locally, from the DVD-ROM, on all cluster nodes.

If Data Protector is already installed on the Exchange Server system or you are performing a remote installation to the Exchange Server system with no Data Protector installed yet, use the Data Protector GUI to install the required software components.

If Data Protector is not installed on the Exchange Server system yet and you are performing a local installation, start the Data Protector Setup Wizard. The Setup Wizard will guide you through the installation process, which is different for installation of a Data Protector Cell Manager and for installation of a Data Protector client.

You need to install the following Data Protector software components:

- MS Exchange Integration
- General Media Agent (if you have devices connected to the Exchange Server client system)

It is recommended that you also install:

- User Interface
- Disk Agent (if you want to perform a filesystem backup of the Exchange Server client system for testing purposes)

3. If the Exchange Server is cluster-aware, assign the Cluster service account to the Data Protector Inet service on all cluster nodes.
 - a. On your Windows desktop, right-click **My Computer** and click **Manage**.
 - b. In the Computer Management window, expand **Services and Applications** and click **Services**.
 - c. In the list of services, locate the **Data Protector Inet** entry, right-click it, and click **Properties**. A Data Protector Inet Properties window appears.
 - d. In the Log On property page, click **This account**.
 - e. In the This account text box, enter the Cluster service account name. Optionally, you can browse to find a particular name by clicking **Browse**.
 - f. In the Password and Confirm password text boxes, enter the Cluster service account password.
 - g. Click **OK**.
 - h. In the File menu, click **Exit**.

Verification of the Data Protector Microsoft Exchange Server integration installation

- Check if the environment variable `Path` also includes the `Exchange_Server_home\bin` directory. If it does not, add the full path of this directory to the `Path` variable.
- Check if the Cell Manager name is correctly set on the Data Protector client system. Proceed as

follows:

- a. Search for the following Registry key:
HKEY_LOCAL_MACHINE\SOFTWARE\Hewlett-Packard\OpenView\OmniBackII\Site
- b. Verify that name and data of the Registry key are `CellServer` and `Cell_Manager_host_name`, respectively. If they are not, reinstall Data Protector on this client.

Verification of Microsoft Exchange Server

- Check if the following Microsoft Exchange Server services are running:
 - Microsoft Exchange System Attendant (MSEExchangeSA)
 - Microsoft Exchange Information Store (MSEExchangeIS)

If not, restart Exchange Server.

- Perform backup and restore of Exchange Server Information Store using Backup Utility for Windows (Microsoft Windows Backup) instead of Data Protector. If a failure occurs, try to identify the problem by verifying the Exchange Server installation and configuration.

Data Protector Microsoft Exchange Server 2010 integration

It is assumed that your Microsoft Exchange Server environment is up and running.

To be able to back up the Microsoft Exchange Server 2010 or the Microsoft Exchange Server 2013 databases, install the following Data Protector components to all the Microsoft Exchange Server systems:

- MS Exchange Server 2010+ Integration
- MS Volume Shadow Copy Integration
- The appropriate Data Protector disk array agent (if Microsoft Exchange Server data resides on a disk array)

Note: For VSS transportable backup sessions, the MS Volume Shadow Copy Integration component and the appropriate Data Protector disk array agent must also be installed on the backup systems.

In DAG environments, the DAG virtual system (host) must also be imported to the Data Protector cell. On how to import a client to a Data Protector Cell, see the *HPE Data Protector Help* index: "importing, client systems".

- Because the Data Protector Microsoft Exchange Server 2010 integration is based on VSS technology, Data Protector automatically installs the MS Volume Shadow Copy Integration component when you install the MS Exchange Server 2010+ Integration component. If the MS Volume Shadow Copy Integration component is already installed, it is upgraded.
- If you remove the MS Exchange Server 2010+ Integration component from a system, the MS Volume Shadow Copy Integration component is not removed automatically. Also note

that you cannot remove the MS Volume Shadow Copy Integration component from a system where the MS Exchange Server 2010+ Integration component is installed.

Data Protector Microsoft Exchange Server Single Mailbox integration

It is assumed that your Microsoft Exchange Server is up and running.

To be able to back up the Microsoft Exchange Server Mailbox and Public Folder items, install the MS Exchange Integration component on the Microsoft Exchange Server system. In a DAG environment, install the component on all Microsoft Exchange Server systems that are part of a DAG.

On Microsoft Exchange Server 2007 systems, you need to install an additional package to enable the functionality of the Data Protector Microsoft Exchange Single Mailbox integration. The package is named Microsoft Exchange Server MAPI Client and Collaboration Data Objects (ExchangeMapiCdo.EXE), and can be downloaded free of charge from the Microsoft web site <http://www.microsoft.com/downloads/Search.aspx?DisplayLang=en>.

Data Protector Microsoft Volume Shadow Copy Service integration

See "[Microsoft Volume Shadow Copy Service clients](#)" on page 122.

Data Protector Granular Recovery Extension for Microsoft Exchange Server

Use the Data Protector extension to be able to recover individual Microsoft Exchange Server mailbox items. Depending on the configuration of your Microsoft Exchange Server environment, install the corresponding Data Protector component on:

- single Microsoft Exchange Server system: this system
- multiple Microsoft Exchange Server systems: each Exchange Server system on which the Mailbox Server role is configured
- Microsoft Exchange Server Database Availability Group (DAG) environment: any of the Exchange Server systems in DAG

Prerequisites

- Install the following to the chosen Microsoft Exchange Server system:
 - The Data ProtectorMS Exchange Server 2010+ Integration component
 - The Data ProtectorUser Interface component

- All required non-Data Protector components
- Keep the TCP/IP port 60000 (default) free on the chosen Microsoft Exchange Server system.

Microsoft Exchange Server software

Install the following:

- Microsoft Exchange Server

Make sure that you have correctly installed and configured the Microsoft Exchange Server environment.

For supported versions, platforms, devices, and other information, see the latest support matrices at <https://softwaresupport.hpe.com/manuals>.

For information on installing, configuring, and using Microsoft Exchange Server, see the Microsoft Exchange Server documentation.

- Microsoft Management Console (MMC) 3.0 or later
- .NET Framework 3.5.1
- Internet Information Services (IIS) 6.0 or later

Data Protector software

Install the following Data Protector components:

- The Data ProtectorUser Interface component
- The Data ProtectorMS Exchange Server 2010+ Integration component on all Microsoft Exchange Server systems

Make sure that you installed and configured your Data Protector backup solution as described in the *HPE Data Protector Installation Guide* and in the *HPE Data Protector Integration Guide*.

Other non-Data Protector software and services

- Install Windows PowerShell 1.0 or later (a Windows Management Framework Core package)
- Localization for PowerShell other than English is not supported (The Windows OS must use the English Localization).
- Keep the TCP/IP port 60000 (default) free for the Granular Recovery Web service.
- Configure a firewall to allow new ports.

Supported Environments

The extension can be integrated with Microsoft Exchange Server in different Microsoft Exchange Server environments:

- a standalone Microsoft Exchange Server system (a standalone environment)
- multiple Microsoft Exchange Mailbox Server systems (multiple Server systems)
- Microsoft Exchange Server Database Availability Group environments (DAG environments)

Depending on your Microsoft Exchange Server environment, install the extension as follows:

Standalone environment

All Microsoft Exchange Server services and data are installed on a single Microsoft Exchange Mailbox Server, which is adequate in small scale environments. Install the MS Exchange Granular Recovery Extension component to the Exchange Mailbox Server system.

Multiple Exchange Server systems environment

Your environment contains more than one Microsoft Exchange Server database. Install the MS Exchange Granular Recovery Extension component to the Exchange Mailbox Server system of which single items you want to recover.

DAG environment

Your environment can contain up to 16 Microsoft Exchange Mailbox Server systems. Install the MS Exchange Granular Recovery Extension component to any Microsoft Exchange Server mailbox role system node. Once the component is installed, the Granular Recovery Extension Graphical User Interface (GUI) displays all mailbox database objects of all the Mailbox Server nodes in the DAG environment. The extension considers the dynamic behavior of the DAG environment automatically.

CCR environment

Install the MS Exchange 2010 Granular Recovery Extension component on a mailbox server node.

LCR environment

Install the MS Exchange 2010 Granular Recovery Extension component on the server where the active and passive mailbox databases are located.

For detailed information on Microsoft Exchange Server concepts, see the Microsoft Exchange Server documentation.

Installing the extension

The HPEData Protector Granular Recovery Extension for Microsoft Exchange Server is provided as a Data Protector component. The MS Exchange Granular Recovery Extension component contains the Granular Recovery Extension graphical user interface, the command line options, the Web Service components, and the context-sensitive (F1) Help. All the content is installed together.

Note: The extension must be installed on the Microsoft Exchange Server mailbox role systems in the Microsoft Exchange Organization only. These systems contain Microsoft Exchange Server mailbox database and recovery technology such as Recovery Databases (RDB) required for restoring complete Microsoft Exchange Server databases and recovering mailbox items.

Procedure

Install the extension using the Data Protector Graphical User Interface (GUI):

Make sure you have the Windows local user account SYSTEM or a Windows domain user account administrative privileges granted on the Microsoft Exchange Server mailbox role system. You need to be allowed to create registry entries and to install files or folders to the Program Files directory.

1. Perform a remote installation of a client by:
 - adding a client
 - importing a client

2. Add the MS Exchange Granular Recovery Extension component to the Data Protector client system.

For detailed information on the Data Protector installation, see "Installing client systems", "Importing client systems", and "adding Data Protector components" in the HPE Data Protector Installation Guide.

Removing the extension

Perform one of the following:

- Using the Data Protector GUI, remotely remove the client which has the extension component installed.
- Manually remove the MS Exchange Granular Recovery Extension component.

Microsoft SQL Server clients

It is assumed that your Microsoft SQL Server is up and running.

To be able to back up the Microsoft SQL Server database, you need to select the MS SQL Integration component during the installation procedure.

Microsoft SharePoint Server clients

Data Protector components that need to be installed in a Microsoft SharePoint Server environment vary depending on the backup and restore solution you want to use. You can choose among the following solutions:

- ["Data Protector Microsoft SharePoint Server 2007/2010/2013 integration" below](#)
- ["Data Protector Microsoft SharePoint Server VSS based solution" on the next page](#)
- ["Data Protector Microsoft Volume Shadow Copy Service integration" on the next page](#)
- ["Data Protector Granular Recovery Extension for Microsoft SharePoint Server" on page 120](#)

Data Protector Microsoft SharePoint Server 2007/2010/2013 integration

It is assumed that your Microsoft SharePoint Server and related Microsoft SQL Server instances are up and running.

To be able to back up Microsoft SharePoint Server objects, install the following Data Protector components:

- MS SharePoint 2007/2010/2013 Integration – on Microsoft SharePoint Server systems (Microsoft SQL Server systems are excluded)
- MS SQL Integration – on Microsoft SQL Server systems

Note: If a system has both the Microsoft SQL Server and Microsoft SharePoint Server installed, install both Data Protector components on it.

Data Protector Microsoft SharePoint Server VSS based solution

It is assumed that your Microsoft SharePoint Server and related Microsoft SQL Server instances are up and running.

To be able to back up Microsoft SharePoint Server objects, install the following Data Protector components:

- MS Volume Shadow Copy Integration on the Microsoft SQL Server systems and the Microsoft SharePoint Server systems that have at least one of the following services enabled:

Microsoft Office SharePoint Server 2007:

- Windows SharePoint Services Database
- Windows SharePoint Services Help Search
- Office SharePoint Server Search

Microsoft SharePoint Server 2010:

- SharePoint Foundation Database
- SharePoint Foundation Help Search
- SharePoint Server Search

Microsoft SharePoint Server 2013:

- SharePoint Foundation Database
- SharePoint Server Search
- The Data ProtectorUser Interface component on one of the Microsoft SharePoint Server systems with the Data ProtectorMS Volume Shadow Copy Integration component installed and on which you plan to configure and start a backup.

Data Protector Microsoft Volume Shadow Copy Service integration

See "[Microsoft Volume Shadow Copy Service clients](#)" on page 122.

Data Protector Granular Recovery Extension for Microsoft SharePoint Server

It is assumed that your Microsoft SharePoint Server and related Microsoft SQL Server instances are up and running.

To be able to recover individual Microsoft SharePoint Server objects, install the MS SharePoint Granular Recovery Extension on the Microsoft SharePoint Server Central Administration system.

- When installing the component locally, the Data Protector installation wizard will display the MS SharePoint GRE options dialog box. Specify the Farm Administrator user name and password.
 - To install this component remotely, select the MS SharePoint Granular Recovery Extension, click **Configure** and specify the Farm Administrator user name and password in the MS SharePoint GRE options dialog box.
- You can install the Granular Recovery Extension only to systems with Microsoft SharePoint Server installed.
 - Ensure that the Data Protector components that are needed to back up Microsoft SharePoint Server data are also installed in the Microsoft SharePoint Server environment.

Prerequisites

- **Microsoft packages:**

Install the following Windows Management Framework Core package:

- Microsoft PowerShell 2.0 or higher

- **Microsoft SQL Server packages:**

Install the following packages for Microsoft SQL Server 2005 or Microsoft SQL Server 2008:

- Microsoft SQL Server Native Client
- Microsoft Core XML Services (MSXML) 6.0
- Microsoft SQL Server 2008 Management Objects Collection

Install the following packages for Microsoft SQL Server 2012:

- Microsoft SQL Server Native Client
- Microsoft Core XML Services (MSXML) 6.0 or higher
- Microsoft SQL Server 2012 Management Objects Collection

These packages must be installed on all the Microsoft SharePoint Server systems that have at least one of the following services enabled:

- Central Administration
- Windows SharePoint Services Web Application (Microsoft Office SharePoint Server 2007)
- Microsoft SharePoint Foundation Web application (Microsoft SharePoint Server 2010/2013)

You can download the packages from the website:

<http://www.microsoft.com/downloads/en/default.aspx>.

Search for **Feature Pack for Microsoft SQL Server 2008** or **Feature Pack for Microsoft SQL Server 2012**.

- **Data Protector components:**

Ensure you installed and configured your Data Protector backup solution as described in:

- *HPE Data Protector Installation Guide*
- applicable chapters of the *HPE Data Protector Integration Guide*
- *HPE Data Protector Zero Downtime Backup Integration Guide*
- *HPE Data Protector Integration Guide for Microsoft Volume Shadow Copy Service*

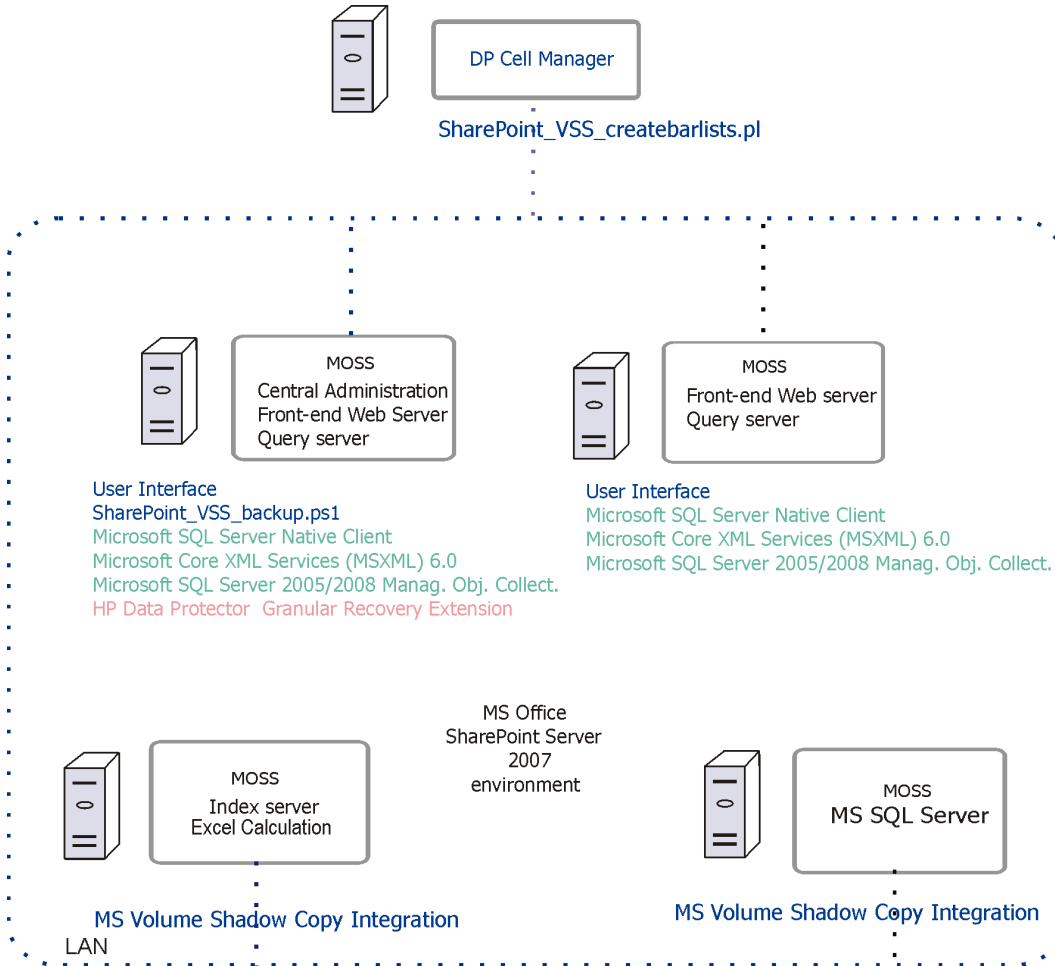
In addition, ensure that the Data Protector User Interface component is installed on all Microsoft SharePoint Server systems that have at least one of the following services enabled:

- Central Administration
- Windows SharePoint Services Web Application (Microsoft Office SharePoint Server 2007)
- Microsoft SharePoint Foundation Web application (Microsoft SharePoint Server 2010/2013)

GRE Environment

In the "Installing a medium farm that uses the HPE Data Protector Microsoft SharePoint Server VSS based solution (an example)" on the next page, the HPE Data Protector components are colored blue, the Microsoft SQL Server install packages are green, and the HPE Data Protector Granular Recovery Extension component red.

Installing a medium farm that uses the HPE Data Protector Microsoft SharePoint Server VSS based solution (an example)



Microsoft Volume Shadow Copy Service clients

To back up VSS writers or only the filesystem using VSS, install the following Data Protector software components on the application system (local backup) or on both the application and backup system (transportable backup):

- MS Volume Shadow Copy Integration.
- If you are using a disk array (with hardware providers) the appropriate disk array agent: HPE P4000 VSS Agent, HPE P6000 / HPE 3PAR SMI-S Agent, HPEP9000 XP Agent, or HPE 3PAR VSS Agent.

After you have installed the VSS integration, you need to resolve the source volumes on the application system if you will perform the ZDB-to-disk and ZDB-to-disk+tape sessions (instant recovery-enabled sessions). Run the resolve operation from any VSS client in the cell as follows:

```
omnidbvs -resolve {-apphost ApplicationSystem | -all}
```

However, if you do not resolve or fail to resolve the application system, it will be resolved automatically, as long as the `OB2VSS_DISABLE_AUTO_RESOLVE` option in the `omnirc` file is set to 0 (default). In this case, the backup time for creating a replica is prolonged.

For more information, see the *HPE Data Protector Zero Downtime Backup Integration Guide*.

Sybase Server clients

It is assumed that your Sybase Backup Server is running.

For backing up the Sybase database, you need to select the following Data Protector component during the installation procedure:

- `Sybase Integration` - to be able to back up a Sybase database
- `Disk Agent` - install the Disk Agent for two reasons:
 - To run a filesystem backup of Sybase Backup Server. Make this backup *before* configuring your Data Protector Sybase integration and resolve all problems related to Sybase Backup Server and Data Protector.
 - To run a filesystem backup of important data that *cannot* be backed up using Sybase Backup Server.

Informix Server clients

It is assumed that your Informix Server is up and running.

For backing up the Informix Server database, you need to select the following Data Protector component during the installation procedure:

- `Informix Integration` - to be able to back up an Informix Server database
- `Disk Agent` - install the Disk Agent for two reasons:
 - To run a filesystem backup of Informix Server. Make this backup *before* configuring your Data Protector Informix Server integration and resolve all problems related to Informix Server and Data Protector.
 - To run a filesystem backup of important Informix Server data (such as, `ONCONFIG` file, `sqlhosts` file, ON-Bar emergency boot file, `oncfg_INFORMIXSERVER.SERVERNUM`, configuration files, and so on) that *cannot* be backed up using ON-Bar.

IBM HACMP Cluster

If Informix Server is installed in the IBM HACMP cluster environment, install the `Informix Integration` component on all the cluster nodes.

SAP R/3 clients

Prerequisites

- Ensure that the following Oracle software is installed and configured:
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net8 software
 - SQL*Plus
- It is assumed that your SAP R/3 Database Server is up and running.

Note: The Data Protector SAP R/3 integration backup specifications are fully compatible with the previous version of Data Protector. Data Protector will run all backup specifications created by earlier Data Protector versions. You cannot use backup specifications created by the current version of Data Protector on older versions of Data Protector.

To be able to back up the SAP R/3 database, select the following components during the installation procedure:

- SAP R/3 Integration
- Disk Agent

Data Protector requires a Disk Agent to be installed on Backup Servers (clients with filesystem data to be backed up).

SAP MaxDB clients

It is assumed that your SAP MaxDB Server is up and running.

To be able to back up the SAP MaxDB database, you need to select the following Data Protector components during the installation procedure:

- SAP MaxDB Integration - to be able to run an integrated online backup of an SAP MaxDB database
- Disk Agent - to be able to run a filesystem backup of an SAP MaxDB database.

SAP HANA Appliance clients

To integrate Data Protector with your SAP HANA Appliance (SAP HANA), install the following Data Protector software components on the SAP HANA system:

- SAP HANA Integration

This component enables integrated backup of a complete SAP HANA database and the SAP HANA redo logs.

- Disk Agent

This component enables non-integrated backup of the SAP HANA configuration files using the Data Protector filesystem backup functionality. After a disaster, having a backup image of the SAP HANA configuration files available helps you more easily identify and restore your changes.

In case of a distributed SAP HANA environment, install the above components on each SAP HANA system that constitutes such environment.

Oracle Server clients

It is assumed that your Oracle Server is up and running.

To be able to back up the Oracle database, you need to select the `Oracle Integration` component during the installation procedure.

HP OpenVMS

On HP OpenVMS, after you installed the Oracle integration and configured it as described in the *HPE Data Protector Integration Guide*, verify that the `-key Oracle8` entry is present in `OMNI$ROOT:[CONFIG.CLIENT]omni_info`, for example:

```
-key oracle8 -desc "Oracle Integration" -nlisset 159 -nlid 12172 -flags 0x7 -ntpath  
"" -uxpath "" -version 9.09
```

If the entry is not present, copy it from `OMNI$ROOT:[CONFIG.CLIENT]omni_format`. Otherwise, the Oracle integration will not be shown as installed on the OpenVMS client.

MySQL clients

To integrate Data Protector with your MySQL database management system and to be able to back up the MySQL instances and data, install the following Data Protector components on the MySQL host:

- MySQL Integration

This component enables integrated backup and restore of MySQL databases.

- Disk Agent

This component enables backup of MySQL binary logs as well as restore of binary logs as a precondition for MySQL database recovery. It can also be used for non-integrated backup of MySQL data for the purpose of solving problems with the Data Protector client where MySQL is installed.

PostgreSQL clients

To integrate Data Protector with your PostgreSQL database server system and to be able to back up the PostgreSQL instances and data, install the following Data Protector components on the PostgreSQL host:

- **PostgreSQL Integration**
This component enables integrated backup and restore of PostgreSQL databases.

IBM DB2 UDB clients

It is assumed that your DB2 Server is up and running.

To be able to back up the DB2 database, you need to select the `DB2 Integration` and the `Disk Agent` components during the installation procedure.

In a physically partitioned environment, install the `DB2 Integration` and `Disk Agent` components on every physical node (system) on which the database resides.

Note: Log in as user `root` to perform the installation.

Lotus Notes/Domino Server clients

It is assumed that your Lotus Notes/Domino Server is up and running.

To be able to back up the Lotus Notes/Domino Server database, you need to select the `Lotus Integration` and the `Disk Agent` components during the installation procedure. You will need the `Disk Agent` component to be able to back up filesystem data with Data Protector in the following purposes:

- Backing up important data that *cannot* be backed up using Lotus Integration Agent. These are so called non-database files, which need to be backed up to provide a complete data protection solution for a Lotus Notes/Domino Server, such as `notes.ini`, `desktop.dsk`, all `*.id` files.
- Testing the filesystem backup to resolve communication and other problems related to the application and Data Protector.

Lotus Domino Cluster

Install the `Lotus Integration` and the `Disk Agent` components on the Domino servers that will be used for backup, and, if you plan to restore Domino databases to other Domino servers containing replicas of these databases, install the components on these Domino servers as well.

VMware clients

The Data Protector components that need to be installed on VMware systems vary depending on the restore and recovery solution you want to use.

This section of the guide helps you with:

- [GRE Environment](#)
- [Installing Data Protector GRE](#)
- [Uninstalling Data Protector GRE](#)

Data Protector GRE for VMware vSphere

The HPE Data Protector Granular Recovery Extension restores data using the Data Protector Virtual Environment integration; this extension is a recovery solution only. The GRE environment, including the Mount Proxy and vCenter Server have specific requirements that need to be met before you can install both the GRE plug-ins.

The GRE plug-in is accessible through two user interfaces:

- Web Plug-in
- Advanced GRE Web Plug-in.

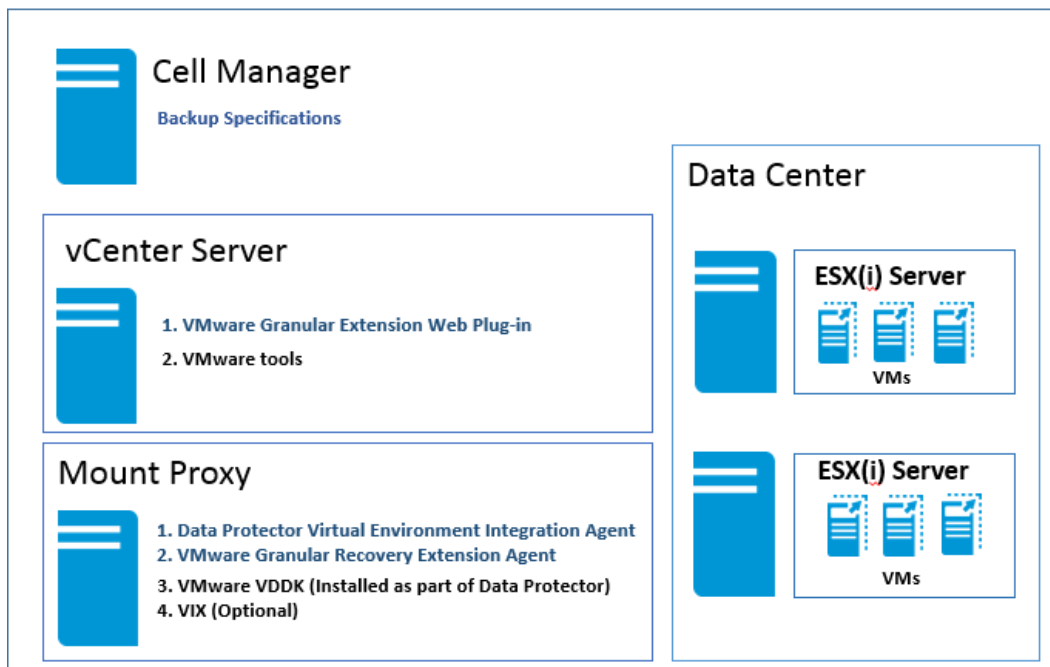
This section of the guide provides the information necessary for creating this environment.

GRE Environment

In the following illustration

- HPE Data Protector components are indicated in blue.
- VMware components are indicated in black.

Installing HPE Data Protector Granular Recovery Extension



Mount Proxy System

The Data Protector Granular Recovery Extension for VMware vSphere requires a mount proxy system as a temporary restore or recovery location between the original location and the target location on the

VMware vCenter Server system. Any supported system, also a virtual machine, can be used as a mount proxy system.

The virtual machine disks are not mounted immediately. The mount session starts when you, as a VMware vCenter user, start browsing the files using the extension integrated in the vCenter environment.

Your mount proxy system needs sufficient disk space for the restored data. You can also adjust the disk space on demand by attaching additional disks or by adding another mount proxy system.

Note: It is recommended to configure a dedicated system as the mount proxy system.

System Requirements

The following system requirements have to be met on the mount proxy system:

- **Windows systems:**

(Optional) Make sure to install the following utility, if you want to use VIX API for file recovery. VIX is used as a fallback option when network share is not available.

- VMware VIX API 1.14

- **Linux systems:**

Make sure to install the following operating system components and utilities:

- FUSE 2.7.3 or later*
- cifs-utils package (used for mounting Windows virtual machine disks on a Linux mount proxy system)
- ntfs-3g package (used for mounting Windows virtual machine disks on a Linux mount proxy system)
- NFS services
- VMware VIX API 1.14 (Optional; used for file recovery and is used as a fallback option when network share is not available)
- kpartx is required for disks with LVM partitions
- Samba server, as Data Protector uses the Samba server to create shares during recovery. Ensure that the Samba shares have read-write permissions. If the Security-Enhanced Linux (SELinux) kernel security module is deployed in your Linux system, then execute the command `# setsebool -P samba_export_all_rw on` to enable read-write permissions for the Samba shares.
- Add the user of the Media Agent host to the samba password database using the following command: `smbpasswd -a <user>`. You can verify if the user has been added to the password database using the following command: `pdbedit -w -L`.
- Windows Firewall should be configured. For more information on configuration, see "Configuring Windows Firewall exceptions" section in the *HPE Data Protector Granular Recovery Extension User Guide*.

Note:

1. For detailed information on configuring Smart Cache devices, see the section "Configuring Smart Cache" in the *HPE Data Protector Administrator's Guide*.
2. For detailed information on configuring StoreOnce devices, see the section "Configuring a Backup to Disk Device - StoreOnce" in the *HPE Data Protector Administrator's Guide*.

*for SUSE Linux Enterprise Server (SLES)- use FUSE 2.7.2

*for SUSE Linux Enterprise Server 12 (SLES 12)- use FUSE 2.9.3

Required Data Protector components on the mount proxy system

Install the Data Protector client. Then proceed to remotely install the following Data Protector components on the mount proxy system:

- **Virtual Environment Integration**
- **VMware Granular Recovery Extension Agent**

See the [Component Selection](#) screen. You need to select this component during the installation procedure. See "[Installing Data Protector clients](#)" on page 55.

If remote installation fails, install the extension on your local system. See the "Local Installation Workaround" section in the *HPE Data Protector Granular Recovery Extension User Guide*. However, for patch updates you must install the GRE agent remotely.

For details on the importing procedure, see "Configuring the Integration" section in the *HPE Data Protector Integration Guide*.

The Linux loop devices are not created by default for RHEL 7.0 and SLES 12. Ensure that there are enough Linux loop devices on the mount proxy system. You need enough loop devices as the number of disks mounted to make the complete logical volume group available.

Note: Restart your system before installing the VMware Granular Recovery Extension Agent, if you have added or removed any of the HPE Data Protector components or VMware VDDKs.

Note: During installation of the VMware Granular Recovery Extension Agent component on the mount proxy system, sometimes the user may be notified in the installation session output and reboot of the target host must be performed to complete the installation.

Note: The client that you intend to use as a backup host should *not* have the VMware Consolidated Backup (VCB) software installed.

VMware vCenter Server (VirtualCenter server)

The Data Protector Granular Recovery Extension (GRE) for VMware vSphere is integrated into the VMware vCenter Server. You access virtual machines using the VMware vSphere Web Client. The HPE Data Protector tab is added to the VMware vSphere Web Client interface.

Note: The GRE Web Plug-in is supported by the VMware vSphere Web Client from version 5.1 onwards and the Advanced GRE Web Plug-in for GRE is supported by the VMware vSphere Web Client from version 5.5.0 U2 onwards.

Required Data Protector components

The following Data Protector components must be installed on the vCenter Server for the GRE Web Plug-in:

- A Data Protector client with the Disk Agent or Media Agent components installed.
- VMware Granular Extension Web Plug-In component.

Note: The Data Protector client installation is not required on the vCenter Server for the Advanced GRE Web Plug-in.

Note: Remote installation of the HPE Data Protector Granular Recovery Extension agent for VMware vSphere is recommended.

Installing Data Protector GRE for VMware vSphere Web Client

Considerations

1. The virtual machines on which you plan to perform recovery operations must have VMware tools 4.x or later installed. You can download the VMware Tools installation package from the webpage <http://www.vmware.com/download>.
2. Only remote installation of the Data Protector Granular Recovery Extension web client for VMware vSphere is supported.
3. To ensure the proper functionality of the extension, do not install and configure both, a VMware vCenter Server system and a mount proxy system on the same client system.
4. Data Protector VMware GRE does not work if encrypted control communication is enabled on machines that communicate with the GRE Plug-in (mount proxy machines and the vCenter). Encrypted control communication can be enabled on the Cell Manager. However, the GRE agent clients must be added to the exception list. For more information on how to enable VMware GRE integration to work in an encrypted Data Protector environment, see the chapter "Meeting Data Protector configuration requirements for Granular Recovery Extension" in the HPE Data Protector Granular Recovery Extension User Guide.
5. Ensure that the VMware Granular Recovery Extension Agent, the Virtual Environment Integration Agent and the Data Protector Cell Manager are of the same version. Mixed agent versions are not supported.

Compatibility Matrix for Data Protector, vCenter and GRE plug-ins

Note: For more details, see the Virtualization Support Matrix

Data Protector	vCenter Version	Advanced GRE Web Plug-in	Web Plug-in
9.01 and earlier versions	Supported version	x	✓

Data Protector	vCenter Version	Advanced GRE Web Plug-in	Web Plug-in
9.02 and later versions	5.5 U1 and earlier versions	✗	✓
9.02 and later versions	5.5 U2 and later versions	✓	✗

Requirements

To use the extension, you need to install and configure the following systems:

- **Data Protector** cell and client
- VMware vCenter Server system
- Mount proxy system

The GRE plug-in is accessible through two user interfaces; Web Plug-in and the Advanced GRE Web Plug-in.

New Installation

Identify the environment which is applicable to you and proceed with installation, see the following:

[Option 1](#)

[Option 2](#)

Option 1

Environment: Data Protector New version (9.02 or later), vCenter (see Virtualization Support Matrix for supported versions), and Web Plug-in

Step 1: Set up the Cell Manager.

The Cell Manager can be on Windows and Linux system.

Step 2: Set up the Installation Server:

The Installation server is added as part of the Cell Manager installation, by default.

- If you installed Windows Installation Server along with the Cell Manager in Windows (default option), you can skip this step and proceed with setup of the Mount Proxy.
- If the Cell Manager is installed on Linux, then you need to set up a Windows Installation Server and import it to the Cell Manager on Linux.

Step 3: Set up the Mount Proxy.

- Can be done on a Windows and/or a Linux system.
- It is recommended to have the Mount Proxy on a different and dedicated machine other than the Cell Manager.

- The Data Protector client must be installed on the Mount Proxy machine with the following components installed:
 - a. Virtual Environment Integration
 - b. VMware Granular Recovery Extension Agent.

Step 4: Set up the vCenter Server.

- The Web Plug-in is supported by vCenter only in Windows, hence the vCenter must be setup in a Windows Environment.
- The Data Protector client must be installed on the vCenter machine with either the Disk Agent or Media Agent.

Step 5: Install the Web Plug-in on the vCenter Server.

1. To import the vCenter machine as vCenter Client to the Data Protector Cell Manager.
 - a. Right-click the **Clients** and select **Import Clients**.
 - b. Enter the host name of the vCenter and select the type as **VMware vCenter**. Click **Next**.
 - c. Enter the credentials of the vCenter (the same credentials used to log into vCenter web client). Leave the **GRE web plugin** field empty. Click **Finish**.
2. Perform a push installation of the vCenter GRE web plugin to the vCenter. Proceed as follows:
 - a. Right-click the vCenter client. Select **Add component**.
 - b. Ensure to select the **vCenter** checkbox and click **Next**.
 - c. Select the option **VMware Granular Recovery Extension Web Plug-in**, and click **Finish**.

Option 2

Environment: Data Protector New version (9.02 or later), vCenter (see the Virtualization Support Matrix for supported versions), and Advanced GRE Web Plug-in.

Step 1: Set up the Cell Manager.

The Cell Manager can be on Windows and Linux system.

Step 2: Set up the Installation Server:

The Installation server is added as part of the Cell Manager installation, by default.

- If you installed Windows Installation Server along with the Cell Manager in Windows (default option), you can skip this step and proceed with setup of the Mount Proxy.
- If the Cell Manager is installed on Linux, then you need to set up a Windows Installation Server and import it to the Cell Manager on Linux.

Step 3: Set up the Mount Proxies.

- Can be done on a Windows and/or a Linux system.
- It is recommended to have the Mount Proxy on a different and dedicated machine other than the Cell Manager.
- The Data Protector client must be installed on the Mount Proxy machine with the following components installed:
 - a. Virtual Environment Integration
 - b. VMware Granular Recovery Extension Agent.

Step 4: Set up the vCenter Server.

- The vCenter can be in Windows or Linux Environment.
- The Data Protector client is not required.

Step 5: Install the Advanced GRE Web Plug-in on the vCenter Server.

1. To import the vCenter machine as a vCenter Client to the Data Protector Cell Manager.
 - a. Right-click the **Clients** and select **Import Clients**.
 - b. Enter the host name of the vCenter and select the type as **VMware vCenter**. Click **Next**.
 - c. Enter the credentials of the vCenter (the same credentials used to log into vCenter web client). Select that **Advanced GRE Web Plug-in** check box and click **Finish**.

Note: You can Register and Unregister the Advanced GRE Web Plug-in using the `omnicc -import_vcenter` and `omnicc -export_host` commands respectively. For more information, see the *HPE Data Protector Command Line Interface Reference* guide.

Note: You can import more than one vCenter into a Data Protector Cell Manager.

Upgrade

Identify the environment applicable or suitable for you and proceed with the steps for upgrade, see the following:

Data Protector		Plug-ins		
From	To	Upgrade From	To	See
Any previous version	DP 9.02 or later	Web Plug-in	Web-Plug-in	Option 1
Any previous version	DP 9.02 or later	Web Plug-in	Advanced Web Plug-in	Option 2
DP 9.02 or later	Latest version	Advanced Web Plug-in	Advanced Web Plug-in	Option 3

Option 1

Environment: Upgrading to a Data Protector new version (9.02 or later), with existing Web Plug-in on vCenter (see the Virtualization Support Matrix for supported versions)

Note that in this scenario, you will be updating other Data Protector components without impacting the original vCenter GRE recovery setup.

Proceed as follows:

1. You can upgrade the Cell Manager using the native (required version) installers.
2. Next, upgrade all the Data Protector clients (including vCenter and the mount proxies). You can use either of the following steps, for each client:

- a. Right-click the client (vCenter and mount proxy), and click **Upgrade**. Click **Next** and then click **Finish**.
- b. Run the native (required version) Windows Patch on the Windows clients to upgrade.

Option 2

Environment: If you are upgrading from a prior Data Protector version with Web Plug-in, to a Data Protector new version (9.02 or later) with Advanced GRE Web Plug-in, on vCenter 5.5 U2 or later (see the Virtualization Support Matrix for supported versions).

If the Data Protector upgrade procedure is complete, then proceed directly to Step 2.

Proceed as follows:

1. Use the native (required version) Data Protector installers to upgrade the Data Protector Cell Manager
2. Right-click the **vCenter** client in the cell manager, and click **upgrade**. (As the user has Web Plug-in setup, the vCenter machine must be already imported as a Data Protector client). This step will remove the existing Web Plug-in on the vCenter and upgrade the Data Protector client on vCenter to the required version.

Note: The existing requests files will be deleted and you will have to create new requests .

3. Right-click a client in the Cell Manager, and click **upgrade**. Repeat this step for all the mount proxies and other clients.

To import the vCenter machine as vCenter Client to the Data Protector Cell Manager.

- a. Right-click the **Clients** and select **Import Clients**.
- b. Enter the host name of the vCenter and select the type as **VMware vCenter**. Click **Next**.
- c. Enter the credentials of the vCenter (the same credentials used to log into vCenter web client). Select the **Advanced GRE Web Plug-in** check box and click **Finish**.

Note: If required, the Data Protector client can be retained on that vCenter.

Option 3

Environment: If you have Data Protector 9.02 or later with the Data Protector Advanced GRE Web Plug-in; to get the updated features of the Advanced GRE Web Plug-in with the most recent upgrade, complete the following steps:

1. To unregister the Advanced GRE Web Plug-in from Data Protector, deselect the **Advanced GRE Web plug-in** check box and click **Apply**. Ensure that you remove all Cell Managers from the Advanced GRE Web Plug-in host list.
2. To register the Advanced GRE Web Plug-in, select the **Advanced GRE Web Plug-in** check box and click **Apply**.

Note: Ensure that the Cell Manager and all the proxy servers are upgraded.

Uninstalling the Web Plug-in and Advanced GRE Web Plug-in

If you encounter any issues while launching the Plug-ins', then complete the following steps and restart the upgrade procedure provided earlier according to your environment.

To uninstall the Web Plug-in

1. To uninstall the Web Plug-in, uninstall the client on that vCenter. If vCenter is on the Cell Manager machine, then uninstall the Cell Manager. Run the `vmwgre_wp_u.cmd` from the Data Protector bin folder on the VMware vCenter host.
2. Access the Extension Manager (<https://<vCenterHostnameOrIP>/mob/?moid=ExtensionManager>) using the web browser and click **UnregisterExtension**.

For Advanced GRE Web Plug-in: Enter this key:

```
com.HewlettPackard.DataProtector.VMwareGREAng.WebClient.
```

For Web Plug-in: Enter this key: `com.HewlettPackard.DataProtector.VMwareGRE.WebClient`

3. Click **Invoke Method**.
4. In a Windows vCenter, navigate to `C:\ProgramData\VMware\vsphere Web Client\vc-packages\vsphere-client-serenity`.
In a Linux vCenter appliance, navigate to `/var/lib/vmware/vsphere-client/vc-packages/vsphere-client-serenity`.
5. Delete all the GRE settings from the following locations in the Cell Manager:

For Windows:

```
C:\ProgramData\OmniBack\Config\Server\Integ\Config\VMware
```

```
C:\ProgramData\OmniBack\Config\client\VMwareGRE
```

For Linux:

```
/etc/opt/omni/server/VMwareGRE/
```

```
/etc/opt/omni/client/VMwareGRE/
```

Note: Perform this step on all the mount proxies.

To uninstall the Advanced GRE Web Plug-in

To uninstall the Advanced GRE Web Plug-in, deselect the **Advanced GRE Web plug-in** check box in the Login tab for the VMware vCenter client and click **Apply**.

Note: If you have uninstalled a Cell Manager or multiple Cell Managers without unregistering the Advanced GRE Web plug-in, then you will see the "HPE Data Protector" tab in the VMware vSphere Web Client, but you will not be able to connect to it. You must manually unregister the Advanced GRE Web Plug-in. For details, see [Manually unregistering VMware vSphere Managed Object Reference](#)

Manually unregistering VMware vSphere Managed Object Reference

Complete these steps to remove one or more cell managers registered in the vCenter.

1. Go to the VMware vSphere Managed Object Reference URL, <https://<vcenter>/mob>

The screenshot shows the VMware vSphere Managed Object Reference page for a **ServiceInstance**. The page includes a header with "Home" and "Logout" links, and a sub-header indicating the Managed Object Type is **ManagedObjectReference:ServiceInstance** and the Managed Object ID is **ServiceInstance**.

Properties

NAME	TYPE	VALUE
capability	Capability	capability
content	ServiceContent	content
serverClock	dateTime	"2014-10-21T13:19:02.290781Z"

Methods

RETURN TYPE	NAME
dateTime	CurrentTime
HostVMotionCompatibility[]	QueryVMotionCompatibility
ServiceContent	RetrieveServiceContent
ProductComponentInfo[]	RetrieveProductComponents
Event[]	ValidateMigration

2. Click **Content** and then click **ExtensionManager**.
3. Select the HPE key `com.HewlettPackardEnterprise.DataProtector.VMwareGREng.WebClient`

The screenshot shows the VMware vSphere Managed Object Reference page for an **ExtensionManager**. The page includes a header with "Home" and "Logout" links, and a sub-header indicating the Managed Object Type is **ManagedObjectReference:ExtensionManager** and the Managed Object ID is **ExtensionManager**.

Properties

NAME	TYPE	VALUE
extensionList	Extension []	extensionList["cim-vi"] Extension extensionList["com.vmware.vim.eam"] Extension extensionList["com.vmware.vim.inventoryservice"] Extension extensionList["com.vmware.vim.ls"] Extension extensionList["com.vmware.vim.sms"] Extension extensionList["com.vmware.vim.sps"] Extension extensionList["com.vmware.vim.stats.report"] Extension extensionList["com.vmware.vim.vsm"] Extension extensionList["health-vi"] Extension extensionList["hostdiag"] Extension extensionList["VirtualCenter"] Extension extensionList["com.HewlettPackard.DataProtector.VMwareGREng.WebClient"] Extension

Methods

RETURN TYPE	NAME
Extension	FindExtension
string	GetPublicKey
ExtensionManagerIpAllocationUsage[]	QueryExtensionIpAllocationUsage
ManagedObjectReference:ManagedEntity[]	QueryManagedBy
void	RegisterExtension
void	SetExtensionCertificate
void	SetPublicKey
void	UnregisterExtension
void	UpdateExtension

4. Click **UnregisterExtension**, at the bottom of the page.

Microsoft Hyper-V clients

Data Protector components that need to be installed on Microsoft Hyper-V systems vary depending on the backup and restore solution you want to use. You can choose among the following solutions:

- ["Microsoft Hyper-V clients" on the previous page](#)
- ["Data Protector Microsoft Volume Shadow Copy Service integration" below](#)

Data Protector Virtual Environment integration

It is assumed that all systems on which you intend to install components are up and running.

On systems that should control backup and restore sessions (**backup hosts**), install the following Data Protector components:

- Virtual Environment Integration
- MS Volume Shadow Copy Integration
- Disk Agent

Note: The `Disk Agent` component enables you to use the **Browse** button when restoring to a directory on the backup host. If the component is not installed, you must type the target directory yourself.

On Microsoft Hyper-V systems, install the following Data Protector component:

- MS Volume Shadow Copy Integration

Note: If your Microsoft Hyper-V systems are configured in a cluster, they must be installed as cluster-aware clients. For details, see ["Installing Data Protector on a Microsoft Hyper-V cluster" on page 184](#).

On backup systems (applicable for VSS transportable backups), install the following Data Protector component:

- MS Volume Shadow Copy Integration

Note: A *backup host* and a *backup system* are not one and the same system.

Data Protector Microsoft Volume Shadow Copy Service integration

For details on which components need to be installed on Microsoft Hyper-V systems, see ["Microsoft Hyper-V clients" on the previous page](#).

NDMP Server clients

It is assumed that your NDMP Server is up and running.

During the installation procedure, select the `NDMP Media Agent` and install it to all Data Protector clients accessing the NDMP dedicated drives.

Note: If a Data Protector client will not be used to access an NDMP dedicated drive through the NDMP Server, but it will be used only to control the robotics of the library, either the `NDMP Media`

Agent or the General Media Agent can be installed on such a client.

Note that only one Media Agent can be installed on one Data Protector client.

HPE P4000 SAN Solutions clients

To integrate HPE P4000 SAN Solutions with Data Protector, install the following Data Protector software components on the application and backup systems:

- MS Volume Shadow Copy Integration
- HPE P4000 VSS Agent

To perform ZDB-to-disk+tape or ZDB-to-tape sessions, additionally install the following Data Protector software component on the backup system:

- General Media Agent

HPE P6000 EVA Disk Array Family clients

To integrate HPE P6000 EVA Disk Array Family with Data Protector, install the following Data Protector software components on the application and backup systems:

- HPE P6000 / HPE 3PAR SMI-S Agent
- General Media Agent

Install the General Media Agent component on the backup system to back up the bulk data. Install it on the application system to back up archive logs or to perform a restore to the application system.

- Disk Agent

Install the Disk Agent component on the application and backup systems to run zero downtime backup of filesystems or disk images. Clients without the Disk Agent installed are not listed in the Application system and Backup system drop-down lists when creating a ZDB backup specification.

On Microsoft Windows Server 2008 systems, two Windows Server 2008 hotfixes must be installed to enable normal operation of the Data Protector HPE P6000 EVA Disk Array Family integration. You can download the required hotfix packages from the Microsoft websites

<http://support.microsoft.com/kb/952790> and <http://support.microsoft.com/kb/971254>.

This additional requirement does not apply to Windows Server 2008 R2 systems.

Installing in a cluster

You can install the HPE P6000 EVA Disk Array Family integration in a cluster environment. For the supported cluster configurations and specific installation requirements, see the *HPE Data Protector Zero Downtime Backup Administrator's Guide*.

Integrating with other applications

To install the HPE P6000 EVA Disk Array Family integration with a database application, install the Data Protector component specific for the particular integration to the application and backup systems and perform the installation tasks specific for this integration. You can install the HPE P6000 EVA Disk Array Family integration with Oracle Server, SAP R/3, Microsoft Exchange Server, Microsoft SQL Server, and Microsoft Volume Shadow Copy Service.

HPE P6000 EVA Disk Array Family integration with Oracle Server

Prerequisites

- The following software must be installed and configured on the application system and on the backup system for the backup set ZDB method:
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net services
 - SQL*Plus

The Oracle software on the backup system must be installed in the same directory as on the application system. The binaries should be identical to the binaries on the application system. You can achieve this either by copying the files and system environment from the application system to the backup system, or by a clean installation of the Oracle binaries on the backup system with the same installation parameters as on the application system.

- The Oracle datafiles on the application system must be installed on source volumes that will be replicated using the SMI-S agent you have installed.

Depending on the location of the Oracle control file, online redo log files, and Oracle SPFILE, the following two options are possible:

- Oracle control file, online redo log files, and Oracle SPFILE reside on a **different** volume group (if LVM is used) or source volume than Oracle datafiles.

By default, instant recovery is enabled for such configuration.

- Oracle control file, online redo log files, and Oracle SPFILE reside on the **same** volume group (if LVM is used) or source volume as Oracle datafiles.

By default, instant recovery is *not* enabled for such configuration. You can enable instant recovery by setting the ZDB_ORA_INCLUDE_CF_OLF, ZDB_ORA_INCLUDE_SPF, and ZDB_ORA_NO_CHECKCONF_IR omnirc options. For more information, see the *HPE Data Protector Zero Downtime Backup Integration Guide*.

The Oracle archive redo log files do not have to reside on source volumes.

If some Oracle data files are installed on symbolic links, then these links have to be created on the backup system too.

Installation procedure

Perform the following installation tasks:

1. Install the Oracle recovery catalog database. Preferably, install it on a separate system, on non-mirrored disks. Leave the recovery catalog unregistered. For details on how to install the database, see the Oracle documentation.
2. Install the following Data Protector software components:
 - HPE P6000 / HPE 3PAR SMI-S Agent – on both the application system and backup system
 - Oracle Integration – on both the application system and backup system

Note:

- The Data ProtectorOracle Integration component on the backup system is needed only for the backup set ZDB method. It is not needed for the proxy-copy ZDB method.
- In a RAC cluster environment, the Oracle application database is accessed by multiple Oracle instances. Therefore, install the Data ProtectorOracle Integration and HPE P6000 / HPE 3PAR SMI-S Agent components on all the systems where the Oracle instances are running.
- If you installed the Oracle recovery catalog database on a separate system, you do not need to install any Data Protector software components there.

HPE P6000 EVA Disk Array Family integration with SAP R/3

Prerequisites

- The following Oracle software must be installed on the application system.
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net services
 - SQL*Plus
- If you plan to run SAP compliant ZDB sessions (BRBACKUP started on the backup system and not on the application system), configure the backup system. For details, see the SAP database guide for Oracle (split mirror backup, software configuration).
- The database on the application system can be installed on disk images, logical volumes, or filesystems.
 - The Oracle datafiles *must* reside on a disk array.
 - For *online backup*, the control file and online redo logs do not have to reside on a disk array.

Online SAP compliant ZDB sessions are an exception, for which the control file must reside on a disk array.

- For *offline backup*, the control file and online redo logs *must* reside on a disk array.
- Archived redo log files do not have to reside on a disk array.

If the Oracle control file, online redo logs, and Oracle SPFILE reside on the same LVM volume group or source volume as Oracle datafiles, set the Data Protector `ZDB_ORA_NO_CHECKCONF_IR`, `ZDB_ORA_INCLUDE_CF_OLF`, and `ZDB_ORA_INCLUDE_SPFomnirc` options. Otherwise, you cannot run ZDB-to-disk and ZDB-to-disk+tape sessions. For details, see the *HPE Data Protector Zero Downtime Backup Integration Guide*.

Note: If some of the Oracle data files are installed on symbolic links, create the links on the backup system too.

UNIX systems: If the Oracle database is installed on raw partitions (rawdisk or raw logical volumes), ensure that the volume/disk group names on the application system and backup system are identical.

- On UNIX systems, ensure that the following users exist on the application system:
 - `oraORACLE_SID` with the primary group `dba`
 - `ORACLE_SID adm` in the UNIX group `sapsys`
- The SAP R/3 software must be correctly installed on the application system.

The following is a list of standard directories that must be installed on the application system after installing SAP R/3:

Note: The location of the directories is dependent on the environment (UNIX systems) or registry (Windows system) variables. For more information, see the SAP R/3 documentation.

- `ORACLE_HOME /dbs` (UNIX systems) `ORACLE_HOME\database` (Windows systems) - the Oracle and SAP profiles)
- `ORACLE_HOME /bin` (UNIX systems) `ORACLE_HOME\bin` (Windows systems) - the Oracle binaries
- `SAPDATA_HOME /sapbackup` (UNIX systems) `SAPDATA_HOME\sapbackup` (Windows systems) - the SAPBACKUP directory with BRBACKUP log files
- `SAPDATA_HOME /saparch` (UNIX systems) `SAPDATA_HOME\saparch` (Windows systems) - the SAPARCH directory with BRARCHIVE log files
- `SAPDATA_HOME /sapreorg` (UNIX systems) `SAPDATA_HOME\sapreorg` (Windows systems)
- `SAPDATA_HOME /sapcheck` (UNIX systems) `SAPDATA_HOME\sapcheck` (Windows systems)
- `SAPDATA_HOME /saptrace` (UNIX systems) `SAPDATA_HOME\saptrace` (Windows systems)
- `/usr/sap/ORACLE_SID/SYS/exe/run` (UNIX systems)

c:\Oracle\ORACLE_SID\sys\exe\run (Windows systems)

Note: If you plan to do instant recovery, ensure that the `sapbackup`, `saparch`, and `sapreorg` directories reside on different source volumes than the Oracle data files.

UNIX systems

On UNIX systems, if the last six directories do not reside at the above specified destinations, create appropriate links to them.

On UNIX systems, the directory `/usr/sap/ORACLE_SID/SYS/exe/run` must be owned by the UNIX user `oraORACLE_SID`. The owner of the SAP R/3 files must be the UNIX user `oraORACLE_SID` and the UNIX group `dba` with `setuid` bit set (`chmod 4755 ...`). The exception is the file `BRRESTORE`, which must be owned by the UNIX user `ORACLE_SIDadm`.

UNIX example

If `ORACLE_SID` is `PRO`, then the permissions inside the directory `/usr/sap/PRO/SYS/exe/run` should look like:

```
-rwsr-xr-x  1 orapro dba 4598276 Apr 17  2011 brarchive
-rwsr-xr-x  1 orapro dba 4750020 Apr 17  2011 brbackup
-rwsr-xr-x  1 orapro dba 4286707 Apr 17  2011 brconnect
-rwsr-xr-x  1 proadm sapsys 430467 Apr 17  2011
brrestore
-rwsr-xr-x  1 orapro dba 188629 Apr 17  2011 brtools
```

Installation procedure

1. Install SAP R/3 BRTOOLS on the application system.
2. Install the following Data Protector software components on both the application system and backup system:
 - HPE P6000 / HPE 3PAR SMI-S Agent
 - SAP R/3 Integration
 - Disk Agent

Note: You need to install SAP R/3 Integration on the backup system only if you plan to run SAP compliant ZDB sessions in which BRBACKUP is started on the backup system.

On Windows systems, the Data Protector software components must be installed using the SAP R/3 administrator user account, and this account must be included in the `ORA_DBA` or `ORA_SID_DBA` local group on the system where the SAP R/3 instance is running.

HPE P6000 EVA Disk Array Family integration with Microsoft Exchange Server

Prerequisite

The Microsoft Exchange Server database must be installed on the application system source volumes. The following objects must be located on the source volumes:

- Microsoft Information Store (MIS)
- optionally, Key Management Service (KMS)
- optionally, Site Replication Service (SRS)

To be able to back up transaction logs, disable Circular Logging on the Microsoft Exchange Server.

Installation procedure

Install the following Data Protector software components:

- HPE P6000 / HPE 3PAR SMI-S Agent – on both the application and backup systems
- MS Exchange Integration – on the application system only

HPE P6000 EVA Disk Array Family integration with Microsoft SQL Server

Prerequisite

Microsoft SQL Server has to be installed on the application system. User databases *must* reside on the disk array source volumes, while system databases can be installed anywhere. However, if the system databases are also installed on the disk array, they *must* be installed on *different* source volumes than user databases.

Installation procedure

Install the following Data Protector software components on both the application and the backup systems:

- HPE P6000 / HPE 3PAR SMI-S Agent – on both the application and backup systems
- MS SQL Integration – on the application system only

HPE P9000 XP Disk Array Family clients

To integrate HPE P9000 XP Disk Array Family with Data Protector, install the following Data Protector software components on the application and backup systems:

- HPEP9000 XP Agent
- General Media Agent

Install the General Media Agent component on the backup system to back up the bulk data. Install it on the application system to back up archive logs or to perform a restore to the application system.

- Disk Agent

Install the Disk Agent component on the application and backup systems to run zero downtime backup of filesystems or disk images. Clients without the Disk Agent installed are not listed in the Application system and Backup system drop-down lists when creating a ZDB backup specification.

On Microsoft Windows Server 2008 systems, two Windows Server 2008 hotfixes must be installed to enable normal operation of the Data Protector HPE P9000 XP Disk Array Family integration. You can download the required hotfix packages from the Microsoft websites

<http://support.microsoft.com/kb/952790> and <http://support.microsoft.com/kb/971254>.

This additional requirement does not apply to Windows Server 2008 R2 systems.

Installing in a cluster

You can install the HPE P9000 XP Disk Array Family integration in a cluster environment. For the supported cluster configurations and specific installation requirements, see the *HPE Data Protector Zero Downtime Backup Administrator's Guide*.

Integrating with other applications

To install the HPE P9000 XP Disk Array Family integration with a database application, install the Data Protector component specific for the particular integration to the application and backup systems and perform the installation tasks specific for this integration. You can install the HPE P9000 XP Disk Array Family integration with Oracle Server, SAP R/3, Microsoft Exchange Server, Microsoft SQL Server, and Microsoft Volume Shadow Copy Service.

HPE P9000 XP Disk Array Family integration with Oracle Server

Prerequisites

- The following software must be installed and configured on the application system and on the backup system for the backup set ZDB method:
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net services
 - SQL*Plus

The Oracle software on the backup system must be installed in the same directory as on the application system. The binaries should be identical to the binaries on the application system. You can achieve this either by copying the files and system environment from the application system to the backup system, or by a clean installation of the Oracle binaries on the backup system with the same installation parameters as on the application system.

- The Oracle data files on the application system must be installed on HPE P9000 XP Disk Array Family LDEVs that are mirrored to the backup system.

In case of the backup set method, if some Oracle data files are installed on symbolic links, then these links have to be created on the backup system too.

Depending on the location of the Oracle control file, online redo log files, and Oracle SPFILE, the following two options are possible:

- Oracle control file, online redo log files, and Oracle SPFILE reside on a **different** volume group (if LVM is used) or source volume than Oracle datafiles.

By default, instant recovery is enabled for such configuration.

- Oracle control file, online redo log files, and Oracle SPFILE reside on the **same** volume group (if LVM is used) or source volume as Oracle datafiles.

By default, instant recovery is *not* enabled for such configuration. You can enable instant recovery by setting the `ZDB_ORA_INCLUDE_CF_OLF`, `ZDB_ORA_INCLUDE_SPF`, and `ZDB_ORA_NO_CHECKCONF_IR` omnirc options. For more information, see the *HPE Data Protector Zero Downtime Backup Integration Guide*.

The Oracle archive redo log files do not have to reside on source volumes.

Installation Procedure

Perform the following installation tasks:

1. Install the Oracle recovery catalog database. Preferably, install it on a separate system, on non-mirrored disks. Leave the recovery catalog unregistered. For details on how to install the database, see the Oracle documentation.
2. Install the following Data Protector software components:
 - HPE P9000 XP Agent – on both the application system and backup system
 - Oracle Integration – on both the application system and backup system

Note:

- The Data Protector Oracle Integration component on the backup system is needed only for the backup set ZDB method. It is not needed for the proxy-copy ZDB method.
- In a RAC cluster environment, the Oracle application database is accessed by multiple Oracle instances. Therefore, install the Data Protector Oracle Integration and HPE P9000 XP Agent components on all the systems where the Oracle instances are running.
- If you installed the Oracle recovery catalog database on a separate system, you do not need to install any Data Protector software components there.

HPE P9000 XP Disk Array Family integration with SAP R/3

Prerequisites

- The following Oracle software must be installed and configured on the application system:
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net services
 - SQL*Plus
- If you plan to run SAP compliant ZDB sessions (BRBACKUP started on the backup system and not on the application system), configure the backup system. For details, see the SAP database guide for Oracle (split mirror backup, software configuration).
- The database on the application system can be installed on disk images, logical volumes, or filesystems.
 - The Oracle datafiles *must* reside on a disk array.
 - For *online backup*, the control file and online redo logs do not have to reside on a disk array. *Online* SAP compliant ZDB sessions are an exception, for which the control file must reside on a disk array.
 - For *offline backup*, the control file and online redo logs *must* reside on a disk array.
 - Archived redo log files do not have to reside on a disk array.

If the Oracle control file, online redo logs, and Oracle SPFILE reside on the same LVM volume group or source volume as Oracle datafiles, set the Data Protector ZDB_ORA_NO_CHECKCONF_IR, ZDB_ORA_INCLUDE_CF_OLF, and ZDB_ORA_INCLUDE_SPF options. Otherwise, you cannot run ZDB-to-disk and ZDB-to-disk+tape sessions. For details, see the *HPE Data Protector Zero Downtime Backup Integration Guide*.

Note: If some of the Oracle data files are installed on symbolic links, create the links on the backup system too.

UNIX systems: If the Oracle database is installed on raw partitions (rawdisk or raw logical volumes), ensure that the volume/disk group names on the application system and backup system are identical.

- On UNIX systems, ensure that the following users exist on the application system:
 - oraORACLE_SID with the primary group dba
 - ORACLE_SID adm in the UNIX group sapsys
- The SAP R/3 software must be correctly installed on the application system.

The following is a list of standard directories that must be installed on the application system after installing SAP R/3:

Note: The location of the directories is dependent on the environment (UNIX systems) or registry (Windows system) variables. For more information, see the SAP R/3 documentation.

- *ORACLE_HOME* /dbs (UNIX systems)
ORACLE_HOME \database (Windows systems) - the Oracle and SAP R/3 profiles
- *ORACLE_HOME* /bin or (UNIX systems)
ORACLE_HOME \bin (Windows systems) - the Oracle binaries
- *SAPDATA_HOME* /sapbackup (UNIX systems)
SAPDATA_HOME \sapbackup (Windows systems) - the SAPBACKUP directory with BRBACKUP log files
- *SAPDATA_HOME* /saparch (UNIX systems)
SAPDATA_HOME \saparch (Windows systems) - the SAPARCH directory with BRARCHIVE log files
- *SAPDATA_HOME* /sapreorg (UNIX systems)
SAPDATA_HOME \sapreorg (Windows systems)
- *SAPDATA_HOME* /sapcheck (UNIX systems)
SAPDATA_HOME \sapcheck (Windows systems)
- *SAPDATA_HOME* /saptrace (UNIX systems)
SAPDATA_HOME \saptrace (Windows systems)
- /usr/sap/*ORACLE_SID*/SYS/exe/run (UNIX systems)
c:\oracle*ORACLE_SID*\sys\exe\run (Windows systems)

Note: If you plan to do instant recovery, ensure that the sapbackup, saparch, and sapreorg directories reside on different source volumes than the Oracle data files.

UNIX systems

On UNIX systems, if the last six directories do not reside at the above specified destinations, create appropriate links to them.

On UNIX systems, the directory /usr/sap/*ORACLE_SID*/SYS/exe/run must be owned by the UNIX user ora*ORACLE_SID*. The owner of the SAP R/3 files must be the UNIX user ora*ORACLE_SID* and the UNIX group dba with setuid bit set (chmod 4755 ...). The exception is the file BRRESTORE, which must be owned by the UNIX user *ORACLE_SID*adm.

UNIX example

If *ORACLE_SID* is PRO, then the permissions inside the directory /usr/sap/PRO/SYS/exe/run should look like:

```
-rwsr-xr-x 1 orapro dba 4598276 Apr 17 2011 brarchive
-rwsr-xr-x 1 orapro dba 4750020 Apr 17 2011 brbackup
-rwsr-xr-x 1 orapro dba 4286707 Apr 17 2011 brconnect
-rwsr-xr-x 1 proadm sapsys 430467 Apr 17 2011

brrestore
-rwsr-xr-x 1 orapro dba 188629 Apr 17 2011 brtools
```

Installation Procedure

1. Install SAP R/3 BRTOOLS on the application system.
2. Install the following Data Protector software components on both the application system and backup system:
 - HPEP9000 XP Agent
 - SAP R/3 Integration
 - Disk Agent

Note: You need to install SAP R/3 Integration on the backup system only if you plan to run SAP compliant ZDB sessions in which BRBACKUP is started on the backup system.

On Windows systems, the Data Protector software components must be installed using the SAP R/3 administrator user account, and this account must be included in the ORA_DBA or ORA_SID_DBA local group on the system where the SAP R/3 instance is running.

HPE P9000 XP Disk Array Family integration with Microsoft Exchange Server

Prerequisite

The Microsoft Exchange Server database must be installed on the application system on the HPE P9000 XP Disk Array Family volumes (LDEVs), which are mirrored to the backup system. The mirroring can be HPE BC P9000 XP or HPE CA P9000 XP and the database installed on a filesystem. The following objects must be located on volumes that are mirrored:

- Microsoft Information Store (MIS)
- optionally, Key Management Service (KMS)
- optionally, Site Replication Service (SRS)

To be able to back up transaction logs, disable Circular Logging on the Microsoft Exchange Server.

Installation procedure

Install the following Data Protector software components:

- HPE P9000 XP Agent – on both the application and the backup system
- MS Exchange Integration – on the application system only

HPE P9000 XP Disk Array Family integration with Microsoft SQL Server

Prerequisite

Microsoft SQL Server has to be installed on the application system. User databases *must* reside on the disk array source volumes, while system databases can be installed anywhere. However, if the system databases are also installed on the disk array, they *must* be installed on *different* source volumes than user databases.

Installation procedure

Install the following Data Protector software components on both the application and the backup systems:

- HPE P9000 XP Agent
- MS SQL Integration

HPE 3PAR StoreServ Storage clients

To integrate HPE 3PAR StoreServ Storage with Data Protector, install the following Data Protector software components on the application and backup systems:

- HPE P6000 / HPE 3PAR SMI-S Agent

For backing up and restoring objects using the Volume Shadow Copy Service, you also need the following components:

- MS Volume Shadow Copy Integration
- HPE 3PAR VSS Agent

Regardless of the operating system, to perform ZDB-to-disk+tape or ZDB-to-tape sessions, additionally install the following Data Protector software component on the backup system:

- General Media Agent

EMC Symmetrix clients

To integrate EMC Symmetrix with Data Protector, install the following Data Protector software components on the application and backup systems:

- **EMC Symmetrix Agent (SYMA)**
Before remotely installing the EMC Symmetrix Agent component, install the following two EMC components:
 - EMC Solution Enabler
 - EMC Symmetrix TimeFinder or EMC Symmetrix Remote Data Facility (SRDF) microcode and license.
- **General Media Agent**
Install the General Media Agent component on the backup system to back up the bulk data. Install it on the application system to back up archive logs or to perform a restore to the application system.
- **Disk Agent**
Install the Disk Agent component on the application and backup systems to run disk image and filesystem ZDB. Clients without Disk Agent installed are not listed in the Application system and Backup system drop-down lists when creating a ZDB backup specification.

Installing in a cluster

You can install the EMC Symmetrix integration in a cluster environment. For the supported cluster configurations and specific installation requirements, see the *HPE Data Protector Zero Downtime Backup Administrator's Guide*.

Integrating with other applications

To install the EMC Symmetrix integration with a database application, install the Data Protector component specific for the particular integration to the application and backup systems and perform the installation tasks specific for this integration. You can install the EMC Symmetrix integration with Oracle and SAP R/3.

EMC Symmetrix Integration with Oracle

Prerequisites

- The following software must be installed and configured on the application system:
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net services
 - SQL*Plus
- The Oracle database files used by the application system must be installed on EMC Symmetrix devices which are mirrored to the backup system.
The database can be installed on disk images, logical volumes or filesystems. The following Oracle files have to be mirrored:

- Datafiles
- Control file
- Online redo log files

The archive redo log files have to reside on non-mirrored disks.

Installation Procedure

Perform the following installation tasks:

1. Install the Oracle recovery catalog database. Preferably, install it on a separate system, on non-mirrored disks. Leave the recovery catalog unregistered. For details on how to install the database, see the Oracle documentation.
2. Install the following Data Protector software components:
 - EMC Symmetrix Agent – on both the application system and backup system
 - Oracle Integration – on both the application system and backup system

Note:

- The Data Protector Oracle Integration component on the backup system is needed only for the backup set ZDB method. It is not needed for the proxy-copy ZDB method.
- In a RAC cluster environment, the Oracle application database is accessed by multiple Oracle instances. Therefore, install the Data Protector Oracle Integration and EMC Symmetrix Agent components on all the systems where the Oracle instances are running.
- If you installed the Oracle recovery catalog database on a separate system, you do not need to install any Data Protector software components there.

EMC Symmetrix Integration with SAP R/3

Prerequisites

- The following Oracle software must be installed and configured on the application system:
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net8 software
 - SQL*Plus
- If you plan to run SAP compliant ZDB sessions (BRBACKUP started on the backup system and not on the application system), configure the backup system. For details, see the SAP database guide for Oracle (split mirror backup, software configuration).
- The database on the application system can be installed on disk images, logical volumes, or filesystems.

- The Oracle datafiles *must* reside on a disk array.
- For *online backup*, the control file and online redo logs do not have to reside on a disk array. *Online* SAP compliant ZDB sessions are an exception, for which the control file must reside on a disk array.
- For *offline backup*, the control file and online redo logs *must* reside on a disk array.
- The archived redo log files do not have to reside on a disk array.

Note: If some of the Oracle data files are installed on symbolic links, create the links on the backup system too.

UNIX systems: If the Oracle database is installed on raw partitions (rawdisk or raw logical volumes), ensure that the volume/disk group names on the application system and backup system are identical.

- On UNIX systems, ensure that the following users exist on the application system:
 - oraORACLE_SID with the primary group dba
 - ORACLE_SID adm in the UNIX group sapsys

- The SAP R/3 software must be correctly installed on the application system.

The following is a list of standard directories that must be installed on the application system after installing SAP R/3:

Note: The location of the directories depends on the environment variables. For more information, see the SAP R/3 documentation.

- ORACLE_HOME /dbs - the Oracle and SAP R/3 profiles
- ORACLE_HOME /bin - the Oracle binaries
- SAPDATA_HOME /sapbackup - the SAPBACKUP directory with BRBACKUP log files
- SAPDATA_HOME /saparch - the SAPARCH directory with BRARCHIVE log files
- SAPDATA_HOME /sapreorg
- SAPDATA_HOME /sapcheck
- SAPDATA_HOME /saptrace
- /usr/sap/ORACLE_SID/SYS/exe/run

Note: If you plan to do instant recovery, ensure that the sapbackup, saparch, and sapreorg directories reside on different source volumes than the Oracle data files.

If the last six directories do not reside at the above specified destinations, create appropriate links to them.

The directory `/usr/sap/ORACLE_SID/SYS/exe/run` must be owned by the UNIX user `oraORACLE_SID`. The owner of the SAP R/3 files must be the UNIX user `oraORACLE_SID` and the UNIX group `dba` with `setuid` bit set (`chmod 4755 ...`). The exception is the file `BRRESTORE`, which must be owned by the UNIX user `ORACLE_SIDadm`.

Example

If `ORACLE_SID` is `PRO`, then the permissions inside the directory `/usr/sap/PRO/SYS/exe/run` should look like:

```
-rwsr-xr-x  1 orapro dba 4598276 Apr 17  2011 brarchive
-rwsr-xr-x  1 orapro dba 4750020 Apr 17  2011 brbackup
-rwsr-xr-x  1 orapro dba 4286707 Apr 17  2011 brconnect
-rwsr-xr-x  1 proadm sapsys 430467 Apr 17  2011 brrestore
-rwsr-xr-x  1 orapro dba 188629 Apr 17  2011 brtools
```

Installation Procedure

1. Install SAP R/3 BRTOOLS on the application system.
2. Install the following Data Protector software components on both the application system and backup system:
 - EMC Symmetrix Agent
 - SAP R/3 Integration
 - Disk Agent

Note: You need to install SAP R/3 Integration on the backup system only if you plan to run SAP compliant ZDB sessions in which BRBACKUP is started on the backup system.

EMC Symmetrix Integration with Microsoft SQL Server

Prerequisite

Microsoft SQL Server has to be installed on the application system. User databases *must* reside on the disk array source volumes, while system databases can be installed anywhere. However, if the system databases are also installed on the disk array, they *must* be installed on *different* source volumes than user databases.

Installation Procedure

Install the following Data Protector software components on both the application and the backup systems:

- EMC Symmetrix Agent
- MS SQL Integration

Non-HPE Storage Arrays

Data Protector uses Storage Providers for non-HPE Storage Arrays to integrate with the following ZDB storage arrays: NetApp storage, EMC VNX and EMC VMAX storage families. This Storage Provider component is a plug-in to the Data Protector SMI-S Agent. It enables ZDB functionality for the respective storage through SMI-S Agent.

Install the following Data Protector software components on the application and backup systems:

- One of the Storage Provider components for non-HPE Storage Arrays depending on the storage you use (NetApp Storage Provider, EMC VNX Storage Provider, or EMC VMAX Storage Provider)

To perform ZDB-to-tape sessions install the following Data Protector software component on the backup system:

- General Media Agent

Integrating with other applications

To install the Data Protector non-HPE Storage Array integration with a database application or a virtual environment integration, install the Data Protector component specific for the particular integration to the applicable systems and perform the installation tasks specific for this integration. You can install the non-HPE Storage Array integration with VMware, Oracle Server, SAP R/3, and Microsoft SQL Server. See the latest support matrices at <https://softwaresupport.hpe.com/> to check which combinations of the non-HPE Storage Arrays with the specific database applications or a virtual environment integration are supported.

Non-HPE Storage Array integration with Virtual Environment for VMware

Limitations

- Only VMware vCenter environment is supported.
- Instant recovery is not supported.
- Only ZDB to tape is supported.

Prerequisite

All systems on which you intend to install components are up and running.

Installation procedure

On systems that should control backup and restore sessions (backup system), install the following Data Protector components:

- Virtual Environment Integration
- Storage Provider for the non-HPE Storage Array (NetApp Storage Provider)
- General Media Agent
- Disk Agent

Note:

- The `Disk Agent` component enables you to use the **Browse** button when restoring to a directory on the backup host. If the component is not installed, you must type the target directory yourself.
- The client that you intend to use as a backup host should *not* have the VMware Consolidated Backup (VCB) software installed.

Non-HPE Storage Array integration with Oracle Server

Limitations

- RAC cluster environment is not supported.
- Instant recovery is not supported.
- Only ZDB to tape is supported.

Prerequisites

- The following software must be installed and configured on the application system and on the backup system for the backup set ZDB method:
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net services
 - SQL*Plus

The Oracle software on the backup system must be installed in the same directory as on the application system. The binaries should be identical to the binaries on the application system. You can achieve this either by copying the files and system environment from the application system to the backup system, or by a clean installation of the Oracle binaries on the backup system with the same installation parameters as on the application system.

- The Oracle datafiles on the application system must be installed on the source volumes that will be replicated using the Storage Provider (through the SMI-S agent) you have installed.

Depending on the location of the Oracle control file, online redo log files, and Oracle SPFILE, the following two options are possible:

- Oracle control file, online redo log files, and Oracle SPFILE reside on a **different** volume group (if LVM is used) or source volume than Oracle datafiles.
- Oracle control file, online redo log files, and Oracle SPFILE reside on the **same** volume group (if LVM is used) or source volume as Oracle datafiles.

The Oracle archive redo log files do not have to reside on source volumes.

If some Oracle data files are installed on symbolic links, then these links have to be created on the backup system too.

Installation procedure

Perform the following installation tasks:

1. Install the Oracle recovery catalog database. Preferably, install it on a separate system, on non-mirrored disks. Leave the recovery catalog unregistered. For details on how to install the database, see the Oracle documentation.
2. Install the following Data Protector software components:
 - Storage Provider for the non-HPE Storage Array (NetApp Storage Provider, EMC VNX Storage Provider, or EMC VMAX Storage Provider) – on both the application system and backup system
 - Oracle Integration – on both the application system and backup system

Note:

- The Data Protector Oracle Integration component on the backup system is needed only for the backup set ZDB method. It is not needed for the proxy-copy ZDB method.
- If you installed the Oracle recovery catalog database on a separate system, you do not need to install any Data Protector software components there.

Non-HPE Storage Array integration with SAP R/3

Limitations

- Instant recovery is not supported.
- Only ZDB to tape is supported.

Prerequisites

- The following Oracle software must be installed on the application system.
 - Oracle Enterprise Server (RDBMS)
 - Oracle Net services
 - SQL*Plus
- If you plan to run SAP compliant ZDB sessions (BRBACKUP started on the backup system and not on the application system), configure the backup system. For details, see the SAP database guide for Oracle (split mirror backup, software configuration).
- The database on the application system can be installed on disk images, logical volumes, or

filesystems.

- The Oracle datafiles *must* reside on a storage system.
- For *online backup*, the control file and online redo logs do not have to reside on a storage system. *Online* SAP compliant ZDB sessions are an exception, for which the control file must reside on a storage system.
- For *offline backup*, the control file and online redo logs *must* reside on a storage system.
- Archived redo log files do not have to reside on a storage system.

Note: If some of the Oracle data files are installed on symbolic links, create the links on the backup system too.

UNIX systems: If the Oracle database is installed on raw partitions (rawdisk or raw logical volumes), ensure that the volume/disk group names on the application system and backup system are identical.

- On UNIX systems, ensure that the following users exist on the application system:
 - oraORACLE_SID with the primary group dba
 - ORACLE_SID adm in the UNIX group sapsys

- The SAP R/3 software must be correctly installed on the application system.

The following is a list of standard directories that must be installed on the application system after installing SAP R/3:

Note: The location of the directories is dependent on the environment (UNIX systems) or registry (Windows system) variables. For more information, see the SAP R/3 documentation.

- ORACLE_HOME /dbs (UNIX systems) ORACLE_HOME\database (Windows systems) - the Oracle and SAP profiles)
- ORACLE_HOME /bin (UNIX systems) ORACLE_HOME\bin (Windows systems) - the Oracle binaries
- SAPDATA_HOME /sapbackup (UNIX systems) SAPDATA_HOME\sapbackup (Windows systems) - the SAPBACKUP directory with BRBACKUP log files
- SAPDATA_HOME /saparch (UNIX systems) SAPDATA_HOME\saparch (Windows systems) - the SAPARCH directory with BRARCHIVE log files
- SAPDATA_HOME /sapreorg (UNIX systems) SAPDATA_HOME\sapreorg (Windows systems)
- SAPDATA_HOME /sapcheck (UNIX systems) SAPDATA_HOME\sapcheck (Windows systems)
- SAPDATA_HOME /saptrace (UNIX systems) SAPDATA_HOME\saptrace (Windows systems)
- /usr/sap/ORACLE_SID/SYS/exe/run (UNIX systems)
c:\Oracle\ORACLE_SID\sys\exe\run (Windows systems)

UNIX systems

On UNIX systems, if the last six directories do not reside at the above specified destinations, create appropriate links to them.

On UNIX systems, the directory `/usr/sap/ORACLE_SID/SYS/exe/run` must be owned by the UNIX user `oraORACLE_SID`. The owner of the SAP R/3 files must be the UNIX user `oraORACLE_SID` and the UNIX group `dba` with setuid bit set (`chmod 4755 ...`). The exception is the file `BRRESTORE`, which must be owned by the UNIX user `ORACLE_SIDadm`.

UNIX example

If `ORACLE_SID` is `PRO`, then the permissions inside the directory `/usr/sap/PRO/SYS/exe/run` should look like:

```
-rwsr-xr-x  1 orapro dba 4598276 Apr 17  2011 brarchive
-rwsr-xr-x  1 orapro dba 4750020 Apr 17  2011 brbackup
-rwsr-xr-x  1 orapro dba 4286707 Apr 17  2011 brconnect
-rwsr-xr-x  1 proadm sapsys 430467 Apr 17  2011

brrestore
-rwsr-xr-x  1 orapro dba 188629 Apr 17  2011 brtools
```

Installation procedure

1. Install SAP R/3 BRTOOLS on the application system.
2. Install the following Data Protector software components on both the application system and backup system:
 - Storage Provider for the non-HPE Storage Array (NetApp Storage Provider)
 - SAP R/3 Integration
 - Disk Agent

Note: You need to install SAP R/3 Integration on the backup system only if you plan to run SAP compliant ZDB sessions in which BRBACKUP is started on the backup system.

On Windows systems, the Data Protector software components must be installed using the SAP R/3 administrator user account, and this account must be included in the `ORA_DBA` or `ORA_SID_DBA` local group on the system where the SAP R/3 instance is running.

Non-HPE Storage Array integration with Microsoft SQL Server

Limitations

- Instant recovery is not supported.
- Only ZDB to tape is supported.

Prerequisite

Microsoft SQL Server has to be installed on the application system. User databases *must* reside on the disk array source volumes, while system databases can be installed anywhere. However, if the system databases are also installed on the disk array, they *must* be installed on *different* source volumes than user databases.

Installation procedure

Install the following Data Protector software components on both the application and the backup systems:

- Storage Provider for the non-HPE Storage Array (NetApp Storage Provider, EMC VNX Storage Provider, or EMC VMAX Storage Provider) – on both the application and backup systems
- MS SQL Integration – on the application system only

Chapter 5: Installing Data Protector on Clusters

Installing Data Protector on an HPE Serviceguard

Data Protector supports HPE Serviceguard (HPE SG) for HP-UX and Linux. For details on supported operating system versions, see the HPE Data Protector Product Announcements, Software Notes, and References.

If your Cell Manager is to be cluster-aware, note that the virtual server IP address should be used for licenses.

Configuration phases

1. [Configuring the Primary Cell Manager](#)
2. [Configuring the Secondary Cell Manager](#)
3. [Configuring the Cell Manager package](#)

Installing a cluster-aware Cell Manager

Prerequisites

Before you install a Data Protector Cell Manager on HPE Serviceguard, check the following:

- Decide which systems are going to be the Primary Cell Manager and the Secondary Cell Manager(s). All of them must have HPE Serviceguard installed and must be configured as cluster members.
- Data Protector Cell Manager, with recommended patches, and all other Data Protector software components for the integrations you want to have in the cluster, must be installed on the Primary node and each of the Secondary nodes.
- The user group `hpdp` and the dedicated user account `hpdp` must have the same IDs on both nodes.
- In this cluster environment, a Data Protector Cell Manager should have its own package. Before installing the Data Protector Cell Manager in HPE Serviceguard, you need to obtain the following information from your network administrator:
 - Virtual server name (the hostname specified in the cluster package)
 - Package IP or virtual IP-address

In addition, you will need to create a volume group on a shared disk. For more information, see "[Volume Group creation example](#)" on page 164.

- Ensure that the cluster nodes and the package IP (virtual IP) are on the same subnet.
- If you have DNS in your environment, ensure that all the nodes in the cluster and the package IP are registered with the DNS server.

What next?

When the installation has been completed, you must configure the installed Primary Cell Manager and the Secondary Cell Manager(s), and the Cell Manager package.

After configuring nodes of the new cluster-aware Cell Manager on the HPE Serviceguard, encrypted control communication is not enabled. If required, you must enable encrypted control communication manually after joining all the cluster nodes. Execute `omnicc -encryption -enable -all` on the primary cluster node.

Configuring the Primary Cell Manager

Steps

1. Start the cluster:

```
cmruncl
```

2. Activate volume group.

HP-UX:

```
vgchange -a e vg_name
```

Linux:

```
vgchange -a y vg_name
```

3. Mount the logical volume to mount point directory (for example, `/omni_shared`).

```
mount lv_path /omni_shared
```

4. Modify the `/etc/opt/omni/server/sg/sg.conf` template file.

Note: The `SHARED_DISK_ROOT` option should contain the name of your mount point directory (for example, `SHARED_DISK_ROOT=/omni_shared`).

The `CS_SERVICE_HOSTNAME` option should contain the name of the virtual Cell Manager, as it is known to the network. Each package in the cluster requires its own virtual IP address and its network name (for example, `CS_SERVICE_HOSTNAME=ob2c1.company.com`).

5. Configure the Primary Cell Manager. Make sure not to be positioned in the `/etc/opt/omni/` or in the `/var/opt/omni/` directory or their subdirectories when running the script. Make also sure to have no mounted subdirectories in the `/etc/opt/omni/` or `/var/opt/omni/`. Run:

```
/opt/omni/sbin/install/omniforsg.ksh -primary
```

Note that after running this script, Data Protector services have been stopped and will be restarted later on.

6. Dismount the mount point directory:

```
umount dirname
```

7. Deactivate the volume group:

```
vgchange -a n vg_name
```

Configuring the Secondary Cell Manager

Steps

1. Activate the volume group.

HP-UX:

```
vgchange -a e vg_name
```

Linux:

```
vgchange -a y vg_name
```

2. Mount the logical volume to mount point directory.

```
mount lv_path /omni_shared
```

3. Configure the Secondary Cell Manager:

```
/opt/omni/sbin/install/omniforsg.ksh -secondary dirname
```

where, *dirname* stands for the mount point or shared directory (for example, /omni_shared).

4. Dismount the mount point directory:

```
umount /omni_shared
```

5. Deactivate the volume group:

```
vgchange -a n vg_name
```

Configuring the Cell Manager package

Prerequisites

- The Data Protector Cell Manager should be installed and configured on both cluster nodes.
- Before configuring the Data Protector cluster package, you should have a cluster configuration file created and edited.

The legacy package configuration always includes 2 files, the package configuration file and the package control script. The legacy package configuration file is created as an ASCII file, then stored in the binary Serviceguard configuration using the `cmapplyconf` command. The modular package configuration file contains all the package filesystem, mount point and service definitions in a single file, which is stored in the binary Serviceguard configuration using the `cmapplyconf` command.

Note: The Data Protector daemons are not running anymore on either cluster node.

Steps

On the Primary Cell Manager node, perform the following steps:

1. Check the cluster configuration file for errors (for example, `cluster.conf`):

```
cmcheckconf -C /etc/cmcluster/cluster.conf
```

If there are errors, fix them.

If there are no errors, enable the configuration:

```
cmapplyconf -C /etc/cmcluster/cluster.conf
```
2. Start the cluster, if it is not started already:

```
cmruncl
```
3. Create and modify the Data Protector cluster package files (configuration and control). For modular packages, create and modify the single cluster package file (configuration).
 - a. Create the directory in the `/etc/cmcluster` directory that will hold the Data Protector package:

```
mkdir /etc/cmcluster/ob2c1
```
 - b. Change to the `/etc/cmcluster/ob2c1` directory:

```
cd /etc/cmcluster/ob2c1
```
 - c. For legacy packages, create a package configuration file in the Data Protector package directory:

```
cmmakepkg -p /etc/cmcluster/ob2c1/ob2c1.conf
```

For modular packages, use this command:

```
cmmakepkg -m sg/all ob2c1.conf
```
 - d. This step needs to be performed for legacy packages only. Create a package control file in the Data Protector package directory: `cmmakepkg -s /etc/cmcluster/ob2c1/ob2c1.cntl`.
 - e. Modify the Data Protector package configuration file (for example, `/etc/cmcluster/ob2c1/ob2c1.conf`). For more information, see ["Modifying the Data Protector package configuration file" on page 167](#).
 - f. This step needs to be performed for legacy packages only. Modify the Data Protector package control file (for example, `/etc/cmcluster/ob2c1/ob2c1.cntl`). For more information, see ["Modifying the Data Protector package control file" on page 169](#).
4. Check and propagate the Data Protector cluster package files.
 - a. For legacy packages, copy the package control file to another node, called `system2` within the cluster:

```
remsh system2 "mkdir /etc/cmcluster/ob2c1" rcp  
/etc/cmcluster/ob2c1/ob2c1.cntl system2: /etc/cmcluster/ob2c1/ob2c1.cntl
```
 - b. Enable the Data Protector shared disk as a cluster volume group (created earlier) on all cluster nodes:
HP-UX:

```
vgchange -c y vg_name
```

Linux:

```
vgchange -a y vg_name
```
 - c. Check the Data Protector package:

```
cmcheckconf -P /etc/cmcluster/ob2c1/ob2c1.conf
```

If the check was successful, add the Data Protector package:

```
cmapplyconf -P /etc/cmcluster/ob2c1/ob2c1.conf
```

- d. Start the package:

```
cmrunpkg ob2c1
```

The cluster should be formed and the Data Protector Cell Manager package should be up and running.

Installing an Installation Server on cluster nodes

You can install the Installation Server on a secondary HPE Serviceguard node and use it for remote installation. ["Installing Installation Servers for UNIX systems" on page 43.](#)

Note: If you install the Installation Server before configuring the primary node as cluster-aware Cell Manager, ensure that the Installation Server is installed on each of the secondary cluster nodes. The Installation Server is imported with virtual server name during primary node configuration. If Installation Server is not installed on each of the cluster nodes, then its virtual server name must be exported from the list of Installation Servers. Additionally, each of the corresponding physically cluster node names must be imported after the configuration of cluster-aware Cell Manager is complete.

Installing cluster-aware clients

The Data Protector cluster-aware clients must be installed on all the cluster nodes.

The installation procedure is standard procedure for installing Data Protector on an UNIX client. For detailed instructions, see ["Installing HP-UX clients" on page 68](#) and ["Installing Linux clients" on page 77.](#)

Next steps

When the installation has been completed, you must import the virtual server (the hostname specified in the cluster package) to the Data Protector cell. See ["Importing a cluster-aware client to a cell" on page 189.](#)

For more information on how to configure backup devices, media pools, or any additional Data Protector configuration tasks, see the *HPE Data Protector Help* index: "configuring".

Volume Group creation example

Create a volume group on a shared disk accessible to both Cell Managers.

Note: If you are using the ob2 disk as a cluster lock disk, you should have already created a volume group for it.

Primary Node Steps

On the Primary Node, perform the following steps:

1. a. Create a directory for a new volume group:

```
mkdir vg_name
```

Note: *vg_name* is the pathname of the volume group in a subdirectory of the `/dev` directory.

- b. List all existing volume groups on the system to check which minor numbers are in use:

```
ll /dev/*/group
```

- c. Create a group file for the volume group:

```
mknod vg_name/group c 64 0xNN0000
```

Note: NN is the available minor number.

- d. Create a physical volume on the disk(s) used for the Data Protector Cell Manager:

```
pvcreate -f pv_path ...
```

Note: *pv_path* used with the `pvcreate` command refers to the character (raw) device path name of the physical volume in the subdirectory of `/dev/rdisk` directory (for example, character *pv_path* for the physical volume `c0t1d0` is `/dev/rdisk/c0t1d0`).

- e. Create a new volume group:

```
vgcreate vg_name pv_path ...
```

Note: *pv_path* used with the `vgcreate` command refers to the block device path name of the physical volume that is assigned to the new volume group. It is located in a subdirectory of `/dev/dsk` directory (for example, the block *pv_path* for the physical volume `c0t1d0` is `/dev/dsk/c0t1d0`).

2. Create a logical volume for this group.

- a. Create a new logical volume for the volume group:

```
lvcreate -L lv_size -n lv_name vg_name
```

Note: The `/etc/opt/omni` and `/var/opt/omni` Data Protector directories are available here.

lv_size is the number representing the size of the partition in MB.

lv_name is the name of the logical volume.

- b. Create a journal filesystem on the logical volume:

```
newfs -F FStype lv_path
```

Note: *FStype* specifies the filesystem type on which to operate.

lv_path is the character (raw) special device pathname of the logical volume.

3. Set the volume group properties according to the cluster documentation.

HP-UX:

- a. Deactivate the volume group from the regular mode:

```
vgchange -a n vg_name
```

- b. Mark the volume group for cluster use:

```
vgchange -c y vg_name
```

Note: If this is a cluster lock disk and you are using a later version of HPE Serviceguard (for example, 11.09), volume group for cluster is marked automatically.

- c. Use the volume group in the exclusive mode:

```
vgchange -a e vg_name
```

Linux:

- a. Deactivate the volume group from the regular mode:

```
vgchange -a n vg_name
```

- b. Mark the volume group for the cluster use:

```
vgchange -a y vg_name
```

4. Create a mount point directory (for example `/omni_shared`), and then mount the logical volume to this directory:

- a. `mkdir shared_dirname`

- b. `mount lv_path shared_dirname`

5. Dismount the mount point directory:

```
umount shared_dirname
```

6. Deactivate the volume group you created:

```
vgchange -a n vg_name
```

7. Export the volume group you created on the Primary Cell Manager.

- a. Export the LVM configuration information from system1:

```
vgexport -p -m mapfile vg_name
```

Note: Here, *mapfile* specifies the path name of the file to which logical volume names and numbers must be written.

- b. Transfer the map file over to system2:

```
rcp mapfile second_system: mapfile
```

Secondary Node Steps

On the Secondary Node, perform the following steps:

1. Create the volume group to be imported, and import it.

- a. Create a directory for a new volume group:

```
mkdir vg_name
```

Note: *vg_name* is the pathname of the volume group located in a subdirectory of the `/dev` directory.

- b. List all existing volume groups on the system to check which minor numbers are in use:

```
ll /dev/*/group
```

- c. Create a group file for the volume group:

```
mknod vg_name/group c 64 0xNN0000
```

Note: NN is the available minor number.

- d. Import the volume group:

```
vgimport -m mapfile -v vg_name pv_path ...
```

Note: *mapfile* is the name of the file from which logical volume names and numbers are to be read.

pv_path is the block device path name of the physical volume.

2. Set the volume group properties.

HP-UX:

- a. Deactivate the volume group from the regular mode:

```
vgchange -a n vg_name
```

- b. Mark the volume group for the cluster use:

```
vgchange -c y vg_name
```

Note: If this is a cluster lock disk and you are using a later version of HPE Serviceguard (for example, 11.09), volume group for a cluster is marked automatically.

- c. Use the volume group in the exclusive mode:

```
vgchange -a e vg_name
```

Linux:

- a. Deactivate the volume group from the regular mode:

```
vgchange -a n vg_name
```

- b. Mark the volume group for the cluster use:

```
vgchange -a y vg_name
```

3. Create the same mount point directory as you have created on the Primary Cell Manager, and then mount the logical volume to this directory.

4. Dismount the mount point directory:

```
umount shared_dirname
```

5. Deactivate the volume group you imported:

```
vgchange -a n vg_name
```

Modifying the Data Protector package configuration file

In Data Protector modular package configuration file, modify the following fields:

For example:

package_name	ob2c1
run_script_timeout	600
halt_script_timeout	600
script_log_file	/usr/local/cmcluster/conf/ob2c1/ob2c1.log

Subnet settings are as follows:

For example:

monitored_subnet	10.81.0.0
ip_subnet	10.81.0.0
ip_address	10.81.8.46

Note: monitored_subnet is the subnet that includes cluster nodes.
 ip_subnet is the subnet that includes the Data Protector Cell Manager virtual server IP.
 ip_address is the Data Protector Cell Manager virtual server IP.

The Data Protector service settings are as follows:

For example:

service_name	dp_svc
service_cmd	/opt/omni/sbin/csfailover.ksh start
service_restart	None
service_fail_fast_enabled	no
service_halt_timeout	300

Note: The service_cmd must be set to /opt/omni/sbin/csfailover.ksh start.

The Data Protector shared file system information is as follows:

For example:

vg	DP
fs_name	/dev/DP/vol
fs_directory	/DPCLUS
fs_type	ext3
fs_mount_opt	-o rw
fs_umount_opt	""

fs_fsck_opt	""
-------------	----

In Data Protector legacy package configuration file, modify the following fields:

PACKAGE_NAME

NODE_NAME

RUN_SCRIPT (Is the same as the Data Protector package control file.)

HALT_SCRIPT (Is the same as the Data Protector package control file.)

MONITORED_SUBNET

SERVICE_NAME (You can enter any name but you must use the same name in the control file as well.)

SERVICE_FAIL_FAST_ENABLED

SERVICE_HALT_TIMEOUT

For example:

PACKAGE_NAME	ob2c1
NODE_NAME	onca
NODE_NAME	pardus
RUN_SCRIPT	/etc/cmcluster/ob2c1/ob2c1.cntl
HALT_SCRIPT	/etc/cmcluster/ob2c1/ob2c1.cntl
MONITORED_SUBNET	10.17.0.0
SERVICE_NAME	omni_sv
SERVICE_FAIL_FAST_ENABLED	NO
SERVICE_HALT_TIMEOUT	300

Modifying the Data Protector package control file

In the Data Protector legacy package control file, modify the following fields:

VG [n]

LV [n]

FS [n]

FS_MOUNT_OPT [n]

IP

SUBNET

SERVICE_NAME (Is the same as used in the configuration file.)

SERVICE_CMD (Must be: /opt/omni/sbin/csfailover.ksh start)

For example:

VG[0]	vg_dp
LV[0]	/dev/vg_dp/dp_share
FS[0]	/DP_SHARE
FS_MOUNT_OPT[0]	-o rw
FS_TYPE[0]	vxfs
IP[0]	10.17.17.69
SUBNET[0]	10.17.0.0
SERVICE_NAME[0]	omni_sv
SERVICE_CMD[0]	/opt/omni/sbin/csfailover.ksh start

Installing Data Protector on a Symantec Veritas Cluster Server

Data Protector supports Symantec Veritas Cluster Server (VCS) for Linux. For details on supported operating system versions, see the latest *Data Protector Platform and Integration Support Matrix*.

Note: If you have configured the Data Protector service group IP, use this IP for licensing. If you have configured the Data Protector service group without the IP address, use the Veritas Cluster IP for licensing.

Configuration phases

1. [Configuring the Primary Cell Manager](#)
2. [Configuring the Secondary Cell Manager](#)
3. [Configuring the Cell Manager Cluster Service Group](#)

Installing a cluster-aware Cell Manager

Prerequisites

Before you install a Data Protector Cell Manager on VCS, check the following:

- Identify Primary and Secondary Cell Manager system(s). All of them must have the Symantec Veritas Cluster Server installed and must be configured as cluster members.
- Data Protector Cell Manager with recommended patches, and all other Data Protector software components for the integrations you want to have in the cluster, must be installed on the Primary node and each of the Secondary nodes.

- The user group `hpdp` and the dedicated user account `hpdp` must have the same IDs on both nodes.
- In this cluster environment, a Data Protector Cell Manager must have its own cluster service group, which must be created and prepared before cluster-aware Cell Manager configuration. Before installing the Data Protector Cell Manager in VCS, you need to obtain the virtual server name and its corresponding IP. This server name or IP is later used as the Data Protector Cell Manager virtual server name or Data Protector service group IP.
- Ensure that the cluster nodes and the Data Protector service group IP (virtual IP) are on the same subnet.

Note: Ensure that the Data Protector service group IP and Veritas Cluster IP are different.

- If you have DNS in your environment, ensure that all the nodes in the cluster and the Data Protector service group IP are registered with the DNS server.

Preparing Cluster Service Group for Data Protector Cell Manager

You need to create a cluster (Data Protector) service group with the following resources:

- IP cluster resource - Refers to the virtual IP used for IP resource configuration.
- Mount cluster resource - Refers to the mount resource with corresponding dependent resources for controlling shared volume created on a shared disk and accessible from all nodes, where Data Protector could be running. This shared volume is used for Data Protector configuration and data files shared among nodes.

Configuring the Primary Cell Manager

Steps

1. Start the Data Protector service group on the primary node.
2. Modify the `/etc/opt/omni/server/sg/sg.conf` template file.

Note: The `SHARED_DISK_ROOT` option should contain the name of your mount point directory (for example, `SHARED_DISK_ROOT=/omni_shared`).

The `CS_SERVICE_HOSTNAME` option must contain the name of the virtual Cell Manager, as it is known to the network. (For example, `CS_SERVICE_HOSTNAME=dpvcs.company.com`)

3. Configure the Primary Cell Manager. Ensure that the script is not executed from `/etc/opt/omni/` or `/var/opt/omni/` directory or their sub-directories. Also, ensure that the sub-directories are not mounted in the `/etc/opt/omni/` or `/var/opt/omni/` directory. Execute the following command:

```
/opt/omni/sbin/install/omniforsg.ksh -primary
```

Note: After running this script, the Data Protector services have been stopped and will be restarted later on.

Configuring the Secondary Cell Manager

Steps

1. Switch over the Data Protector service group to the secondary node.
2. Configure the Secondary Cell Manager:

```
/opt/omni/sbin/install/omniforsg.ksh -secondary dirname
```

where *dirname* stands for the mount point or shared directory (for example, /omni_shared).

Configuring the Cell Manager Cluster Service Group

Steps

1. Switch over the Data Protector service group back to the primary node.
2. Add the cluster application resource, which will be used for monitoring and controlling the Data Protector services to Data Protector service group and use `vcsfailover.ksh` script as an application monitor or control program. For example,

```
Application dpapp (  
  StartProgram = "/opt/omni/sbin/vcsfailover.ksh start"  
  StopProgram = "/opt/omni/sbin/vcsfailover.ksh stop"  
  CleanProgram = "/opt/omni/sbin/vcsfailover.ksh stop"  
  MonitorProgram = "/opt/omni/sbin/vcsfailover.ksh monitor"  
)
```

Note: If the `vcsfailover.ksh` script needs to be customized, a copy of it must be created and used as a monitor or control program. During upgrades or updates, the original script gets overwritten and customized script must be manually updated with the newly introduced changes (if any).

3. Create the Data Protector application resource.

Note: Make the Data Protector application resource dependent on the mount and virtual server IP resources.

4. Enable and start the Data Protector application resource.

Next steps

After configuring nodes of the new cluster-aware Cell Manager on the Symantec Veritas Cluster Server, encrypted control communication is not enabled. If required, you must enable encrypted control communication manually after joining all the cluster nodes. Execute `omnicc -encryption -enable -all` on the primary cluster node.

Installing an Installation Server on cluster nodes

You can install the Installation Server on a secondary Symantec Veritas Cluster Server node and use it for remote installation. ["Installing Installation Servers for UNIX systems" on page 43.](#)

Note: If you install the Installation Server before configuring the primary node as cluster-aware Cell Manager, ensure that the Installation Server is installed on each of the secondary cluster nodes. The Installation Server is imported with virtual server name during primary node configuration. If Installation Server is not installed on each of the cluster nodes, then its virtual server name must be exported from the list of Installation Servers. Additionally, each of the corresponding physically cluster node names must be imported after the configuration of cluster-aware Cell Manager is complete.

Installing cluster-aware clients

The installation procedure is standard procedure for installing Data Protector on a client system. For detailed instructions, see ["Installing Data Protector clients" on page 55.](#)

Next steps

When the installation has been completed:

- To back up the virtual server, you should import it into the cell.
- To back up the physical nodes, you should also import them into the cell.

See ["Importing a cluster-aware client to a cell" on page 189.](#) For more information on how to configure backup devices, media pools, or any additional Data Protector configuration tasks, see the *HPE Data Protector Help* index: "configuring".

Installing Data Protector on a Microsoft Cluster Server

For supported operating systems for Microsoft Cluster Server integration, see the latest support matrices at <https://softwaresupport.hpe.com/manuals>.

Note: If your Cell Manager is to be cluster-aware, the Cell Manager's virtual server IP address should be used for licenses.

Installing a cluster-aware Cell Manager

Prerequisites

Before you install the cluster-aware Data Protector Cell Manager, the following prerequisites must be fulfilled:

- Clustering functionality must be installed properly on all cluster nodes. For example, you must be able to move groups from one to another node as many times as needed, without problems with shared disks.

- Make sure resources with the following names do not exist on the cluster:

OBVS_MCRS, OBVS_HPDP_AS, OBVS_HPDP_IDB, OBVS_HPDP_IDB_CP and OmniBack_Share.

Data Protector uses these names for the Data Protector virtual server. If such resources exist, delete or rename them.

This can be done as follows:

- a. Click **Start > Programs > Administrative Tools > Cluster Administrator**.
 - b. Check the resource list and delete or rename these resources, if necessary.
- At least one group in the cluster should have a file cluster resource defined. Data Protector will install some of its data files in this file cluster resource under a specific folder.

Windows Server 2008, Windows Server 2012: Data files are installed on the *File Server* resource under the shared folder selected by the user at installation.

Other Windows systems: Data files are installed on the *File Share* resource under the folder specified when the file cluster resource was created.

For instructions on how to define a file cluster resource, see the cluster-specific documentation.

Note that the file share name of the file cluster resource cannot be `OmniBack`.

- If the virtual server does not exist in the same group as the file cluster resource, create a new virtual server using a free registered IP address and associate a network name with it.
- The file cluster resource where Data Protector is to be installed must have the `IP Address`, `Network Name`, and `Physical Disk` set among the file cluster resource dependencies. This ensures that the Data Protector cluster group can run on any node independently of any other group.
- Ensure that only the cluster administrator has access to shared folder of the file cluster resource, and they should have full access to it.
- Data Protector is installed on the same location (drive and path name) on all cluster nodes. Ensure that these locations are free.
- If you start the cluster-aware Cell Manager installation from a network share, you must have access to this share from all cluster nodes.
- Ensure no other Microsoft Installer-based installations are running on any cluster node.
- Each system (node) of the cluster should be running and functioning properly.
- To enable installation of the cluster-aware Data Protector Cell Manager on a server cluster with Microsoft Cluster Service (MSCS) running on Windows Server 2008 or Windows Server 2012, perform the procedure described in ["Preparing a Microsoft server cluster running on Windows Server 2008 or Windows Server 2012 for Data Protector installation"](#) on page 361.

Considerations

- Setup must be started under the cluster service account on the system (node) where the file cluster resource is active, so that shared folder of the file cluster resource can be accessed directly. The resource owner (the system where the resource is active) can be determined using Cluster Administrator.
- To properly install and configure cluster-aware Data Protector Cell Manager, a domain account with the following user rights must be provided during installation:
 - Administrator rights on the Cell Manager system
 - Cluster Administrator rights within the cluster
 - Password Never Expires
 - Logon as a service
 - User Cannot Change Password
 - All logon hours are allowed

An account with administrator rights on all the cluster systems (nodes) is required for Microsoft Cluster Server installation. You should use this account to install Data Protector as well. Failing to do so results in Data Protector services running in the ordinary instead of the cluster-aware mode.

- The Windows domain user account that is used for the Inet service must additionally be given the following Windows operating system Security Policy privileges on all cluster nodes:
 - Impersonate a client after authentication
 - Replace a process level token

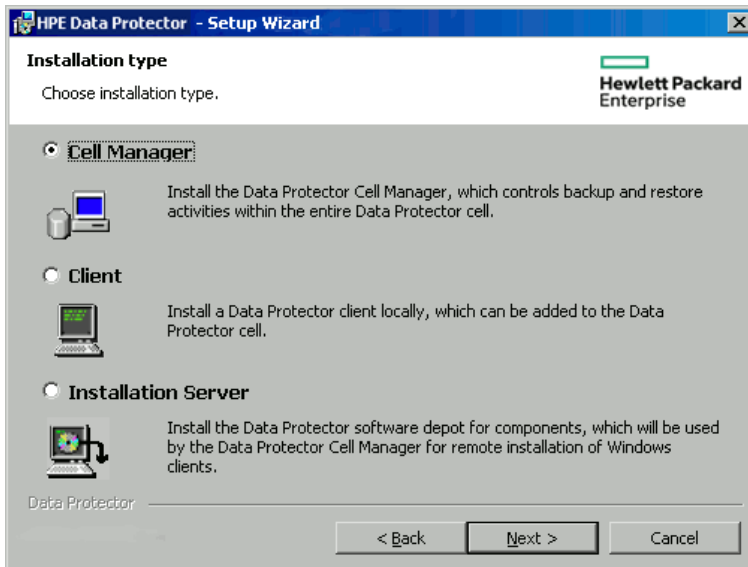
See the *HPE Data Protector Help* index: "Inet user impersonation".

Local installation procedure

The cluster-aware Data Protector Cell Manager must be installed locally, from the DVD-ROM or ISO image. Perform the following:

1. Insert the Windows installation DVD-ROM or mount the ISO image.
The User Account Control dialog is displayed. Click **Continue** to proceed with the installation.
2. In the HPE Data Protector window, select **Install Data Protector** to start the Data Protector Setup Wizard.
3. Follow the Setup Wizard and carefully read the license agreement. Click **Next** to continue, if you accept the terms of the agreement.
4. In the Installation Type page, select **Cell Manager** and then click **Next** to install Data Protector Cell Manager software.

Selecting the installation type

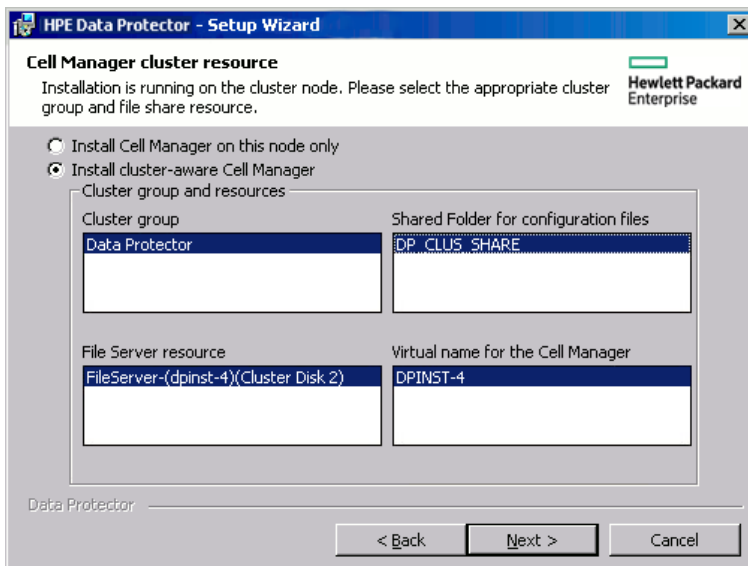


5. Setup automatically detects that it is running in a cluster environment. Select **Install cluster-aware Cell Manager** to enable a cluster setup.

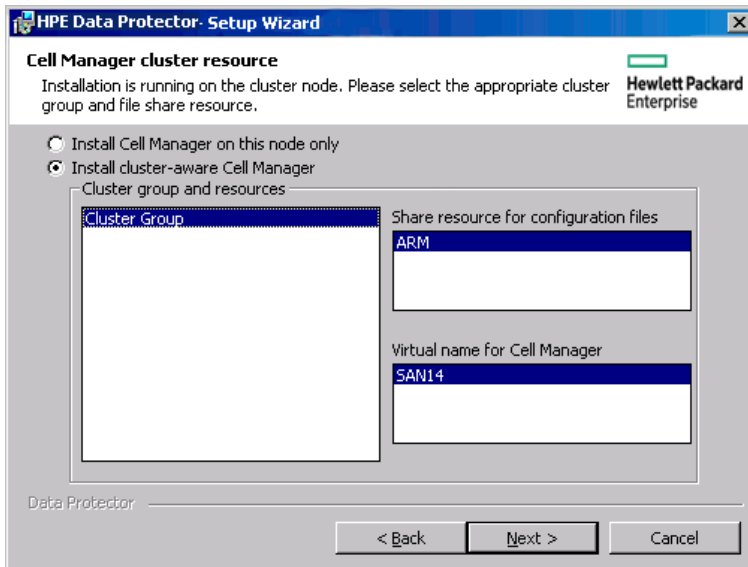
Select the cluster group, the virtual hostname, and the file cluster resource on which Data Protector shared files and the database will reside.

Note: If you select **Install Cell Manager on this node only**, the Cell Manager will *not* be cluster aware. See "[Installing a Windows Cell Manager](#)" on page 35.

Selecting the cluster resource on Windows Server 2008

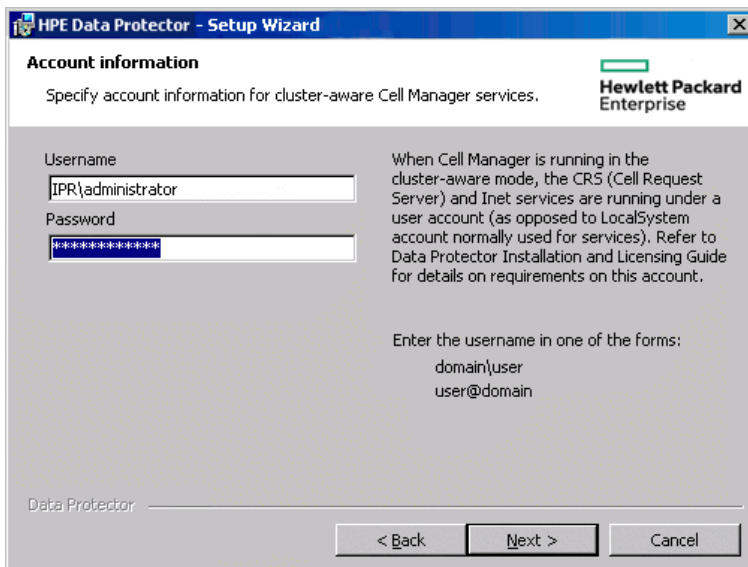


Selecting the cluster resource on other Windows systems



6. Enter the username and password for the account that will be used to start Data Protector services.

Entering the account information



7. Click **Next** to install Data Protector into the default installation folders.
Otherwise, click **Change** to open the Change Current Destination Folder or Change Current Program Data Destination Folder dialog box, and change the installation folder as needed. Path to the program data installation folder should not exceed 80 characters.
8. In the Component Selection window, select the components you want to install on all cluster nodes and cluster virtual servers. Click **Next**.
The MS Cluster Support files are installed automatically.
The selected components will be installed on all the cluster nodes.

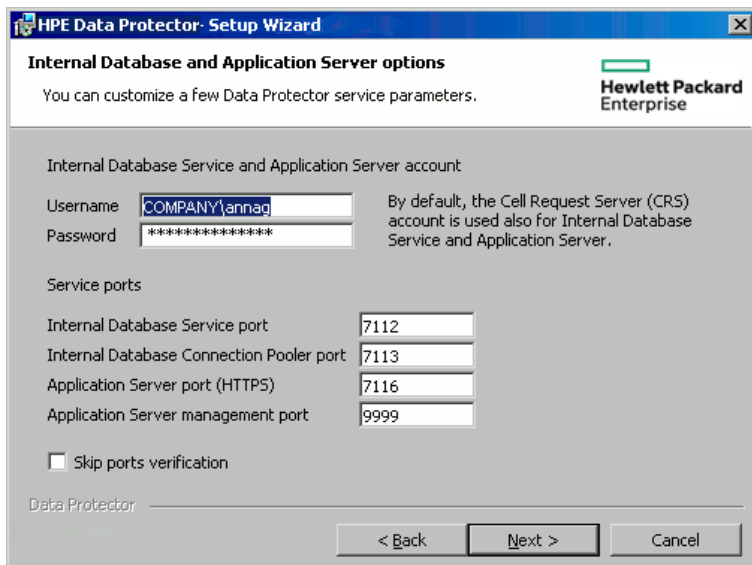
Component selection page



9. Optionally, change the user account or the ports used by the Data Protector services Internal Database Service and Application Server.

Click **Next**.

Changing the IDB and Application Server options



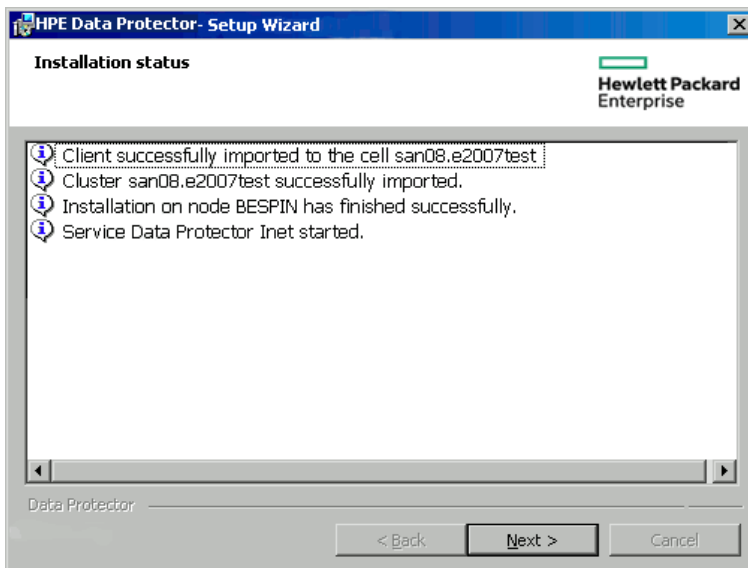
10. If Data Protector detects Windows Firewall on your system, the Windows Firewall configuration page is displayed. Data Protector setup registers all necessary Data Protector executables. By default, the **Initially, allow newly registered Data Protector executables to open inbound ports as needed** option is selected. If you do not want to enable Data Protector to open ports at the moment, deselect the option. For proper functioning of Data Protector with previous version of 9.09 clients, the Data Protector rules in Windows firewall must be enabled. Rules for the Omninet Service executable, Application Server port and Internal Database Service port will always be enabled, regardless of the choice.



Click **Next**.

11. The component selection summary page is displayed. Click **Install**.
12. The Installation setup page is displayed. Click **Next**.

Installation status page



13. If you have installed the User Interface component, to start using the Data Protector GUI immediately after setup, select **Launch Data Protector GUI**.

If you have installed the English Documentation (Guides, Help) component, to view the see the HPE Data Protector Product Announcements, Software Notes, and References immediately after setup, select **Open the Product Announcements, Software Notes, and References**.

14. Click **Finish** to complete the installation.

Installing a cluster-aware Cell Manager for Windows 2012 and Windows 2012 R2 clusters

To install a cluster-aware Cell Manager

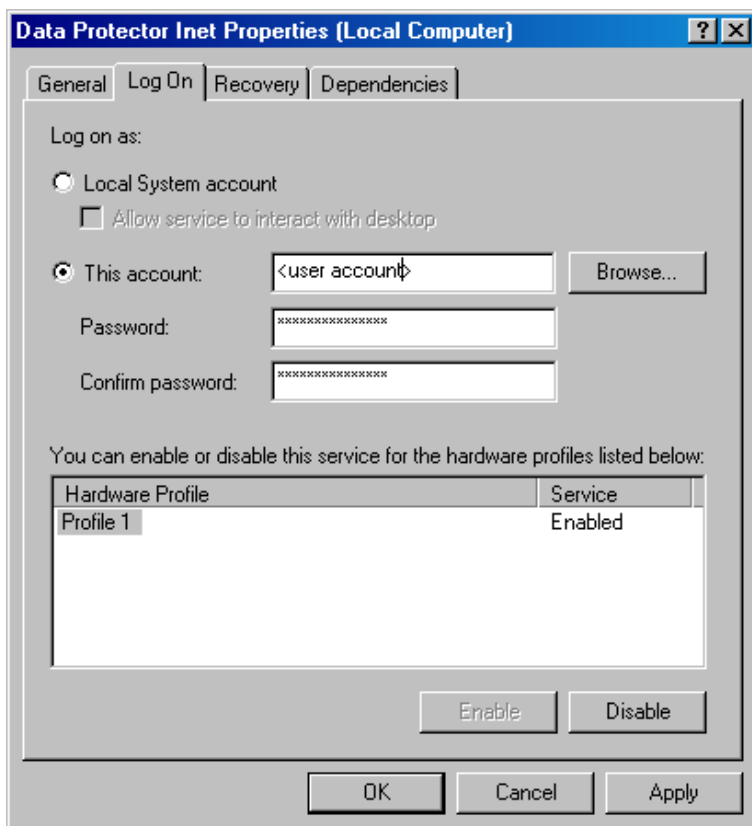
1. Install the Data Protector Installation Server on a machine that is not a part of the cluster.
2. Apply the latest patch on it. The depot in ‘\DP_Program_data\Depot’ of the Installation Server can be used to install the cluster-aware Cell Manager in Windows 2012 and 2012 R2 systems.
3. Copy the depot to any of the cluster nodes and start the installation from the local disk.
4. Alternatively, access the depot using a network share and start the installation from the share. For this step, you need to consider the following:
 - The installation server should be in the same domain as the cluster.
 - Administrative (hidden) shares (\\hostname or IP address of IS\c\$\...) should not be used, because in some cases, they will not be accessible from other cluster nodes. Therefore, normal paths (\\hostname or IP address of IS\depot) should be used and it should be shared with all the cluster nodes.
 - The cluster nodes should be able to connect to the normal net path without any password.
 - Normal net path should be accessible from a browser without providing the credentials. If prompted for credentials, enter them and select Remember Credentials.

Checking the installation

When the setup procedure has been completed, you can check whether or not the Data Protector software has been properly installed. Proceed as follows:

1. Check if the Cluster service account is assigned to the Data Protector Inet service on each cluster node. Make sure the same user is also added to the Data Protector admin user group. The logon account type should be set to This account as shown in "[Data Protector user account](#)" below.

Data Protector user account



2. Execute the following command:

```
omnirsh host INFO_CLUS
```

where *host* is the name of the cluster virtual server (case-sensitive). The output should list the names of the systems within the cluster and the name of virtual server. If the output returns \emptyset "NONE", Data Protector is not installed in the cluster-aware mode.
3. Start the Data Protector GUI, select the **Clients** context, and then click **MS Clusters**. See the newly installed systems listed in the Results Area.

Data Protector Inet and CRS services

If needed, change the accounts under which the Data Protector Inet and CRS services are running.

Installing cluster-aware clients

Prerequisites

Before you install a cluster-aware Data Protector client, the following prerequisites must be fulfilled:

- Clustering functionality must be installed properly on all cluster nodes. For example, you must be able to move groups from one to another node as many times as needed, without problems with shared disks.
- Each system of the cluster should be running and functioning properly.

- To enable installation of the cluster-aware Data Protector client on a server cluster with Microsoft Cluster Service (MSCS) running on Windows Server 2008 or Windows Server 2012, perform the procedure described in "[Preparing a Microsoft server cluster running on Windows Server 2008 or Windows Server 2012 for Data Protector installation](#)" on page 361.

Local installation procedure

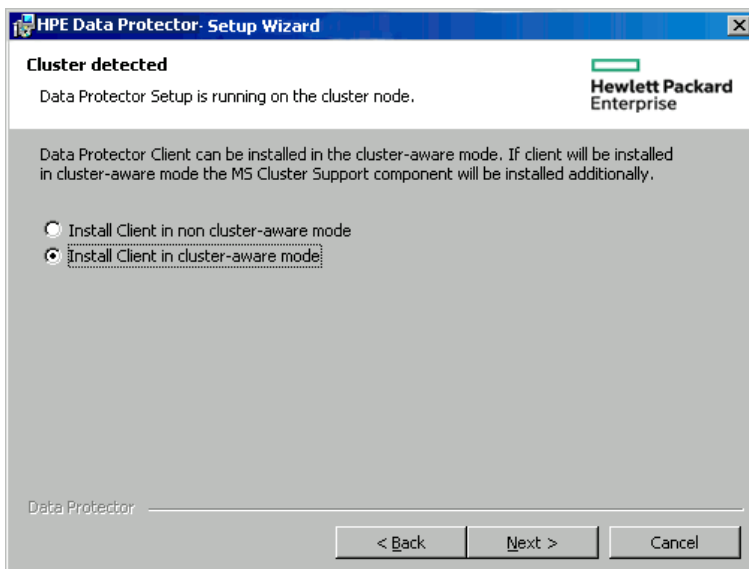
The cluster-aware Data Protector clients must be installed locally, from the DVD-ROM or ISO image, on each cluster node. The cluster nodes (Data Protector cluster clients) are imported to the specified cell during the installation process. You need to import the virtual server name afterwards.

The cluster Administrator account is required to perform the installation. Apart from that, the cluster client setup is the same as for the ordinary Windows client setup. The MS Cluster Support files are installed automatically.

For information on how to locally install a Data Protector Windows client system, see "[Installing Windows clients](#)" on page 62.

The Data Protector installation reports that a cluster was detected. Select **Install client in cluster-aware mode**.

Selecting cluster-aware installation mode



If you are installing the Data Protector Oracle integration, the setup procedure must be performed on all cluster nodes and on the virtual server of the Oracle resource group.

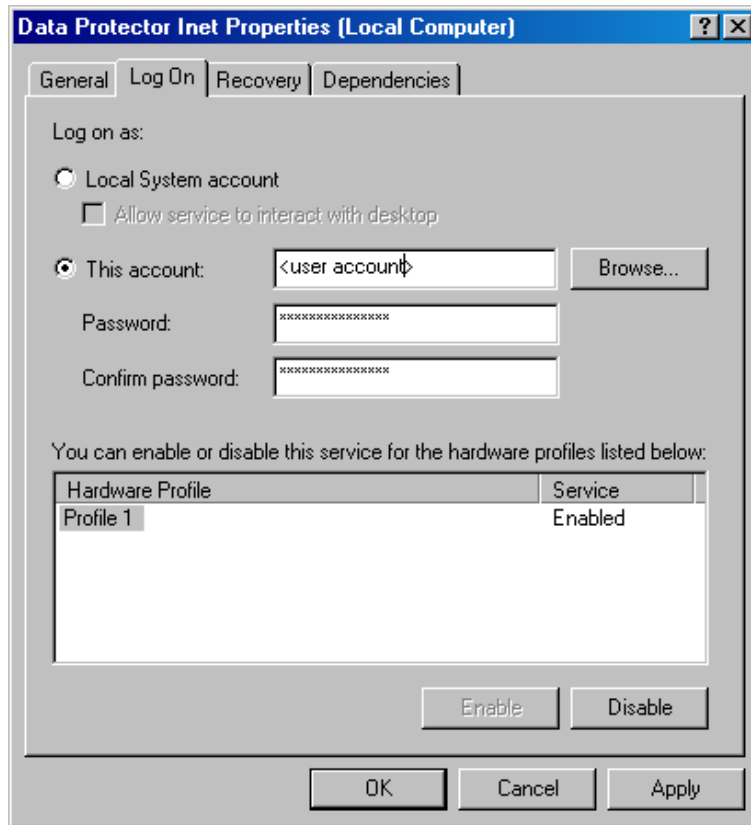
Note: You can import a cluster-aware client to the Data Protector cell that is managed using either the standard Cell Manager or the cluster-aware Cell Manager.

Checking the installation

When the setup procedure has been completed, you can check whether or not the Data Protector software has been properly installed. Proceed as follows:

1. Check if the Cluster service account is assigned to the Data Protector Inet service on each cluster node. Make sure the same user is also added to the Data Protector admin user group. The logon account type should be set to **This account** as shown in "Data Protector user account" below.

Data Protector user account



2. Execute:

```
omninsh host INFO_CLUS
```

where *host* is the name of the cluster client system. The output should return the name of the cluster-aware client system. If the output returns \emptyset "NONE", Data Protector is not installed in the cluster-aware mode.

Veritas Volume Manager

If you have Veritas Volume Manager installed on the cluster, additional steps are required after you have completed the installation of Data Protector on Microsoft Cluster Server. For the additional steps to be performed, see "Installing Data Protector on Microsoft Cluster Server with Veritas Volume Manager" on page 363.

Next steps

When the installation has been completed, you must import the virtual server hostname (cluster-aware application) to the Data Protector cell. See "Importing a cluster-aware client to a cell" on page 189.

For more information on how to configure backup devices, media pools, or any additional Data Protector configuration tasks, see the *HPE Data Protector Help* index: "configuring".

Changing the Inet and CRS accounts

If needed, change the accounts under which the Data Protector Inet and CRS services are running.

Installing Data Protector on an IBM HACMP Cluster

Data Protector supports IBM High Availability Cluster Multi-Processing for AIX.

Install the Data Protector Disk Agent component on all the cluster nodes.

Installing cluster-aware clients

To install Data Protector components on a cluster node, use the standard procedure for installing Data Protector on UNIX systems. For details, see ["Remote installation" on page 90](#) or ["Local installation on UNIX and Mac OS X systems" on page 98](#).

Next steps

After the installation, import the cluster nodes and the virtual server (virtual environment package IP address) to the Data Protector cell. See ["Importing a cluster-aware client to a cell" on page 189](#).

For information on how to configure backup devices, media pools, or any additional Data Protector configuration tasks, see the *HPE Data Protector Help* index: "configuring".

Installing Data Protector on a Microsoft Hyper-V cluster

Installing Data Protector on Microsoft Hyper-V systems that are configured in a cluster using the Microsoft Failover Clustering feature is similar to installing Data Protector on Microsoft Cluster Server; Microsoft Hyper-V systems must become Data Protector cluster-aware clients. For details, see ["Installing Data Protector on a Microsoft Cluster Server" on page 173](#).

Note: Once the Microsoft Hyper-V systems become cluster-aware clients, you can install any additional Data Protector components on them remotely, using the Data Protector Installation Server.

Chapter 6: Maintaining the Installation

This chapter describes the procedures most frequently performed to modify the configuration of your backup environment. The following sections provide information about:

- How and when to use maintenance mode
- How to import clients to a cell using the graphical user interface
- How to import an Installation Server to a cell using the graphical user interface
- How to import clusters/virtual servers using the graphical user interface
- How to export clients using the graphical user interface
- How to ensure security using the graphical user interface
- How to configure LDAP for user authentication in Data Protector
- How and when to use the Certificate Generation Utility
- How to manage Data Protector patch bundles and identify the installed Data Protector patches
- How to uninstall Data Protector software
- How to add or remove Data Protector software components

Data Protector maintenance mode

Maintenance tasks on Cell Manager, during which the write operations to the Internal Database should be prevented, require Data Protector to enter maintenance mode. Such tasks include upgrading the Data Protector installation, installing patches and critical fixes, upgrading hardware or the operating system. Maintenance mode is required only for certain procedures described in this chapter, but is as well applicable for tasks described elsewhere throughout the documentation.

The process of entering maintenance mode automatically initiates a series of tasks, such as stopping the scheduler, renaming the backup specification directories, aborting the running processes and freeing up locked resources. Maintenance mode is supported in individual cells, as well as in MoM and cluster environments.

Initiating maintenance mode

Maintenance mode can be initiated by the users with administrative rights via the command line interface. To initiate the maintenance mode, execute:

In an individual cell:

```
omnisv -maintenance [GracefulTime]
```

In a MoM environment:

```
omnisv -maintenance -mom
```

Running sessions are instructed by the Cell Manager to stop all at once, while the cells in a MoM environment enter the maintenance mode one by one.

To customize the way Cell Manager enters the maintenance mode, modify the appropriate global options. The `MaintenanceModeGracefulTime` option reflects the seconds given to the Data Protector services to abort the running sessions, while the `MaintenanceModeShutdownTime` option reflects the seconds to wait for the sessions to abort. The default value for both options is 300. If the `GracefulTime` option is used, it overrides the `MaintenanceModeGracefulTime` global option. In case a restore session is still running after this option is exceeded, maintenance mode initiation fails.

In case any cell in MoM environment fails to enter the maintenance, the mode is reverted.

To check if Data Protector is running in maintenance mode, see the status of CRS service by executing `omnisv -status`, or check the GUI status bar. Note that the GUI can only reliably indicate the maintenance mode when connecting to the Cell Manager, which may sometimes result in the status bar indicating the maintenance mode even after the Cell Manager has been switched back to normal mode.

During the maintenance mode, Cell Manager rejects all operations that write data to the Internal Database, such as creating new devices, backup and restore sessions or their previews, purge, copy and consolidation sessions.

In cluster environments, only manual cluster related activities can be performed while the maintenance mode is active, such as shutting down cluster packages, stopping the Data Protector services, or manual volume mounting.

All read-only IDB operations are allowed while the maintenance mode is active. Data Protector services are all up and running. Only users with administrative Data Protector user rights can connect to the cell or MoM while the Cell Manager is in maintenance mode.

Quitting maintenance mode

To quit the maintenance mode on Cell Manager using the CLI, execute:

- In an individual cell:
`omnisv -maintenance -stop`
- In a MoM environment:
`omnisv -maintenance -mom_stop`

While in a MoM environment, an individual cell cannot quit the maintenance mode. MoM maintenance can only be invoked from MoM Server.

To quit maintenance mode using the GUI:

1. In the Context List select **Clients**.
2. In the **Actions** menu click **Stop Maintenance Mode**.

After the normal mode is resumed, you can restart aborted and rejected sessions, as they have been logged in the `maintenance.log` file, located at the default Data Protector log files directory.

The following two examples show `maintenance.log` entries for aborted and rejected sessions:

```
10.5.2013 10:52:45 OMNISV.2492.9936
["/cli/omnisv/omnisv.c $Rev: 22709 $ $Date:: 2013-03-22 18:00:03":247] X.99.01 b2
Session was aborted - graceful period expired!
session id:      2013/05/10-8
session type:    0
```

```
datalist:          large_backup
start date:       2013-05-10 10:52:45
owned by:        JOHN.JOHNSON@company.com
```

```
10.5.2013 10:48:45 CRS.7620.3308 ["/cs/mcrs/sessions.c $Rev: 22709 $ $Date:: 2013-
03-22 18:00:03":142] X.99.01 b2
CRS is in maintenance mode - session rejected
session id:       R-2013/05/10-200
session type:     dbsm
session desc:     Database
start date:       2013-05-10 10:48:45
owned by:        .@ pid=0
```

Sessions are logged as aborted when they attempted to start while the maintenance mode was active. To run aborted sessions afterwards:

1. In the Context List, click **Internal Database**
2. In the Scoping Pane, expand **Sessions**.
3. Right-click a session, and select **Restart Failed Objects** from the context menu

Sessions are logged as rejected when they attempted to start while the Cell Manager was entering the maintenance mode. To run rejected session afterwards, restart each session manually.

Importing clients to a cell

When you distribute Data Protector software to clients using the Installation Server, the client systems are automatically added to the cell. As soon as the remote installation has finished, the client becomes a member of the cell.

Importing means manually adding a system to a cell after the Data Protector software has been installed. When added to a Data Protector cell, the system becomes a Data Protector client. Once the system is a member of the cell, information about the new client is written to the IDB, which is located on the Cell Manager.

When to import

Some of the clients, such as HP OpenVMS and Windows XP Home Edition, that were installed locally from the installation DVD-ROM or ISO image must be imported to the cell after the installation.

A client can only be a member of one cell. If you wish to move a client to a different cell, you first *export* it from its current cell and then *import* it to the new cell. For the procedure on how to export clients, see ["Exporting clients from a cell" on page 192](#).

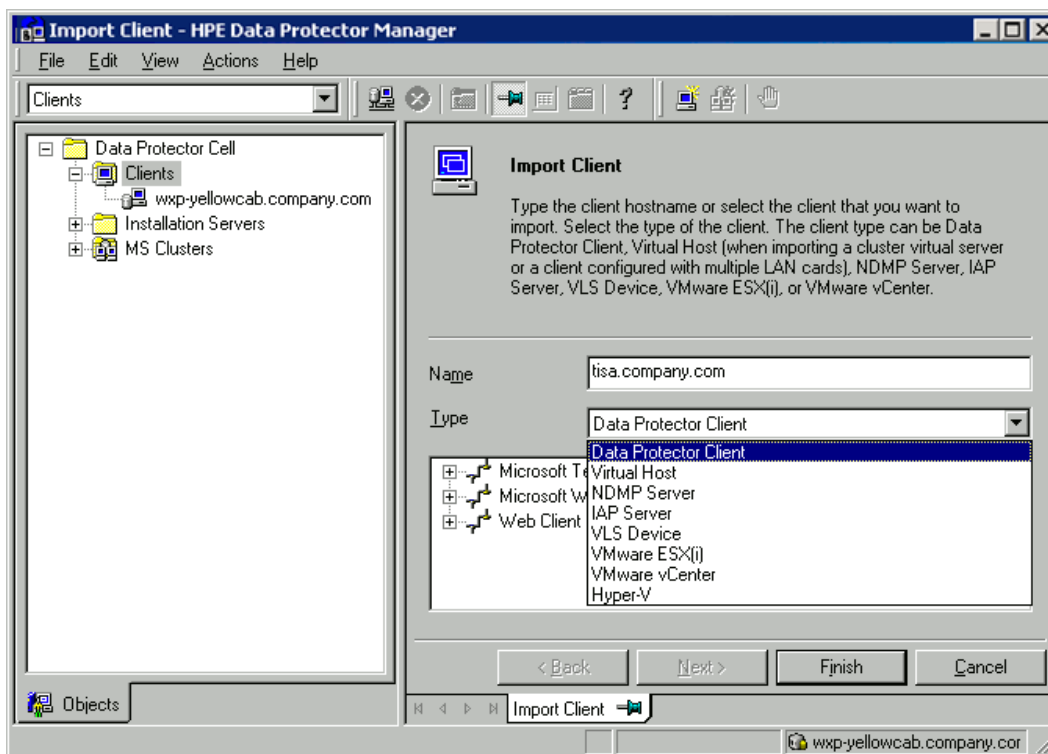
After you have installed Data Protector clients and imported them to a cell, it is highly recommended to protect the clients from access by unwanted cell authorities. See ["Securing clients" on page 196](#).

To import a client system

1. In the Context List, click **Clients**.
2. In the Scoping Pane, right-click **Clients** and click **Import Client**.

3. Type the name of the client or browse the network to select the client (on Windows GUI only) you want to import.

Importing a client to the cell



If you are importing a client configured with multiple LAN cards, select the **Virtual Host** option. With this option you must import all names of the same system.

If you are importing an NDMP client, select the **NDMP Server** option and click **Next**. Specify the information about the NDMP Server.

If you are importing an HP OpenVMS client, type the TCP/IP name of the OpenVMS client in the Name text box.

If you are importing a VLS device, select the **VLS Device** option and click **Next**. Specify the information about the VLS device.

If you are importing a Microsoft Exchange Server DAG virtual host for the Data Protector Microsoft Exchange Server 2010 integration, select **Virtual Host**.

If you are importing a client for the Data Protector Virtual Environment integration, select either **VMware ESX(i)** for a standalone VMware ESX(i) Server system, **VMware vCenter** for a VMware vCenter Server system, or **Hyper-V** for a Microsoft Hyper-V system. Click **Next** and specify login credentials.

Note: To be able to back up virtual machines using the vCD vStorage Image backup method, make sure to import all vCenter Server systems used by VMware vCloud Director in the Data Protector Cell as VMware vCenter clients.

4. Click **Next**.

5. In the Configure encrypted control communication page, you can enable or disable encrypted control communication for the client. See the [Encrypted control communication page](#) for more details.
6. Click **Finish** to import the client.

The name of the imported client is displayed in the Results Area.

Importing an Installation Server to a cell

When to add

An Installation Server must be added to a cell in the following circumstances:

- If it is installed as an independent UNIX Installation Server, for example, it is not installed on a Cell Manager.
In this case, it will not be possible to remotely install any clients within a cell until the Installation Server has been added to that cell.
- If it is installed on a Cell Manager, but you also want to use it to perform remote installations in another cell. It must then be added to the other cell (using the GUI connected to the Cell Manager of the other cell).

Unlike a client, an Installation Server can be a member of more than one cell. Therefore it does not have to be deleted (exported) from one cell before it can be added (imported) to another cell.

How to add

The process for importing an Installation Server is similar to that for importing a client. The task is performed using the Data Protector GUI (connected to the Cell Manager of the cell to which the Installation Server is to be added) by performing the following steps:

1. In the Context List, click **Clients**.
2. In the Scoping Pane, right-click **Installation Servers**, and then click **Import Installation Server** to start the wizard. See "[Importing a client to the cell](#)" on the previous page.
3. Enter or select the name of the system that you want to import. Click **Finish** to import the Installation Server.

Importing a cluster-aware client to a cell

After you have locally installed the Data Protector software on a cluster-aware client, import the virtual server representing the cluster-aware client to the Data Protector cell.

Prerequisites

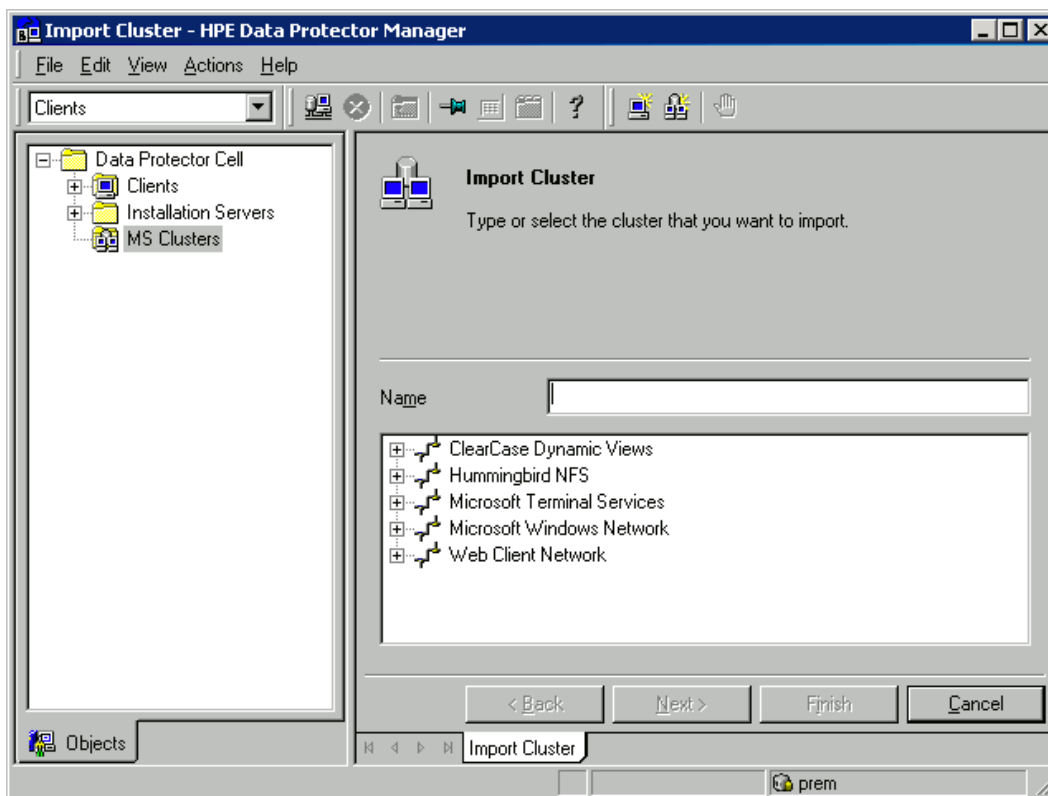
- Data Protector must be installed on all cluster nodes.
- All cluster packages must be running within the cluster.

Microsoft Cluster Server

To import a Microsoft Cluster Server client to the Data Protector cell

1. In the Data Protector Manager, switch to the Clients context.
2. In the scoping pane, right-click **MS Clusters** and click **Import Cluster**.
3. Type the name of the virtual server representing the cluster client to be imported or browse the network to select the virtual server.

Importing a Microsoft Cluster Server client to a cell



4. Click **Next**.
5. When you import a Microsoft Cluster Server Virtual Server, the options specified in the encrypted control communication page apply to all the physical cluster nodes. If you clear the encrypted control communication option, then encrypted control communication is disabled on all the physical nodes. If you select this option, then Encrypted control communication is enabled on all physical cluster nodes. Mixed combinations are not possible.
6. Click **Finish** to import the cluster client.

Tip: To import a specific cluster node or a virtual server, right click its cluster in the Scoping Pane and click **Import Cluster Node** or **Import Cluster Virtual Server**.

Note: When importing additional cluster nodes or additional cluster virtual servers, the Encrypted Control Communication - Configuration page will not be available. If encrypted control communication is enabled on the cluster environment, then each new node or virtual server will also have encrypted control communication enabled.

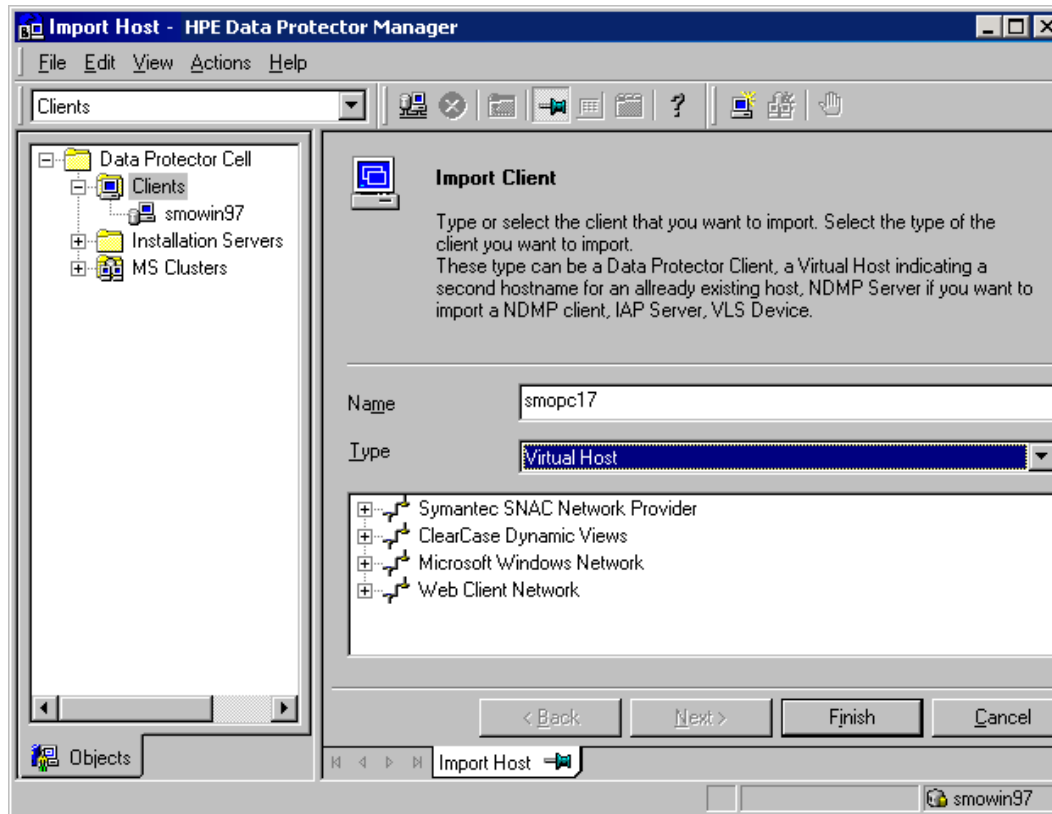
Other clusters

To import an HPE Serviceguard, Veritas, or IBM HACMP Cluster client to the Data Protector cell

1. In the Data Protector Manager, switch to the Clients context.
2. In the Scoping Pane, right-click **Clients** and click **Import Client**.
3. Type the hostname of the virtual server as specified in the application cluster package, or browse the network to select the virtual server (on Windows GUI only) you want to import.

Select the **Virtual Host** option to indicate that this is a cluster virtual server.

Importing an HPE Serviceguard or Veritas client to a cell



4. Click **Finish** to import the virtual server.

Tip: To configure backups of data on the local disks of the cluster nodes, you need to import the cluster nodes representing the Data Protector clients. For the procedure, see ["Importing clients to a](#)

cell " on page 187.

Importing a Virtual Library System (VLS)

A Virtual Library System (VLS) is treated as a Data Protector client. To gain access to the VLS, you need to import it to the Data Protector cell. By doing so, you provide Data Protector with the necessary information for connecting to this VLS and gaining access to the actions and status information.

Steps

1. In the Context List, click **Clients**.
2. In the Scoping Pane, right-click **Clients** and click **Import Client**.
3. In the Name text box, type the hostname or the IP address of the VLS client you want to import. This name will be used for connecting to the VLS.
In the Type drop-down list, select **VLS Device**.
Click **Next**.
4. Specify the required information about the VLS. In the **Port** text box, type the VLS port number (the default value is 5988). Also, provide the username and the password for the specified user, who has sufficient privileges to read attributes and trigger operations on the VLS.
5. Click **Finish**.

Exporting clients from a cell

Exporting a client from a Data Protector cell means removing its references from the IDB on the Cell Manager without uninstalling the software from the client. This can be done using the Data Protector GUI.

You may want to use the export functionality if you:

- Want to move a client to another cell
- Want to remove a client from the Data Protector cell configuration which is no longer part of the network
- Want to resolve problems related to licensing

By exporting a client from a cell, the license becomes available to some other system.

Prerequisites

Before you export a client, check the following:

- All the occurrences of the client have been removed from backup specifications. Otherwise, Data Protector will try to back up unknown clients and this part of the backup specification will fail. For instructions on how to modify backup specifications, see the *HPE Data Protector Help* index: "modifying, backup specification".

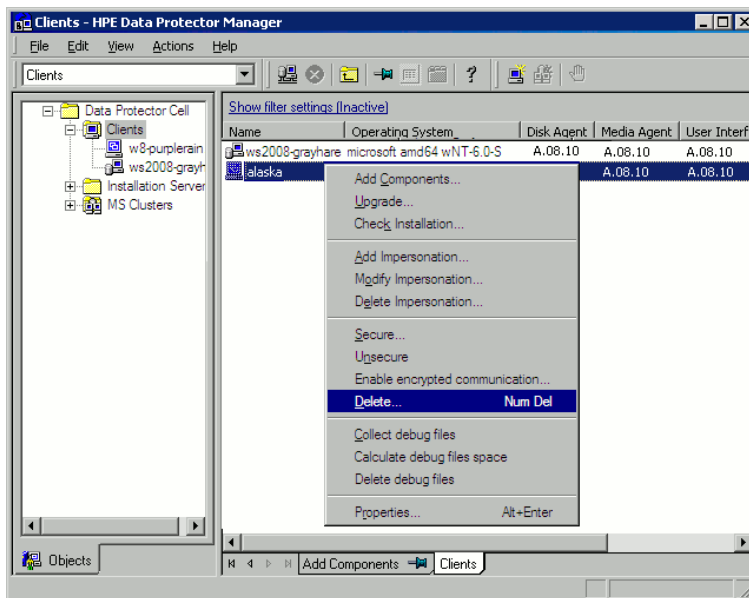
- The client does not have any connected and configured backup devices or disk arrays. Once the system is exported, Data Protector can no longer use its backup devices or disk arrays in the original cell.

Exporting a client

To export a client using the Data Protector GUI

1. In the Context List, click **Clients**.
2. In the Scoping Pane, click **Clients**, right-click the client system that you want to export, and then click **Delete**.

Exporting a client system



3. You will be asked whether you want to uninstall Data Protector software as well. Click **No** to export the client, and then click **Finish**.

The client will be removed from the list in the Results Area.

Note: You cannot export or delete a Data Protector client if the Cell Manager is installed on the same system as the client you would like to export. However, you can export the clients from systems where only the client and Installation Server are installed. In this case, Installation Server is also removed from the cell.

Microsoft Cluster Server clients

To export a Microsoft Cluster Server client from the Data Protector cell

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **MS Clusters**, right-click the cluster client that you want to export,

and then click **Delete**.

3. You are asked if you also want to uninstall the Data Protector software. Click **No** to only export the cluster client.

The cluster client will be removed from the list in the Results Area.

Tip: To export a specific cluster node or a virtual server, right-click the cluster node or virtual server in the Scoping Pane and click **Delete**.

Security considerations

This section describes the security elements of Data Protector. It describes the advanced settings that can be used to enhance the security of Data Protector with prerequisites and considerations that have to be taken into account.

Since enhancing security in an entire environment requires additional effort, many security features cannot be enabled by default.

The considerations described in this chapter apply not only when the security settings are changed, but must also be followed when configuring new users, adding clients, configuring application agents, or making any other changes these considerations apply to. Any changes in the security settings can have cell-wide implications and should be carefully planned.

Security layers

Security has to be planned, tested and implemented on different security-critical layers to ensure the secure operation of Data Protector. Such layers are Data Protector clients, Cell Manager, and users. This section explains how to configure security on each of these layers.

Client security

Data Protector agents installed on clients in the cell provide numerous powerful capabilities, like access to all the data on the system. It is important that these capabilities are available only to the processes running on **cell authorities** (Cell Manager and Installation Server), and that all other requests are rejected.

Before securing clients, it is important to determine a list of trusted hosts. This list must include:

- Cell Manager
- Relevant Installation Servers
- For some clients also a list of clients that will access the robotics remotely.

The list must contain all possible hostnames (or IP addresses) where connections can come from. Multiple hostnames may be needed if any of the above clients is multihomed (has multiple network adapters and/or multiple IP addresses) or is a cluster.

If the DNS configuration in the cell is not uniform, additional considerations may apply. For more information, see "[Securing clients](#)" on page 196.

While it may not always be necessary to secure each and every client in the cell, it is important that the computers that other clients will trust are secured themselves:

- Cell Manager / Manager-of-Managers
- Installation Servers
- Media Agent clients

Note: User interface clients do not need to be added to the list of trusted clients. Depending on the user rights, you can either use the GUI to access the complete Data Protector functionality or to access only specific contexts.

Data Protector users

Consider the following important aspects when configuring Data Protector users:

- Some user rights are very powerful. For example, the `User configuration` and `Clients configuration` user rights enable the user to change the security settings. `Restore to other clients` user right is also very powerful, especially if (but not only if) combined with either the `Back up as root` or `Restore as root` user right.
- Even less powerful user rights bear an inherent risk associated with them. Data Protector can be configured to restrict certain user rights to reduce these risks. These settings are described later on in this chapter. See also "[Start backup specification user right](#)" on page 216.
- Data Protector comes with only a few predefined user groups. It is recommended to define specific groups for each type of user in the Data Protector environment to minimize the set of rights assigned to them.
- In addition to assigning user rights by user group membership, you may want to further restrict actions of certain user groups to only specific systems of the Data Protector cell. You can implement this policy by configuring the `user_restrictions` file. For more information, see the *HPE Data Protector Help*.
- The configuration of users is connected with user validation (see "[Strict hostname checking](#)" on page 201). Enhanced validation can be worthless without careful user configuration and the other way round - even the most careful user configuration can be worked around without the enhanced validation.
- It is important that there are no "weak" users in the Data Protector user list.

Note: The host part of a user specification is the strong part (especially with the enhanced validation), while user and group parts cannot be verified reliably. Any user with powerful user rights should be configured for the specific client they will use for Data Protector administration. If multiple clients are used, an entry should be added for each client, rather than specifying such a user as `user, group, <Any>`. Non-trusted users should not be allowed to log on to any of those systems.

For details on configuring users, see the *HPE Data Protector Help* index: "configuring, users".

Cell Manager security

Cell Manager security is important because the Cell Manager has access to all clients and all data in the cell.

Security of the Cell Manager can be enhanced via the strict hostname checking functionality. However, it is important that the Cell Manager is also secured as a client and that Data Protector users are configured carefully.

While it may not always be necessary to secure each and every client in the cell, it is important that the computers that other clients will trust are secured themselves. These are besides the Cell Manager also the Installation Server and Media Agent clients.

Security of a Cell Manager and subsequently all clients in the Data Protector cell can be additionally enhanced by enabling encrypted control communication.

For details, see the ["Strict hostname checking" on page 201](#), ["Securing clients" below](#), and ["Managing encrypted control communication" on page 203](#).

Other security aspects

There are also some other security related aspects you should consider:

- Users should not have access to any of the trusted clients (Cell Manager, Installation Servers, MA, and robotics clients). Even granting anonymous log on or ftp access could introduce a serious risk to overall security.
- Media and tape libraries (and the clients they are connected to) must be physically protected from unauthorized or untrusted personnel.
- During backup, restore, object or media copying, object consolidation or object verification, data is generally transferred via network. If sufficient separation from the untrusted network cannot be achieved with network segmentation, use locally attached devices, Data Protector encryption techniques, or a custom encoding library. Note that after changing the encoding library, you should perform a full backup.
- In addition, enabling encrypted control communication in a Data Protector cell helps preventing unauthorized access to your system and enhances security.

For other security related aspects, see the *HPE Data Protector Help* and the *HPE Data Protector Concepts Guide*.

Securing clients

After you have installed Data Protector clients and imported them to a cell, it is highly recommended to protect the clients from access by unwanted clients.

Data Protector allows you to specify from which cell authorities (Cell Manager, MoM, and Installation Servers) a client will accept requests on the Data Protector port 5555. Consequently, other computers will not be able to access such a client. See ["Client security" on page 194](#).

Note: Clients that will access library robotics remotely should be added to the cell authorities list for the library robotics clients.

For tasks like backup and restore, starting pre- or post-execution scripts, or importing and exporting clients, the client checks whether the computer which triggers one of these tasks via the Data Protector port (default 5555) is allowed to do so. This security mechanism instructs the client to accept such actions only from the specified cell authorities.

Consider exceptional situations

Before limiting the access to clients, consider the following circumstances which may cause problems:

- A cell authority has several LAN cards and several IP addresses/client names.
- The Cell Manager is cluster-aware.
- A tape library has robotics configured on a separate (or dedicated) system.

Data Protector lets you specify not only one but a list of systems that are explicitly authorized to connect as a cell authority to the client. To avoid failure, prepare in advance such a list of all possible valid client names for alternate cell authorities.

The list should include:

- All additional client names (for all LAN cards) of the cell authority.
- Client names of all cluster nodes where the Cell Manager might failover, as well as a cluster virtual server hostname.
- The target system name to which a cell authority will be moved in case of a total hardware failure of the cell authority. This target system has to be defined in the disaster recovery strategy.
- For clients that are allowed to access a client that controls the robotics of a library, all clients that use the drives of that library.

The concept of allowing and denying access can be applied to all systems with Data Protector installed. For example, you can allow or deny access of Cell Managers to clients, Cell Managers to Cell Managers, Installation Servers to clients, or clients to clients.

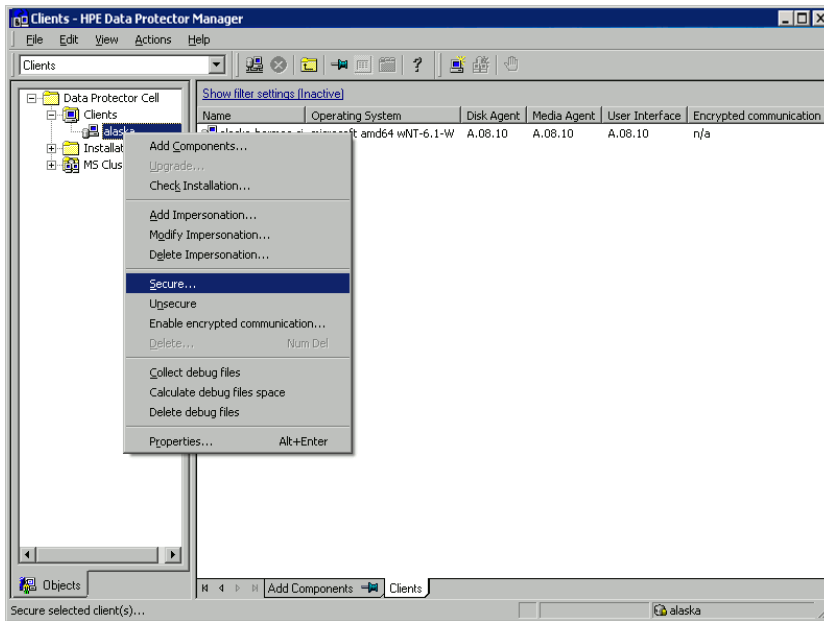
Note: If an Installation Server residing on a system other than the Cell Manager is not added to the list of allowed clients, it will not have access to a secured client. In this case, the operations dependent on the Installation Server (such as checking installation, adding components and removing clients) will fail. If you want these operations to be available on the secured client, add the Installation Server to the list of allowed clients.

Securing a client

To enable verification of a cell authority on the client side (secure a client) in the Data Protector GUI

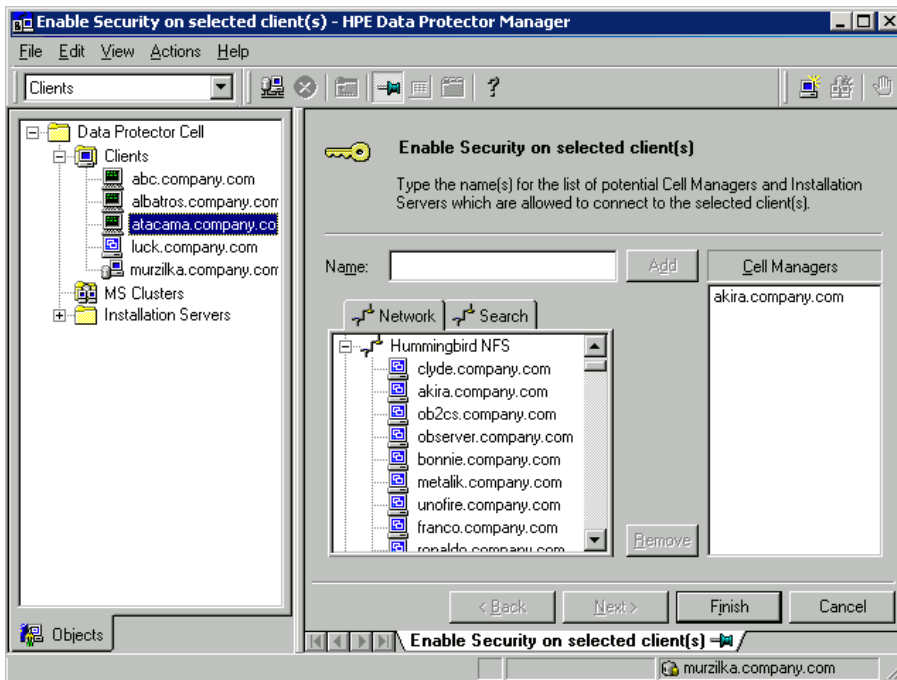
1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand Clients, right-click the client(s) you want to secure, and click **Secure**.

Securing a client



3. Type the names of the systems that will be allowed to access the selected client(s) or search for the systems using the Network tab (on Windows systems only) or Search tab. Click **Add** to add each system to the list.

Enabling security on selected client(s)



The Cell Manager is automatically provided with access and added to the list of trusted clients. You cannot exclude the Cell Manager from the list.

4. Click **Finish** to add the selected systems to the allow_hosts file.

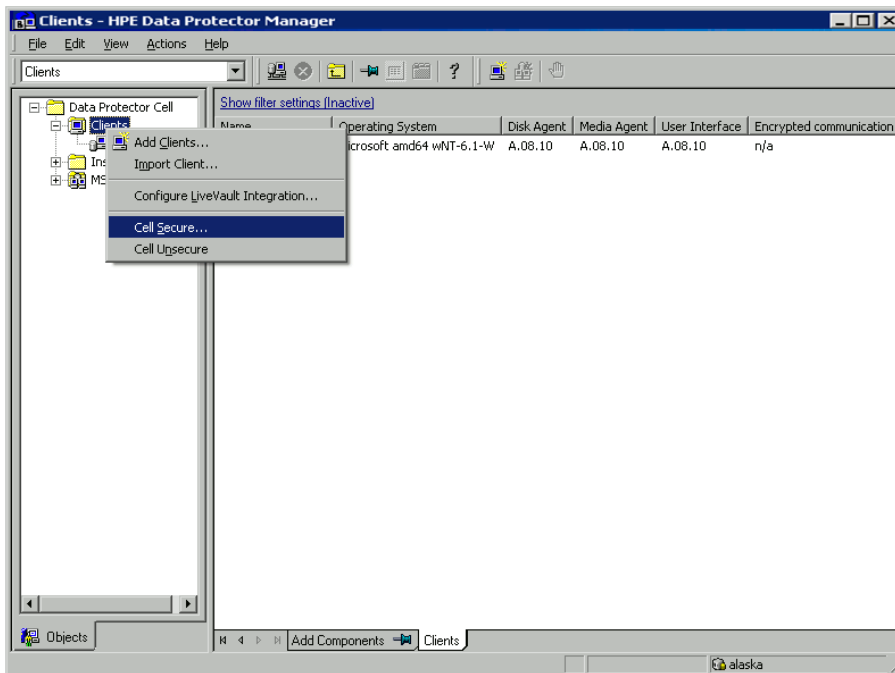
What happens

Clients will verify the source for each request from other clients and allow only those requests received from clients selected in the Enable Security on selected client(s) window. These clients are listed in the `allow_hosts` file. If a request is denied, the event is logged to the `inet.log` file residing in the default Data Protector log files directory.

To secure all clients in the cell

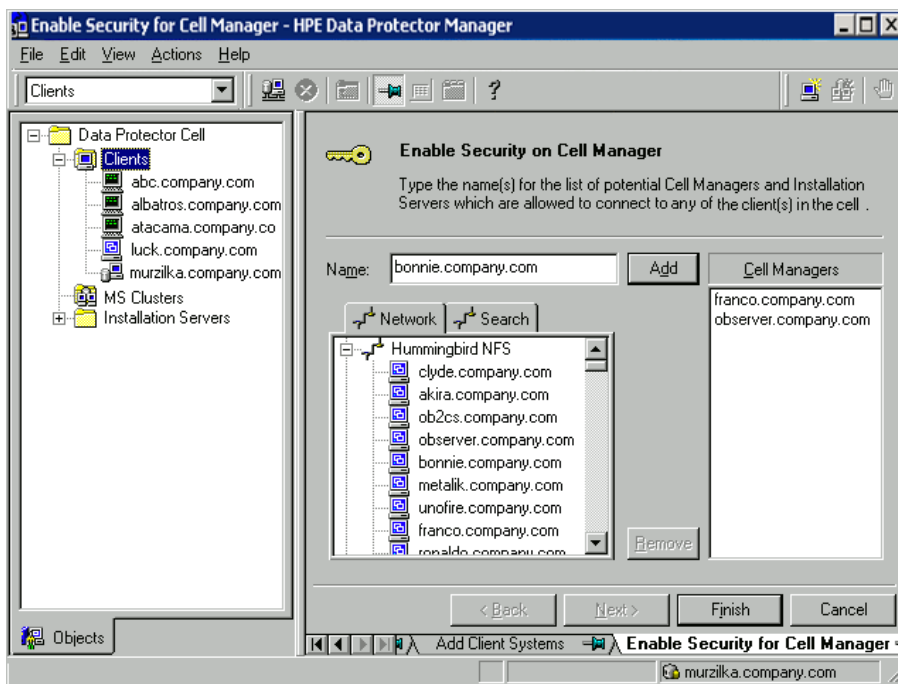
1. In the Context List, click **Clients**.
2. In the Scoping Pane, right-click **Clients** and click **Cell Secure**.

Securing a cell



3. Type the names of the systems that will be allowed to access all clients in the cell or search for the systems using the **Network** (on Windows GUI only) or **Search** tabs. Click **Add** to add each system to the list.

Enabling security for all clients in the cell



4. Click **Finish** to add the selected systems to the `allow_hosts` file.

What happens

Clients will verify the source of each request and allow only those requests received from clients selected in the Enable Security on Cell Manager window. These clients are listed in the `allow_hosts` file. If a request is denied, the event is logged to the `inet.log` file residing in the default Data Protector log files directory.

When you secure an entire cell, all clients residing in this cell at the time are secured. When you add new clients to the cell, you should also secure them.

Removing security

To remove security from the selected system(s) in the Data Protector GUI

1. In the Context List, click **Clients**.
2. In the Scoping Pane, right-click the client(s) from which you want to remove security and click **Unsecure**.
3. Click **Yes** to confirm that you allow access to the selected client(s).

To remove security from all clients in the cell

1. In the Context List, click **Clients**.
2. In the Scoping Pane, right-click **Clients** and click **Cell Unsecure**.
3. Click **Yes** to confirm that you allow access to all client(s) in your cell.

The `allow_hosts` and `deny_hosts` files

When you secure a client, the client names of the systems allowed to access a client are written to the `allow_hosts` file. You can also explicitly deny access to a client from certain computers by adding their names to the `deny_hosts` file. These files are located in the default Data Protector client configuration directory.

Specify each client name in a separate line.

Note: If you accidentally lock out a client, you can manually edit (or delete) the `allow_hosts` file on this client.

On Windows systems, the files are in double-byte format (Unicode), whereas on HP-UX, Solaris, and Linux systems, the files are in single-byte format or multi-byte format (for example, Shift-JIS).

Excessive logging to the `inet.log` file

If the clients are not secured and the Cell Manager is configured in the HPE Serviceguard environment or has multiple names or IP numbers, the `inet.log` file may contain many entries of the following type:

```
A request 0 came from host name.company.com which is not a Cell Manager of this client.
```

This happens because the client, which is not secured, recognizes only the primary hostname of the Cell Manager. Requests from any other clients are allowed, but logged to the `inet.log` file.

When a client is secured, requests from the clients listed in the `allow_hosts` file are accepted, and are thus not logged. Requests from other clients are denied.

Securing clients can be used as a workaround to prevent unnecessary entries in `inet.log` files. However, all possible client names for the Cell Manager should be listed in the `allow_hosts` file on each client. This enables access to the client also in case of a failover.

If this workaround is for any reason not possible in your environment, you can secure the clients and specify `*` as an IP address range for the systems you want to allow access. This means that your clients will accept requests from all systems (any IP address) and will practically not be secured, but you will still resolve the excessive logging issue.

Strict hostname checking

By default, the Cell Manager uses a relatively simple method for validating users. It uses the hostname as known by the client where a user interface or an application agent is started. This method is easier to configure and it provides a reasonable level of security in environments where security is considered as “advisory” (for example, malicious attacks are not expected).

The strict hostname checking setting on the other hand, provides enhanced validation of users. The validation uses the hostname as it is resolved by the Cell Manager using the reverse DNS lookup from the IP obtained from the connection. This imposes the following limitations and considerations:

Limitations

- IP based validation of users can only be as strong as the anti-spoof protection in the network. The security designer must determine whether the existing network provides a sufficient degree of anti-spoof safety for the particular security requirements. Anti-spoof protection can be added by segmenting the network with firewalls, routers, VPN, and such.
- The separation of users within a certain client is not as strong as the separation between clients. In a high security environment, one must not mix regular and powerful users within the same client.
- Hosts that are used in user specifications cannot be configured to use DHCP, unless they are bound to a fixed IP and configured in the DNS.

Be aware of the limitations in order to correctly assess the degree of safety that can be achieved with the strict hostname checking.

Hostname resolution

The hostname that Data Protector uses for validation may differ between the default user validation and strict hostname checking in the following situations:

- Reverse DNS lookup returns a different hostname. This can be either intentional or can indicate misconfiguration of either the client or the reverse DNS table.
- The client is multihomed (has multiple network adapters and/or multiple IP addresses). Whether this consideration applies to a specific multihomed client, depends on its role in the network and on the way it is configured in the DNS.
- The client is a cluster.

The nature of checks that are enabled with this setting may require reconfiguration of Data Protector users. Existing specifications of Data Protector users must be checked to see if they could be affected by any of the above reasons. Depending on the situation, existing specifications may need to be changed or new specifications added to account for all the possible IPs from which the connections can come.

Note that users have to be reconfigured also when reverting back to the default user validation, if you had to modify user specifications when you enabled the strict hostname checking. It is therefore recommended to decide which user validation you would like to use and keep using it.

A prerequisite for a reliable reverse DNS lookup is a secure DNS server. You must prevent physical access and log on to all unauthorized personnel.

By configuring users with IPs instead of hostnames, you can avoid some DNS related validation problems, but such configuration is more difficult to maintain.

Requirements

The enhanced validation does not automatically grant access for certain internal connections. Therefore, when this validation is used, a new user must be added for each of the following:

- Any application agent (OB2BAR) on Windows clients. For Windows clients, it is required to add the user SYSTEM, NT AUTHORITY, *client* for each client where an application agent is installed. Note that if Inet on a certain client is configured to use a specific account, this account must have already

been configured. For more information, see the *HPE Data Protector Help* index: “strict hostname checking”.

- If you are using Web Reporting, user `java`, `applet`, `Hostname` must be added for every hostname from where Web Reporting will be used. Note that for full Web Reporting functionality the users must be in the `admin` group. Therefore, these clients must be trusted. Also, before making any data or functionality of Web Reporting available to other users (for example, via a web server), consider the security implications of making such data generally available.

Enabling the feature

To enable the strict hostname checking, set the `StrictSecurityFlags` global option to `0x0001`.

For more information about the global options, see the *HPE Data Protector Troubleshooting Guide*.

Managing encrypted control communication

Data Protector encrypted control communication helps in preventing unauthorized access to clients in Data Protector Cell Managers. Using the Data Protector GUI or the CLI you can enable or disable encrypted control communication for all clients in the Data Protector cell.

- [Enabling encrypted control communication](#)
- [Selecting TLS version](#)
- [Disabling encrypted control communication](#)
- [Viewing certificate expiration date in Data Protector GUI](#)
- [Upgrading an encrypted environment](#)

Considerations

- The Cell Manager has to be upgraded to the latest patch, to use the new encrypted control communication with Data Protector automatically generated certificates. If the Cell Manager had encrypted control communication enabled from a prior release, you have to disable the encrypted control communication before you proceed to use the new procedure.
- Enabling Encrypted Control Communication will impart additional overhead but testing has shown that any performance impact should not exceed 10%. This can be offset through increased memory and processor allocation.
- It is also recommended to upgrade the Data Protector clients. Data Protector clients that have not been upgraded will not be able to disable the earlier encrypted control communication.
- Hosts with General Media agent, acting as gateway clients, and hosts with StoreOnce Software Deduplication agent must be upgraded.
- The Installation Server cannot be shared between Cell Managers, if the Installation Server has enabled encrypted control communication. However, if the Installation Server has enabled encrypted control communication as part of the MoM environment, then the Installation Server can have encrypted control communication enabled and shared between the Cell Managers in the MoM environment.
- In a Windows environment, you can enable encrypted control communication from the GUI and from the CLI.

- In a UNIX environment, you can enable encrypted control communication only after installing the Cell Manager, using the CLI.
- After you enable encrypted control communication with Data Protector automatically generated certificates on the Cell Manager, the clients added will also have encrypted control communication as enabled.
- StoreOnce Software may fail if the certificate key length is 512 bits or less when the encrypted control communication is enabled. Therefore, use a certificate that has a key length of more than 512 bits.

Note: It is only possible to manage encryption locally on a Cell Manager or from a client that has enabled encrypted control communication.

Enabling encrypted control communication

You can enable encrypted control communication on the following:

In a cell: This includes the Cell Manager and individual clients. You do not need to enable encrypted control communication on all clients.

In a MoM environment: This includes all cells that are a part of the MoM environment.

Note: Ensure that the Universal Standard Time (UST) is the same on all clients in the cell and the Cell Manager.

Enabling encrypted control communication for all clients in the cell, using the CLI:

Execute the following command: `omnicc -encryption -enable -all`

If encrypted control communication has been disabled on the Cell Manager, then it is not possible to enable encrypted control communication for a client in a cell.

To enable encrypted communication only on the Cell Manager, run:

```
omnicc -encryption -enable <CellManager_name>
```

To enable encrypted communication on the Cell Manager (if it has not yet been enabled) and all clients in the cell, run:

```
omnicc -encryption -enable -all
```

Enabling encrypted control communication for all cells in a MoM environment, using the CLI:

It is recommended that you first disable encrypted control communication on all the Cell Managers (including the clients of the Cell Managers) before importing them to the MoM environment, otherwise the Cell Managers cannot communicate and the creation of the MoM environment will not complete. After creating the MoM environment, proceed to enable encrypted control communication in the MoM environment.

Enabling MoM encryption only works:

1. If all the Cell Managers are upgraded to the latest patch. Some clients in Cell Managers can be older, but disabling will not work in this case.
2. If the MoM server and the other Cell Managers can connect and communicate:

- Encrypted control communication has not been enabled on the MoM server and all the other Cell Managers or
- Encrypted control communication has been enabled with Data Protector generated certificates on the MoM server and on some or all of the Cell Managers, which are a part of the MoM environment. Additionally, trust has been established between the MoM server and member servers.

Establishing trust

To enable encrypted control communication without disabling the earlier encrypted control communication, the MoM server has to be able to communicate with the other (member) servers. Before MoM can be created, trust has to be established between the MoM server and the member servers.

Note: Save the initial state of the files so that you can revert the changes in case of an error.

To establish trust between the Cell Managers, do the following:

1. Get the CA certificate for MoM server.
 - a. On the MoM server, open the MoM server trusted certificates file `Data_Protector_program_data/config/client/config` and find the line `trusted_certificates_file=`
For example, `trusted_certificates_file='C:\ProgramData\OmniBack\config\client\certificates\<CMhostname>_cacert.pem'`;
 - b. Open the file `client\certificates\<CMhostname>_cacert.pem` file in a text editor (unless it has been modified, the standard file name format is `<CMhostname>_cacert.pem`) and copy its contents (MoM server CA certificate).
2. Get the CA certificate for server1.
 - a. On server 1 open the server 1 trusted certificates file `Data_Protector_program_data/config/client/config` and find the line `trusted_certificates_file=`
For example, `trusted_certificates_file='C:\ProgramData\OmniBack\config\client\certificates\<CMhostname>_cacert.pem'`
 - b. Open the file `client\certificates\<CMhostname>_cacert.pem` file in a text editor (unless it has been modified, the standard file name format is `<CMhostname>_cacert.pem`) and copy its contents (server 1 CA certificate).
3. Edit both trusted certificate files '`<CMhostname>_cacert.pem`' to include all the certificates that exist on each server that needs to be trusted. In this example, the MoM Server and Server1 need to establish trust with each other.
 - a. On the MoM server, open the MoM server trusted certificates file and include the server 1 CA certificate to the file.
 - b. On server 1, open the server 1 trusted certificates file and include the MoM server CA certificate to the file.
4. If there are more servers (server 2) and so on. Repeat steps 2 and 3 for every server, to be added to the MoM environment.

The Cell Manager trusted certificate file is initially a copy of `Data_Protector_program_data/config/server/certificates/<CMhostname>_cacert.pem`

To enable encrypted control communication, in the MoM environment run `omnicc -encryption -enable_mom{CSHostname1 [CSHostName2...] |-all} [-recreate_cert]`

For more details, see the `omnicc` command in the *HPE Data Protector Command Line Interface Reference*.

Enabling encrypted control communication for all clients in the cell, using the GUI:

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **Data Protector Cell** and then **Clients**. All clients are displayed.
3. Right-click the client that you want to modify and select **Enable encrypted control communication**. In case of multiple clients, select one or more clients for which you want to enable encrypted control communication.

Note: If you select enable encrypted communication option for a client whose Cell Manager is not yet encrypted, you are prompted with a message “You can change encrypted communication configuration only from a client with encrypted communication enabled or the Cell Manager” and the options on that page become unavailable.

4. In the Connection tab, the **Encrypted control communication** option is selected by default.
5. Select **Use Existing certificates**, if you need to use the existing certificates on the Cell Manager.
6. Click **Apply** to save the changes.

Note: You can also enable encrypted control communication in the following scenarios:
Adding or importing: clients to a cell.
Editing the Properties of a client or Cell Manager.

Enabling encrypted control communication with manual distribution of certificates and keys

You can enable encrypted control communication between the clients in the Data Protector cell using the custom keys and certificates.

This section provides details on manual distribution of certificates and keys.

Note: Follow the manual steps carefully to avoid Data Protector communication issues.

Encrypted control communication with manual distribution of certificates

This section covers details on enabling encrypted control communication by manually distributing certificates, instead of using the Data Protector distribution of certificates.

Considerations

- Store certificates and keys in PEM format without any password.
- Do not use existing certificate names for new certificates.

The certificate naming convention is as follows:

`<CMhost>_cacert-C.pem` for the Certificate authority PEM file.

<host>_key-C.pem for the Host private key PEM file.

<host>_cert-C.pem for the Host certificate PEM file.

Note: This is a sample of the certificate naming convention, which can be changed based on user preferences.

To enable encrypted control communication starting with the Cell Manager, perform the following steps:

1. Place certificates in the following certificate directory on the client:

Windows 7, Windows Server 2008, and later:

Data_Protector_program_data\Config\client\certificates

Older Windows systems:

Data_Protector_home\Config\client\certificates

HP-UX and Linux systems:

/etc/opt/omni/client/certificates

Other UNIX systems:

/usr/omni/client/certificates

2. Create a config file with the following:

```
encryption={  
  enabled=1;  
  certificate_chain_file='<client certificate directory>/<host>_cert-C.pem';  
  private_key_file='<client certificate directory>/<host>_key-C.pem';  
  trusted_certificates_file='<client certificate directory>/<CMhost>_cacert-  
  C.pem';  
};
```

The created config file must be placed in the following directory:

Windows 7, Windows Server 2008, and later:

Data_Protector_program_data\Config\client\config

Older Windows systems:

Data_Protector_home\Config\client\config

HP-UX and Linux systems:

/etc/opt/omni/client/config

Other UNIX systems:

/usr/omni/client/config

3. Create or modify the config file in the Server directory on the Cell Manager of the client.

Perform the following steps:

- a. Create or search for the following config file in the Server directory:

Windows Server 2008 and later:

Data_Protector_program_data\Config\Server\config

HP-UX and Linux systems:

```
/etc/opt/omni/server/config
```

- b. Add or modify the following host configuration entry:

```
<host>={  
  encryption={  
    enabled=1;  
    certificate_chain_file='<client certificate directory>/<host>_cert-C.pem';  
    private_key_file='<client certificate directory>/<host>_key-C.pem';  
    trusted_certificates_file='<client certificate directory>/<CMhost>_cacert-C.pem';  
  };  
};
```

Note: The host configuration file entry details are used by the Data Protector GUI.

4. After the encrypted control communication is enabled on the Cell Manager, the clients that connect to the Cell Manager requires a trusted certificate or needs to be added to the security exception list. You can add all the clients that needs to contact the Cell Manager to the security exception list by editing the `config` file in the Server directory as follows:

```
<client1>={  
  encryption={  
    exception=1;  
  };  
};
```

(OR)

You can add the client to the exception list by issuing the following command:

```
omnicc -encryption -add_exception <client1>
```

5. Upload the PEM files into the following server certificate directory to view the certificate content in the Clients context in the Data Protector GUI:

Windows Server 2008 and later:

```
Data_Protector_program_data\Config\Server\certificates
```

HP-UX and Linux systems:

```
/etc/opt/omni/server/certificates
```

Note: In the Data Protector GUI client context, a lock icon is displayed on the host. The flag `-encryption` in `cell_info` file handles this lock functionality.

To add the lock, perform the following steps:

- a. Navigate to the following `cell` directory:

Windows Server 2008 and later:

```
Data_Protector_program_data\Config\Server\cell\cell_info
```

HP-UX and Linux systems:

```
/etc/opt/omni/server/cell/cell_info
```


Note: The `cell_info` file lists all clients.

- b. Modify the line in the `cell_info` file for the client with encrypted control communication enabled by adding `-encryption 1` as shown:

```
-host "computer.company.com" -os "gpl i686 linux-2.6.18-8.e15" -core  
A.09.00 -da A.09.00 -ma A.09.00 -encryption 1
```

6. Repeat steps 1, 2, 3, and 5 for clients you want to enable secure communication.

Note: If Encrypted Control Communication (ECC) is applied on hosts with Physical and Virtual clients, the ECC certificates are applicable for both clients.

Tip:

- It is recommended to use the generated keys and certificates instead of the HPE Data Protector certificate `hpdpcert.pem`.
- Remote clients must consider the manual steps for distribution of certificates and keys, instead of enabling encrypted control communication from the Data Protector GUI or CLI.
- Restart the StoreOnce Software service after replacing certificates.

Encrypted control communication with user-created certificates

This section is applicable for users who want to generate the certificates themselves.

Encrypted control communication with certificates created manually

The earlier versions of Data Protector did not create certificates automatically, you had to create the certificates and point Data Protector to the certificate files.

If you generate the certificates manually, then you have to place the certificates in the following certificates directory on the Cell Manager :

Windows: `Data_Protector_program_data\Omniback\Config\Server\certificates ;`

UNIX: `/etc/opt/omni/server/certificates` directory.

In addition, the certificates have to comply with the following naming convention.

`<computer.company.com>_cert.pem` for the certificate

`<computer.company.com >_key.pem` for the private key

`<CellManager.company.com>_cacert.pem` for the trusted certificate

When you enable encryption (while adding / importing / editing properties of a client or a Cell Manager), these certificates are used by Data Protector. When encryption is enabled, ensure that you select the **Use existing certificates** option from the Data Protector GUI otherwise the existing certificates will get overwritten.

Note that you can also generate the certificates to be used for encrypted control communication, using the script `omnigencert.pl` and then select **Use existing certificates** option from the Data Protector GUI. This enables faster encryption of the clients.

To create the certificates for encrypted control communication use the script `omnigencert.pl`, and run:

```
omnigencert.pl -pem_client -user_id <computer.company.com> [-recreate]
```

The `-recreate` option overwrites the existing certificates, if they exist.

Note: The `omnigencert.pl` script can also be used for generating certificates for other purposes.

Encrypted control communication with certificates created automatically

If you need to generate certificates automatically, and as per your specification, then you can create a Perl script file `gencert.pl` and place it in the following location:

ws: %Data_Protector_home%\bin

UNIX: /opt/omni/lbin

Data Protector starts using the `gencert.pl` instead of the `omnigencert.pl` script after it is added to the specified folder. You can enable encryption using the Data Protector GUI or CLI. This `gencert.pl` script must comply with the following certificate naming conventions:

<computer.company.com>_cert.pem for the certificate

<computer.company.com >_key.pem for the private key

<CellManager.company.com>_cacert.pem for the trusted certificate

The `gencert.pl` script should be able to accept the following parameters:

```
gencert.pl -pem_client -user_id <computer.company.com> [-recreate]
```

Replacing CA certificates in an encrypted control communication environment

It is possible to replace certificates with the ones signed by a different CA. If you need to replace the CA and the certificates in the cell you must perform the following steps:

1. Concatenate the CA certificates:

Copy the new CA certificate to the following path:

- Windows - Data_Protector_program_data\Omniback\Config\Server\certificates and
- UNIX - /etc/opt/omni/server/certificates

To update all the clients in the cell to also trust this new CA, run the following command:

```
omnicc -encryption -update_trust -all -trust newCA.pem
```

2. Recreate the certificates:

You can recreate the certificates either manually or use Data Protector to trigger certificate generation. Data Protector triggers `omnigencert.pl` or `gencert.pl` (if it exists) for creating certificates when you run the following command:

```
omnicc -encryption -enable -all -recreate_cert
```

3. Update the clients to trust only the new CA:

```
omnicc -encryption -update_trust -all -trust newCA.pem -replace
```

Selecting TLS version

To configure the TLS versions, execute the following `omnicc` command:

```
omnicc -encryption -encr_param <hosts> -tls_min <min_ver> -tls_max <max_ver>
```

This command specifies both minimum and maximum versions of TLS. The default range after the installation is TLSv1 to TLSv1.1.

By default, Data Protector uses TLSv1.1 for Encrypted Control Communication. TLSv1 is the default minimum version supported to support communication with previous versions of Data Protector binaries. Binaries prior to version 9.07 supported only TLSv1.

When setting the range of minimum and maximum TLS versions, ensure that a common version is available for all the pairs of systems and Data Protector processes that communicate. If there is no overlap between the two clients, then the connection between them cannot be established.

The maximum version of TLS is TLS1.2. To enable TLS1.2 for a host, use the following command:

```
omnicc -encryption -encr_param <hostname> -tls_max TLS1.2
```

Note: The file `hdpcert.pem` is not suitable for TLS1.2 version.

When using the `hdpcert.pem` or similar short certificate, update the encryption before setting TLS1.2. It is recommended to switch to the Data Protector generated certificates. This can be done by disabling the old encrypted control communication and enabling it again. This causes the certificates to be newly generated by Data Protector.

The `<ssl />` element with `protocol` attribute defines the allowed versions of TLS protocol. The default value is comma-separated list of three versions:

```
protocol = TLSv1,TLSv1.1,TLSv1.2
```

For Windows:

```
c:\ProgramData\OmniBack\Config\Server\AppServer\standalone.xml
```

For Linux:

```
/etc/opt/omni/server/AppServer/standalone.xml
```

Disabling encrypted control communication

You can disable encrypted control communication:

- In a cell: This includes the Cell Manager and clients
- In a MoM environment: This includes all Cell Managers in a MoM environment.

Note: You can change encrypted communication configuration only from a client with encrypted communication enabled or from the Cell Manager.

Disabling encrypted control communication, using the CLI:

- In a cell, run: `omnicc -encryption -disable -all`
- In a MoM environment, run: `omnicc -encryption -disable_mom -all`

- On a specific client, run: `omnicc -encryption -disable <client_name>`
- On multiple clients, run: `omnicc -encryption -disable{Hostname1 [HostName2 ...] | -all}`

For more details, see the `omnicc` man page or the *HPE Data Protector Command Line Interface Reference*.

Disabling encrypted control communication for multiple clients, using the GUI:

1. In the Clients context, select a client or multiple clients.
2. Right-click the selection and select **Disable Encrypted Communication**.
The Disable encrypted control communication page appears. All the clients are selected.
3. Click **Finish** to disable encrypted control communication for the clients.

Disabling encrypted control communication for each client, using the GUI:

1. In the Clients context, select a client.
2. Right-click the selection and select **Properties**.
3. In the **Connection** tab deselect the **Encrypted control communication** option.
4. Click **Apply**.

Note: You can also disable encrypted control communication in the following scenarios:
Adding or importing: Clients to a cell.
Editing the Properties of a client and Cell Manager.

Disabling encrypted communication when the Cell Manager is cluster-aware

This section is relevant only if the Cell Manager is configured in a non-Microsoft cluster.

To illustrate how to disable encrypted communication in such an environment, we will use this example:

The Cell Manager consists of the following systems:

- `cm1.company.com` (cluster node 1)
- `cm2.company.com` (cluster node 2)
- `cmvs.company.com` (cluster virtual server)

The clients are:

- `cl1.company.com`
- `cl2.company.com`
- `cl3.company.com`

To disable encrypted control communication:

1. Ensure that all cluster nodes are online.
2. Disable encrypted communication on all clients in the cell that are not part of the Cell Manager cluster. Run:

```
omnicc -encryption -disable cl1.company.com cl2.company.com cl3.company.com
```

Tip: If you have a Windows client with GUI installed, use the Disable Encrypted

Communication wizard in the GUI. Select all clients in the cell by clicking the **Select All** button and then deselect all systems that are part of the Cell Manager cluster, including the Cell Manager cluster virtual server.

This comes useful if you have many clients in the cell.

3. On the active Cell Manager node, run the following command to disable encrypted communication on all the remaining cluster Cell Manager nodes:

```
omnicc -encryption -disable cm1.company.com cm2.company.com cmvs.company.com
```

Note: If the command fails to disable encrypted communication on all nodes in the cluster, run the command once again.

Disabling encrypted communication manually

To disable encrypted control communication in a whole cell manually, delete the `config` file that is located in the `client` directory on each client in the cell, including the Cell Manager.

Windows systems: `<Data_Protector_program_data>\Config\client`

UNIX systems: `/etc/opt/omni/client`

To disable encrypted control communication on an individual client:

1. Delete the `config` file on the client.
2. On the Cell Manager, modify the `config` file that is located in the `server` directory:

Windows Cell Manager: `<Data_Protector_program_data>\Config\Server\`

UNIX Cell Manager: `/etc/opt/omni/server`

Delete the section related to the client and replace it with:

```
<client.company.com>={  
  encryption={  
    exception=1;  
  };  
};
```

Viewing certificate expiration date in Data Protector GUI

To view the duration from when the certificates are valid using the Data Protector GUI, proceed as follows:

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **Data Protector Cell** and then **Clients**. All clients are displayed.
3. Select a Cell Manager host.

You get to view the General tab details.

4. Select the **Certificates** tab.

You get to view the list of all certificates and their valid from and to dates.

Note: From Data Protector 9.07 onwards, the private keys are generated on the client. If there exists any old private keys of the clients that were created prior to Data Protector 9.07, only those private keys are displayed until recreated.

Upgrading an encrypted environment

By default, after upgrading to the latest patch, changes made to the encrypted control communication functionality do not affect the existing environment. You can choose from the following options to maintain the existing encrypted environment:

Option 1

Remove the encryption from the entire cell and enable encryption in the cell in the new way (recommended). See [Enabling encrypted control communication](#).

Option 2

Keep the existing certificates on the clients and maintain the environment using the `omnicc` command:

```
omnicc -encryption -enable {Hostname1 [HostName2 ...] | -all} [-cert Cert [-key Key]] [-trust TrustedCerts]
```

In this method, it is not possible to configure encrypted control communication using the GUI. Also, the clients will not be encrypted automatically after import. You can encrypt the clients after importing them using the CLI.

For details, see the `omnicc` man page or the *HPE Data Protector Command Line Interface Reference*.

Note: With the earlier method of enabling encrypted control communication, if certificates were not specified, then using the command line `omnicc -encryption -enable` defaulted to `hdpcert.pem`. With the new approach, the default mechanism is for Data Protector to generate the certificates. To enable encrypted control communication with `hdpcert.pem`, the certificate has to be specified: `omnicc -encryption -enable <host> -cert hdpcert.pem -key hdpcert.pem -trust hdpcert.pem`

What happens

Encrypted control communication is enabled on a per-client basis, which means that encryption control communication is either enabled or disabled for all control communication with the selected client.

Upgrading encrypted environment with pre Data Protector 9.03 clients

To move to generated certificates when some clients cannot do disable in a similar way to enable/disable is:

1. Disable all the clients:
 - a. Disable all the clients that can process disable command:

```
omnicc -encryption -disable -all
```

- b. On clients that failed to process disable command, disable the encryption in alternate way.

Option 1:

login to the client and locally delete config/client/config file and then add the line in the subsection for this client on Cell Managers in file config/server/config

```
exception=1;
```

Option 2:

export and import back the client by running the following commands:

```
omnicc -export_host <client>
```

```
omnicc -import_host <client>
```

2. If the Cell Manager has encryption enabled, then the flag has to be set for Cell Manager to generate certificates.

Once all the clients are disabled, the Cell Manager can be instructed to generate the certificates.

- a. Edit the file **config/server/config** file, adding to the subsection for Cell Manager virtual hostname the line:

```
cert_generated=1;
```

- b. Verify that the Cell Manager file is edited correctly and Data Protector generates certificate by running the command

```
omnicc -encryption -cell_enabled
```

which should return 1.

- c. Enable the encryption on Cell Manager and test the local connection (for example, `omnicc -encryption -cell_enabled`, GUI or similar)
- d. Enable the encryption back for the whole cell.

How to add a client to the Security Exceptions list

Clients that for some reason are not supposed to communicate confidentially can be placed in a Cell Manager exception list, which allows particular clients to communicate in non-encrypted mode.

To add a client to the Security Exceptions list

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **Data Protector Cell** and then **Clients**. All clients are displayed.
3. Click the Cell Manager that you want to modify.
4. Type the names of the systems that will be added to the Security Exceptions list in the cell or search for systems using the **Network** (on Windows GUI only) or **Search** tabs.
5. Click **Add** to add systems to the list, then click **Apply** to save the changes.

The server configuration file

The clients that are accepted in a plain text mode are written to the server configuration file, located on the Cell Manager in the directory:

Windows systems: `Data_Protector_program_data\Config\server\config`

HP-UX and Linux systems: `/etc/opt/omni/server/config`

To remove a system from the Security Exceptions list, perform steps 1 to 4 and click **Remove**, then click **Apply** to save the changes.

Limitation

- Communication between the client, which is using plain control communication and the client with enabled encrypted control communication is not supported. This means, that Data Protector operations will not be executed (for example, remote installation from an Installation Server, which is using plain control communication to the client with enabled encrypted control communication will not succeed).

However, the Cell Manager can communicate with both types of clients in the Data Protector cell.

Start backup specification user right

For general information about the Data Protector users and user rights, see the *HPE Data Protector Help* index: “users”.

The `Start backup specification` user right alone does not enable a user to use the Backup context in the GUI. The user is allowed to start a backup specification from the command line by using the omnib with the `-datalist` option.

Note: By combining the `Start Backup Specification` with the `Start Backup` user rights, a user is allowed to see the configured backup specifications in the GUI and is able to start a backup specification or an interactive backup.

Allowing users to perform interactive backups may not always be desired. To allow interactive backups only for users who also have the right to save a backup specification, set the `StrictSecurityFlags` global option to `0x0200`.

For more information on the global options, see the *HPE Data Protector Troubleshooting Guide*.

Hiding the contents of backup specifications

In a high security environment, the contents of saved backup specifications may be considered to be sensitive or even confidential information. Data Protector can be configured to hide the contents of backup specifications for all users, except for those who have the `Save backup specification` user right. To do so, set the `StrictSecurityFlags` global option to `0x0400`.

For more information about the global options, see the *HPE Data Protector Troubleshooting Guide*.

Host trusts

The host trusts functionality reduces the need to grant the `Restore to other clients` user right to users when they only need to restore the data from one client to another within a limited number of clients. You can define groups of hosts that will trust each other with the data.

Host trusts are typically used in the following situations:

- For clients in a cluster (nodes and virtual server).
- If the hostname of a client is changed and the data from the old backup objects needs to be restored.

- If there is a mismatch between the client hostname and backup objects due to DNS issues.
- If a user owns several clients and needs to restore the data from one client to another.
- When migrating data from one host to another.

Configuration

To configure host trusts, on the Cell Manager, create the file *Data_Protector_program_data\Config\Server\cell\host_trusts* (Windows systems) or */etc/opt/omni/server/cell/host_trusts* (UNIX systems).

The groups of hosts that trust each other are defined as lists of hostnames enclosed in curly brackets. For example:

Example

```
GROUP="cluster.domain.com"
{
    cluster.domain.com
    node1.domain.com
    node2.domain.com
}
GROUP="Bajo"
{
    computer.domain.com
    anothercomputer.domain.com
}
```

Monitoring security events

If you encounter problems using Data Protector, you can use the information in the log files to determine your problem. For example, logged events can help you to determine misconfigured users or clients.

Client security events

Client security events are logged in the *inet.log* file on every client in the cell in the default Data Protector log files directory.

Cell Manager security events

Cell Manager security events are logged in the *security.log* file residing in the default Data Protector server log files directory.

User authentication and LDAP

Authentication and authorization of Data Protector as an enterprise system should be connected to the enterprise user management infrastructure. This connection allows users and groups configured in a corporate user directory to be granted access to Data Protector services.

User authentication is performed over secure connections, and Lightweight Directory Access Protocol (LDAP) is used as the underlying technology. Consequently, users can use their corporate credentials to access Data Protector services and are not required to maintain separate passwords. In addition, administrators or operators can be maintained as groups in the corporate directory, adhering to established authorization and approval processes.

LDAP integration is configured in a security domain of Data Protector's embedded application server (JBoss) using Java Authentication and Authorization Service (JAAS) login modules. An optional LDAP login module provides LDAP authentication and authorization services, which are mapped to Data Protector permissions by a mandatory Data Protector Login Module. If LDAP integration is not configured, then Data Protector works just as it did in previous releases.

Data Protector uses the login modules in an login module stack to authenticate users. When a user connects to the Cell Manager using the Data Protector GUI, user authentication is performed by the following login modules:

1. LDAP Login Module: Authenticates user credentials, such as username and password, against an existing LDAP server. See [Initializing and Configuring the LDAP Login Module](#).
2. Data Protector Login Module: Authenticates user credentials against the Data Protector user list and the Web access password. See [Granting Data Protector Permissions to LDAP Users or Groups](#).
3. After performing all the steps necessary to complete LDAP initialization and configuration, you can also check the configuration. See [Checking the LDAP Configuration](#).

Note: Whenever a user or client is configured in Data Protector to allow the CLI access in the classic way, the Data Protector GUI does not use the LDAP feature.

Initializing and configuring the LDAP login module

The LDAP login module is located in the security domain of JBoss Application Server, which is installed with Data Protector. The LDAP login module must be initialized and configured prior to the first use of the LDAP security feature.

1. Initializing the LDAP Login Module.
2. Configuring the LDAP Login Module.

Initializing the LDAP login module

To initialize the LDAP login module, use the `jboss-cli` utility, which is also installed with Data Protector

1. The `jboss-cli` utility is located in: `%Data_Protector_home%/AppServer/bin`. Execute the following command:
 - **Windows:** `jboss-cli.bat --file=ldapinit.cli`
 - **UNIX:** `jboss-cli.sh --file=ldapinit.cli`

This command creates an LDAP login module in JBoss configuration and populates this new login module with default values. The default values generated by the command line within the `standalone.xml` configuration file:

```
<security-domain name="hdp-domain">
```

```
<authentication>
<login-module code="LdapExtended" flag="optional">
<module-option name="java.naming.factory.initial"
value="com.sun.jndi.ldap.LdapCtxFactory"/>
<module-option name="java.naming.security.authentication" value="simple"/>
<module-option name="roleFilter" value="(member={1})"/>
<module-option name="roleAttributeID" value="memberOf"/>
<module-option name="roleNameAttributeID" value="distinguishedName"/>
<module-option name="roleAttributeIsDN" value="true"/>
<module-option name="searchScope" value="SUBTREE_SCOPE"/>
<module-option name="allowEmptyPasswords" value="true"/>
<module-option name="password-stacking" value="useFirstPass"/>
</login-module>
<login-module code="com.hp.im.dp.cell.auth.DpLoginModule" flag="required">
<module-option name="password-stacking" value="useFirstPass"/>
</login-module>
</authentication>
</security-domain>
```

Note: The default values generated by the command line within the `standalone.xml` configuration file changes, if the Cell Manager is installed on UNIX environment and uses LDAP authentication. The following are the changes:

```
<login-module code="LdapExtended" flag="optional">
  <module-option name="java.naming.factory.initial"
value="com.sun.jndi.ldap.LdapCtxFactory"/>
  <module-option name="java.naming.security.authentication" value="simple"/>
  <module-option name="roleFilter" value="(member={1})"/>
  <module-option name="roleAttributeID" value="memberOf"/>
  <module-option name="roleNameAttributeID" value="distinguishedName"/>
  <module-option name="roleAttributeIsDN" value="true"/>
  <module-option name="searchScope" value="SUBTREE_SCOPE"/>
  <module-option name="allowEmptyPasswords" value="false"/>
  <module-option name="password-stacking" value="useFirstPass"/>
```

```
<module-option name="java.naming.provider.url" value="ldap://<IP_of_
Active_Directory_host>"/>

<module-option name="baseCtxDN" value="OU=_Benutzer,DC=godyo,DC=int"/>

<module-option name="rolesCtxDN" value="OU=_Gruppen,DC=godyo,DC=int"/>

<module-option name="bindDN" value="CN=backup-service,OU=_Service_
Accounts,DC=godyo,DC=int"/>

<module-option name="bindCredential" value="password"/>

<module-option name="baseFilter" value="(userPrincipalName={0})"/>

</login-module>
```

The configuration parameters `baseCtxDN` and `rolesCtxDN` are the main ones. The Organization Unit (OU) parameter is used to authenticate the UNIX Cell Manager.

2. To access the JBoss admin console, located on the Cell Manager, from a remote client, enable the remote access to the JBoss admin console. To do this, use a text editor and change the bind address of the management interface from 127.0.0.1 to 0.0.0.0 in the interfaces section of the `standalone.xml` file:

```
<interfaces>

<interface name="management">

<inet-address value="{jboss.bind.address.management:0.0.0.0}"/>

</interface>

<interface name="public">

<inet-address value="0.0.0.0"/>

</interface>

<interface name="unsecure">

<inet-address value="{jboss.bind.address.unsecure:127.0.0.1}"/>

</interface>

</interfaces>
```

3. Restart the Data Protector services:

```
omnisv stop
omnisv start
```

Configuring the LDAP login module

To configure the LDAP login module, use the web-based admin console of JBoss Application Server, which gets installed together with Data Protector. Proceed as follows:

1. To access the JBoss admin console, create a JBoss user. To create a JBoss user, run the `add-user` utility:

- **Windows:** add-user.bat located in %Data_Protector_home%/AppServer/bin
 - **UNIX:** add-user.sh located in /opt/omni/AppServer/bin
2. Provide inputs for the following parameters:
 - **Type of user to add:** Select Management User.
 - **Realm:** Leave this field blank, as the default value ManagementRealm is selected by the utility.
 - **Username:** Add a username.
 - **Password:** Add a password.
 3. To access the JBoss admin console, use a browser and open the URL: <http://cell-manager-name:9990/console>
 4. In the Authentication screen, specify the **Username** and **Password** created using the add-user utility.
 5. Click **Log In**. JBoss Application Server admin console appears.
 6. In the JBoss admin console, select the **Profile** tab.
 7. In the **Profile** tab, expand the **Security** node and then click **Security Domains**.
 8. From the list of registered security domains, click **View** for hpdp-domain. The following login modules are defined for the security domain, hpdp-domain:
 - LdapExtended
 - Com.hp.im.dp.cell.auth.DpLoginModule
 9. Select the **LdapExtended** module.
 10. From the Details section, click the **Module Options** tab. All of the pre-configured module options are listed in the **Module Options** tab.
 11. To customize and use the LDAP login module, you need to add additional Module Options. Click **Add** and specify the **Name** and **Value** for each module option. See the following table for more information:

Module Option	Name	Value	Description
Provider URL	java.naming.provider.url	Specify the URL of the LDAP server in the following format: ldap://<server>:<port>	A standard property name
Base Context Distinguished Name (DN)	baseCtxDN	Specify the DN of the LDAP location that contains the users.	The fixed DN of the context from where you start the user search
Base Filter	baseFilter	Specify the attribute in the LDAP	A search filter

Module Option	Name	Value	Description
		setup that matches the user's login name in the following format: (<user-login-name-attribute>={0}) where <user-login-name-attribute> needs to be replaced by the corresponding LDAP attribute name.	used to locate the context of the user to authenticate
Roles Context DN	rolesCtxDN	Specify the DN of the LDAP location that contains the user groups.	The fixed DN of the context to search for user groups
Bind DN	bindDN	Specify the DN of an LDAP user that is used by the login module to perform the initial LDAP bind. You must have the required permission to search the LDAP location of the users and groups to obtain the users and their groups. These locations are defined in the baseCtxDN and rolesCtxDN module options.	The DN used to bind against the LDAP server for the user and roles queries. This is a DN with read/search permissions on the baseCtxDN and rolesCtxDN values
Bind Credential	bindCredential	Specify the password for the LDAP user provided in the BindDN module option.	The password for the bindDN.

For more information on other Module Options, visit the following URLs:

- <https://community.jboss.org/wiki/LdapExtLoginModule>
 - [http://technet.microsoft.com/en-us/library/cc773354\(v=ws.10\).aspx](http://technet.microsoft.com/en-us/library/cc773354(v=ws.10).aspx)
12. The changes will take effect when you reload JBoss Application Server configuration. To reload the configuration, use the `jboss-cli` utility located in: `%Data_Protector_home%/AppServer/bin`.
 13. Execute the following command:
 - **Windows:** `jboss-cli.bat -c :reload`
 - **UNIX:** `jboss-cli.sh -c :reload`

Note: When configuring the LDAP Login Module in MoM environments, ensure that you perform the steps described above on every Cell Manager. Every Cell Manager in the MoM environment needs to have the same configuration for the LDAP login module.

Granting Data Protector permissions to LDAP users or groups

LDAP users can connect to a Cell Manager only if they are granted the Data Protector permissions. After configuring the LDAP login module, you can grant the LDAP users the required Data Protector permissions.

To grant the Data Protector permissions, proceed as follows:

1. Start the Data Protector GUI and grant Data Protector permissions to the LDAP users or groups.
 - Add LDAP users to Data Protector user groups.
 - Add LDAP groups to Data Protector user groups.
2. Log In using LDAP credentials.

Adding LDAP users to user groups

To add LDAP users to Data Protector user groups, proceed as follows:

1. In the Context List, click **Users**.
2. In the Scoping Pane, expand **Users** and right-click the user group to which you want to add the LDAP user(s).
3. Click **Add/Delete Users** to open the wizard.
4. In the **Manual** tab of the Add/Delete Users dialog box, provide the following details:
 - **Type:** Select LDAP.
 - **Name:** Specify the LDAP user in the LDAP user principal name format.
 - **Entity:** Enter LDAP User.
 - **Description:** This is optional.
5. Click **Finish** to exit the wizard.

Adding LDAP groups to user groups

To add LDAP groups to Data Protector user groups, proceed as follows:

1. In the Context List, click **Users**.
2. In the Scoping Pane, expand **Users** and right-click the user group to which you want to add the LDAP group.
3. Click **Add/Delete Users** to open the wizard.

4. In the **Manual** tab of the Add/Delete Users dialog box, provide the following details:
 - **Type:** Select LDAP.
 - **Name:** Specify the LDAP group name in the Distinguished Name (DN) format.
 - **Entity:** Enter LDAP Group.
 - **Description:** This is optional.
5. Click **Finish** to exit the wizard.

Note: An LDAP user is automatically granted the same permission level as the LDAP group this user belongs to.

Logging in using LDAP credentials

To log in using your LDAP credentials, proceed as follows:

1. Start the Data Protector GUI and connect to a Cell Manager.
2. In the LDAP Authentication screen, provide the LDAP credentials to access Data Protector. The LDAP user can belong to any available Data Protector user group.

Checking the LDAP configuration

The following procedure explains how to check if the user rights are set correctly for a specific LDAP user or group by querying the Data Protector login provider service `getDpAc1` from a web browser.

To obtain the Data Protector Access Control List (ACL) for a specific user, proceed as follows:

1. Connect to the Data Protector login provider web service using a browser.
2. The browser may prompt you to accept the server certificate. Click **Accept** to confirm the request.
3. A dialog box appears, prompting you to provide login credentials. Provide a valid LDAP user name and password that was configured using Data Protector. See [Configuring the LDAP login module](#).
4. The browser returns the following Access Control List (ACL): `https://<server>:7116/dp-loginprovider/restws/dp-ac1`
5. Use the ACL to check if the assigned rights match the Data Protector user rights specified for the corresponding Data Protector user group.

Certificate Generation Utility

The X.509 certificate generation utility—`omnigencert.pl`—generates the Certificate Authority (CA), server, and client certificates. It is responsible for the following tasks:

- Setting up a single-level root CA
- Generating CA, server, and client certificates

- Creating the necessary directory structure for storing keys, certificates, configuration, and keystore files
- Storing the generated certificates in predefined locations on the CM
- Generating the properties files of web service roles

Note: The `omnigencert.pl` utility can be run only by the Administrator user (Windows) or the root user (UNIX).

The `omnigencert.pl` utility is developed as a script and gets installed along with the Cell Manager (CM) installation kit. As part of the CM installation, the script is run for the first time, and the certificates are generated and stored in predefined locations.

The `omnigencert.pl` script exists in the following location:

Windows: `%Data_Protector_home%\bin`

Unix: `/opt/omni/sbin`

If required, the Data Protector administrators can run this utility any time after the installation to regenerate certificates using the new keys pair or the new CA setup. However, it is not mandatory to use the certificates generated by this utility for the certificate-based authentication. Instead, you can use an existing CA setup for generating the necessary certificates.

Syntax

This utility is executed initially by the installer as part of Cell Manager installation and the necessary certificates are generated and stored at predefined locations.

The use of this utility is restricted to administrators and is also used to regenerate certificates using new keys pair even including new CA setup. The 'Administrator' user on Windows platform and 'root' user on UNIX platform can execute this script.

The `omnigencert.pl` script exists in the following location:

Windows: `%Data_Protector_home%\bin`

Unix: `/opt/omni/sbin`

You can run the `omnigencert.pl` utility using the following syntax and options:

Usage

```
[-no_ca_setup]
[-server_id ServerIdentityName]
[-user_ID UserIdentityName]
[-store_password KeystorePassword]
[-cert_expire CertificateExpireInDays]
[-ca_dn CertificateAuthorityDistinguishedName]
[-server_dn ServerDistinguishedName]
[-client_dn ClientDistinguishedName]
```

[-server_san]

The `omnigencert.pl` utility supports multiple options, which provide flexibility while generating certificates. If no options are specified, the utility uses default values for generating the certificates.

The `omnigencert.pl` utility supports the following options:

Option	Description
-no_ca_setup	Generates the client and server certificates for an existing CA setup. This option is invalid if a CA setup does not exist.
-server_id	Specifies the value for the Common Name (CN) entity in the Distinguished Name (DN) section of the server certificate. The default value for this option is the CM Fully Qualified Domain Name (FQDN).
-user_id	Specifies the value for the CN entity in the DN section of the client certificate. The default value for this option is WebService User.
-store_password	Defines the password for the keystore or truststore, where the server and client certificates, including their keys, are stored. If this option is not provided, the default password is used for creating stores.
-cert_expire	Defines the expiry of the generated certificate in days. The default value for this option is 8760 days (24 years).
-ca_dn	Defines the DN string for the CA. The DN format is as follows: "CN=<value>, O=<value>, ST=<value>, C=<value>" CN = Common Name, O=Organization Name, ST=State Name, C=Country Name. The default values for the O, ST, and C parameters are as follows: CN = CA <FDQN name of CM server> O = HEWLETT-PACKARD ST = CA C= US
-server_dn	Defines the DN string for the server certificate. The DN format is as follows: "CN=<value>, O=<value>, ST=<value>, C=<value>" CN = Common Name, O=Organization Name, ST=State Name, C=Country Name. The default values for the O, ST, and C parameters are as follows: CN = <FDQN name of CM server> O = HEWLETT-PACKARD ST = CA C= US

Option	Description
-client_dn	<p>Defines the DN string for the client or user certificate. The DN format is as follows: "CN=<value>, O=<value>, ST=<value>, C=<value>" CN = Common Name, O=Organization Name, ST=State Name, C=Country Name. The default values for the O, ST, and C parameters are as follows: CN = WebService User O = HEWLETT-PACKARD ST = CA C= US</p>
-server_san	<p>Specifies the Subject Alternative Names (SAN) in the server certificate. However, the generated server certificate, during the installation of a Cell Manager, has entries of type DNS in the SAN section. These SAN entries are generated automatically based on the available IP numbers in the Cell Manager. To override default auto-generation of SAN entries in the server certificate, specify this option while generating certificates using the certificate generation utility.</p> <p>The DNS and IP types of SAN entries are supported.</p> <p>The format of value for this option is as follows: santype:value, santype:value</p> <p>Each SAN entry is separated by comma (',') and it contains 2 parts; 1) SAN type, 2) value of the SAN type.</p> <p>Examples:</p> <pre>dns:iwf1112056.dprdn.hpe.com, dns:iwf1113456.dprnd.hpe.com ip:15.218.1.100, ip:15.218.1.200, ip:15.218.1.155 dns:iwf1112056.dprnd.hpe.com, ip:15.218.1.100</pre>

Note: The utility does not support the following combinations for options: -server_id and -server_dn, -user_id and -client_dn, and -no_ca_setup and -ca_dn

Examples

The following sections list sample commands for running the `omnigencert.pl` utility on Windows and UNIX.

The `omnigencert.pl` script exists in the following location:

Windows: `%Data_Protector_home%\bin`

Unix: `/opt/omni/sbin`

Windows and Unix Commands

Task	Windows Command	Unix Command
To set up CA and to generate CA, client, and server certificates using default values	<code>%Data_Protector_home%\bin\perl.exe omnigencert.pl</code>	<code>/opt/omni/bin/perl omnigencert.pl</code>
To set up CA and to gen	<code>%Data_Protector_home%\bin\perl.exe omnigencert.pl -server_id <value> -user_id <value></code>	<code>/opt/omni/bin/perl omnigencert.pl -server_id <value> -user_id <value></code>

Task	Windows Command	Unix Command
erate CA, client, and server certificates using specified common name values		
To set up CA and to generate CA, client, and server certificates using specified	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -store_password <value></pre>	<pre>/opt/omni/bin/perl omnigencert.pl -store_password <value></pre>

Task	Windows Command	Unix Command
store password		
To set up CA and to generate CA, client, and server certificates using specified certificate expiry days	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -cert_expire <value></pre>	<pre>/opt/omni/bin/perl omnigencert.pl -cert_expire <value></pre>
To generate the client and	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -no_ca_setup</pre>	<pre>/opt/omni/bin/perl omnigencert.pl -no_ca_setup</pre>

Task	Windows Command	Unix Command
server certificates using an existing CA setup (which is created as part of the installation) using default values		
To set up CA and to generate CA, client, and server	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -ca_dn <value> -server_dn <value> -client_dn <value></pre>	<pre>/opt/omni/bin/perl omnigencert.pl -ca_dn <value> -server_dn <value> -client_dn <value></pre>

Task	Windows Command	Unix Command
certificates using specified DNS		
To generate the client and server certificates using an existing CA setup using specified DNS	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -no_ca_setup -server_dn <value> -client_dn <value></pre>	<pre>/opt/omni/bin/perl omnigencert.pl -no_ca_setup -server_dn <value> -client_dn <value></pre>
To generate client	<ol style="list-style-type: none"> 1. Retrieve the existing keystore password from <DP_DATA_DIR>\Config\client\components\websevice.properties. 2. Retrieve the PGOSUSER value from <DP_SDATA_DIR>\server\idb\idb.config. 	<ol style="list-style-type: none"> 1. Retrieve the existing keystore password from /etc/opt/omni/client/components/websevice.properties. 2. Retrieve the PGOSUSER value from /etc/opt/omni/server/idb/idb.config.

Task	Windows Command	Unix Command
and server certificates using an existing CA certificate in the SG-CLUSTER environment	3. Run the omnigencert.pl utility with the cluster virtual system name as follows: <pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -no_ca_setup -server_id cm_virtual_name.domain.com -user_id hpdp_so_user -store_password existing_keystor_passwd</pre>	3. Run the omnigencert.pl utility with the cluster virtual system name as follows: <pre>/opt/omni/bin/perl omnigencert.pl -no_ca_setup -server_id cm_virtual_name.domain.com -user_id hpdp_so_user -store_password existing_keystor_passwd</pre>
To generate CA, client, and server certificates in the SG-CLUSTER environment	1. Retrieve the existing keystore password from <DP_DATA_DIR>\Config\client\components\webservice.properties. 2. Retrieve the PGOSUSER value from <DP_SDATA_DIR>\server\idb\idb.config. 3. Run the omnigencert.pl utility with the cluster virtual system name as follows: <pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -server_id cm_virtual_name.domain.com -user_id hpdp_so_user -store_password existing_keystor_passwd</pre>	1. Retrieve the existing keystore password from <pre>/etc/opt/omni/client/components/webservice.properties.</pre> 2. Retrieve the PGOSUSER value from <pre>/etc/opt/omni/server/idb/idb.config.</pre> 3. Run the omnigencert.pl utility with the cluster virtual system name as follows: <pre>/opt/omni/bin/perl omnigencert.pl -server_id cm_virtual_name.domain.com -user_id hpdp_so_user -store_password existing_keystor_passwd</pre>

Task	Windows Command	Unix Command
ron men t		
To generate a server certificate with SAN entries of type DNS for a specific Cell Manager server.	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -no_ca_setup -server_ dn iwf11160123.dprnd.hpe.com -server_ san "dns:iwf11160123.dprnd.hpe.com,dns:iw f11160123.dp.hpe.com"</pre>	<pre>/opt/omni/bin/perl omnigencert.pl - no_ca_setup -server_dn iwf11160123.dprnd.hpe.com -server_san "dns:iwf11160123.dprnd.hpe.com,dns:iw f11160123.dp.hpe.com"</pre>
To generate a server certificate with SAN entries of	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -no_ca_setup -server_ dn 15.218.1.100 -server_san "ip:15.218.1.100,ip:15.218.1.101,ip:1 5.218.1.125,ip:15.218.1.116"</pre>	<pre>/opt/omni/bin/perl omnigencert.pl - no_ca_setup -server_dn 15.218.1.100 - server_san "ip:15.218.1.100,ip:15.218.1.101,ip:1 5.218.1.125,ip:15.218.1.116"</pre>

Task	Windows Command	Unix Command
type IP for a specific Cell Manager server.		
To generate a server certificate with SAN entries of types DNS and IP for a specific Cell Manager server.	<pre>%Data_Protector_home%\bin\perl.exe omnigencert.pl -no_ca_setup -server_ dn iwf111206.dprnd.hpe.com -server_ san "dns:iwf111206.dprnd.hpe.com, iwf111206.hpe.com,ip:15.218.1.100,ip: 15.218.1.101,ip:15.218.1.125,ip:15.21 8.1.116"</pre>	<pre>/opt/omni/bin/perl omnigencert.pl - no_ca_setup -server_dn iwf111206.dprnd.hpe.com -server_san "dns:iwf111206.dprnd.hpe.com, iwf111206.hpe.com,ip:15.218.1.100,ip: 15.218.1.101,ip:15.218.1.125,ip:15.21 8.1.116"</pre>

Directory Structure

The following sections list the directories where certificates are stored.

Windows Directory	Unix Directory	Description
ProgramData\Omniback\Config\Server\certificates	/etc/opt/omni/server/certificates	Contains the CA certificate file, cacert.pem, which contains the CA public key.
ProgramData\Omniback\Config\Server\certificates\ca	/etc/opt/omni/server/certificates /ca	Contains the configuration, input, and other files necessary for the CA functioning.
ProgramData\Omniback\Config\Server\certificates\ca\keys	/etc/opt/omni/server/certificates /ca/keys	Contains the CA private key file, cakey.pem.
ProgramData\Omniback\Config\Server\certificates\server	/etc/opt/omni/server/certificates /server	<p>Contains two kinds of stores: keystore and truststore. These stores are created by the Java utility, keytool, for protecting server certificates and its keys. These stores are protected by the store password. It contains the following stores:</p> <p>ca.truststore server.keystore server.trust</p>

Windows Directory	Unix Directory	Description
		store
ProgramData\Omniback\Config\Server\certificates\client	/etc/opt/omni/server/certificates /client	<p>Contains two kinds of stores: keystore and truststore. These stores are created by the Java utility, keytool, for protecting client certificates and its keys. These stores are protected by the store password. It contains the following stores:</p> <ul style="list-style-type: none"> • client.keystore • client.truststore
ProgramData\Omniback\Config\Server\AppServer	/etc/opt/omni/server/AppServer	<p>Contains the properties files created by this utility. This directory contains other files apart from the following properties files:</p> <ul style="list-style-type: none"> • jce-webservice-roles.properties • dp-webservice-roles.properties

Windows Directory	Unix Directory	Description
		ties

Overwriting existing certificates

To overwrite existing certificates—generated by the utility as part of the CM installation—with the certificates generated by an existing CA setup, you can use one of the following options:

- Overwriting certificates in existing keystore and truststore files
- Overwriting certificates by creating new keystore and truststore files

Note: After regenerating certificates or using new certificates, you must restart the Data Protector services on the CM. You must do this before performing any operation that uses certificates, as restarting the services ensures that new certificates are in effect.

Overwriting certificates in existing keystore and truststore files

To overwrite certificates in existing keystore and truststore files, complete the following tasks:

- Replace existing server and client store files
- Replace the CA certificate
- Update the Distinguished Name(DN) string

Replacing existing server and client store files

To replace existing server and client store files, proceed as follows:

1. Retrieve the keystore and truststore files' store password from the `webservice.properties` and `standalone.xml` configuration files, located in:

Windows

- `ProgramData\OmniBack\Config\client\components\webservice.properties`
- `ProgramData\OmniBack\Config\server\AppServer\standalone.xml`

UNIX

- `/etc/opt/omni/client/components/webservice.properties`
- `/etc/opt/omni/server/AppServer/standalone.xml`

2. Remove all entries from the existing server and client store files, `server.keystore`, `server.truststore`, `client.keystore`, and `client.truststore`, located in:

Server

- Windows: ProgramData\Omniback\Config\Server\certificates\server
- Unix: /etc/opt/omni/server/certificates/server

Client

- Windows: ProgramData\Omniback\Config\Server\certificates\client
- UNIX: /etc/opt/omni/server/certificates/client

To make these changes, you can use the Java keytool utility, located in:

Windows: Program Files\Omniback\jre\bin

UNIX: /opt/omni/jre/bin

3. Import the generated certificates into the following stores using the Java keytool utility:
 - Server and CA certificates into server.keystore
 - CA and Client certificate into server.truststore
 - CA certificate into ca.truststore
 - Client and CA certificates into client.keystore
 - CA and Server certificate into client.truststore

Replacing the CA certificate

To replace the existing CA certificate, proceed as follows:

1. Note the permissions of the existing CA certificate file cacert.pem, located in:
 - **Windows:** ProgramData\Omniback\Config\Server\certificates
 - **UNIX:** /etc/opt/omni/server/certificates
2. Replace the existing CA certificate cacert.pem file with the generated CA certificate.

Updating the distinguished name (DN) string

Replace the existing Distinguished Name (DN) string in the jce-webservice-roles.properties and dp-webservice-roles.properties files with the DN string used for the client certificate. These files are located in:

Windows: ProgramData\Omniback\Config\Server\AppServer

UNIX: /etc/opt/omni/server/AppServer

Note: In the DN string, precede spaces and “=” characters with the backslash (\) character.

Overwriting certificates by creating new keystore and truststore files

To overwrite certificates in new keystore and truststore files, complete the following tasks:

- Replace existing server and client store files
- Replace the CA certificate
- Update the Distinguished Name (DN) string
- Update the configuration file with the stores password

Note: You must retain the password for server and client stores.

Replacing existing server and client store files

To replace existing server and client store files, proceed as follows:

1. Note the permissions of the existing server and client store files, `server.keystore`, `server.truststore`, `client.keystore`, and `client.truststore`, located in:

Server

- Windows: `ProgramData\Omniback\Config\Server\certificates\server`
- UNIX: `/etc/opt/omni/server/certificates/server`

Client

- Windows: `ProgramData\Omniback\Config\Server\certificates\client`
- UNIX: `/etc/opt/omni/server/certificates/client`

2. Remove the server and client store files.
3. Create stores with the same file names and permissions.
4. Import the generated certificates into the following stores using the Java keytool utility:
 - Server and CA certificates into `server.keystore`
 - CA and Client certificate into `server.truststore`
 - CA certificate into `ca.truststore`
 - Client and CA certificates into `client.keystore`
 - CA and Server certificate into `client.truststore`

Note: The Java keytool utility is located at Windows: `Program Files\Omniback\jre\bin` and UNIX: `/opt/omni/jre/bin`.

Replacing the CA certificate

To replace the existing CA certificate, proceed as follows:

1. Note the permissions of the existing CA certificate file, `cacert.pem`, located in:

Windows

`ProgramData\Omniback\Config\Server\certificates`

UNIX

`/etc/opt/omni/server/certificates`

2. Replace the existing CA certificate file, `cacert.pem`, with the generated CA certificate.

Updating the distinguished Name (DN) string

Replace the existing Distinguished Name (DN) string in the `jce-webservice-roles.properties` and `dp-webservice-roles.properties` files with the DN string used for the client certificate. These files are located in:

Windows

`ProgramData\Omniback\Config\Server\AppServer`

UNIX

`/etc/opt/omni/server/AppServer`

Note: In the DN string, precede spaces and "=" characters with the backslash (\) character.

Updating the configuration file with the stores password

To update the configuration file with the stores password, proceed as follows:

Note: This task is required only if new stores are created with a new password.

1. Update the `webservice.properties` and `standalone.xml` configuration files with the store password used while creating store files, such as `server.keystore`, `server.truststore`, `ca.truststore`, `client.keystore`, and `client.truststore`.

The configuration files are located in:

Windows

- `ProgramData\OmniBack\Config\client\components\webservice.properties`
- `ProgramData\OmniBack\Config\server\AppServer\standalone.xml`

UNIX

- `/etc/opt/omni/client/components/webservice.properties`
- `/etc/opt/omni/server/AppServer/standalone.xml`

2. In the `standalone.xml` file, update the stores password (highlighted in bold):

```
<ssl name="ssl" password="M6.p0ino06L3w" certificate-key-  
file="/etc/opt/omni/server/certificates/server/server.keystore" protocol="TLS"  
verify-client="want" ca-certificate-  
file="/etc/opt/omni/server/certificates/server/ca.truststore" ca-certificate-  
password="M6.p0ino06L3w"/>
```

3. In the `webservice.properties` file, update the password (highlighted in bold):

```
<jsse keystore-password="M6.p0ino06L3w" keystore-  
url="/etc/opt/omni/server/certificates/server/server.keystore" truststore-  
password="M6.p0ino06L3w" truststore-  
url="/etc/opt/omni/server/certificates/server/server.truststore"/>  
  
<jsse keystore-password="M6.p0ino06L3w" keystore-  
url="/etc/opt/omni/server/certificates/server/server.keystore" truststore-  
password="M6.p0ino06L3w" truststore-  
url="/etc/opt/omni/server/certificates/server/server.truststore"/>  
  
<ssl name="ssl" password="M6.p0ino06L3w" certificate-key-  
file="/etc/opt/omni/server/certificates/server/server.keystore" protocol="TLS"  
verify-client="want" ca-certificate-  
file="/etc/opt/omni/server/certificates/server/ca.truststore" ca-certificate-  
password="M6.p0ino06L3w"/>
```

Managing Data Protector patches

Data Protector patches are provided through HPE support and can be downloaded from the HPE support website. Data Protector provides individual patches and patch bundles.

Verifying which Data Protector patches are installed

You can verify which Data Protector patches are installed on a system in the cell. To verify which Data Protector patches are installed on a particular system in a cell, use the Data Protector GUI or CLI.

Note: After you install a site-specific patch or a patch bundle, it will always be listed in the patch report, even if it has been included into later patches.

Prerequisites

- To use this functionality, you should have the User Interface component installed.

Limitations

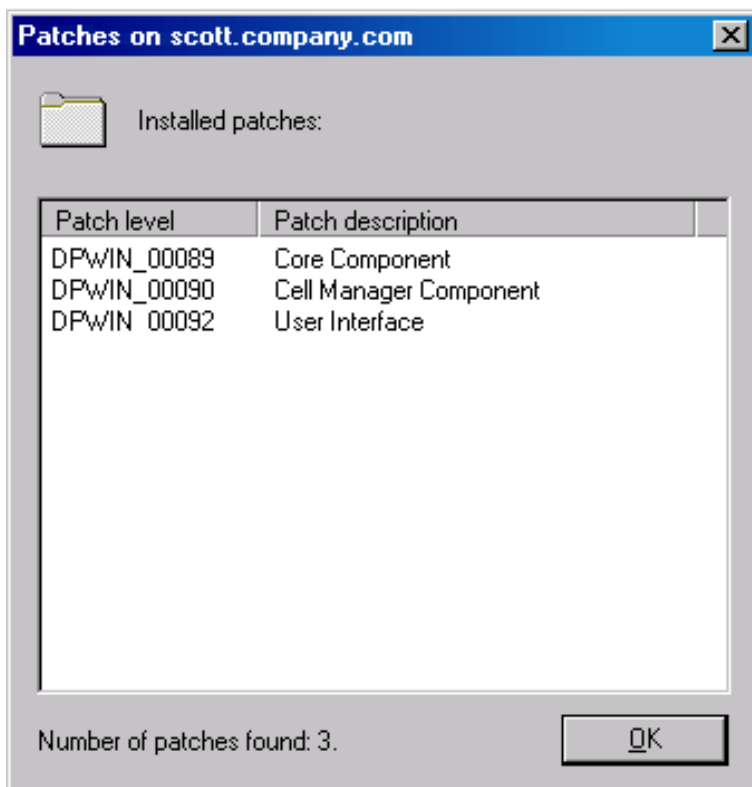
- Patch verification can check which patches are installed on systems within the same cell only.

Verifying Data Protector patches using the GUI

To verify which patches are installed on a particular client using the Data Protector GUI

1. In the Context List, select **Clients**.
2. In the Scoping Pane, expand **Clients** and select a system in the cell for which you want to verify the patches installed.
3. In the Results Area, click **Patches** to open the **Patches on** window.

Verifying patches installed



If there are patches found on the system, the verification returns the level and the description of each patch and the number of the patches installed.

If there are no Data Protector patches on the system, the verification returns an empty list.

If the system verified is not a member of the cell, is unavailable, or an error occurs, the verification reports an error message.

4. Click **OK** to close the window.

Verifying Data Protector Patches Using the CLI

To verify which patches are installed on a particular client using the Data Protector CLI, execute the `omnicheck -patches -host hostname` command, where the *hostname* is the name of the system to be verified.

For more information on the `omnicheck` command, see the `omnicheck` man page.

Patches required by Data Protector

For Data Protector patches, see <https://softwaresupport.hpe.com/> for the latest information.

Windows system patches

For systems running Windows, contact the Microsoft Corporation for the latest Microsoft Windows Service Pack.

HP-UX system patches

For patches on systems running the HP-UX operating systems, see <http://h20565.www2.hpe.com/portal/site/hpsc> for the latest information or check with the Response Center to get the current patch numbers. Install the latest patches before calling support. The patches listed can be replaced with newer patches.

HPE recommends that you regularly install the Extension Software Package delivered for HP-UX. This is a collection of recommended patches, some of which are listed below. Contact HPE Support for the current version of the HP-UX Extension Software Package.

HP-UX 11.11

The following HP-UX 11.11 patch bundles are required by Data Protector:

Service pack	Bundle name	Description
Use latest	GOLDQPK11i	Current patch bundle for HP-UX 11.11
Use latest	HWEnable11i	Required hardware enablement patches

The following HP-UX 11.11 individual patches are recommended for all systems in the Data Protector cell:

Patch name	Hardware platform	Description
PHCO_40310	s700, s800	libc cumulative patch
PHSS_41214	s700, s800	ld(1) and linker tools cumulative patch
KRNG11i	s700, s800	Strong Random Number Generator ¹

The following HP-UX 11.11 individual patches are recommended for all HP-UX 11.11 clients in the Data Protector cell:

Patch name	Hardware platform	Description
Use latest	s700, s800	HPE Serviceguard patches for the version you use

¹ Required to enable encrypted control communication.

The following product and HP-UX 11.11 patch must be installed on each Data Protector Disk Agent system from which data will be backed up in the AES 256-bit encrypted form:

Product number or patch name	Hardware platform	Description
KRNG11I	s700, s800	HP-UX Strong Random Number Generator
PHKL_27750	s700, s800	vpar enablement, krng enablement

Additionally, to use IPv6 on HP-UX 11.11, the following bundle and patches are required by Data Protector:

Bundle or patch name	Hardware platform	Description
IPv6NCF11i bundle or the TOUR transition patches	s700, s800	Transport Transition patch

HP-UX 11.23

The following HP-UX 11.23 patch bundles are required by Data Protector:

Service pack	Bundle name	Description
Use latest	QPK1123	Current patch bundle for HP-UX 11.23

The following HP-UX 11.23 individual patches are recommended for all HP-UX 11.23 clients in the Data Protector cell:

Patch name	Hardware platform	Description
PHKL_32272 ¹	s700, s800	Changes to fix intermittent failures in getacl/setacl.
PHSS_41178	s700, s800	linker and fdp cumulative patch

HP-UX 11.31

The following HP-UX 11.31 patch bundles are required by Data Protector:

Service pack	Bundle name	Description
Use latest	QPK1131	Current patch bundle for HP-UX 11.31

The following HP-UX 11.31 individual patches are required by Data Protector:

¹ This patch is required to support the access control list (ACL) functionality.

Patch name	Hardware platform	Description
PHCO_38050	Itanium, PA-RISC	pthread library cumulative patch
PHKL_38055	Itanium, PA-RISC	Scheduler cumulative patch
PHSS_41179	Itanium, PA-RISC	linker and fdp cumulative patch

SUSE Linux Enterprise Server system patches

Use the latest recommended system patches provided by SUSE.

Red Hat Enterprise Linux system patches

Use the latest recommended system patches provided by Red Hat.

Installing patches

Cell Manager patches can be installed locally. However, in order to patch clients, Installation Server is required. Once the Installation Server is patched, you can then patch clients remotely.

On HP-UX systems, before patching the Cell Manager with a Cell Manager (CS) patch, stop the Data Protector services using the Data Protector `omnisv` command, and start them again after the patching process completes.

If individual patches are included in a patch bundle, you can only install the whole bundle. For details, see the installation instructions provided with the patch.

To verify which patches are installed on the system, you can use the Data Protector GUI or CLI. See ["Verifying which Data Protector patches are installed" on page 242](#)

Installing patches on the Cell Manager configured in Symantec Veritas Cluster Server

When installing a patch for Cell Manager components (CS patch and Patch Bundle), the patch must be applied locally on each node first. The patching procedure for cluster-aware Cell Manager executing on the Symantec Veritas Cluster Server is similar to upgrade (see [Upgrading the Cell Manager configured in Symantec Veritas Cluster Server](#)) with the following exceptions:

1. The configuration steps must be skipped. (that is, the `omniforsg.ksh` must not be executed.)
2. The Data Protector services must not be started before the patch installation.

After locally installing patches (if required), the non-Cell Manager components and core component must be push upgraded from the patched Installation Server. This is also the normal patch installation procedure for non-cluster aware Cell Managers.

Installing and removing Data Protector patch bundles

Before running patch removal on the host, make sure that the following configurations are made on all the systems to which host connects:

- Firewall is configured appropriately to allow Data Protector communication like it was applicable before 9.09 (for example, if windows Data Protector created firewall rules were disabled either by `omnicc` command or manually, they should be re-enabled). For more information, see `omnicc - firewall` command in *HPE Data Protector CLI Reference Guide*.
- If internal Data Protector firewall mode was enabled by `omnicc`, it should be disabled.

The above configurations are required only when:

- Windows OS firewall rules created by Data Protector are modified.
- Data Protector internal firewall was enabled.
- Third party firewall was reconfigured to benefit from the single port feature.

If Data Protector is already installed on your system, you can also install a Data Protector patch bundle (a set of Data Protector patches) on this system.

To install a Data Protector patch bundle on UNIX systems, you can use the `omnisetup.sh` script. On Windows systems, a patch bundle installation is provided as an executable file.

You can also remove the patch bundle. After removing the patch bundle, the last Data Protector release version remains on the system. For details, see the installation instructions provided with the patch bundle.

Installing and removing Data Protector patch bundles on UNIX systems

To install a Data Protector patch bundle, use the `omnisetup.sh` command provided in the tar archive together with the patch bundle files. Use the `-bundleadd` option. For example:

```
omnisetup.sh -bundleadd b909
```

You can install a Data Protector patch bundle only on the Installation Server and the Cell Manager. If the installation fails or you stopped it, you can continue with the installation and install the rest of the patches (supported with Linux systems only), rollback the installed patches to the previous patch level, or exit the installation without installing all patches.

To remove the Data Protector patch bundle, use the `omnisetup.sh -bundlerem` command. For example:

```
omnisetup.sh -bundlerem b909
```

For details, see the installation instructions provided with the patch or patch bundle.

Telemetry subscription

To opt-in to the collection of telemetry data, accept the telemetry license agreement and enter the required details using the `omnisetup.sh` command `-telemetry` option.

The command options used for the telemetry are: `-compname`, `-proxyhost`, `-proxyport`, `-proxyuser`, and `-proxypasswd`.

For more information on `omnisetup.sh` command, see *HPEData Protector CLI Reference Guide*.

Note: Telemetry subscription can be configured later using Data Protector GUI, if not done during installation process.

Installing and removing Data Protector patch bundles on Windows systems

A Data Protector patch bundle for Windows is provided as an executable file (for example, `DPWINBDL_00909.exe`). You can install a Data Protector patch bundle on the Installation Server, the Cell Manager, or the client system.

To install the patch bundle on a Windows system, execute the `BundLeName.exe` command, for example:

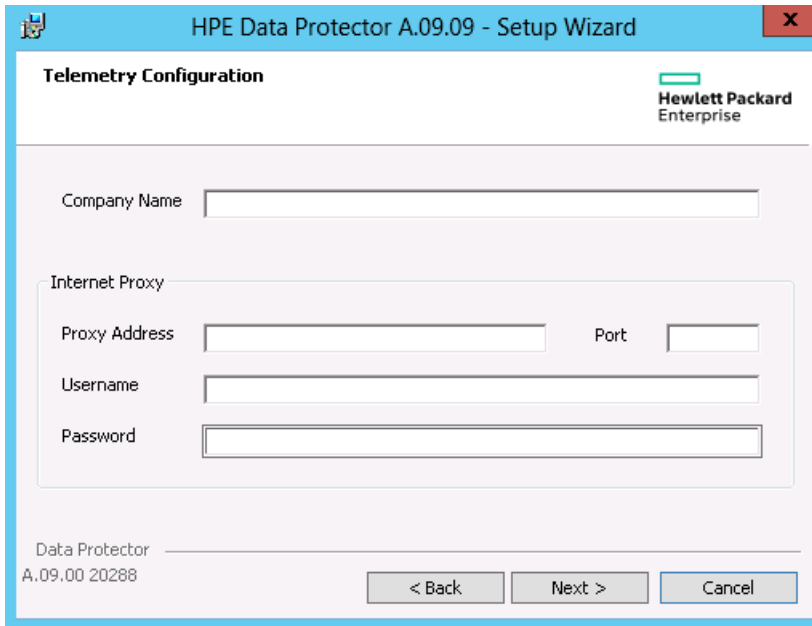
```
DPWINBDL_00909.exe
```

Telemetry subscription

- **Telemetry Agreement** : To opt-in to the collection of telemetry data, accept the telemetry license agreement and enter the required details. For more information on telemetry, see *HPE Data Protector Administration Guide*.



- **Telemetry Configuration:** After accepting the agreement you need to update the following parameters:



- Company Name: Name of the company.
- Proxy Address: The address of proxy server.
- Port: The port of the proxy server.
- Username: User name to connect to the proxy server.
- Password: Password for the given user name.

Note: The proxy configurations are required for loading the telemetry data from Cell Console (CC) client to the backend server.

Note: Telemetry subscription can be configured later using Data Protector GUI, if you chose to opt-out during installation process.

The command recognizes, which components are installed on the system and upgrades them to the latest patch.

Installing patch bundle on Cell Manager

A Data Protector patch bundle for Windows is provided as an executable file (for example, `DPWINBDL_00909.exe`). You can install a Data Protector patch bundle on the Installation Server, the Cell Manager, or the client system.

To install the patch bundle on a Windows system, execute the `BundLeName.exe` command, for example:

```
DPWINBDL_00909.exe
```

To remove the Data Protector patch bundle, use the `remove_patch.bat` command located at the default Data Protector commands location in the `utils` directory .

`remove_patch` *BundleName* *DPIInstallationDepot* where *DPIInstallationDepot* is the location from which Data Protector (not the patch bundle) was installed. For example, to remove the patch `Servicbundle b701`, where Data Protector was installed from `D:\WINDOWS_OTHER`, execute:

```
remove_patch.bat b701 D:\WINDOWS_OTHER
```

You can remove a Data Protector patch bundle from the Installation Server, the Cell Manager, or the client system.

Note: On Windows systems, it is also possible to remove individual patches using the `remove_patch.bat` command. However make sure that if you do not remove the core patch until other individual patches are still installed on the system. Otherwise, you will not be able to remove other individual patches later.

When some of the Data Protector components are installed on the system which were introduced after the major release, ensure that the product on such system is updated back to the patch level to which such components are known or remove such components before uninstalling core patch or patch bundles. For information on removing the Data Protector components, see the "[Changing Data Protector software components](#)" on page 254 section.

For details, see the installation instructions provided with the patch or patch bundle.

Downgrading the Internal Database patch

For Data Protector 9.07 and higher versions, the IDB needs to be downgraded before removing the patch.

To downgrade the IDB patch, proceed as follows:

1. Stop all the services except IDB by executing the following commands:

```
omnisv stop  
omnisv start -idb_only
```

2. Perform the IDB downgrade to Data Protector 9.04 level:

Windows systems:

```
cd %DP_HOME_DIR%\bin\dbscripts  
omnidbutil -run_script CPE\downgrade_to_904.sql
```

GNU/Linux or UNIX systems:

```
cd /opt/omni/sbin/dbscripts  
omnidbutil -run_script CPE/downgrade_to_904.sql
```

3. Proceed with patch removal and remove all patches until the Data Protector version is upgradable to and older than DP 9.04.
4. Re-upgrade at least to 9.04 or higher version immediately after removing the patch and before executing backup or restore.

Managing Site Specific Patches and Hot Fixes

Site Specific Patches (SSP) and Hot Fixes (HF) are applied manually on affected clients or Cell Manager(s).

Preparing Installation Server for remote installation of SSPs or HFs

Data Protector SSP or HF packages are provided by HPE Support. You must copy the SSP or HF package to the Installation Server depot at the following location:

UNIX: /opt/omni/databases/vendor/ssphf

Windows: Data_Protector_program_data\depot\ssphf (For example:
C:\ProgramData\Omniback\depot\ssphf)

To check the SSP/HF packages available for remote installation on the Installation Server, proceed as follows:

1. In the Context List, select **Clients**.
2. In the Scoping Pane, expand **Installation Servers** and select a system in the cell to which you want to push install SSPs/HFs.
3. In the Results Area, click **SSPs and HFs...** to open the SSPs/HFs pop-up window.
If SSPs/HFs are found on the system, you get to view the SSP/HF ID and the number of SSPs/HFs on the Installation Server.
4. Click **OK** to close the window.

Note: Packages for Windows client are shipped in the **zip** format and directly accepted by the Windows installation server. Packages for UNIX clients are usually shipped in a **tar.gz** format to reduce transfer size. The UNIX installation server expects the SSP or HF packages in the tar format. Uncompress the package using gunzip.

Installing Site Specific Patch or Hot Fixes on clients

After the SSP/HF package is copied to the Installation Server, you can select the SSP/HF for installation using the SSP/HF selection list available in the Data Protector GUI. If SSP/HF is selected, all the other Data Protector components are disabled for selection, as only one SSP/HF package can be installed at a time. As SSP/HF can provide binaries for various Data Protector components, only binaries of the installed Data Protector components will be applied to the system. However, the status of the SSP/HF package still shows as Installed as all the applicable binaries are applied to the system.

Note: The remote installation of SSP/HF packages is also available in MoM-GUI.

Remote installation of SSP/HF package refers to deploying the SSP/HF package on the remote system, extracting it, and copying applicable binaries to their target location. As such, it does not handle special procedures needed to replace files in use.

To manually install the SSP/HF on clients, proceed as follows:

- Copy the SSP/HF archive package to the destination host and extract it.
- Stop Data Protector services. Only affected services or processes can be stopped.
- Apply SSP/HF binaries as follows:
 - Copy files from the extracted SSP/HF package to the applicable destination location. (copy only those files for which the Data Protector components are being installed.)
- Copy the CII_<SSPHFNAME> to its corresponding location.

For example:

Windows: Data_Protector_program_data\config\Client\ssphf

Unix: \etc\opt\omni\client\ssphf

Also, you can install the SSP/HF on clients using the `ob2install` command. For more information on the `ob2install` command, see the `ob2install` man page.

Mostly, you need to manually install the SSP/HF packages, which provide some of the listed binaries:

- Cell Server binaries - Especially service and session manager binaries.
- CORE binaries - **Windows:** Inet service binary and catalogue messages. For example, `OmniInet.exe`, `OmniEnu.dll`, and so on.
- GUI binaries - When using the Data Protector GUI on host where such SSP/HF needs to be applied.

Note: Adding components to a cluster-aware Cell Manager running on MS Cluster Server is disabled, as such the SSP/HF cannot be installed remotely and must be manually applied on all applicable cluster nodes.

Reverting binaries replaced by SSP/HF

During remote installation of SSP/HF binaries, the current files are backed up and left on the system for later use.

For example,

Windows: Data_Protector_program_data\tmp\ssphf\<SSPHFNAME>\<DATE_TIME>

Other platform: /var/opt/omni/tmp/ssphf/<SSPHFNAME>/<DATE_TIME>. (Exact location depends on the platform.)

To revert the binaries replaced by the SSP/HF push install, consider one of the following approaches:

- Manually revert backed up binaries.
- Reinstall the affected components to the system. (Preferred)
- Upgrade the system from the Data Protector GUI. (**Clients** context)
- Execute the Repair operation from the Data Protector Setup Wizard. (Applicable for Windows system only)
- Install any other SSP/HF package, which includes all binaries being packed as part of the old SSP/HF to be replaced.

Each SSP/HF push operation creates its own log in the following location, which can be used for troubleshooting failed operations:

Windows: Data_Protector_program_data\log\ssphf_install_<DATE_TIME>.log

Unix: /var/opt/omni/log/ssphf_install_<PID>.log (exact location depends on the platform)

Verifying installed SSPs or HFs

You can verify which Data Protector site specific patches or hot fixes are installed on a system in the cell using the Data Protector GUI or CLI.

Note: After successful installation of SSP/HF, the SSPs and HFs display the installation status as *Installed*. In case of failures, binaries are reverted and status of such SSPs/HFs are not listed.

Remote installation of SSP/HF installs only binaries for the components, which are installed on the target host. The SSP/HF package can display one of the following status:

- **Installed** - all SSP/HF binaries for Data Protector components installed on the system are copied.
- **Partly** - few binaries from the SSP/HF package for Data Protector components installed on the system are not installed. This can happen due to two possible reasons:
 1. If a complete SSP/HF package is installed, the SSP/HF will be marked as *Installed*. However, at some point of time, if another SSP/HF or Data Protector component from the original installation is pushed to the system overwriting some of the binaries provided by SSP/HF, the status of such a package would be changed to *Partly* installed.
 2. If SSP/HF package provides binaries for multiple Data Protector components (example: *da* and *ma*) and only few of the components are installed on the system (example: *da*), only binaries for installed components will be applied on the system (that is, *da*). The installation status of such a package will be shown as *Installed*. Later, if *ma* component is installed on the system, the status of the package would be changed to *Partly* installed.

Note: If all binaries installed by the SSP/HF package are replaced by some other binaries, such an SSP/HF will be treated as not installed anymore and will not be displayed in the SSP/HF status list.

To view the list of SSP/HF binaries which were changed, proceed as follows:

- Check the status of the installed SSP/HF packages in GUI **Clients** context or by using commands `omnicheck -ssphf -host` or `omnicheck -patches -host`.
- Check the debug log on the client for changed binaries after running `omnicheck -ssphf -host` command.
- Enable debugging on the client and revise the created files.

Verifying SSP or HF packages using the GUI

To verify which SSPs/HFs are installed on a particular client using the Data Protector GUI:

1. In the Context List, select **Clients**.
2. In the Scoping Pane, expand **Clients** and select a system in the cell for which you want to verify the SSPs/HFs installed.
3. In the Results Area, click **SSPs and HFs...** to open the SSPs/HFs pop-up window.

If there are SSPs/HFs found on the system, the verification returns the SSP/HF ID and status of each SSP/HF, and the number of SSPs/HFs installed.

4. Click **OK** to close the window.

Verifying the SSPs or HFs using the CLI

To verify which SSPs/HFs are installed on a particular client using the Data Protector CLI, execute the `omnicheck -ssphf -host hostname` command, where the *hostname* is the name of the system to be verified.

For more information on the `omnicheck` command, see the `omnicheck` man page.

Changing Data Protector software components

This section describes the procedure for removing and adding Data Protector software components from or to Windows, HP-UX, Solaris, and Linux systems. For the list of supported Data Protector components for a particular operating system, see the HPE Data Protector Product Announcements, Software Notes, and References.

Data Protector software components can be added on the Cell Manager or on a client using the Data Protector GUI. You perform the remote installation of selected components using the Installation Server functionality. For the detailed procedure, see ["Remote installation" on page 90](#).

The Data Protector components can be removed locally on the Cell Manager, an Installation Server, or a client.

On Windows systems

To add or remove the Data Protector software components on a Windows system.

This procedure is possible only if Data Protector Installation depot with same patch level is available. In some cases path to Installation depot needs to be set, for example: `\\<DP_IS_SYSTEM>\Omniback\ix8664`.

1. In the Windows Control Panel, click **Add or Remove Programs/Programs and Features**.
2. Select **HPE Data Protector 9.09** and click **Change**.
3. Click **Next**.
4. In the Program Maintenance window, click **Modify** and then **Next**.
5. In the Custom Setup window, select the components you want to add and/or unselect the software components you want to remove. Click **Next**.
6. Click **Install** to start the installing or removing the software components.
7. When the installation is completed, click **Finish**.

Cluster-aware clients

If you are changing the Data Protector software components on the cluster-aware clients, it must be done locally, from the DVD-ROM, on each cluster node. After that, the virtual server hostname has to be manually imported to the Data Protector cell using the GUI.

On HP-UX systems

You can add new components using the Installation Server functionality.

To remove components, use the `swremove` command.

Procedure

To remove Data Protector software components

1. Log in as `root` and run the `swremove` command.
2. Double-click **B6960MA**, **DATA-PROTECTOR**, and then **OB2-CM** to display a list of the Data Protector components.
3. Select the components you want to remove.
4. In the **Actions** menu, click **Mark for Remove** to mark the components you want to remove.
5. When the components you want to remove are marked, click **Remove** in the **Actions** menu, and then click **OK**.

Note: When you mark the Data Protector components you want to remove, and if the remaining components cannot operate properly, the **Dependency Message Dialog** box appears with a list of dependent components.

Oracle Server specifics

After uninstalling the Data Protector Oracle Server integration on an Oracle Server system, the Oracle Server software is still linked to the Data Protector Database Library. You have to remove this link, otherwise the Oracle Server cannot be started after removing the integration. For more information, see the *HPE Data Protector Integration Guide*.

On Linux systems

You can add new components using the Installation Server functionality. On Linux systems, some Data Protector components depend on each other and cannot operate properly, if you remove one of them. The table below presents the components and their dependencies on each other.

Data Protector software component dependencies on Linux

Components	Depend on
Cell Manager	
OB2-CC, OB2-DA, OB2-MA, OB2-DOCS	OB2-CORE, OB2-TS-CORE
OB2-CS	OB2-CORE, OB2-TS-CORE, OB2-CC
OB2-TS-CS, OB2-TS-JRE, OB2-TS-AS, OB2-WS, OB2-JCE-DISPATCHER, OB2-JCE-SERVICEREGISTRY	OB2-CORE, OB2-TS-CORE, OB2-CC
Installation Server	
OB2-CORE-IS	OB2-CORE
OB2-CF-P, OB2-TS-CFP	OB2-CORE-IS
OB2-CCP, OB2-DAP, OB2-MAP, OB2-NDMPP, OB2-AUTODRP, OB2-DOCSP, OB2-CHSP, OB2-FRAP, OB2-JPNP, OB2-INTEGP, OB2-VMWP, OB2-VMWAREGRE-AGENTP, OB2-SODAP, OB2-TS-PEGP	OB2-CORE-IS, OB2-CF-P, OB2-TS-CFP
OB2-DB2P OB2-EMCP OB2-INFP OB2-LOTP OB2-OR8P OB2-SAPDP OB2-SAPP OB2-SSEAP OB2-SYBP	OB2-INTEGP, OB2-CORE-IS, OB2-CF-P, OB2-TS-CFP
OB2-SMISP	OB2-CORE-IS, OB2-CF-P, OB2-TS-CFP, OB2-TS-PEG-P

Procedure

To remove Data Protector components from the Linux systems

1. Make sure you terminated all Data Protector sessions and exited the GUI.
2. Enter the command `rpm | grep OB2` to list all the Data Protector components installed.
3. In reverse order to the sequence in which they were installed, remove the components mentioned in Step 2 using the `rpm -e package name` command and follow the prompts.

On other UNIX systems

When manually removing components from a Data Protector client on a UNIX system other than HP-UX or Linux, update the `omni_info` file in `/usr/omni/bin/install`.

For each of the removed components, remove the associated component version string from the `omni_info` file.

If you are only removing components from a Data Protector client and have not exported the client from the cell, you will need to update the cell configuration in the `cell_info` file (on the Cell Manager). This can be done by executing the following command on a system in the cell with the Cell Console installed:

```
omnicc -update_host HostName
```

Verifying the Installation

When you need to check if the Data Protector software components are up and running on the Cell Manager or the client systems, you can verify the installation using the Data Protector graphical user interface.

Prerequisite

You must have the Installation Server for the type of the client system (UNIX system or Windows system) available.

Steps

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **Clients**, right-click the Cell Manager or client system, and then click **Check Installation** to open the wizard.
3. All client systems of the same type (UNIX systems or Windows systems) are listed. Select the clients for which you want to verify the installation and click **Finish** to start the verification.

The results of the verification will be displayed in the Check Installation window.

Uninstalling Data Protector software

If your system configuration changes, you may want to uninstall the Data Protector software from the system or remove some software components.

Uninstalling is removing all the Data Protector software components from the system, including *all* references to this system from the IDB on the Cell Manager computer. However, by default, the Data Protector configuration data remains on the system because you may need this data in the future upgrade of Data Protector. To remove the configuration data after uninstalling the Data Protector software, delete the directories where Data Protector was installed.

If you have some other data in the directory where Data Protector is installed, make sure you copied this data to another location before uninstalling Data Protector. Otherwise, the data will be removed during the uninstallation process.

Uninstalling the Data Protector software from a cell consists of the following steps:

1. Uninstalling the Data Protector client software using the GUI. See "[Uninstalling a Data Protector client](#)" below.
2. Uninstalling Data Protector Cell Manager and Installation Server. See "[Uninstalling the Cell Manager and Installation Server](#)" on the next page.

You can also uninstall Data Protector software components without uninstalling the Cell Manager or client. See "[Changing Data Protector software components](#)" on page 254.

On UNIX, you can also manually remove the Data Protector software. See "[Manual removal of Data Protector software on UNIX](#)" on page 266.

Prerequisites

Before you uninstall the Data Protector software from a computer, check the following:

- Make sure that all references to the computer are removed from the backup specifications. Otherwise, Data Protector will try to back up unknown systems and this part of the backup specification will fail. For instructions on how to modify backup specifications, see the *HPE Data Protector Help* index: "modifying, backup specification".
- Make sure that no backup devices or disk arrays are connected and configured on the system that you want to uninstall. Once the system is exported, Data Protector can no longer use its backup devices or disk arrays in the original cell.
- Before uninstalling, ensure that all GRE and Power On open requests are closed. Additionally, make sure that the Live Migrate sessions that are in progress, are completed or aborted.

Uninstalling a Data Protector client

Note: The remote uninstallation procedure requires the Installation Server to be installed for the platforms from which you are uninstalling the Data Protector software.

To uninstall a client remotely in the Data Protector GUI

1. In the Context List, switch to the **Clients** context.
2. In the Scoping Pane, expand **Clients**, right-click the client you want to uninstall, and then click **Delete**. You will be asked whether you want to uninstall the Data Protector software as well.
3. Click **Yes** to uninstall all the software components from the client, and then click **Finish**.

The client will be removed from the list in the Results Area and the Data Protector software will be deleted from its hard disk.

Note that the Data Protector configuration data remains on the client system. To remove the configuration data, delete the directories where Data Protector was installed.

Uninstalling Cluster clients

If you have cluster aware clients in your Data Protector environment and you want to uninstall them, you must do this locally. The procedure is the same as for uninstalling Cell Manager or Installation Server. See "[Uninstalling the Cell Manager and Installation Server](#)" on the next page.

The cluster client will be removed from the list in the Results Area and the Data Protector software will be deleted from its hard disk.

TruCluster

To uninstall TruCluster clients, export the virtual node first. Then uninstall Data Protector clients from the node(s).

HP OpenVMS clients

A Data Protector OpenVMS client cannot be removed remotely using an Installation Server. It must be uninstalled locally.

To uninstall a Data Protector client from an OpenVMS system

1. First export the client concerned from the Data Protector cell using the Data Protector GUI, as described in ["Exporting clients from a cell" on page 192](#).
If asked whether you want to uninstall the Data Protector software as well, select **No**.
2. To delete the actual Data Protector client software, log in to the SYSTEM account on the OpenVMS client and execute the following command: `$ PRODUCT REMOVE DP`. Respond to the prompt with YES.
This will shut down the Data Protector service and delete all the directories, files, and accounts associated with Data Protector on the OpenVMS system.

Uninstalling the Cell Manager and Installation Server

This section describes the procedure of uninstalling the Data Protector Cell Manager and Installation Server software from Windows, HP-UX and Linux systems.

Uninstalling from Windows systems

Uninstalling from a Microsoft server cluster

To uninstall Data Protector software from a Windows system

1. Make sure you have terminated all Data Protector sessions and exited the GUI.
2. In Windows Control Panel, click **Add/Remove Programs**.
3. Depending on whether you want to leave the configuration data on the system or not, different actions apply:

If you leave the Data Protector configuration data on the system after the uninstallation, and you later install a lower version of the Data Protector Cell Manager than the uninstalled version was, note that the configuration data will be unusable.

To successfully install a lower version, during the installation choose the option that will remove the configuration data.

- To uninstall Data Protector and leave the Data Protector configuration data on the system, select **HPE Data Protector 9.09** and click **Remove**.

- To uninstall Data Protector and remove the Data Protector configuration data, select **HPE Data Protector 9.09**, click **Change** and then **Next**. In the Program Maintenance dialog box, select **Remove**. Select **Permanently remove the configuration data** and click **Next**.
4. When uninstalling is completed, click **Finish** to exit the wizard.

Uninstalling from HP-UX systems

The Cell Manager for HP-UX is always installed locally, using the `omnisetup.sh` command. Therefore, it must be uninstalled locally, using the `swremove` utility.

If you leave the Data Protector configuration data on the system after the uninstallation, and you later install a lower version of the Data Protector Cell Manager than the uninstalled version was, note that the configuration data will be unusable.

To successfully install a lower version, after the uninstallation remove the remaining Data Protector directories from your system.

Prerequisites

- Remove any installed Data Protector patch bundles using the `omnisetup.sh -bundlerem` command. See ["Installing and removing Data Protector patch bundles on UNIX systems" on page 247](#).

Procedure

Before you start uninstalling Data Protector software, shut down Data Protector processes running on the Cell Manager and/or Installation Server system:

1. Log in as root and execute the `omnisv -stop`.
2. Enter the `ps -ef | grep omni` command to verify whether or not all the processes have been shut down. There should be no Data Protector processes listed after executing `ps -ef | grep omni`.

If you have any Data Protector processes running, stop them using the `kill process_ID` command before you proceed with uninstalling.

3. Run `/usr/sbin/swremove DATA-PROTECTOR` to uninstall Data Protector software.
4. The HPE AutoPass utility is not removed during the Data Protector uninstallation. You can manually remove it by running the `/usr/sbin/swremove HPOVLIC` command as the user root.

To remove the remaining Data Protector directories from your system, see ["Manual removal of Data Protector software on UNIX" on page 266](#).

Uninstalling the Cell Manager and/or Installation Server configured on HPE Serviceguard

If your Cell Manager and/or Installation Server is configured on an HPE Serviceguard cluster, perform the following steps to uninstall the software.

Primary node

Log on to the primary node and perform the following steps:

1. Stop the Data Protector package:

```
cmhaltpkg PackageName
```

where *PackageName* stands for the name of the cluster package.

For example:

```
cmhaltpkg ob2c1
```

2. Deactivate the cluster mode for the volume group:

```
vgchange -c n vg_name
```

(where *vg_name* stands for the path name of the volume group located in the subdirectory of the /dev directory).

For example:

```
vgchange -c n /dev/vg_ob2cm
```

3. Activate the volume group:

```
vgchange -a y -q y vg_name
```

For example:

```
vgchange -a y -q y /dev/vg_ob2cm
```

4. Mount the logical volume to the shared disk:

```
mount lv_path shared_disk
```

(where *lv_path* stands for the path name of the logical volume and *shared_disk* stands for the mount point or shared directory).

For example:

```
mount /dev/vg_ob2cm/lv_ob2cm /omni_shared
```

5. Remove Data Protector by using the swremove utility.

6. Remove the soft links:

```
rm /etc/opt/omni
```

```
rm /var/opt/omni
```

7. Remove the backup directories:

```
rm -rf /etc/opt/omni.save
```

```
rm -rf /var/opt/omni.save
```

8. Remove the Data Protector directory with its contents:

```
rm -rf /opt/omni
```

9. Dismount the shared disk:

```
umount shared_disk
```

For example:

```
umount /omni_shared
```

10. Deactivate the volume group:

```
vgchange -a n vg_name
```

For example:

```
vgchange -a n /dev/vg_ob2cm
```

Secondary node

Log on to the secondary node and perform the following steps:

1. Activate the volume group:
`vgchange -a y vg_name`
2. Mount the shared disk:
`mount lv_path shared_disk`
3. Remove Data Protector by using the `swremove` utility.
4. Remove the soft links:
`rm /etc/opt/omni`
`rm /var/opt/omni`
5. Remove the backup directories:
`rm -rf /etc/opt/omni.save`
`rm -rf /var/opt/omni.save`
6. Remove the Data Protector directory with its contents:
`rm -rf /opt/omni`
7. Remove the directories in the shared filesystem:
`rm -rf shared_disk/etc_opt_omni`
`rm -rf shared_disk/var_opt_omni`
For example:
`rm -rf /omni_shared/etc_opt_omni`
`rm -rf /omni_shared/var_opt_omni`
8. Dismount the shared disk:
`umount shared_disk`
9. Deactivate the volume group:
`vgchange -a n vg_name`

Data Protector is completely removed from the system.

Uninstalling the Cell Manager and/or Installation Server configured on Symantec Veritas Cluster Server

If your Cell Manager and/or Installation Server is configured on a Symantec Veritas Cluster Server, perform the following steps to uninstall the software.

Primary node

Log on to the primary node and perform the following steps:

1. Take the Data Protector application resource offline.
2. Disable the Data Protector application resource.
3. Uninstall Data Protector.

4. Remove the soft links:

```
rm /etc/opt/omni  
rm /var/opt/omni
```

5. Remove the backup directories:

```
rm -rf /etc/opt/omni.save  
rm -rf /var/opt/omni.save
```

6. Remove the Data Protector directory with its contents:

```
rm -rf /opt/omni
```

Secondary node

Log on to the secondary node and perform the following steps:

1. Switch over the Data Protector service group to the secondary node.

2. Uninstall Data Protector.

3. Remove the soft links:

```
rm /etc/opt/omni  
rm /var/opt/omni
```

4. Remove the backup directories:

```
rm -rf /etc/opt/omni.save  
rm -rf /var/opt/omni.save
```

5. Remove the Data Protector directory with its contents:

```
rm -rf /opt/omni
```

6. Remove the directories in the shared filesystem:

```
rm -rf shared_disk/etc_opt_omni  
rm -rf shared_disk/var_opt_omni
```

For example:

```
rm -rf /omni_shared/etc_opt_omni  
rm -rf /omni_shared/var_opt_omni
```

Data Protector is completely removed from the system.

Uninstalling from Linux systems

Prerequisites

- Remove any installed Data Protector patch bundles using the `omnisetup.sh -bundlerem` command. See ["Installing and removing Data Protector patch bundles on UNIX systems" on page 247](#).

Cell Manager

The Cell Manager for Linux is always installed locally, using the `omnisetup.sh` command. Therefore, it must be uninstalled locally, using the `rpm` utility.

If you leave the Data Protector configuration data on the system after the uninstallation, and you later

install a lower version of the Data Protector Cell Manager than the uninstalled version was, note that the configuration data will be unusable.

To successfully install a lower version, after the uninstallation remove the remaining Data Protector directories from your system.

To uninstall the Data Protector Cell Manager, proceed as follows:

1. Make sure you have terminated all Data Protector sessions and exited the graphical user interface.
2. Enter the `rpm -qa | grep OB2` command to list all the Data Protector components installed on the Cell Manager.

The components associated with the Cell Manager are as follows:

OB2-CORE	Data Protector Core software.
OB2-TS-CORE	Data Protector Core Technology Stack Libraries
OB2-CC	Cell Console software. This contains the command-line interface.
OB2-TS-CS	Cell Manager Technology Stack Libraries.
OB2-TS-JRE	Java Runtime Environment for use with Data Protector.
OB2-TS-AS	Data Protector Application Server
OB2-WS	Data Protector Web Services
OB2-JCE-DISPATCHER	Job Control Engine Dispatcher
OB2-JCE-SERVICEREGISTRY	Job Control Engine Service Registry
OB2-CS	Cell Manager software.
OB2-DA	Disk Agent software. This is required, otherwise it is not possible to back up the IDB.
OB2-MA	The General Media Agent software. This is required to attach a backup device to the Cell Manager.
OB2-DOCS	Data Protector documentation subproduct that includes the Data Protector guides in the PDF format and the <i>HPE Data Protector Help</i> in the WebHelp format.

If Data Protector clients or an Installation Server are also installed on the system, other components will also be listed.

Note: To leave any other Data Protector components installed, you must leave the OB2-CORE component installed, since it is a dependency for other components.

3. In reverse order to the sequence in which they were installed, remove the components mentioned in the previous step using the `rpm -e package name` command and follow the prompts.

Installation Server

The Installation Server for UNIX on Linux is always installed locally, using the `omnisetup.sh` command. Therefore, it must be uninstalled locally, using the `rpm` utility.

To uninstall the Data Protector Installation Server, proceed as follows:

1. Make sure you have terminated all Data Protector sessions and exited the GUI.
2. Enter the `rpm -qa | grep OB2` command to list all the Data Protector components and remote installation packages stored on the Installation Server system.

The components and remote installation packages associated with the Installation Server are as follows:

OB2-CORE	Data Protector Core software. Note that this is already installed, if you are installing the Installation Server on the Cell Manager system.
OB2-TS-CORE	Data Protector Core Technology Stack Libraries.
OB2-CORE-IS	Installation Server Core software.
OB2-CFP	Common Installation Server Core software for all UNIX platforms.
OB2-TS-CFP	Common Installation Server Technology Stack software for all UNIX platforms
OB2-DAP	Disk Agent remote installation packages for all UNIX systems.
OB2-MAP	Media Agent remote installation packages for all UNIX systems.
OB2-NDMPP	The NDMP Media Agent component.
OB2-CCP	Cell Console remote installation packages for all UNIX systems.

If other Data Protector components are installed on the system, other components will also be listed.

For a complete list of components and their dependencies, see ["Data Protector software component dependencies on Linux " on page 256](#).

Note: To leave any other Data Protector components installed, you must leave the OB2-CORE component installed, since it is a dependency for other components.

3. In reverse order to the sequence in which they were installed, remove the components mentioned in the previous step using the `rpm -e package name` command and follow the prompts.

Manual removal of Data Protector software on UNIX

Before uninstalling a UNIX client, you should export it from the cell. For procedure, see ["Exporting clients from a cell" on page 192](#).

HP-UX systems

To manually remove the files from an HP-UX system, do the following:

1. Run `/usr/sbin/swremove DATA-PROTECTOR` to remove the Data Protector software.
2. Remove the following directories using the `rm` command:

```
rm -fr /var/opt/omni
```

```
rm -fr /etc/opt/omni
```

```
rm -fr /opt/omni
```

At this stage, Data Protector references no longer reside on your system.

Linux systems

To manually remove files from a Linux system, delete them from the following directories and then delete the directories using the `rm` command:

```
rm -fr /var/opt/omni
```

```
rm -fr /etc/opt/omni
```

```
rm -fr /opt/omni
```

Solaris systems

To manually remove files from a Solaris system, delete them from the following directories and then delete the directories using the `rm` command:

```
rm -fr /var/opt/omni
```

```
rm -fr /etc/opt/omni
```

```
rm -fr /opt/omni
```

Other UNIX systems and Mac OS X systems

Delete the files from the following directory and then delete the directories using the `rm` command:

```
rm -fr /usr/omni
```

Chapter 7: Upgrading the Data Protector

This chapter provides instructions for performing Data Protector upgrade and migration tasks.

Upgrade overview

Before you begin

Before upgrading an existing product version, consider the following:

- For information about supported and discontinued platforms and versions, see the latest support matrices at <https://softwaresupport.hpe.com/> and the HPE Data Protector Product Announcements, Software Notes, and References.

On platforms on which the Cell Manager is no longer supported, first migrate the Cell Manager to a supported platform and then upgrade to Data Protector 9.00. For details, see "[Migrating the Cell Manager to a different platform](#)" on page 287.

As an unsupported functional area, the Data Protector Java graphical user interface is not supplied in Data Protector 9.00. If there are UNIX systems in your Data Protector cell that have the Data Protector Java graphical user interface installed, during the cell upgrade process, you need to choose other systems that will take the role of Data Protector graphical user interface clients. These clients should run on operating systems supported by the original (native) Data Protector graphical user interface.

- License passwords issued for releases prior to Data Protector 9.00 will no longer work with this version. You must have a valid active support agreement in place in order to be eligible for new license passwords according to the type and quantity of licenses listed in your support agreement.

Before you start the upgrade, check the quantity and type of license keys installed in your Data Protector environment and compare it to the quantity and type of licenses listed in your support agreement.

If you have fewer or different licenses listed in your support agreement than actually installed in your environment, you should not start the upgrade. Otherwise you risk that your Data Protector environment is no longer operational due to missing license keys. Instead, contact your HPE sales representative or HPE partner first to determine what steps are needed to close the gap in the licensed functionality covered by the support contract and the actual licenses currently in use with Data Protector versions older than Data Protector 9.00.

For details about licensing, see "[Data Protector Licensing](#)" on page 306.

- Data Protector 8.00 introduced a new Internal Database (IDB) to address scalability needs in enterprise environments, resulting in changes in the IDB structure, system requirements (disk space, user rights, and so on), and platform support. If you are upgrading from Data Protector 6.20 or 7.00, check the requirements in the HPE Data Protector Product Announcements, Software Notes, and References. and "[Installing a UNIX Cell Manager](#)" on page 29.
- After the upgrade, the Cell Manager, and Installation Server must have the same Data Protector version installed. Although older Data Protector Disk Agent and Media Agent versions are supported in the same cell, it is highly recommended that the clients also have the same version of Data Protector components installed.

For constraints imposed by older Disk Agent and Media Agent versions after an upgrade, see the *HPE Data Protector Product Announcements, Software Notes, and References*.

- After the upgrade of a multiple-cell (MoM) environment, all Cell Managers must have the same Data Protector version installed.

Prerequisites

- Run database consistency checks on the existing IDB to validate data consistency prior to the upgrade. See "[Validating data consistency before upgrade](#)" on page 270
- Perform a backup of the existing Cell Manager system and the Internal Database (IDB).
- If you are upgrading from Data Protector 6.20 or 7.00, note that the new IDB requires more disk space due to format changes. Before upgrading, make sure you have enough free space available. See "[IDB conversion duration and changes in IDB size and structure](#)" on page 279.
- If you are upgrading from Data Protector 6.20 or 7.00, in order to allow the upgrade process to export the IDB, the existing Data Protector installation must be functional and the IDB services or at least the Raima Database Server (RDS) service must be up and running.
- Before upgrading, ensure that all GRE and Power On open requests are closed. Additionally, make sure that the Live Migrate sessions that are in progress, are completed or aborted.

Limitations

- The upgrade to Data Protector 9.00 is only supported for Data Protector 6.20, Data Protector 7.00, and Data Protector 8.00 and later.
- A backup of the Internal Database, created with Data Protector 6.20 or 7.00, cannot be restored with Data Protector 9.00.

Note: After upgrading the Cell Manager, back up the Internal Database before you continue using Data Protector.

- Changing the Cell Manager platform during the upgrade is not supported. Upgrades are only supported on the same Cell Manager platform (HP-UX to HP-UX, Linux to Linux, and Windows to Windows).
If your platform is discontinued, migrate the Cell Manager to a supported platform first and then upgrade to the new version. See "[Migrating the Cell Manager to a different platform](#)" on page 287.
- In a UNIX environment: The only Data Protector processes that can be running before performing an upgrade are from Data Protector services. To do this, stop the Data Protector services, terminate any running process and restart the services.
- The Internal Database restore is supported only from the same minor-minor Data Protector version, in which the Internal Database was backed up. This is because of the Internal Database schema changes that are present in new releases.
- If you want to restore the Internal Database that was backed up in an earlier Data Protector version, reinstall the particular version, import the Internal Database backup medium, and then perform the restore.

Upgrade sequence

To upgrade your cell from the earlier versions of the product, proceed as follows:

1. Upgrade the Cell Manager and Installation Server to Data Protector 9.00. The steps are different for UNIX and Windows platforms.
You must first upgrade the Cell Manager in the current cell before you can upgrade the Installation Server.
2. Upgrade the GUI clients.
3. Upgrade the clients that have an online application integration installed, such as Oracle, SAP R/3, Informix Server, Microsoft SQL Server, Microsoft Exchange Server, and other.
4. Upgrade the clients that have a Data Protector Media Agent (MA) installed. You can perform backups as soon as MA is upgraded on all MA clients of the same platform as the Cell Manager.
5. HPE recommends that you upgrade the clients that have the Data Protector Disk Agent (DA) installed within the next two weeks.
6. Optionally, if you are upgrading from Data Protector 6.20 or 7.00, migrate the Detail Catalog Binary Files (DCBF).

Note: The Data Protector Internal Database changed in Data Protector 8.00 and is automatically migrated during the upgrade, except for the Detail Catalog Binary Files (DCBF). Because a migration of DC Binary Files is time consuming, HPE recommends to perform it after you upgrade the entire cell. For details, see "[Migrating the Detail Catalog Binary Files \(DCBF\)](#)" on page 279.

Upgrading in a MoM environment

To upgrade your MoM environment to Data Protector 9.00, you need to upgrade the MoM Manager system first. After this is done, all Cell Managers of the previous versions, which have not been upgraded yet, are able to access the Central MMDB and central licensing, perform backups, but other MoM functionality is not available. Note that device sharing between the Data Protector 9.00 MoM cell and the cells with earlier versions of the product installed is not supported. During the upgrade in a MoM environment, none of the Cell Managers in the MoM environment should be operational.

Support for earlier agent versions

Wherever possible, Data Protector components on all clients in a Data Protector cell should be upgraded to version 9.09 during the regular upgrade process. This ensures that customers can benefit from the full feature set of Data Protector 9.09 on all systems in a cell.

Nevertheless, Disk Agent and Media Agent components of an earlier Data Protector version (7.00, or 8.00) are supported in a 9.09 cell with the following constraints:

- The earlier product version is still supported by HPE as an independent product. To check the announced end-of-support dates for HPE products, see the webpage <https://softwaresupport.hpe.com/>.

- Support is limited to the feature set of the earlier Data Protector version.
- If you are performing operations involving clients on different systems, all agents of the same type (for example Media Agents) must be of the same version.
- Earlier Media Agent component versions are not supported in combination with NDMP servers.
- A file system backup can be sourced from multiple Disk Agents with different versions and the Backup Server deduplication is supported with different versions of the Media Agent. The Disk and Media agent versions could be lower than or equal to the Cell Manager version. However, the source deduplication requires the same versions of Disk Agents and Media Agents, which can be lower than or equal to the Cell Manager version.
- For the Data Protector StoreOnce software store, the Disk Agent and Media Agent must be the same version. However, this version can be lower than or equal to the Cell Manager version.
- If one Data Protector component on a client is upgraded to 9.09, all other components have to be upgraded to 9.09 as well.
- Lower versions of Integration agents are not supported with the latest Cell Manager version..

If you encounter problems establishing a connection with agents of an earlier product version, consider upgrading to 9.09 as the first resolution step.

Upgrading from Data Protector 6.20, 7.00, 8.00 and later

UNIX and Windows platforms running Data Protector 6.20, 7.00, 8.00 and later release versions can be directly upgraded to Data Protector 9.00

Licenses

The existing Data Protector 6.20, 7.00, 8.00 and later license keys must be updated. Existing license keys from these versions will not work with Data Protector 9.00 Licensing. For details about licensing, see ["Data Protector Licensing" on page 306](#).

Before you begin

Before you begin the upgrade, see ["Upgrade overview" on page 267](#) for information on limitations and the upgrade sequence.

Validating data consistency before upgrade

Before you proceed with the upgrade, it is highly recommended to perform several consistency checks to validate data consistency in the existing IDB.

To run database consistency checks

1. Run `omnidbcheck`.

This command validates data consistency in the following areas:

- Database connection
 - Schema consistency
 - Datafiles consistency
 - DCBF
2. Run `omnidbcheck -dc`.

This command validates your DataCatalog consistency.

If the data is consistent, both checks respond with `Status - Ok` on all fields. Perform a backup of the existing Cell Manager system and the IDB.

If any inconsistencies are detected, it is highly advised to first fix those problems and then perform the upgrade.

Upgrading the UNIX Cell Manager and Installation Server

Prerequisites

- A POSIX shell (`sh`) is required for the installation.
- You must have `root` permissions to perform the upgrade.

If the HP-UX or Linux Installation Server is installed together with the Cell Manager, it is upgraded automatically when the `omnisetup.sh` command is executed.

If the HP-UX or Linux Installation Server is installed on a separate system, see ["Upgrading an Installation Server" on page 273](#).

Upgrading a Cell Manager

The HP-UX or Linux Cell Manager is upgraded automatically when the `omnisetup.sh` command is executed.

On HP-UX, this command directly upgrades the installed components using the `swinstall` utility. On Linux, this command directly upgrades the installed components using the `rpm` utility.

If the Installation Server is installed with client components, it will be removed by the `omnisetup.sh` command. In this case, install a new Installation Server depot using the `omnisetup.sh -IS` command, and then re-import the upgraded Installation Server. For details, see ["Importing an Installation Server to a cell" on page 189](#).

HPE Serviceguard

The upgrade procedure for the Cell Manager, configured on HPE SG differs from the upgrade procedure for the Cell Manager not running in the HPE SG environment. The detailed steps you need to follow are described in ["Upgrading the Cell Manager configured in HPE Serviceguard" on page 298](#).

Preparing the environment

HP-UX systems:

- Set the kernel parameter `shmmmax` (maximum size of a shared memory segment) to at least 2.5 GB. To check the configuration, execute:

```
kcusage shmmmax
```

- HPE recommends to set the kernel parameter `maxdsiz_64` (max data segment size) to at least 134217728 bytes (128 MB), and the kernel parameter `semmnu` (number of semaphore undo structures) to at least 256. After committing these changes, recompile the kernel and restart the system.

Linux systems:

- Set the kernel parameter `shmmmax` (maximum size of a shared memory segment) to at least 2.5 GB. To check the configuration, execute:

```
cat /proc/sys/kernel/shmmmax
```

Upgrade procedure

To upgrade the HP-UX or Linux Cell Manager,

1. Insert and mount the appropriate UNIX installation DVD-ROM or ISO image (for HP-UX or Linux) to a mount point.

Note that the DVD-ROM filesystem uses the Rock Ridge extensions.

- Optionally, copy the following directories from the DVD-ROM or ISO image to your local disk:

```
LOCAL_INSTALL
```

```
platform_dir/DP_DEPOT
```

Where *platform_dir* is:

hpux	for HP-UX systems
linux_x86_64	for Linux systems

2. Go to the `LOCAL_INSTALL` directory on the DVD-ROM, ISO image, or local directory and execute:

```
./omnisetup.sh
```

After the previous version of Data Protector is detected, the upgrade procedure is automatically started. To perform a clean installation (the database of previous version will be deleted), uninstall the old version and restart the installation.

For details about installation, see ["Installing a UNIX Cell Manager" on page 29](#) and ["Installing Installation Servers for UNIX systems" on page 43](#).

As soon as the procedure is completed, you can start using Data Protector.

For the description of the `omnisetup.sh` command, see the `README` file located in the `Mount_point/LOCAL_INSTALL` directory on the DVD-ROM or ISO image, or the *HPE Data Protector Command Line Interface Reference* located in the `Mount_point/DOCS/C/MAN` directory on the DVD-ROM or ISO image.

Next steps

- After the upgrade is complete, validate the data consistency by running `omnidbcheck` and `omnidbcheck -dc` again. See ["Validating data consistency before upgrade" on page 270](#)
- Once the Cell Manager and Installation Server systems are upgraded, check if you have to apply any modifications to your configuration files. See ["Checking configuration changes" on page 276](#).
- You must manually adjust the library capacity (VTLCAPACITY) of a virtual tape library, which was created with a previous version of Data Protector, and is after the upgrade by default set to 1 TB. See ["Checking configuration changes" on page 276](#).
- On HP-UX 11.31 (Itanium) and SUSE Linux Enterprise Server (x86-64) the maximum size of database files can exceed the default maximum size of 2 GB. Consequently, during an upgrade to Data Protector 9.00 or later, a warning message is displayed with an advice to adjust the maximum size of database files. This adjustment should be done after the upgrade, as it may take a significant amount of time, depending on the database size. See ["Troubleshooting upgrade" on page 338](#).

Upgrading an Installation Server

The HP-UX or Linux Installation Server is upgraded automatically when the `omnisetup.sh` command is executed.

On HP-UX, this command directly upgrades the installed components and stored remote installation packages using the `swinstall` utility. On Linux, this command directly upgrades the installed components and stored remote installation packages using the `rpm` utility.

If the Installation Server is installed with client components, it will be removed by the `omnisetup.sh` command. In this case, install a new Installation Server depot using the `omnisetup.sh -IS` command, and then re-import the upgraded Installation Server. For details, see ["Importing an Installation Server to a cell" on page 189](#).

You cannot upgrade the Installation Server unless you upgraded the Cell Manager first.

Upgrade procedure

To upgrade the HP-UX or Linux Installation Server, follow the procedure described below:

1. Insert and mount the appropriate UNIX installation DVD-ROM or ISO image (for HP-UX or Linux) to a mount point.

Note that the DVD-ROM filesystem uses the Rock Ridge extensions.

- Optionally, copy the following directories from the DVD-ROM or ISO image to your local disk:

`LOCAL_INSTALL`

`pPlatform_dir/DP_DEPOT`

Where `pPlatform_dir` is:

<code>hpux</code>	for HP-UX systems
<code>linux_x86_64</code>	for Linux systems

2. Go to the LOCAL_INSTALL directory on the DVD-ROM, ISO image, or local directory and execute:

```
./omnisetup.sh
```

As soon as the procedure is completed, you can start using Data Protector.

For the description of the `omnisetup.sh` command, see the `README` file located in the LOCAL_INSTALL directory on the DVD-ROM or ISO image or the *HPE Data Protector Command Line Interface Reference* located in the `Mount_point/DOCS/C/MAN` directory on the DVD-ROM or ISO image.

Next steps

Once the Installation Server system is upgraded, check if you have to apply any modifications to your configuration files. See ["Checking configuration changes" on page 276](#).

Upgrading the Windows Cell Manager and Installation Server

When the previous version of Data Protector is detected, the same component set as installed is assumed by the operating system (without obsolete components). The installed components are removed and the new components are installed as for a new (clean) installation.

The Windows Installation Server is upgraded automatically during the upgrade procedure if it is installed on the same system as the Cell Manager. The old Installation Server depot is removed and if the `Installation Server` component is selected during the installation, the new Installation Server depot is copied to its place.

If the Installation Server is installed together with the Data Protector client, and this client is upgraded remotely (using the Data Protector GUI), the Installation Server is upgraded as well.

Re-import the upgraded Installation Server after the installation procedure has finished. For details, see ["Importing an Installation Server to a cell" on page 189](#).

Considerations

- **Microsoft Cluster Server**

The upgrade procedure for the Cell Manager, running in the Microsoft Cluster Server environment, is different from the upgrade procedure for the Cell Manager not configured for use with Microsoft Cluster Server. The detailed steps you need to follow are described in ["Upgrading the Cell Manager configured on Microsoft Cluster Server" on page 303](#).

- You cannot upgrade Data Protector directly if the installation path:
 - contains non-ASCII characters
 - contains the characters "@" or "#"
 - contains a directory that ends with the character "!"
 - is longer than 80 characters.

For workarounds, see ["Upgrading fails if the previous version of the product is installed in a long path"](#) on page 338 and ["Upgrading fails if the previous version of the product is installed in a path with unsupported characters"](#) on page 339.

Upgrade procedure

To upgrade the Windows Cell Manager and Installation Server, follow the procedure described below:

1. Insert the Windows installation DVD-ROM or mount the ISO image and run the `\Windows\x8664\setup.exe` command. Setup detects the previous Data Protector installation. Click **Next** to start the upgrade.
2. In the **Component Selection** page, the components previously installed on the system are selected.
You can change the component set by selecting or deselecting additional components. Click **Next**.
3. Optionally, change the user account or the ports used by the Data Protector Internal Database Service and Application Server. For details on these services, see ["After the installation"](#) on page 41.

Click **Next**.

4. If Data Protector detects Windows Firewall on your system, the Windows Firewall configuration page is displayed. Data Protector setup registers all necessary Data Protector executables. By default, the **Initially, allow newly registered Data Protector executables to open inbound ports as needed** option is selected. If you do not want to enable Data Protector to open ports at the moment, deselect the option. For proper functioning of Data Protector with previous version of 9.09 clients, the Data Protector rules in Windows firewall must be enabled. Rules for the Omninet Service executable, Application Server port and Internal Database Service port will always be enabled, regardless of the choice.



Click **Next**.

5. The component summary list is displayed. Click **Install** to perform the upgrade.

Upgrades from 6.20 and 7.00 to 9.00 or later:

A Command Prompt window opens and the software begins the IDB migration to the new database format by exporting the older IDB.

This Command Prompt window remains open during the export of the older IDB and displays status messages. The IDB export may take several minutes to complete.

As the upgrade proceeds, an additional Command Prompt window opens to display the status of the import of the IDB configuration information and data into Data Protector 9.00 or later.

Upgrades from 8.00 and later:

The IDB updates automatically; no Command Prompt windows are opened.

6. The **Installation status** page is displayed. Click **Next**.
7. To start using the Data Protector GUI immediately after setup, select **Launch Data Protector GUI**.

If the English Documentation (Guides, Help) component has been upgraded or newly installed, to view the HPE Data Protector Product Announcements, Software Notes, and References immediately after setup, select **Open the Product Announcements, Software Notes, and References**.

Note: This step is performed only for a Cell Manager upgrade. If the Installation Server installed on a client other than the Cell Manager is being upgraded, this step does not occur.

8. Click **Finish**.

As soon as the procedure is completed, you can start using Data Protector.

Next steps

- After the upgrade is complete, validate the data consistency by running `omnidbcheck` and `omnidbcheck -dc` again. See "[Validating data consistency before upgrade](#)" on page 270
- Once the Cell Manager and Installation Server systems are upgraded, check if you have to apply any modifications to your configuration files. See "[Checking configuration changes](#)" below.
- You must manually adjust the library capacity (VTLCAPACITY) of a virtual tape library, which was created with a previous version of Data Protector, and is after the upgrade by default set to 1 TB. See "[Checking configuration changes](#)" below.

Checking configuration changes

Global options file

During the upgrade, the contents of the *old* global options file are merged with the contents of the *new* (*default*) global options file on the Cell Manager, located at:

Windows systems: `Data_Protector_program_data\NewConfig\Server\Options`

UNIX systems: `/opt/omni/newconfig/etc/opt/omni/server/options`

The *merged* file `global` resides at the same location on the Cell Manager as the old one and is used by the upgraded version of the product. The *old* global options file is renamed to `global.1`, `global.2`, and so on, depending on the number of upgrades performed.

The following applies when the merged file is created:

- Global options that were active (uncommented) in the old file remain active in the merged file. The following comment, stating that the value of the option was copied from the old file, is added to the merged file:

```
Option=Value
# Data Protector 9.00
# This value was automatically copied from previous version.
```

- Global options that are not used anymore, are commented (made inactive) in the merged file and added the following comment stating that the option is no longer in use:

```
#Option=Value
# Data Protector 9.00
# This value is no longer in use.
```

- Global options with values, not supported anymore, are commented (made inactive) in the merged file. The following comment is added, containing a template line (*DefaultValue*) and stating the previous value of this option:

```
# Option=DefaultValue
# Data Protector9.00
# This variable cannot be transferred automatically.
# The previous setting was:
# Option=Value
```

- Comments are not transferred to the newly merged file.

Descriptions of the new options are in the merged global options file. For more information about the global options use, see the *HPE Data Protector Troubleshooting Guide*.

Manual steps

The following list summarizes the steps you must perform manually once the upgrade procedure has successfully completed:

- Omnirc options

After upgrading the Cell Manager and Installation Server systems, you may want to edit the `omnirc` file. For instructions, see section *How to use omnirc options?* in the *HPE Data Protector Troubleshooting Guide* and in the *HPE Data Protector Help*.

- Command line

You may need to make adjustments for your scripts that invoke Data Protector commands:

- For a general list of newly introduced commands, commands that have been changed or are provided with extended functionality, and commands that are no longer available in Data Protector, see "[Command Line Interface changes after upgrading the Data Protector](#)" on page 400. For command usage synopses, see the *HPE Data Protector Command Line Interface Reference* or the corresponding man pages.

- The `omnidbrestore` command is replaced with the extended `omniofflr` command that provides the same functionality. Until you replace the `omnidbrestore` command lines with the `omniofflr` command lines, you can use the script `omnidbrestore.pl` that is supplied for your convenience. It recognizes the same set of options as `omniofflr`. Invocations of the script should be in the following format where `OMNIOFFLR_OPTIONS` are `omniofflr` command options without the `-idb` option:

Windows systems:

```
perl omnidbrestore.pl OMNIOFFLR_OPTIONS
```

UNIX systems:

```
omnidbrestore.pl OMNIOFFLR_OPTIONS
```

- Verify that the `hosts` file contains the fully qualified domain names (FQDNs) in the `computer.company.com` format. If needed, update the file accordingly. The file resides at the following location:

Windows systems: `%SystemRoot%\system32\drivers\etc\`

UNIX systems: `/etc/hosts`

- Changed default block size of backup devices

Pay attention to an increased default block size for physical backup devices and other device types in device configuration wizard. Specific use cases, for example, object copying, object mirroring, and object consolidation, require careful selection of backup device block sizes. Devices configured with the default block size may not meet such use case requirements when used in conjunction with devices configured with the default block size in an earlier product version.

Non-converted Internal Database parts after an upgrade from Data Protector 6.20 or 7.00

To ensure an efficient upgrade, the Data Protector upgrade process does not automatically upgrade (convert) specific parts of the Internal Database to the new format. The non-converted parts are nevertheless actively used in the new product version. Files constituting these IDB parts are located in the following directory:

Windows systems: `Data_Protector_program_data\db40`

UNIX systems: `/var/opt/omni/server/db40`

The directory continues to be used until either of the following happens:

- Catalog protection expires for all backup data that was referenced in the DCBF of the earlier product version at the time of upgrade.
- You trigger migration of the legacy DCBF to the new format using the `omnimigrate.pl` command. For more information, see ["Migrating the Detail Catalog Binary Files \(DCBF\)" on the next page.](#)

Caution: The above-mentioned directory should not be manually removed. Failing to do so may result in a data loss.

Next steps

Once the Cell Manager and Installation Servers are installed and all required modifications implemented, HPE recommends that you distribute the software to clients. See ["Upgrading the clients" on page 281.](#)

Internal database changes after upgrade from Data Protector 6.20 or 7.00

Data Protector 8.00 introduced a new Internal database (IDB) which differs significantly from the IDB in Data Protector version 7.00 or earlier. This includes changes in the IDB structure, size, and operation. As a result, you may also need to migrate some parts of the IDB after the conversion.

Migrating the Detail Catalog Binary Files (DCBF)

After the upgrade, Data Protector is fully operational. However, all objects whose catalogs are still protected and were backed up prior to the upgrade still have their catalogs stored in the old format. When catalogs expire, the old DC Binary Files are automatically deleted (through daily maintenance tasks). Old database files are however kept as long as there are any filenames in any of the old catalogs files which are protected and continue to occupy disk space.

Data Protector helps you to identify the protected media, objects, and sessions that still need the old DC Binary Files and IDB files, and the amount of space they occupy, and writes a report (warning) to the Event log. You can also execute the report manually from the CLI:

```
omnimigrate.pl -report_old_catalog [media | sessions | objects]
```

Catalogs for permanently protected objects, media, and sessions will not expire and must be migrated manually.

Tip: The migration process can take a significant amount of time. Therefore, HPE recommends that you wait until most of your old media expire and you trigger the migration only for permanently protected media.

To migrate the catalog files, execute:

```
omnimigrate.pl -start_catalog_migration
```

Note: Once the full catalog migration is done (after there are no old catalogs), change the global variable `SupportOldDCBF` to `0`.

For the conversion duration and space requirement estimates, see ["IDB conversion duration and changes in IDB size and structure" below](#).

After you finish the upgrade, back up the IDB. The old IDB backups cannot be used with Data Protector 9.00 and later.

IDB conversion duration and changes in IDB size and structure

During the upgrade process, the IDB is converted to the new format. The conversion duration depends on the size and complexity of the existing database as well as on the performance of your hardware. Note that the examples given below may differ in your environment.

IDB size after IDB migration

The size of the new IDB depends on the size of the original IDB and its structure; therefore it is not possible to exactly predict the new size. During tests, 1 GB tended to be sufficient for medium sized databases. The installation will check for an additional 1 GB of available space and display a warning if this space is not available. If you are migrating large databases, you will likely need more free space.

Detailed Catalog Binary Files migration

The DCBF format is changed and the DCBFs now contain the file version information. Additionally, the space requirements for the new DCBFs change as well.

The DCBF size increases because the filenames are now stored in the DCBF, therefore it is not possible to exactly predict the new size. However, a rough guideline is an increase of approximately four times. Some example conversions are listed in the following table:

Old DCBF size	24 MB	48.4 MB	97.3 MB
Upgrade duration (minutes:seconds)	1:51	3:33	6:13
New DCBF size	90.6 MB	181 MB	417 MB

Serverless Integrations Binary Files migration

During the upgrade process, data contained in the Serverless Integrations Binary Files (SIBF) is moved to the Catalog Database (CDB) part of the IDB, and becomes its integral part. Thus, the SIBF part of the IDB is no longer used, and the following IDB installation directories are not present:

Windows systems: `Data_Protector_program_data\server\db80\meta`

UNIX systems: `/var/opt/omni/server/db80/meta`

Importing legacy NDMP media

Ownership of objects backed up from UNIX file systems and stored on NDMP media was incorrectly handled in Data Protector versions earlier than 9.00. When legacy NDMP media are imported to Data Protector 9.00 or later, ownership flags of such objects are set to 0 0 (owner, group), since the original ownership information is missing.

Ordinal numbers in session IDs

Due to an increased limit on a specific backup session concurrency metric in Data Protector 9.00 or later, session IDs may contain 5-digit ordinal numbers. Additionally, in the Data Protector debug messages, ordinal numbers lower than 10 000 are padded with zeroes. For example, the first backup session run on 1 January 2013 is logged with the ID `2013/01/01-0001` in the debug files.

You may need to revise and possibly adapt scripts that you have been using in conjunction with Data Protector to consider the above changes.

Upgrading the clients

Upgrade sequence

For information about the sequence in which the client upgrade is performed, see ["Upgrade overview" on page 267](#).

On platforms where remote installation is supported, HPE recommends that you upgrade the clients remotely.

Upgrading clients remotely

For the procedure on how to upgrade the clients using the Installation Server, see ["Remote installation" on page 90](#). On UNIX systems, you must upgrade the already present components before you add new components. After new components are added, the components from previous versions are not displayed by Data Protector. In this case, you have to reinstall them.

Note: If a client is not part of any Cell Manager, the remote upgrade of the client is not possible.

Upgrading clients locally

If you do not have an Installation Server installed on your network, or if for some reason you cannot distribute the Data Protector software to a client system, Data Protector clients can be upgraded locally.

To upgrade Windows clients locally, see ["Installing Windows clients" on page 62](#).

To upgrade UNIX clients locally, see ["Local installation on UNIX and Mac OS X systems" on page 98](#).

Upgrade-related operating system specifics

Upgrading Windows, HP-UX, and Linux clients

During an upgrade, the enhanced incremental backup database is not migrated to the new release version. The old enhanced incremental backup repository is deleted from the directory *Data_Protector_home\enhincrd\MountPoint* (Windows systems) or */var/opt/omni/enhincrd* (UNIX systems). During the first full backup after the client upgrade, a new repository is created at the same location. Ensure the type of your first backup performed after the upgrade is full.

Upgrading Linux clients

If the *xinetd* service is used instead of *inetd*, the */etc/xinetd.d/omni* file is *not* replaced and thus the settings remain unchanged. To check if the *xinetd* service is running, run the following command:

```
ps -e | grep xinetd
```

To replace your settings with the default Data Protector settings or to replace a corrupted file, remove the file and remotely upgrade any Data Protector software component from the Data Protector GUI. The */etc/xinetd.d/omni* file is then installed with the default settings.

By replacing the `/etc/xinetd.d/omni` file, your modifications are lost. To retain your modifications, create a backup copy in advance and manually transfer the settings to the newly installed file after the upgrade.

Upgrading Solaris 8 to Solaris 9 systems

Starting with Data Protector 7.00, upgrading the operating system on the Data Protector Disk Agent clients from Solaris 8 to Solaris 9 is no longer supported.

If you still have Disk Agent (DA) of an earlier Data Protector version installed on Solaris 8, to upgrade the operating system to Solaris 9, follow instructions in the corresponding section of the *HPE Data Protector Installation Guide* of the earlier product version.

Upgrading clients configured on HPE Serviceguard

If you are upgrading the client that uses HPE Serviceguard, and if the Data Protector integration component to be upgraded is installed on the same node as the Cell Manager, first upgrade the physical nodes, and then perform the following:

1. Export the virtual host by executing:

```
omnicc -export_host virtual_hostname
```
2. Re-import the virtual host by executing:

```
omnicc -import_host virtual_hostname -virtual
```

Upgrading integration clients

If you are upgrading a Data Protector client that has the integration installed (such as the integration for Oracle, SAP R/3, Microsoft Volume Shadow Copy Service, or HPE P6000 EVA Disk Array Family, the Automatic Disaster Recovery module, the integration for Microsoft Exchange Server, Microsoft SQL Server, HPE P9000 XP Disk Array Family, or EMC Symmetrix, and so on), follow the steps described in sections below to successfully perform the upgrade:

- For instructions on how to upgrade the Oracle integration, see ["Upgrading the Oracle integration" below](#).
- For instructions on how to upgrade the SAP R/3 integration, see ["Upgrading the SAP R/3 integration" on the next page](#).
- For instructions on how to upgrade the Microsoft Volume Shadow Copy Service integration, see ["Upgrading the Microsoft Volume Shadow Copy Service integration" on page 284](#).
- For instructions on how to upgrade the HPE P6000 EVA Disk Array Family integration, see ["Upgrading the HPE P6000 EVA Disk Array Family integration" on page 284](#).
- For instructions on how to upgrade the Virtual Environment integration, see ["Upgrading the Virtual Environment integration" on page 285](#).
- For instructions on how to upgrade the Microsoft Exchange Server, Microsoft SQL Server, HPE P9000 XP Disk Array Family, or EMC Symmetrix integration, or any other integration, see ["Upgrading other integrations" on page 285](#).

Upgrading the Oracle integration

The clients that have the Oracle integration installed are upgraded either locally, by running the `omnisetup.sh -install oracle8` command (UNIX systems) or the `setup.exe` command (Windows

systems), or remotely, by remotely installing the Oracle integration agent to the client using the Data Protector GUI. Note that on UNIX, if you are upgrading the client that does not reside on the Cell Manager, you do not need to specify the `-install oracle8` option. In this case, the setup will select the same components as installed on the system before the upgrade without issuing a prompt.

When the user has installed Container Database (CDB) on Data Protector 9.0x version and upgrades to Data Protector 9.09 version then he needs to reconfigure Oracle integration to get the new functionality.

User root is no longer required

On UNIX clients, the Data Protector Oracle Server integration no longer configures, checks the configuration of, and browses Oracle databases under the user `root`. Now, these operations run under the operating system user account that you specify in a backup specification. Therefore, you can safely remove the user `root` from the Data Protector user group.

Note: For ZDB and instant recovery sessions, the user `root` is still required.

After the upgrade, it is also recommended to perform a configuration check for each Oracle database, during which Data Protector copies the operating system user account (backup owner) from the backup specification to the corresponding Data Protector Oracle database configuration file.

If the configuration check is not performed, the configuration file is not updated. In such cases, during restore, Data Protector browses Oracle databases under the backup owner of the last backup session. If such a backup session has not been created in the last three months, the `root` user is used as the last option.

Configuring an Oracle instance for instant recovery

If the control files, recovery catalogs, or archive redo logs are located on the same volume group (if LVM is used) or source volume as the database files, you must either reconfigure the Oracle instance or set the `ZDB_ORA_INCLUDE_CF_OLF`, `ZDB_ORA_INCLUDE_SPF`, and `ZDB_ORA_NO_CHECKCONF_IR` omnirc options. See the *HPE Data Protector Zero Downtime Backup Integration Guide*.

Oracle ASM configurations using HPE P6000 EVA Disk Array Family or HPE 3PAR StoreServ Storage

To enable support for creation of consistent replicas of the Oracle Server data on P6000 EVA Array or in HPE 3PAR StoreServ Storage configurations in which Automatic Storage Management (ASM) is used, you need to upgrade both Data Protector components, the Oracle Integration and the HPE P6000 / HPE 3PAR SMI-S Agent, on the application system as well as on the backup system.

Upgrading the SAP R/3 integration

The clients that have the SAP R/3 integration installed are upgraded either locally, by executing the `omnisetup.sh -install sap` command (UNIX systems) or the `setup.exe` command (Windows systems), or remotely, by remotely installing the SAP R/3 integration agent to the client using the Data Protector GUI. Note that on UNIX, if you are upgrading the client that does not reside on the Cell Manager, you do not need to specify the `-install sap` option. In this case, the setup will select the same components as installed on the system before the upgrade without issuing a prompt.

SAP compliant ZDB sessions

SAP standards recommend that BRBACKUP is started on the backup system during ZDB sessions (SAP compliant ZDB sessions). Data Protector enables you to comply with these standards. First, configure the backup system as described in the SAP guide for Oracle (split mirror backup, software configuration) and install the Data Protector SAP R/3 Integration component on the backup system. Then, configure Data Protector for SAP compliant ZDB sessions as described in the *HPE Data Protector Zero Downtime Backup Integration Guide*.

Configuring an Oracle instance for instant recovery

If the control files, recovery catalogs, or archive redo logs are located on the same volume group (if LVM is used) or source volume as the database files, you have three options:

- Reconfigure the Oracle instance.
- Set the ZDB_ORA_INCLUDE_CF_OLF, ZDB_ORA_INCLUDE_SPF, and ZDB_ORA_NO_CHECKCONF_IR omnirc options.
- Configure Data Protector to start BRBACKUP on the backup system (SAP compliant ZDB sessions).

For details, see the *HPE Data Protector Zero Downtime Backup Integration Guide*.

Upgrading the Microsoft Volume Shadow Copy Service integration

Instant recovery-enabled backup sessions after upgrading from HPE Data Protector 6.20, Data Protector 7.00, and Data Protector 8.00 and later

After you upgraded the VSS integration from an older version of Data Protector, you need to resolve the source volumes on the application system if you will perform the ZDB-to-disk and ZDB-to-disk+tape sessions. Otherwise, the ZDB-to-disk sessions will fail and ZDB-to-disk+tape session will complete only with backups to tape not leaving the replicas on the disk array. Execute the resolve operation from any VSS client in the cell as follows:

```
omnidbvss -resolve {-apphost ApplicationSystem | -all}
```

For more information, see the *HPE Data Protector Zero Downtime Backup Integration Guide*.

Upgrading the HPE P6000 EVA Disk Array Family integration

Considerations

- When upgrading a pre-6.20 version of Data Protector to Data Protector 9.00 or later, note that the *Loose* snapshot policy for replica creation on P6000 EVA Array was no longer supported starting with the Data Protector version 6.20. The *Strict* snapshot policy is implied for all ZDB sessions involving this disk array. After the upgrade, when a ZDB session using the *Loose* snapshot policy is run, a warning is reported and the *Strict* snapshot policy is used instead, but the ZDB backup

specification itself is not updated. To avoid such warnings, you need to manually update such ZDB backup specifications.

To manually update a ZDB backup specification to use the now implicit *Strict* snapshot policy, open the backup specification in the Data Protector GUI, change any of its options and change it back, and finally save the backup specification by clicking **Apply**.

For information on snapshot policies for replica creation on P6000 EVA Array, see the *HPE Data Protector Zero Downtime Backup Administrator's Guide* and the *HPE Data Protector Help*.

Upgrading the Virtual Environment integration

When upgrading the Data Protector Virtual Environment integration component from the Data Protector version 6.20 or earlier, run the following command after the new version has been installed on the corresponding clients:

```
vepa_util.exe --upgrade-cell_info
```

This is needed due to a change in password encoding in the `cell_info` file. It will re-encode the passwords used by the Virtual Environment integration, first creating a `cell_info.bak` file.

Upgrading other integrations

If the Data Protector client has the Microsoft Exchange Server, Microsoft SQL Server, HPE P9000 XP Disk Array Family, or EMC Symmetrix integration, or any other integration installed, upgrade such client either locally, using the `omnisetup.sh-installcomponent_list` command (UNIX systems) or the `setup.exe` command (Windows systems), or remotely, using the Data Protector GUI. For a list of the Data Protector component codes, see "[Local installation on UNIX and Mac OS X systems](#)" on [page 98](#). Note that if you are upgrading the client that does not reside on the Cell Manager, you do not need to specify the `-installcomponent_list` option. In this case, the setup will select the same components as installed on the system before the upgrade without issuing a prompt.

Upgrading in a MoM environment

You can upgrade a MoM Environment sequentially. However, note the following limitations:

Limitations

- You cannot use **distributed file media format** with your file libraries until all Cell Managers have been upgraded to Data Protector 9.00 or later.

To upgrade your MoM environment, proceed as follows:

1. Upgrade the MoM Manager/CMMDB Server to Data Protector 9.09.
During the upgrade, Cell Managers in a MoM environment must not be operational. After the upgrade, the MoM Manager can still work with the old Cell Managers.
2. Upgrade each client Cell Manager in a MoM environment.
For the upgrade procedure, see "[Upgrading the UNIX Cell Manager and Installation Server](#)" on [page 271](#) and "[Upgrading the Windows Cell Manager and Installation Server](#)" on [page 274](#).
3. Upgrade clients with configured devices.

4. Upgrade clients with application integrations.
After this part of the upgrade is finished, you can backup and restore filesystems and integrations with the Data Protector 9.00 or later MoM GUI.

Upgrading from the Single Server Edition

You can perform the upgrade from one of the following:

- From earlier versions of the Single Server Edition (SSE) to Data Protector 9.09 Single Server Edition. For details, see "[Upgrading from earlier versions of SSE to Data Protector 9.09 SSE](#)" below.
- From Data Protector 9.09 Single Server Edition to Data Protector 9.09. For details, see "[Upgrading from Data Protector 9.09 SSE to Data Protector 9.09](#)" below.

Upgrading from earlier versions of SSE to Data Protector 9.09 SSE

The upgrade procedure from earlier versions of SSE to Data Protector 9.09 SSE is the same as the upgrade procedure from earlier versions of Data Protector to Data Protector 9.09. For the information, see "[Upgrading from Data Protector 6.20, 7.00, 8.00 and later](#)" on page 270.

Upgrading from Data Protector 9.09 SSE to Data Protector 9.09

Licenses

You need to have a license to perform the upgrade from Data Protector 9.09 Single Server Edition to Data Protector 9.09. For details about licensing, see "[Data Protector Licensing](#)" on page 306.

The upgrade from Data Protector 9.09 Single Server Edition to Data Protector 9.09 is offered for two possible scenarios:

- If you have the Data Protector Single Server Edition installed on one system (Cell Manager) only. See "[Upgrading the Cell Manager](#)" below.
- If you have the Data Protector Single Server Edition installed on multiple systems and you want to merge these cells. See "[Upgrading from multiple installations](#)" on the next page.

Note: To upgrade from a previous version of the Single Server Edition to a full Data Protector installation, first upgrade your Single Server Edition to the full installation of the same version level. To upgrade this full installation to Data Protector 9.09, see "[Upgrading from Data Protector 6.20, 7.00, 8.00 and later](#)" on page 270.

Upgrading the Cell Manager

To upgrade the Single Server Edition Cell Manager, do the following:

1. Remove the Single Server Edition license:

Windows systems:

```
del Data_Protector_program_data\Config\server\Cell\lic.dat
```

UNIX systems:

```
rm /etc/opt/omni/server/cell/lic.dat
```

2. Start the Data Protector GUI and add a permanent password.

Upgrading from multiple installations

To upgrade the Data Protector Single Server Edition installed on multiple systems, proceed as follows:

1. Select one of the existing Single Server Edition systems to be the new Cell Manager. See ["Choosing the Cell Manager system" on page 25](#).
2. Upgrade the selected Cell Manager by performing the following:
 - a. Remove the Single Server Edition license:

```
del Data_Protector_program_data\Config\server\Cell\lic.dat (on Windows systems) or  
rm /etc/opt/omni/server/cell/lic.dat (on UNIX systems)
```
 - b. Start the Data Protector GUI and add a permanent password.
3. Import the other Single Server Edition systems into the newly created Cell Manager system as clients using the GUI.
4. Uninstall the Data Protector Single Server Edition from the other systems. See .
5. Import the media to the new Cell Manager.

For information about importing media, see the *HPE Data Protector Help* index: "importing, media".

Migrating the Cell Manager to a different platform

Migration from PA-RISC HP-UX systems to Intel Itanium HP-UX systems

Data Protector no longer supports PA-RISC architecture based HP-UX 11.11/11.23 systems as a Cell Manager platform. Therefore, you must migrate Cell Manager from a PA-RISC architecture based HP-UX 11.11/11.23 system to an HP-UX 11.23/11.31 system for the Intel Itanium 2 architecture before the upgrade.

For the migration procedure, see the *HPE Data Protector Installation Guide* of the appropriate product version.

Migrating from 32-bit/64-bit Windows to 64-bit Windows/Windows Server 2008 or Windows Server 2012

Data Protector no longer supports 32-bit Windows systems as a Cell Manager platform. Therefore, you must migrate the Cell Manager to a 64-bit Windows system before you start the upgrade procedure to Data Protector 9.00 or later. For the migration procedure, see the *HPE Data Protector Installation Guide* from the appropriate product version.

Migrating from Solaris to Linux

This section describes the procedure for migrating your existing Cell Manager from a Solaris system to a Linux system.

Data Protector 9.00 no longer supports Solaris as a Cell Manager platform. Therefore, you must migrate the Cell Manager to a new platform before you start the upgrade procedure to Data Protector 9.00 or later, using the installed Data Protector version.

Procedure

1. Using your existing Data Protector installation, export all media catalogs on the current Cell Manager:
 - a. In the Context List, click **Devices & Media**.
 - b. In the Scoping Pane, expand **Media** and then expand **Pools**.
 - c. Expand the media pool with the media whose catalog you want to copy.
 - d. Select and right-click the media and click **Copy Catalog to File**.
 - e. Specify the output directory for the MCF files, which will contain media-related catalog data.
 - f. Click **Finish** to start copying and exit the wizard. For details, see the *HPE Data Protector Help* topic *Copying the Catalog Media Data to the MCF File*.
2. Install Data Protector on the Linux system that will become the new Cell Manager. For details, see ["Installing a UNIX Cell Manager" on page 29](#).
3. If you changed the default Data Protector Inet port on the old Cell Manager, set the same Inet port also on the new Cell Manager. See ["Changing the default Data Protector Inet port" on page 359](#).
4. Import the MCF files to the new Cell Manager:
 - a. In the Context List, click **Devices & Media**.
 - b. In the Scoping Pane, expand **Media**, right-click **Pools**, and click **Import Catalog from MCF File** to open the wizard.
 - c. Specify MCF files you want to import.
 - d. Specify additional options for the session: by default, the **Import to original pool if possible** option is selected. Select the **Import Copy as Original option**.
 - e. Click **Finish** to start importing and exit the wizard.

For details, see the *HPE Data Protector Help* topic *Importing the Catalog Media Data from the MCF Files*.

5. Configure the licenses on the new Cell Manager. See "[Data Protector product structure and licenses](#)" on page 323.
6. Additional steps are required if the following is true:
 - Your cell is a part of the MoM environment. See "[MoM specifics](#)" below.
 - Your cell works across a firewall. Reconfigure all firewall related settings on the new Cell Manager. See the *HPE Data Protector Help* index: "firewall environments".
 - You want to have an Installation Server on your new Cell Manager. See "[Installation Server specifics](#)" below.

After the migration is done, you can upgrade Data Protector.

MoM specifics

If the new Cell Manager will be configured in the MoM, additional steps are required after the basic migration procedure has been completed. The required steps depend on the configuration of the MoM for the old and new Cell Managers in your environment. The supported combinations are:

- The old Cell Manager was a MoM client; the new Cell Manager will be a MoM client of the same MoM Manager.

Perform the following steps:

- a. On the MoM Manager, export the old Cell Manager from the MoM Manager cell and import the new Cell Manager. See the *HPE Data Protector Help* index: "client systems exporting".
 - b. Add the MoM administrator to the users list on the new Cell Manager. See the *HPE Data Protector Help* index: "MoM administrator, adding".
- The old Cell Manager was a MoM Manager; the new Cell Manager will be a MoM Manager.

If the old MoM Manager was the only client in the MoM, no action is necessary. Otherwise, perform the following steps:

- a. On the old MoM Manager (the old Cell Manager), export all MoM clients.
- b. On the new MoM Manager (the new Cell Manager), import all MoM clients.
- c. Add the MoM administrator to the users list on all MoM clients.

Installation Server specifics

The migration of the Installation Server is not done as part of the Cell Manager migration. If Installation Server is installed on your old Cell Manager, it will not be migrated to the new Cell Manager and will stay the Installation Server for your cell.

To use the new Cell Manager also as an Installation Server, install the Installation Server component on the new Cell Manager after the migration and import it in the cell. See the *HPE Data Protector Help* index: "Installation Server".

Migrating a Windows Cell Manager Internal Database to a Different Server

The following scenario is an example of migrating an Internal Database (IDB) from one Windows Cell Manager server to another.

Terminology

The following terminology is used in this scenario.

- **OLD_SERVER.** The source Cell Manager from which the IDB will be moved.
- **NEW_SERVER.** The destination Cell Manager to which the IDB will be moved.

Prerequisites

- When using command line arguments, substitute the fully qualified domain name for OLD_SERVER and NEW_SERVER.
- If the OLD_SERVER is running on Windows 2008, the NEW_SERVER may run either Windows 2008 or Windows 2012.
- If the OLD_SERVER is running on Windows 2012, the NEW_SERVER must be running on Windows 2012.
- Both servers must have the same version of Data Protector installed on the Cell Manager.
- If the NEW_SERVER has a different IP address than the OLD_SERVER, you must move your licenses to the new IP address by contacting the HPE Password Center (<http://enterpriselicense.hpe.com/>).
- On the NEW_SERVER you must be able to import the media that contains the full IDB backup from the OLD_SERVER.
 - If the IDB backup is on a physical tape, you must configure a tape drive or library on the NEW_SERVER and ensure that the tape is accessible.
 - If the IDB backup is on a file library backup device, you may need to export the file library from the OLD_SERVER and import it to the NEW_SERVER. For more information, see "[On NEW_SERVER](#)" on the next page.
- The configuration, logs, and database files are stored under the *Data_Protector_program_data* directory, usually C:\ProgramData\Omniback.
If you have installed to a different location, take note of the location for later use.

Preparing for migration

Before you begin the migration, there are several tasks that must be performed on the OLD_SERVER and the NEW_SERVER to prepare them for the migration of the IDB.

On OLD_SERVER

- Run an extended database consistency check on the existing IDB on the OLD_SERVER to validate data consistency prior to the migration.
- Perform a full backup of the existing IDB.

Running an extended database consistency check

1. Run `omnidbcheck -extended`.

This command validates data consistency in the following areas:

- Database connection
- Database and schema consistency
- Datafiles and media consistency

If any inconsistencies are detected, ensure that you first fix those problems and then perform the migration.

Performing a full backup of the IDB on OLD_SERVER

For more information on performing a full backup of the IDB, see the *HPE Data Protector Help*.

On NEW_SERVER

- Save a copy of the `cell_info` file, found in the `Data_Protector_program_data` directory, usually `C:\ProgramData\Omniback\Config\Server\cell\cell_info`. This file will be used later.

Using omnidownload and omniupload to transfer information about a file library

1. On the OLD_SERVER, use `omnidownload-library Library` to download information about the file library from the Data Protector IDB to an ASCII file.

For example, for an IDB backup to a file library named “FL1” use the command as follows:

```
omnidownload -library FL1 -file "C:\tmp\FL1.txt"
```

2. Copy the `omnidownload` output file to the NEW_SERVER.

For example, copy to `C:\tmp\FL1.txt`.

3. On the NEW_SERVER, use `omniupload -create_library <filename>.txt` to upload the library file and create a new backup device on NEW_SERVER.

```
omniupload -create_library "C:\tmp\FL1.txt"
```

4. Import the media from the new backup device on NEW_SERVER.

For details on commands, see the *HPE Data Protector Command Line Interface Reference*. For details on importing media, see the *HPE Data Protector Help*.

Migration tasks

Prerequisite for Linux:

- If the IDB is restored to a new host or Cell Manager, the user and group ID must be the same as the original Cell Manager.

Use the following commands to change the user and group ID on new host before installing the Data Protector:

- To determine the ID for hpd user and group on the original host, use `cat /etc/passwd`.
- To set user and group ID on the new host, use:
`usermod -u <NEWID> <LOGIN>`
`groupmod -g <NEWID> <GROUP>`
`usermod -g <GROUP> <LOGIN>`

Importing the IDB

To import the IDB on the NEW_SERVER

1. Once the media is imported, ensure that you can see the IDB backup session in the Data Protector GUI.
2. Create a new directory to be used for the restored IDB.
For example, create a directory at the following location:

```
C:\ProgramData\Omniback\server\db80_restore\idb
```

Note: You cannot restore the IDB from OLD_SERVER to the same location on NEW_SERVER, because it is in use.

3. In the Data Protector GUI Context List, click **Restore**.
4. In the Scoping Pane, expand **Restore Objects**, and then expand **Internal Database**.
5. Expand the OLD_SERVER item, and click **Internal Database**.
 - a. On the Internal Database property page, to restore the basic Internal Database parts:
 - i. Select the **Restore Internal Database** option.
 - ii. Specify the temporary port to be used for the Internal Database Service during the restore, and the restore location as `C:\ProgramData\Omniback\server\db80_restore\idb`.
 - iii. Select **Restore catalog binary files** to restore the DCBF part of the IDB, and select the **Restore to original location** option.
 - b. On the Configuration Files property page:
On Windows system:
 - i. Select **Restore to original location**.

Note: Ensure that the **Restore configuration files** option is checked.

- ii. Select **Keep most recent** from the **File conflict handling** list.

On UNIX system:

See ["IDB restore fails at the end of a restore process" on page 297](#)

- c. Click **Restore** to start the restore of the IDB.

During restore, you might see the following error message along with few others; which can be ignored:

```
[Major] From: OB2BAR_POSTGRES_BAR@mrou77.usa.hp.com "DPIDB" Time: 10/9/2014  
10:35:29 PM The OS reported error while accessing  
C:/ProgramData/OmniBack/config/server/certificates: [80] The file exists.
```

- d. When the restore has completed, stop and start the Data Protector services.

```
omnisrv -stop
```

```
omnisrv -start
```

Note: If you encounter any issues after completing the IDB restore session, see [Troubleshooting](#).

Post Restore Tasks

Perform the following post-restore tasks.

1. Run `omnidbutil -show_db_files` to ensure that the restored files exist in the directory created in Step 3 of ["Importing the IDB" on the previous page](#).
2. Add the `NEW_SERVER` as the Cell Manager. See ["Adding the NEW_SERVER as the Cell Manager" below](#)
3. Optionally, change the Cell Manager name in the IDB. See ["Changing the Cell Manager Name in the IDB" on the next page](#).
4. Run `omnidbcheck -extended` to verify the consistency of the restored IDB. See ["Running an extended database consistency check " on page 291](#).

Adding the NEW_SERVER as the Cell Manager

To add the NEW_SERVER as the Cell Manager

1. In the Data Protector GUI Context List, click **Clients**.
2. Delete the `OLD_SERVER` item.
3. Import the `NEW_SERVER` and ensure that it is shown as the Cell Manager.

If the steps above do not work

1. In a text editor, open the `cell_info` file that you saved in ["Preparing for migration" on page 290](#).
2. Copy the line containing the host name of the `NEW_SERVER` to your paste buffer.
3. Edit the `cell_info` file.
 - a. Add the entry for the `NEW_SERVER` from your paste buffer.

- b. Remove the entry for the OLD_SERVER and save the cell_info file.
4. Restart the GUI.

Changing the Cell Manager Name in the IDB

If the NEW_SERVER has a different host name than the OLD_SERVER, you must change the Cell Manager name in the IDB.

For example, the OLD_SERVER name is oldcm.company.com and the NEW_SERVER name is newcm.company.com.

On the NEW_SERVER

1. Run `omnidbutil -show_cell_name` to display which Cell Manager owns the IDB.

For example

```
> omnidbutil -show_cell_name
Catalog database owner: "oldcm.company.com"
```

2. Run `-change_cell_name OldHost` to change the ownership of the IDB to the NEW_SERVER.

For example

```
> omnidbutil -change_cell_name oldcm.company.com
This action will change ownership of libraries, devices, media pools and media.
Are you sure [y/n]? y
DONE!
```

Next Steps

1. Migrate your clients to the NEW_SERVER by running the `omnicc` command.
Run the `omnicc -update_all -force_cs` command to update the version and installed components information in the NEW_SERVER cell_info configuration file for all clients in the cell.
For a description of the `omnicc` commands, see the *HPE Data Protector Command Line Interface Reference*.
2. Create a new IDB backup specification for the NEW_SERVER because the original one is configured to use the OLD_SERVER.
For more information, see the *HPE Data Protector Help*.
3. Navigate to the Internal Database and check, if any sessions are in running state. If any, run the `omnidbutil -clear` command.
4. Stop and start the Data Protector services.
`omnisrv -stop`
`omnisrv -start`

Troubleshooting

Problem

After completing the IDB restore operation, connecting from the Data Protector GUI to the Cell Manager fails

After completing a restore operation, connecting from the GUI to the Cell Manager fails with the error:

```
A server error has occurred. Reported error message:  
couldn't connect to host.
```

The `hpdp-as` service process is not listening on port 7116.

Action

1. Verify the listening port as 7116 by opening a command window and running the `netstat` command.

```
c:\> netstat -ban | findstr 7116 | findstr LISTEN
```

If the `netstat` command returns results, the listening port is properly configured.

If the `netstat` command does not return any results the port is improperly configured, for example:

```
c:\> netstat -ban | findstr 7116 | findstr LISTEN  
c:\>
```

2. Take a backup of `/etc/opt/omni/server/AppServer/standalone.xml` file.
3. Replace all keystore and truststore passwords in `/etc/opt/omni/server/AppServer/standalone.xml` with ones stored in `/etc/opt/omni/client/components/webservice.properties`.

Navigate to the `C:\ProgramData\Omniback\Config\client\components` directory and in `webservice.properties` file search for the following lines of code:

```
keystorePassword=jones7XE7EJjHzZ  
truststorePassword=jones7XE7EJjHzZ
```

4. Take note of the keystore password for later use.
5. Open `standalone.xml` file in a text editor and search for the lines that contain keystore-password, such as:

```
<jsse keystore-password="JypjEnc0.9aG1"  
keystoreurl="C:/ProgramData/OmniBack/Config/server/certificates/server/server.keystore"  
  
truststore-password="JypjEnc0.9aG1"  
truststoreurl="C:/ProgramData/OmniBack/Config/server/certificates/server/server.truststore"/>
```

6. Replace all instances of keystore and truststore passwords in the `standalone.xml` file with the keystore password from the `webservice.properties` file from Step 4 and save the file.
7. In a command window, navigate to `C:\Program Files\Omniback\bin`.
8. Regenerate the certificate using the following command:

```
perl omnigencert.pl -server_id NEW_SERVER -store_password <keystore-password>
```

where the <keystore-password> is the password noted in Step 4.

9. Stop and start the Data Protector services.

```
omnisrv -stop
```

```
omnisrv -start
```

10. Attempt to connect to the Cell Manager again.

Problem

After completing the IDB restore operation, connecting from the Data Protector GUI to the Cell Manager fails with SSL errors

After completing a restore operation, connecting from the GUI to the Cell Manager fails with the error:

A server error has occurred. Reported error message:

SSL peer certificate or SSH remote was not OK.

Action

1. Navigate to the C:\ProgramData\Omniback\Config\client\components directory and open the webservice.properties file:

```
# global property file for all components
jce-serviceregistry.URL = https://newcm.company.com:7116/jce-
serviceregistry/restws
```

```
keystorePath=C:/ProgramData/OmniBack/Config/server/certificates/client/client.keystore
```

```
truststorePath=C:/ProgramData/OmniBack/Config/server/certificates/client/client.truststore
```

```
keystorePassword=jones7XE7EJjHzZ
```

```
truststorePassword=jones7XE7EJjHzZ
```

2. Take note of the keystorePassword and the truststorePassword.
3. In a command window, navigate to C:\Program Files\OmniBack\bin.
4. Regenerate the certificate using the following command:

```
perl omnigencert.pl -server_id NEW_SERVER -store_password <keystore-password>
```

where the <keystore-password> is the password noted in Step 2.

5. Stop and start the Data Protector services.

```
omnisrv -stop
```

```
omnisrv -start
```

6. Attempt to connect to the Cell Manager again.

Problem

During an IDB backup, the IDB cannot be put into backup mode and fails

During an IDB backup, the Session Messages display an error:

```
[Critical] From: OB2BAR_POSTGRES_BAR@oldcm.company.com "DPIDB" Time: 10/10/2014  
12:19:51 PM
```

Putting the Internal Database into the backup mode failed

Action

1. Navigate to C:\ProgramData\OmniBack\Config\Server\idb and made a copy of the idb.config file as a backup.
2. In a text editor, open the idb.config file and search for PGOSUSER.

For example

```
PGOSUSER='OLD_SERVER\Administrator';
```

3. If the server name is not correct, edit it to the NEW_SERVER name.

For example

```
PGOSUSER='NEW_SERVER\Administrator';
```

4. Stop and start the Data Protector services.

```
omnisrv -stop
```

```
omnisrv -start
```

5. Attempt the IDB backup again.

Problem

IDB restore fails at the end of a restore process

IDB restore fails at the end of restore process with the message:

```
cannot execute omnidbutil -clear command
```

Action

This could happen under the following circumstances in a HP-UX cell manager: When restoring to a different cell manager or on the same cell manager, but postgres passwords have changed after the backup session was restored or after a fresh cell manager installation.

Note: In a Linux environment, restore will complete successfully. This is because Linux mostly uses Operating System authentication on databases in contrast to HP-UX, which uses password authorization and in this case passwords files are not restored correctly. However, the workaround should be applied in the Linux environment too, to have the correct password files.

1. Restore only the configuration files to another location <restore-conf> up to the point in time you are planning to restore the whole IDB.

2. Restore the whole IDB but don't choose to restore DCBFs or else restore the whole DCBFs to the original location.
3. Save a backup of `/etc/opt/omni/server/idb/idb.config` to `idb.config.bkp`
4. Perform file copies from the `<restore-conf>` location to the original location:
 - a. `cp <restore-conf>/etc/opt/omni/server/idb/idb.config /etc/opt/omni/server/idb/idb.config`
 - b. `cp <restore-conf>/etc/opt/omni/server/idb/ulist /etc/opt/omni/server/idb/ulist`
 - c. `cp <restore-conf>/etc/opt/omni/server/AppServer/standalone.xml /etc/opt/omni/server/AppServer/standalone.xml`
5. Modify the following fields in `idb.config` to point to the correct location (correct locations are stored in `idb.config.bkp`)
 - a. `PGDATA_PG='/space/restore1/pg';`
 - b. `PGDATA_IDB='/space/restore1/idb';`
 - c. `PGDATA_JCE='/space/restore1/jce';`
 - d. `PGWALPATH='/space/restore1/pg/pg_xlog_archive' ;`
6. Stop and start Data Protector services.
 - a. `run omniv stop` (this could take a while)
 - b. `run omniv start`
 - c. `run omnidbutil -clear`

Upgrading the Cell Manager configured in HPE Serviceguard

During an upgrade procedure, only the database is upgraded, and the previous version of the product is removed. The latest version of Data Protector is installed with the default selection of agents, and other agents are removed. To obtain a configuration equivalent to the state before the upgrade, you must manually select any other agents during the upgrade procedure or reinstall them afterwards on each physical node.

Prerequisites

- The Data Protector services on the HPE Serviceguard secondary node(s) should not be running. This ensures the upgrade uses the IDB exported during the upgrade of the primary node and avoids an additional IDB export.

The upgrade procedure from previous versions of Data Protector to the latest version of Data Protector consists of upgrading the primary and secondary nodes. Follow the instructions in the order they are presented in the sections below.

Primary node

Log on to the primary node and perform the procedure:

1. Stop the old Data Protector package by running the `cmhaltpkg PackageName` command (where *PackageName* is the name of the cluster package). For example:

```
cmhaltpkg ob2c1
```
2. Activate the volume group in exclusive mode:

```
vgchange -a e -q y VGName
```

For example:

```
vgchange -a e -q y /dev/vg_ob2cm
```
3. Mount the logical volume to the shared disk:

```
mount LVPATHSharedDisk
```

The *LVPATH* parameter is the path name of the logical volume, and *SharedDisk* is the mount point or a shared directory. For example:

```
mount /dev/vg_ob2cm/lv_ob2cm /omni_shared
```
4. Start the Data Protector services:

```
omnisv -start
```
5. Upgrade the Cell Manager by following the instructions in the section "[Upgrading the UNIX Cell Manager and Installation Server](#)" on page 271. Some steps are different depending on the product version you are upgrading from.
6. Stop the Data Protector services:

```
omnisv -stop
```
7. Dismount the shared disk:

```
umount SharedDisk
```

For example:

```
umount /omni_shared
```
8. Deactivate the volume group:

```
vgchange -a n VGName
```

For example:

```
vgchange -a n /dev/vg_ob2cm
```

Secondary node

Log on to the secondary node and perform the procedure:

1. Activate the volume group in exclusive mode:

```
vgchange -a e -q y VGName
```
2. Mount the logical volume to the shared disk:

```
mount LVPATHSharedDisk
```

3. Upgrade the Cell Manager by following the instructions in the section "[Upgrading the UNIX Cell Manager and Installation Server](#)" on page 271. Some steps are different depending on the product version you are upgrading from.
4. Rename the `csfailover.sh` and `mafailover.ksh` startup scripts in the `/etc/opt/omni/server/sg` directory (for example, to `csfailover_DP70.sh` and `mafailover_DP70.ksh`) and copy the new `csfailover.sh` and the `mafailover.ksh` scripts from the `/opt/omni/newconfig/etc/opt/omni/server/sg` directory to the `/etc/opt/omni/server/sg` directory.

If you customized your old startup scripts, reimplement the changes also in the new startup scripts.

5. Stop the Data Protector services:

```
omnisv -stop
```

6. Dismount the shared disk:

```
umount SharedDisk
```

7. Deactivate the volume group:

```
vgchange -a n VGName
```

Primary node

Log on to the primary node again and perform the procedure:

1. Start the Data Protector package:

```
cmrunpkg PackageName
```

2. Configure the Cell Manager. Make sure not to be positioned in the `/etc/opt/omni` or `/var/opt/omni` directory or their subdirectories when running the script. Make also sure to have no mounted subdirectories in the `/etc/opt/omni` or `/var/opt/omni`. Execute:

```
/opt/omni/sbin/install/omniforsg.ksh -primary -upgrade
```

3. Stop the Data Protector package:

```
cmhaltpkg PackageName
```

Secondary node

Log on to the secondary node again and perform the procedure:

1. Start the Data Protector package:

```
cmrunpkg PackageName
```

2. Configure the Cell Manager. Make sure not to be positioned in the `/etc/opt/omni` or `/var/opt/omni` directory or their subdirectories when running the script. Ensure no subdirectories are mounted in the `/etc/opt/omni` or `/var/opt/omni` directory. Execute:

```
/opt/omni/sbin/install/omniforsg.ksh -secondary /share -upgrade
```

Note: `/share` is the shared directory or storage between cluster nodes.

3. Stop the Data Protector package:

```
cmhaltpkg PackageName
```

Primary node

Log on to the primary node once again and perform the procedure:

1. Start the Data Protector package:

```
cmrunpkg PackageName
```

Make sure that the package switching and switching for nodes options are enabled.

2. Re-import the virtual host:

```
omnicc -import_host VirtualHostname -virtual
```

3. Change the Cell Manager name in the IDB:

```
omnidbutil -change_cell_name
```

4. If you have the Installation Server in the same package as the Cell Manager, import the Installation Server virtual hostname:

```
omnicc -import_is VirtualHostname
```

Note: All requests coming from the Cell Managers are logged in the `/var/opt/omni/log/inet.log` file on the Data Protector clients. To prevent unnecessary log entries, secure the clients. See ["Security considerations" on page 194](#) for information on how to secure a cell.

Upgrading the Cell Manager configured in Symantec Veritas Cluster Server

During an upgrade procedure, only the database is upgraded, and the previous version of the product is removed. Data Protector is installed with the default selection of agents, and other agents are removed. To obtain a configuration equivalent to the state before the upgrade, you must manually select any other agents during the upgrade procedure or reinstall them afterwards on each physical node.

Prerequisites

The Data Protector services on the Symantec Veritas Cluster Server secondary node(s) should not be running.

The upgrade procedure from previous versions of Data Protector consists of upgrading the primary and secondary nodes. Follow the instructions in the order they are presented in the sections below.

Primary node

Log on to the primary node and perform the following steps:

1. Take the Data Protector application resource offline.
2. Disable the Data Protector application resource.
3. Start the Data Protector services:

```
omnisv -start
```
4. Upgrade the Cell Manager by following the instructions in the section "[Upgrading the UNIX Cell Manager and Installation Server](#)" on page 271.
5. If you have customized the monitoring script used by the Data Protector Application resource, re-implement the changes provided by the newly installed `/opt/omni/sbin/vcsfailover.ksh` script in your customized script.
6. Stop the Data Protector services:

```
omnisv -stop
```

Secondary node

Log on to the secondary node and perform the following steps:

1. Switch over the Data Protector service group to the secondary node.
2. Upgrade the Cell Manager by following the instructions in the section "[Upgrading the UNIX Cell Manager and Installation Server](#)" on page 271.
3. If you have customized the monitoring script used by Data Protector Application resource, re-implement the changes provided by the newly installed `/opt/omni/sbin/vcsfailover.ksh` script in your customized script.
4. Stop the Data Protector services:

```
omnisv -stop
```

Primary node

Log on to the primary node again and perform the following steps:

1. Switch over the Data Protector service group to the primary node.
2. Enable the Data Protector application resource.
3. Bring the Data Protector application resource online.
4. Configure the Cell Manager. Ensure that the script is not executed from `/etc/opt/omni` or `/var/opt/omni` directory or their sub-directories. Also, ensure that sub-directories are not mounted in the `/etc/opt/omni` or `/var/opt/omni` directory. Execute the following command:

```
/opt/omni/sbin/install/omniforsg.ksh -primary -upgrade
```

Secondary node

Log on to the secondary node again and perform the following steps:

1. Switch over the Data Protector service group to the secondary node.
2. Configure the Cell Manager. Ensure that the script is not executed from `/etc/opt/omni` or `/var/opt/omni` directory or their sub-directories. Also, ensure that sub-directories are not

mounted in the `/etc/opt/omni` or `/var/opt/omni` directory. Execute the following command:
`/opt/omni/sbin/install/omniforsg.ksh -secondary dirname -upgrade`
where *dirname* stands for the mount point or shared directory (for example, `/omni_shared`).

Primary node

Log on to the primary node once again and perform the following steps:

1. Switch over the Data Protector service group to the primary node.
2. If you have the Installation Server in the same service group as the Cell Manager, import the Installation Server virtual hostname:

```
omnicc -import_is VirtualHostname
```

Note: All requests coming from the Cell Managers are logged in the `/var/opt/omni/log/inet.log` file on the Data Protector clients. To prevent unnecessary log entries, secure the clients. See ["Security considerations" on page 194](#) for information on how to secure a cell.

Upgrading the Cell Manager configured on Microsoft Cluster Server

Upgrade of the Cell Manager on Microsoft Cluster Server (MSCS) is performed locally, from the Windows installation DVD-ROM or ISO image.

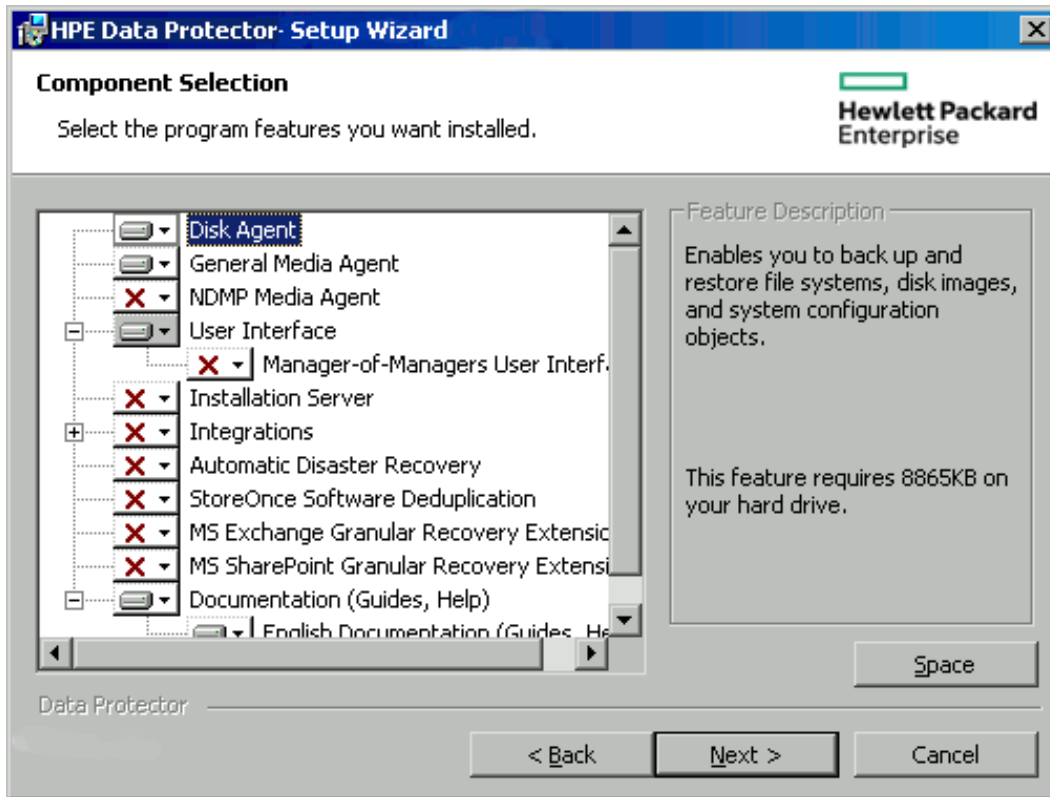
Prerequisites

- The upgrade option is supported only if the previously installed Data Protector software is the Cell Manager installed in cluster-aware mode. If a system in the cluster has the Data Protector software installed as non-cluster-aware, you must uninstall it prior to starting the setup.

Upgrade procedure

To perform the upgrade, proceed as follows:

1. Insert the Windows installation DVD-ROM or mount the ISO image and run `\Windows_Other\x8664\setup.exe`. It is recommended to start the setup on the currently active virtual server node.
Setup automatically detects the previous version of the product and prompts you to upgrade.
Click **Next** to continue.
2. Data Protector automatically selects the components that were installed.
Selecting the components



Click **Next**.

3. If Data Protector detects Windows Firewall on your system, the Windows Firewall configuration page is displayed. Data Protector setup registers all necessary Data Protector executables. By default, the **Initially, allow newly registered Data Protector executables to open inbound ports as needed** option is selected. If you do not want to enable Data Protector to open ports at the moment, deselect the option. For proper functioning of Data Protector with previous version of 9.09 clients, the Data Protector rules in Windows firewall must be enabled. Rules for the Omninet Service executable, Application Server port and Internal Database Service port will always be enabled, regardless of the choice.



Click **Next**.

4. Optionally, change the user account used by the Data Protector IDB and HTTPS Application Server and the ports used by these services.

Click **Next**.

5. The component selection summary list is displayed. Click **Install** to perform the upgrade.

Upgrades from 6.20 and 7.00:

A Command Prompt window opens and the software begins the IDB migration to the new database format by exporting the older IDB.

This Command Prompt window remains open during the export of the older IDB and displays status messages. The IDB export may take several minutes to complete.

As the upgrade proceeds, an additional Command Prompt window opens to display the status of the import of the IDB configuration information and data into Data Protector.

Upgrades from 8.00 and later:

The IDB updates automatically; no Command Prompt windows are opened.

Note that after the upgrade, every node has the same component set.

6. The **Installation status** page is displayed. Click **Next**.
7. To start using the Data Protector GUI immediately after setup, select **Launch Data Protector GUI**.

If the English Documentation (Guides, Help) component has been upgraded or newly installed, to view the HPE Data Protector Product Announcements, Software Notes, and References immediately after setup, select **Open the Product Announcements, Software Notes, and References**.

Click **Finish**.

Note: If you are upgrading cluster-aware clients, first upgrade every cluster node separately, and then re-import the virtual server. The remote upgrade is not supported.

Chapter 8: Data Protector Licensing

This chapter contains information about Licensing:

- New license keys introduced
- Data Protector license checking and reporting
- Obtaining and installing Data Protector passwords
- Data Protector product structure and licenses

Overview

HPE Data Protector or later supports two licensing schemes:

- Traditional licensing based on features and backup targets
- Capacity based licensing

Traditional licensing

The Data Protector software product structure and traditional licensing model consists of three main categories:

- The Starter Packs: A management server (Cell Manager) is supported on HP-UX, Windows, and Linux. The UNIX product licenses operate on the UNIX and Windows platforms, providing the functionality regardless of the platform, while the Windows product licenses operate on the Windows and Linux platforms only.
- Backup targets, such as tape drive or jukebox licenses. They are also referred to as the following:
 - Drive Extensions for one drive
 - Advanced backup to disk (licensed by capacity)
 - Zero Downtime backup (licensed by capacity)
- Data Protector Functional Extensions: The functional extensions licenses are required once per instance (system, library, and terabyte) for on-line backup of databases and applications, the Manager-of-Managers functionality, for libraries with more than 60 media slots, encryption, Instant Recovery, NDMP, and Granular Recovery Extension. The Starter Pack and Drive extensions and Library extensions passwords are bound to the Cell Manager and are valid for the entire Data Protector cell. Clients do not require any license for file system or disk image backups. Licenses of the Functional Extensions category either apply only to a specific client that is protected or cover the entire cell, depending on the license type.

Capacity based licensing

The capacity based product structure is based on the volume of primary data protected by HPE Data Protector and includes unlimited use of enterprise protection features. The capacity is measured in "Front End Terabytes" or Front End TB. The total amount of Front End Terabytes is defined as the aggregate amount of

data from all systems being backed up in the Cell Manager. Per system it is measured as the largest full (that is, the amount of source data protected).

The licensing in this product structure is perpetual that covers all existing or new server, storage, apps, and so on.

The following features are included in the capacity based license:

- Cell Managers and Manager of Managers
- Tape Drives and Libraries
- Online Backup and Granular Recovery Extensions
- Zero Downtime Backup and Instant Recovery for HP arrays
- Advanced Backup to Disk and NDMP
- Extended Online Backup (MySQL, PostgreSQL)
- Zero Downtime Backup for non-HP arrays

The following licenses are not included in this product structure and must be ordered separately:

- Software encryption

You can find details about the product structure and licensing model in the document "*HPE Data Protector software, Worldwide*" (PDF format) at <http://www.hpe.com/software/dataprotector> by selecting the tab labeled **Resources** under **QuickSpecs**.

New License Keys

Requesting new passwords for existing licenses

If you are an existing Data Protector customer, in order to upgrade your old license passwords to the latest version of Data Protector, you must have a valid active support agreement in place, covering the quantity and types of licenses you have in use.

Once you have received the new license keys, you should compare them to the quantity and type of license keys installed in your Data Protector environment. You should upgrade the software only after you have verified that you are in possession of enough valid license keys.

If you have received fewer or different new license keys than there are actually installed in your Data Protector environment, you should not upgrade to the latest version of Data Protector. Otherwise you risk that your Data Protector environment is no longer operational due to missing license keys.

Instead, you should contact your HPE sales representative or HPE partner first to determine what steps are needed to close the gap in the licensed functionality covered by your support contract and the actual licenses currently in use with Data Protector versions earlier than 9.00.

New license key introduced

License keys and passwords generated in Data Protector 8.00 and earlier must be upgraded as they are not compatible with the latest version of Data Protector due to changes in licensing technologies.

License keys and existing passwords generated in Data Protector 8.10 and later are compatible with 9.00 or later and no new license keys need to be issued for the upgrade from 8.10 to 9.00 or later.

For newly purchased licenses, you must select the product version “9.00” or later when requesting a password. A password generated for Data Protector 9.00 or later will not work with any previous version of Data Protector.

After the upgrade, Data Protector 9.00 or later will run with a 60 days Instant-On password. The behavior will be identical to a fresh installation with an Instant-On password.

As soon as *at least one new license key* for Data Protector 9.00 or later has been installed, the Instant-On password will be turned off and only installed valid keys will be recognized.

The activation of the instant-on passwords after the upgrade can be done only once.

Tip: After upgrade, existing licenses are still reported as invalid alongside the new (Instant-On) ones. To avoid that, rename (but do not delete) the file `lic.dat`:

Windows systems: Go to the directory `Data_Protector_program_data\Config\server\Cell` and rename the file:

```
ren lic.dat lic.bak
```

UNIX systems: Go to the directory `/etc/opt/omni/server/cell` and move the file:

```
mv lic.dat lic.bak
```

License checking and reporting

Data Protector licenses are checked and if missing, reported during various Data Protector operations, for example:

- As a part of the Data Protector checking and maintenance mechanism, the licenses are checked and, if missing, reported in the Data Protector Event Log. The Data Protector Event Log is located on the Cell Manager in `Data_Protector_program_data\log\server\Ob2EventLog.txt` (Windows systems) or `/var/opt/omni/server/log/Ob2EventLog.txt` (UNIX systems). For more information on Data Protector checking and maintenance mechanism, see the *HPE Data Protector Help* index: “Event Log, Data Protector”.
- When the Data Protector GUI is launched, if there are any missing licenses reported in the Data Protector Event Log, an Event Log notification is displayed. For more information on Data Protector Event Log, see the *HPE Data Protector Help* index: “Event Log, Data Protector”.
- When a Data Protector session is started, the licenses are checked and, if missing, reported.

Data Protector traditional licenses

Data Protector traditional licenses are with regard to their characteristics grouped as follows:

- Cell Manager related licenses
- Backup target related licenses (examples: tape drive or jukebox licenses, referred to as Drive Extensions, for one drive, advanced backup to disk and Zero Downtime Backup both licensed by

capacity)

- Functional Extensions related licenses

Cell Manager related licenses

The Data Protector Cell Manager related licenses are:

- Starter packs
- Manager-of-Managers Extension
- Single Server Edition

When a certain Data Protector component, such as the Cell Manager (included in the Starter Pack) or the Manager-of-Managers (MoM) is present in the cell, only the presence of the required basic or special license is checked.

Backup targets

For the following backup targets, Data Protector checks the number of configured items against the number of entity based licenses:

- Library extension for one library with 61-250 slots and for one library with unlimited slots
- Drive extension for SAN / all platforms and Drive extension for Windows / Linux

The presence and number of the required entity based licenses is checked if any of the items that are the subject of the source based licenses is configured in the cell. If there are less licenses than configured items, Data Protector issues a notification.

When a backup device is configured in a SAN environment for several Data Protector clients, multipath functionality must be used for Data Protector to recognize it as a single backup device.

The following backup targets are licensed by capacity:

- UNIX Zero Downtime Backup for 1 TB and 10 TB
- UNIX Zero Downtime Backup non HPE arrays 1 TB
- UNIX Instant Recovery for 1 TB and 10 TB
- Linux Zero Downtime Backup for 1 TB and 10 TB
- Linux Zero Downtime Backup non HPE arrays 1 TB
- Linux Instant Recovery for 1 TB and 10 TB
- Windows Zero Downtime Backup for 1 TB and 10 TB
- Windows Zero Downtime Backup non HPE arrays 1 TB
- Windows Instant Recovery for 1 TB and 10 TB
- Direct Backup using NDMP for 1 TB and 10 TB
- Advanced backup to disk for 1 TB, 10 TB, and 100 TB

When a license for a backup target that is based on capacity (other than the advanced backup to disk license) is being checked, the amount of *total* disk space on logical units that have been backed up is compared to the capacity of licenses installed. For the advanced backup to disk license, see ["The advanced backup to disk license" on page 311](#)

License checking is done in such a way as not to prevent you from performing instant recovery or a backup even if you have run out of licensed capacity. In these circumstances a warning message appears during the backup session informing you that you have exceeded your licensed capacity.

Capacity of used disks is calculated based on historical information gathered during each ZDB backup session. The time interval taken into account is twenty-four hours. Data Protector calculates used disk capacity based on the disks that were used in all sessions in the last twenty-four hours and compares the calculated capacity with the licensed capacity.

If a license violation occurs, a warning message is issued during the backup. In addition, the license reporting tool is run daily and writes a notification to the Data Protector Event Log if the licensed capacity is exceeded.

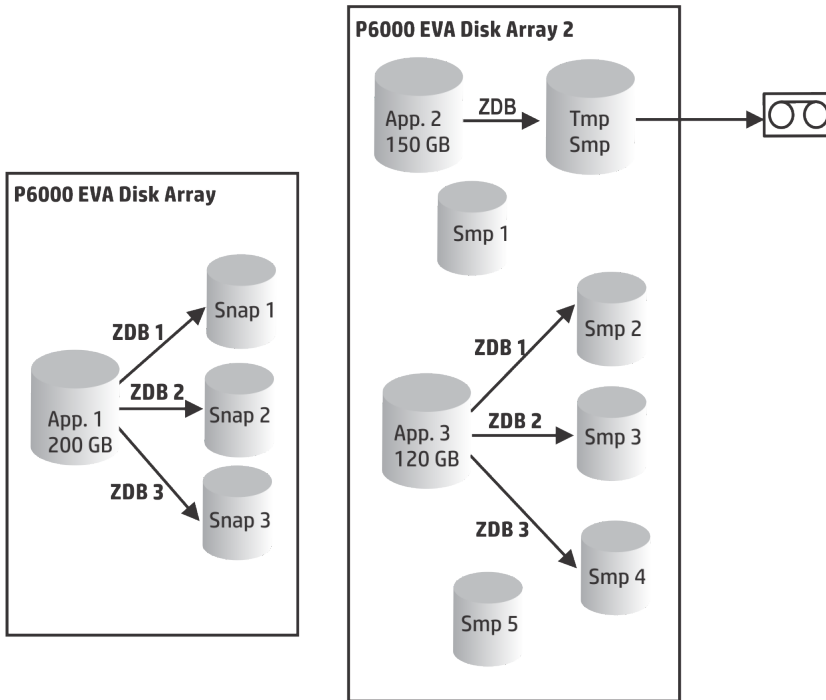
Used capacity calculation for applying to backup targets

The used capacity calculation calculates the licensed capacity of each disk array used in the past twenty-four hours. Disks used two or more times in the specified time interval are only counted once. Disk array units are identified by their identification numbers taken from each array. The use of array identification numbers means that it is possible to know when an array has already been counted.

If a ZDB backup has been run that includes instant recovery, the original unit's total capacity is calculated both for ZDB used capacity per disk array, and in addition, that used for instant recovery capacity per disk array.

For example, imagine a scenario where there are two P6000 EVA disk arrays. On one array there is a single disk (App.1) with a capacity of 200 GB being used for data protection. An instant recovery option is included with each backup session which are triggered three times a day. Three replicas at a time are kept, these are rotated for instant recovery purposes. On the second disk array there are two disks (App.2 and App.3) with capacities of 150 GB and 120 GB respectively. Backup is run once a day on App.2 disk and the snapshot is deleted after the data is moved to tape. On App.3, backup is run three times a day and five different replicas are rotated for instant recovery. See "[Used capacity calculation scenario](#)" on the next page.

Used capacity calculation scenario



The calculation for ZDB used capacity counts all disks used in backup sessions in the last twenty-four hours $200 \text{ GB (App. 1)} + 150 \text{ GB (App. 2)} + 120 \text{ GB (App. 3)} = 470 \text{ GB}$.

Calculations for instant recovery used capacity count source capacity for ZDB sessions that left data for instant recovery purposes. The same disk is only counted once $200 \text{ GB (App. 1)} + 120 \text{ GB (App. 3)} = 320 \text{ GB}$.

The advanced backup to disk license

The advanced backup to disk license is required to back up to a Data Protector file library and can be used for a virtual tape library (VTL) instead of drive licenses.

- Usable native capacity of a Data Protector file library is the available size on disk for the file library, as reported by the filesystem.
 - Virtual full backups and the incremental backups that will be consolidated into a synthetic full or virtual full backup must be stored in the Data Protector file library, which requires this license.
- If Data Protector is using the VTL exclusively, it is recommended to license a quantity matching the physical capacity of the VTL, also referred as usable native capacity.
 - Usable native capacity of a virtual tape library (VTL) is the size on disk of the virtual tape library consumed by all protected HPE Data Protector backups as reported by the VTL.
 - For each VTL, you can choose whether to use the backup to disk or tape drive licensing model. Within one VTL, both concepts must not be mixed.
 - If the VTL has a built-in capability to migrate backup data from the disk cache to another disk or tape, the migrated storage capacity needs to be fully licensed. No drive and library licenses are

required for the tape library exclusively controlled by the VTL, but ***the used capacity of all tapes in the physical tape library needs to be licensed***. However, this is not applicable if Data Protector object copy functionality has been used to migrate the backup data to another disk or tape.

- By default, Data Protector treats VTL devices as ordinary libraries (such as SCSI II libraries) and does not utilize capacity based licensing. To enable capacity based licensing, the device must be marked as a VTL during the device configuration.

For more information on how to configure a VTL via the graphical user interface (GUI), see the *HPE Data Protector Help* index: "virtual tape library". For more information on how to configure a VTL via the command-line interface (CLI), see the following ["Example" below](#).

- In case of central licensing with the Manager-of-Manager (MoM), you need to assign at minimum 1 TB to each cell using the advanced backup to disk functionality.

Note: Data Protector cannot report the required amount of licenses due to the missing instrumentation and interfaces of today's Virtual Tape Libraries and some files servers hosting the Data Protector file library. It is your responsibility to license the capacity consistently with the licensing definitions.

Example

If you configure a virtual tape library named "VTL_2011" via the command-line interface (CLI) by using the `omniupload` command, you must specify the estimated library capacity in the configuration file for the string `VTLCAPACITY`. This estimated value consequently adds up to used licenses capacity for advanced backup to disk in the license checker report.

Note: The estimated virtual library capacity consumption value (`VTLCAPACITY`) in terabytes (TB) must be an integer to avoid the error message "Invalid VTL capacity specified".

In the configuration file named "libVTL.txt" in the directory "C:\Temp" type the estimated library capacity, for example 11 and execute:

```
omniupload -create_library VTL_2011 -file C:\Temp\libVTL.txt
```

To verify library configuration, execute:

```
omnidownload -library VTL_2011  
  
#omnidownload -library VTL_2011  
NAME "VTL2011"  
DESCRIPTION ""  
HOST computer.company.com  
POLICY SCSI-II  
TYPE DDS  
LIBVIRTUAL  
VTLCAPACITY 11  
IOCTLSERIAL ""  
CONTROL "SCSI address"  
REPOSITORY  
    "SCSI repository"  
MGMTCONSOLEURL ""
```


The license checker reports the license capacity in use, which is the sum of used space on disk for the file library (FL) and the estimated size of disk space on a virtual tape library. For example, you are using 2 TB of the disk space by backing up with the FL and 10 TB of disk capacity on the VTL. The total capacity in use is 12 TB. If there are only 5 TB licenses capacity installed, you get a notification that you need additional 7 Advanced Backup to disk for 1 TB licenses.

```
#omnicc -check_licenses -detail
```

```
-----  
License Category           : Advanced Backup to disk for 1 TB  
Licenses Capacity Installed : 5 TB  
Licenses Capacity In Use   : 12.0 TB  
Add. Licenses Capacity Required: 7 TB
```

Summary

```
-----  
Description                               Licenses Needed  
Advanced Backup to disk for 1 TB          7  
Total protected data                      1 TB
```

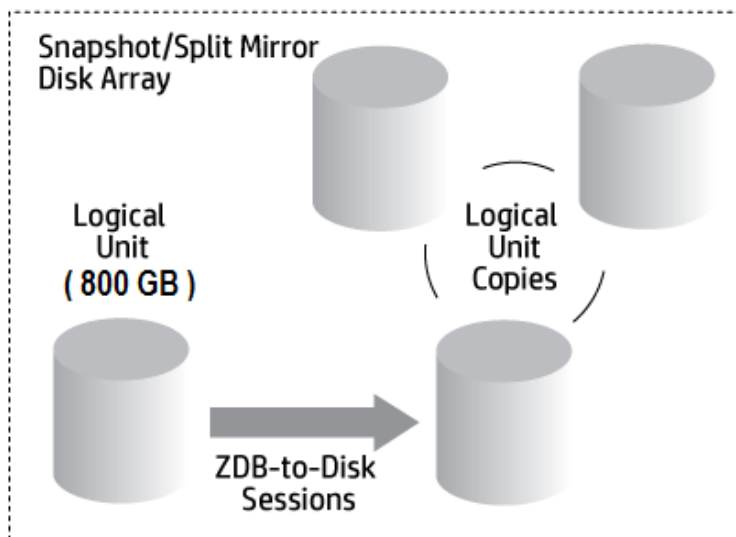
Examples for backup targets based on licensed capacity

This section provides examples of how capacity based licensing is calculated.

Example 1

" [ZDB-to-disk sessions](#) " below shows a situation where data from one 800 GB logical unit is backed up three times a day in a ZDB-to-disk session.

ZDB-to-disk sessions



Three split mirror or snapshot copies (replicas) are rotated and kept for the purpose of instant recovery. The capacity based licensing is calculated as follows:

One 800 GB logical unit is used for ZDB-to-disk sessions:

1 x 800 GB = 0.8 TB for the “Zero Downtime Backup for 1 TB” license.

Three replicas of the same 800 GB logical unit are kept for the purpose of instant recovery. Note that it is the capacity of source volumes and not the capacity of replica that is the subject of the license:

1 x 800 GB = 0.8 TB for the “Instant Recovery for 1 TB” license.

One “Zero Downtime Backup for 1 TB” license and one “Instant Recovery for 1 TB” license are sufficient for this situation.

Example 2

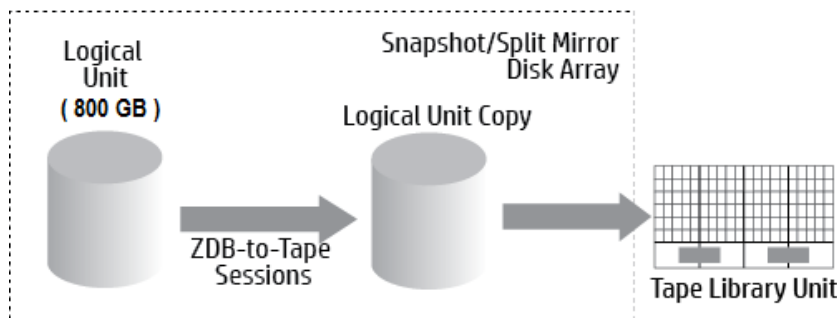
" ZDB-to-tape sessions " below shows a situation where data from one 800 GB logical unit is backed up twice a day in a ZDB-to-tape session. Split mirror or snapshot copies (replicas) are, therefore, not kept for instant recovery. The capacity based licensing is calculated as follows:

One 800 GB logical unit is used for ZDB-to-disk sessions:

1 x 800 GB = 0.8 TB for the “Zero Downtime Backup for 1 TB license.

One “Zero Downtime Backup for 1 TB” license is sufficient.

ZDB-to-tape sessions



Example 3

" ZDB-to-disk+tape sessions " on the next page shows a situation where data from one 800 GB logical unit is backed up three times a day in a ZDB-to-disk+tape session. Five split mirror or snapshot copies (replicas) are rotated and kept for the purpose of instant recovery. The capacity based licensing is calculated as follows:

One 800 GB logical unit is used for ZDB-to-disk+tape sessions:

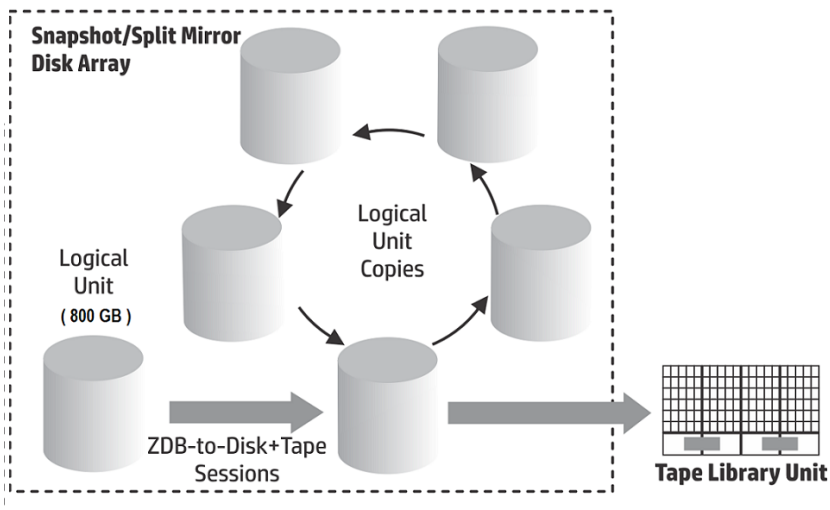
1 x 800 GB = 0.8 TB for the “Zero Downtime Backup for 1 TB” license.

Five replicas of the same 800 GB logical unit are kept for the purpose of instant recovery. Note that it is the capacity of source volumes and not the capacity of replica that is the subject of the license:

1 x 800 GB = 0.8 TB for the “Instant Recovery for 1 TB” license.

One “Zero Downtime Backup for 1 TB” license and one “Instant Recovery for 1 TB” license are sufficient.

ZDB-to-disk+tape sessions



Example 4

One 200 GB logical unit, one 500 GB logical unit, one 120 GB logical unit, and one 300 GB logical unit are used in ZDB sessions:

$1 \times 200 \text{ GB} + 1 \times 500 \text{ GB} + 1 \times 120 \text{ GB} + 1 \times 300 \text{ GB} = 1.12 \text{ TB}$ for the "Zero Downtime Backup for 1 TB" license.

Split mirror or snapshot copies of one 200 GB logical unit, one 120 GB logical unit, and one 300 GB logical unit are kept for the purpose of instant recovery:

$1 \times 200 \text{ GB} + 1 \times 120 \text{ GB} + 1 \times 300 \text{ GB} = 0.62 \text{ TB}$ for the "Instant Recovery for 1 TB" license.

One "Zero Downtime Backup for 1 TB" licenses and one "Instant Recovery for 1 TB" license are sufficient if all three examples in "ZDB-to-disk sessions" on page 313 through "ZDB-to-disk+tape sessions" above are configured in a cell.

Data Protector Functional Extensions

The functional extensions licenses are required once per instance (system, library and terabyte) for:

- On-line extension for one UNIX system and On-line extension for one Windows / Linux system
- The Manager-of-Managers functionality
- Libraries with more than 60 media slots
- Data Protector encryption extension for one client system
- Instant Recovery
- NDMP backup
- Granular recovery extension for one database server

Capacity based license reports

In the capacity based licensing mode, Data Protector lists only the number of capacity based licenses (with a granularity of 1 TB) and licenses that are not covered by capacity based licenses, that is the Software Encryption extension. Traditional licenses which are covered by capacity based licensing are not displayed.

Capacity based license report

```
#omnicc -check_license -detail
```

WARNING: Calculation of total protected data size may take some time.

```
Report generated      : 03/03/2016 1:48:27 AM  
Licensing mode       : Server  
License server       : host.domain.com
```


```
License Category      : Encryption Extension for one client system  
Licenses Installed    : 0  
Licenses Used         : 0  
Additional Licenses Required : 0
```


```
License Category      : HPE Data Protector - capacity based per TB SW  
Licenses Capacity Installed : 9 TB  
Licenses Capacity In Use   : 0 TB  
Add. Licenses Capacity Required : 0 TB
```


```
.  
. .  
. .
```

Summary

```
-----  
Licensing is covered.  
Total Protected Data      : 4,00 TB
```


Backup Type	Total Protected Data
-------------	----------------------

MS Filesystem	1 GB
MS SQL	1 GB
SAP	1 GB
UNIX Filesystem	1 GB

The Total Protected Data is defined as the aggregate amount of data being backed up from all systems. The Total Protected Data for each system is measured as the sum of the following:

- Sum of the largest full backup of each object for the file system (including synthetic backups) and virtual environment backups.
- Sum of the largest full backup of each data set for each of the application integration backups.

Note: The unique object for each of the file systems and virtual environments is the actual object created at the time of backup. The actual object can be either: mount point, virtual machine, or virtual machine's disk.

The unique data set for each of the application integrations is identified differently, usually this is the database instance or server name.

Limitations

- When backing up the same data with multiple different agents, the backup is calculated multiple times. Few such examples of double calculations are as follows:
 - File system backup of database using VSS and application integration agent backup of the same database.
 - Virtual environment integration backup of virtual host and file system agent backup run inside the virtual machine (host).

Note: It is recommended to backup unique objects to overcome double calculations.

- When the Oracle backup object name format is externally reconfigured, this could result in the database name not being resolved from the new object names. Such object sizes could be incorrectly handled while calculating the total protected data.

Note: It is essential for a reconfigured format to still include the Oracle database name defined as <DBID_*.dbf for correctly adding Oracle objects in the total protected data size calculation.

Producing a license report on demand

To produce a report about licensing related information from the cell, execute:

```
omnicc -check_licenses [-detail]
```

If the `-detail` option is specified, a detailed report is produced. The license checker returns the following information for every license in the cell: license name, licenses installed, licenses used, the total TB of data under protection, and additional licenses (capacity) required.

If the `-detail` option is not specified, the command returns information on whether the Data Protector licensing is covered or not. The following information is returned: the time when the report was generated, the licensing mode, the license server and the total TB of data under protection.

Note that for drive extension licenses-to-use, the license checker returns information about configured drives and recommended additional licenses. You need as many licenses as there are drives in use at any point in time. This is typically the total number of configured drives to allow all drives to be used simultaneously.

Note that the command does not list the expiration dates for the licenses. Depending on the environment and the number of licenses installed, the report may take some time to generate. To get the information on the licenses expiration dates, execute:

```
omnicc -password_info
```

In a MoM environment with the CMMDB configured, when producing a license report for the items that are subject to libraries and drives, the `omnicc` command must be run on the Cell Manager with the CMMDB installed.

For more information, see the `omnicc` man page or the *HPE Data Protector Command Line Interface Reference*.

Data Protector passwords

Once you have installed Data Protector product, you can start using it for 60 days. After this period, you must install a permanent password on the Cell Manager to enable the software. You may load the software on the Data Protector Cell Manager, but you cannot perform configuration tasks without a permanent password, because the licenses required for particular Data Protector functionality require passwords.

The Data Protector licensing requires one of the following passwords:

- Instant-On password

An Instant-On password is built in the product when first installed. You are able to use the software for 60 days after you have installed it on any system supported by Data Protector. Within this period you must request your permanent password from the *HPE Password Delivery Center (PDC)* and then install it.

For an existing Data Protector installation, after the upgrade to Data Protector 9.00 or later, your installation is running with an Instant-On password for 60 days. Within this period you must request your new permanent passwords from the HPE Password Delivery Center as specified in your active support agreement. Old licenses which are not covered in the support agreement cannot be upgraded.

- Permanent passwords

The Data Protector product is shipped with an *Entitlement Certificate* license that entitles you to obtain a permanent password. The permanent password permits you to configure a Data Protector cell with regard to your backup policy, provided that you have bought all required licenses. Before you request a permanent password, you must determine the Cell Manager system and understand your cell configuration requirements.

- Emergency password

Emergency or fallback passwords are available in case the currently installed passwords do not match the current system configuration due to an emergency. They will allow operation on any system for a duration of 120 days.

Emergency passwords are issued by the support organization. They must be requested by and are issued only to HPE personnel. Refer to your support contact or see the HPE Licensing site at: <http://enterpriselicense.hpe.com/>.

The purpose of an emergency password is to enable the backup operation while the original system configuration gets reconstructed or until you move to a new permanent installation. In case of moving the licenses, you need to fill out the License Move Form and send it to the *HPE Password Delivery Center (PDC)* or go to the webpage <http://enterpriselicense.hpe.com/> where passwords can be generated, moved, and so on.

For instructions on how to obtain and install a password, see "[Obtaining and installing permanent passwords](#)" below.

Obtaining and installing permanent passwords

Obtaining

The following is the procedure to obtain permanent passwords:

1. Gather the information required in the *Permanent Password Request Form*. See "[Data Protector licensing forms](#)" on page 324 to find the location of the forms and get instructions on how to fill them out.
2. See "[Data Protector product structure and licenses](#)" on page 323 for more information about the product structure. The *HPE Password Delivery Center* will send your permanent password using the same method that you used when you sent your request. For example, if you sent your request by e-mail then you would receive your permanent password by e-mail.
3. Do one of the following:
 - Go to the online *HPE Password Delivery Center* site at <http://enterpriselicense.hpe.com/>.
 - Complete the *Permanent Password Request Form* and send it to the *HPE Password Delivery Center* using one of the following (see the Entitlement Certificate shipped with the product for fax numbers, telephone numbers, email addresses, and hours of operation):
 - Faxing a form to the *HPE Password Delivery Center*
 - Sending an e-mail to the *HPE Password Delivery Center*

You can use the electronic version of the license forms that are included in the following files on the Cell Manager and the installation media:

On Windows Cell Manager: `Data_Protector_home\Docs\license_forms.txt`

On UNIX Cell Manager: `/opt/omni/doc/C/license_forms_UNIX`

On Windows installation DVD-ROM: `Disk_Label:\Docs\license_forms.txt`

to "copy" and "paste" your message to the *HPE Password Delivery Center (HPE PDC)*.

You will receive your permanent password within 24 hours of sending your *Permanent Password Request Form*.

Installing

This section describes the procedure to install a permanent password that the *HPE Password Delivery Center (HPE PDC)* has sent to you.

Prerequisite

You must have received permanent passwords sent from the *HPE Password Delivery Center* and the Data Protector user interface must be installed on the Cell Manager. The passwords are installed on the Cell Manager and are valid for the entire cell.

Using the GUI

To install the permanent password using the Data Protector GUI, proceed as follows:

1. In the Context List, click **Clients**.
2. In the Scoping Pane, right-click **Data Protector Cell** and click **Add License**.
3. Type or copy the password exactly as it appears on the *Password Certificate*.

A password consists of 4-character groups of variable length, separated by a space and followed by a string. Make sure that you do not have a line-feed or a return character within this sequence.

The following is an example of a password:

```
QB9A AQEA H9PQ KHU2 UZD4 H8S5 Y9JL 2MPL B89H MZVU EUJV KCS9 KHU4 9AC2 CRYP DXMR  
KLLK XVSS GHU6 D2RJ N6KJ 2KG8 PVRJ 37LX DJ2J EWMB A3PG 96QY E2AW WF8E NMXC LNCK  
ZVWM 9AKS PU3U WCZ8 PSJ5 PQKM 5KCC FYDE 4MPM 9GUB C647 WEQX 4NMU BGN5 L8SM 23TX  
ANTR VFPJ PSJL KTQW U8NK H4H4 TB4K L4XQ "Product; Cell Manager for UNIX"
```

After you have typed in the password, check the following:

- Make sure the password appears correctly on the screen.
- Make sure there are no leading or trailing spaces, or extra characters.
- Double-check "1" (number one) characters and "l" (letter l) characters.
- Double-check "O" (uppercase letter O) characters and "0" (number zero) characters.
- Make sure that you have used the correct case. The password is case-sensitive.

Click **OK**.

The password is written to the following file on the Cell Manager:

Windows systems: `Data_Protector_program_data\Config\server\Cell\lic.dat`

UNIX systems: `/etc/opt/omni/server/cell/lic.dat`

Using the CLI

To install the permanent password using the Data Protector CLI, proceed as follows:

1. Log on to the Cell Manager.
2. Execute the following command:

```
omnicc -install_license password
```

The *password* string must be entered exactly as it appears on the *Password Certificate*. It must be formatted as a single line and must not contain any embedded carriage returns. The password must be in quotes. If the password includes also a description in quotes, the quotes in this description must be preceded with backslashes. For an example and more information, see the `omnicc` man page or the *HPE Data Protector Command Line Interface Reference*.

You can also append the password to the following file on the Cell Manager:

Windows systems: `Data_Protector_program_data\config\server\cell\lic.dat`

UNIX systems: `/etc/opt/omni/server/cell/lic.dat`

If the file does not exist, create it with an editor, such as `vi` or Notepad. For an example of a password, see ["Type or copy the password exactly as it appears on the Password Certificate." on the previous page](#) in the procedure for the graphical user interface.

Verifying the password

Using the GUI

To verify if the password for the license you have installed is correct, proceed as follows in the Data Protector GUI:

1. In the Help menu, click **Licenses...**
2. Click the **Licenses** tab. All installed licenses are displayed. Click the **Passwords Info** tab to see details about the installed valid passwords. Invalid passwords will either be marked as expired or suppressed.

The whole pop-up window as well as the individual columns are re-sizable.

Using the CLI

To verify if the password for the license you have installed is correct, use the following command:

```
omnicc -password_info
```

This command displays all installed licenses. If the password you entered is not correct, it is listed with the remark `Password could not be decoded`.

Finding the number of installed licenses

Using the GUI

Once you have installed a permanent password, you can check how many licenses are currently installed on the Cell Manager:

1. Start the Data Protector Manager.
2. In the menu bar, click **Help**, and then **Licenses...**. The About Manager window will open, displaying the installed licenses.

Using the CLI

If you use the command line, proceed as follows:

1. Log on to the Cell Manager.
2. Execute the following command:

```
omnicc -query
```

A table listing the currently installed licenses will be displayed.

Moving licenses to another Cell Manager System

You must contact the *HPE Password Delivery Center* in any of the following cases:

- If you wish to move the Cell Manager to another system.
- If you plan to move a license, installed on a Cell Manager not currently in use in the cell, to another Data Protector cell.

Note: The UNIX product licenses apply for UNIX, Windows and Novell NetWare platforms, providing the functionality regardless of the platform, while the Windows product licenses apply for the Windows, Novell NetWare and Linux platforms only.

A Cell Manager license for HP-UX can be moved to and works for any cell manager platform. A Cell manager license for Windows or Linux cannot be moved to and does not work for an HP-UX cell manager platform.

All other licenses can be moved to any cell manager platform without restrictions. The cell manager platform type does not imply any restrictions on the license. For example, a Windows drive license can be installed on an HP-UX cell manager, however it cannot be used for a drive connected to a UNIX system.

To move licenses from one Cell Manager to another

1. Fill out one *License Move Form* for each new Cell Manager and send it to the *HPE Password Delivery Center*. To move licenses for products, which can no longer be purchased, you should use the *License Move Forms* delivered with the previous version of the product. See "[Data Protector licensing forms](#)" on page 324.

On the form, you must specify the number of licenses you want to move from the existing Cell Manager.

Alternatively, go to the web site of the password delivery center (<http://enterpriselicense.hpe.com/>) and initiate the license move online.

2. Delete the following file:

Windows systems:

`Data_Protector_program_data\config\server\cell\lic.dat`

UNIX systems:

`/etc/opt/omni/server/cell/lic.dat`

3. As soon as you have filled out the *License Move Form* and sent it to the *HPE Password Delivery Center (PDC)*, you are legally obliged to delete all Data Protector passwords from the current Cell Manager.
4. Install the new passwords. You will receive one password for each new Cell Manager. You will also receive one new password for the current Cell Manager if licenses are left on the current Cell Manager. This new password replaces the current password entry on the current Cell Manager.

Centralized licensing

Data Protector allows you to configure centralized licensing for a whole multicell environment, which simplifies license management. All licenses are kept on the Manager-of-Managers (MoM) Manager system. Licenses are allocated to specific cells although they remain configured on the MoM Manager.

For more information on how to configure licenses, see the *HPE Data Protector Help*.

Note: The UNIX product licenses apply for UNIX, Windows and Novell NetWare platforms, providing the functionality regardless of the platform, while the Windows product licenses apply for the Windows, Novell NetWare and Linux platforms only.

A Cell Manager license for HP-UX can be moved to and works for any cell manager platform. A Cell manager license for Windows or Linux cannot be moved to and does not work for an HP-UX cell manager platform.

All other licenses can be moved to any cell manager platform without restrictions. The cell manager platform type does not imply any restrictions on the license. For example, a Windows drive license can be installed on an HP-UX cell manager, however it cannot be used for a drive connected to a UNIX system.

The MoM functionality allows you to move (re-assign) licenses among the MoM cells. For more information, see the *HPE Data Protector Help* index: “MoM environment”.

If you are installing a new Data Protector license, ensure that you check the MoM functionality before you request any licenses. If you decide to use centralized licensing at a later date, you will then have to go through the procedure of moving licenses.

Note: The MoM functionality allows centralized licensing. This means you can install all licenses on the MoM Manager and then distribute them to the Cell Managers that belong to the MoM cell. You can later move (re-distribute) licenses among the MoM cells. For more information, see the *HPE Data Protector Help* index: “MoM environment”.

Data Protector product structure and licenses

Password considerations

Consider the following to help determine the right number of passwords.

- Instant-On passwords are built-in. They are available for every new installation and every existing Data Protector installation upgraded to version Data Protector 9.00 or later for 60 days without any extra license password installation requirements, and they offer you the full product functionality for evaluation purposes.

After 60 days the Instant-On passwords expire and the product stops working, unless permanent license key have been installed.

The evaluation period for the full product ends as soon as the first regular license key is installed. As soon as at least one license key is installed, only the functionality can be used, for which license

keys have been installed.

- Permanent licenses can be moved to a different Cell Manager. However, you need to use the License Move Form(s) and send them to the *HPE Password Delivery Center (PDC)*.
- Passwords are installed on the Cell Manager and are valid for the entire cell.
- Centralized licensing is provided within the Manager-of-Managers (MoM) functionality. You can have all the licenses installed on the MoM system if you purchase multiple licenses for several cells.
- You need one Cell Manager license for each cell.
- The license keys or passwords are regularly checked by the software when you perform a Data Protector configuration task or start a backup session.
- Instant-On passwords can be used on any system, while evaluation and permanent passwords can be used only on the Cell Manager system for which you requested the licenses.

Note: To change the IP address of the Cell Manager, to move the Cell Manager to another system, or to move licenses from one cell to another (where MoM functionality is not used), you should contact the *HPE Password Delivery Center (PDC)* in order to update the licenses. For information about contacting the HPE Password Delivery Center, see "[Obtaining and installing permanent passwords](#)" on page 319.

License migration to Data Protector 9.09

Data Protector 6.20, 7.00 and 8.00 and later customers on support contract will receive Data Protector 9.09 free of charge including new license keys for all licenses on the support contract.

You can go to the MyUpdates portal at the Software Support Online (SSO) <https://softwaresupport.hpe.com/>.

Here you get access to the software and license keys downloads which you are entitled for according to your active support contract (SAID).

You can see all software associated to the SAID, check the box in front of Data Protector 9.00 or later and click **Get updates**.

Three tabs are displayed:

- **Get software:** For downloading the software.
- **Get licenses:** To get licenses for the LTUs mapped to Data Protector 9.00 or later.
- **Get documentation:** To download the product documentation.

When you click the **Get license** link, this directs you to the update order the HPE Software Licensing Portal (<http://enterpriselicense.hpe.com/>) where you can get license keys for the LTUs and quantities that are on your Service Agreement Identifier (SAID).

Data Protector licensing forms

This section discusses Data Protector Licensing forms. Fill them out to order permanent passwords using one of the following methods:

- Order permanent passwords using the online *Password Delivery Center* site at <http://enterpriselicense.hpe.com/>.
- Print the electronic version of the license forms that are included in the following files on the Cell Manager system and the installation media:

HP-UX and Linux systems: /opt/omni/doc/C/license_forms_UNIX

Windows installation DVD-ROM: DriveLetter:Docs\license_forms.txt

or use the electronic files to “copy” and “paste” your message to the *Password Delivery Center (PDC)*.

Make sure that you type information clearly and that you do not forget the required fields.

The common fields in the licensing forms that you are required to fill out are briefly described beneath:

Personal Data	This field contains customer information, including to whom the new password should be delivered.
Licensing Data	Provide licensing information about your Data Protector cell.
Current Cell Manager	Enter the required information about your current Cell Manager.
New Cell Manager	Enter the required information about your New Cell Manager.
Order Number	Enter the <i>Order Number</i> printed on the <i>Entitlement Certificate</i> . The <i>Order Number</i> is required to verify that you are entitled to request a permanent password.
IP Address	This field defines for which system the <i>Password Delivery Center</i> will generate the passwords. In case you want to use centralized licensing (MoM environments only) then this system must be the MoM Manager system. If the Cell Manager has the several LAN cards, you can enter any of the IP addresses. HPE recommends that you enter the primary one. If you have Data Protector in an HPE Serviceguard or Microsoft Cluster environment, enter the IP address of your virtual server. For more information on clusters, see the <i>HPE Data Protector Help</i> .
The <i>Password Delivery Center</i> Fax Numbers	For contact information, see the <i>Entitlement Certificate</i> shipped with your product.
Product License Type	In the fields next to the <i>Product Numbers</i> , enter the quantity of licenses you want to install on this Cell Manager. The quantity can be all or a subset of the licenses purchased with the <i>Order Number</i> .

Chapter 9: Troubleshooting Installation and Upgrade

This chapter contains information specific to installation related problems. For general troubleshooting information, see the *HPE Data Protector Troubleshooting Guide*.

Name resolution problems when installing the Windows Cell Manager

During the installation of the Data Protector Cell Manager on Windows, Data Protector detects and warns you if the DNS or the LMHOSTS file is not set up as required. In addition, Data Protector notifies you if the TCP/IP protocol is not installed on your system.

Problem

Name resolution fails when using DNS or LMHOSTS

If the name resolution fails, the “error expanding hostname” message is displayed and the installation is aborted.

- If you encounter resolution problems when using DNS, you get a warning message about your current DNS configuration.
- If you encounter resolution problems when using LMHOSTS file, you get a warning message to check your LMHOSTS file configuration.
- If you have not configured either DNS or LMHOSTS, you get a warning message to enable the DNS or the LMHOSTS resolution in the TCP/IP properties dialog.

Action

Check your DNS or LMHOSTS file configuration or activate it. See "[Verifying DNS connections within Data Protector cell](#)" on the next page.

Problem

The TCP/IP protocol is not installed and configured on your system

Data Protector uses the TCP/IP protocol for network communications; it must be installed and configured on every client in the cell. Otherwise, the installation is aborted.

Action

Check the TCP/IP setup. For information, see "[Changing the default Data Protector Inet port](#)" on page 359.

Verifying DNS connections within Data Protector cell

DNS (Domain Name System) is a name service for TCP/IP hosts. The DNS is configured with a list of host names and IP addresses, enabling users to specify remote systems by host names rather than by IP addresses. DNS ensures proper communication among the members of the Data Protector cell.

If DNS is not configured properly, name resolution problems may occur in the Data Protector cell and the members will not be able to communicate with each other.

Data Protector provides the `omnicheck` command to verify the DNS connections among the members of the Data Protector cell. Although all possible connections in the cell can be checked with this command, it is enough to verify the following connections, which are essential in the Data Protector cell:

- Cell Manager to any other member of the cell and the other way round
- Media Agent to any other member of the cell and the other way round

Using the `omnicheck` command

Limitations

- The command verifies connections among the cell members only; it does not verify DNS connections in general.

The synopsis of the `omnicheck` command is:

```
omnicheck -dns [-host Client | -full] [-verbose]
```

You can verify the following DNS connections in the Data Protector cell using different options:

- To check that the Cell Manager and every Media Agent in the cell resolve DNS connections to every Data Protector client in the cell properly and the other way round, execute:

```
omnicheck -dns [-verbose]
```

- To check that a particular Data Protector client resolves DNS connections to every Data Protector client in the cell properly and the other way round, execute:

```
omnicheck -dns -host client [-verbose]
```

where *client* is the name of the Data Protector client checked.

- To check all possible DNS connections in the cell, execute:

```
omnicheck -dns -full [-verbose]
```

When the `[-verbose]` option is specified, the command returns all the messages. If this option is not set (default), only the messages that are the result of failed checks are returned.

For more information, see the `omnicheck` man page.

["Return messages" on the next page](#) lists return messages for the `omnicheck` command. If the return message indicates a DNS resolution problem, see the "Troubleshooting Networking and Communication" chapter of the *HPE Data Protector Troubleshooting Guide*.

Return messages

Return message	Meaning
<i>client_1</i> cannot connect to <i>client_2</i>	Timeout connecting to <i>client_2</i> .
<i>client_1</i> connects to <i>client_2</i> , but connected system presents itself as <i>client_3</i>	The <i>%SystemRoot%</i> \System32\drivers\etc\hosts/etc/hosts (UNIX systems) file on the <i>client_1</i> is not correctly configured or the hostname of the <i>client_2</i> does not match its DNS name.
<i>client_1</i> failed to connect to <i>client_2</i>	<i>client_2</i> is either unreachable (for example, disconnected) or the <i>%SystemRoot%</i> \System32\drivers\etc\hosts (Windows systems) or /etc/hosts (UNIX systems) file on the <i>client_1</i> is not correctly configured.
checking connection between <i>client_1</i> and <i>client_2</i>	
all checks completed successfully.	
<i>number_of_failed_checks</i> checks failed.	
<i>client</i> is not a member of the cell.	
<i>client</i> contacted, but is apparently an older version. Hostname is not checked.	

Troubleshooting common issues

Problem

One of the following error messages is reported

- The Windows Installer Service could not be accessed.
- This application must be installed to run.
- This patch package could not be opened.
- The system cannot open the device or file specified.

After the Data Protector installation or upgrade, Windows may report that some applications are not installed or that a reinstall is required.

The reason is an error in the Microsoft Installer upgrade procedure. Microsoft Installer version 1.x data information is not migrated to the Microsoft Installer version 2.x that Data Protector installs on the computer.

Action

On how to solve the problem, see article Q324906 in the Microsoft Knowledge Base.

Problem

Cell Manager installation on a Windows system, which is not part of any Windows domain, fails

The following error message is reported:

Setup is unable to match the password with the given account name.

Actions

Two solutions are available:

- Make the Windows system, on which you are installing the Cell Manager, part of a domain.
- Use the local administrator account for the CRS service.

Problem

The following error message is reported

msvcr90.dll file is not found

The MSVCR90.dll library (upper case) cannot be found, because only msvcr90.dll (lower case) is available on the network share. Since MSVCR90.dll and msvcr90.dll are not treated as the same files, setup.exe fails to find the appropriate dll.

Action

Rename the file from msvcr90.dll (lower case) to MSCVCR90.dll (upper case) or reconfigure the network share not to be case-sensitive.

Problem

Canceling of installation does not uninstall already installed components

If you cancel the Data Protector installation while some components have been already installed, Data Protector does not uninstall them. The installation finishes with an error.

Action

Manually uninstall already installed components after you cancelled the installation.

Problem

The following error is reported

"too many open files" error

The Cell Request Server (CRS) adjusts its `ulimit` to support large number of open files or sockets, which is usually sufficient. In case, you encounter "too many open files" error, you need to adjust the OS parameters.

Action

The OS parameters cover two aspects:

- They change the limit for open files or sockets.
- They influence the performance when large number of socket connections are present.

The following list is not a definite one. For more information, see the OS documentation.

HP-UX

The maximum number of open files are set by the kernel variables.

To configure, use `kctune variable=value`.

To view, use `kctune -v variable` or `kcusage`.

variable	default	valid values	note
<code>maxfiles</code>	2048	32 ... 1,048,576 $\leq \text{maxfiles_lim}$	Initial (soft) maximum number of file descriptors per process <code>ulimit -Sn</code>
<code>maxfiles_lim</code>	4096	32 ... 1,048,576 $\geq \text{maxfiles}$ $\leq \text{nfile}/2$	Hard maximum number of file descriptors per process <code>ulimit -Hn</code>
<code>nfile</code>	65,536	2048 ... 2,147,483,647 $\geq 2 * \text{maxfiles_lim}$	Maximum number of file descriptors (system-wide) Note: " <code>ulimit -Hn nnn</code> " succeeds even if <code>nnn > nfile/2</code>

Also, tune the network parameters with `ndd` for large number of sockets as described:

```
ndd -h tcp_time_wait_interval
ndd -h tcp_fin_wait_2_timeout
ndd -h /dev/tcp tcp_smallest_anon_port
vi /etc/rc.config.d/nddconf
```

Linux

Kernel parameters are saved in the following location:

```
/etc/sysctl.conf
```

You can edit the `sysctl.conf` file or invoke `sysctl -w name=value`. Also, you can load the running kernel using `sysctl -p` or modify its corresponding `procfs` file. For example, the variable `fs.file-max` corresponds to `/proc/sys/fs/file-max`.

Note: The defaults depend on the available memory.

Variable	Note
fs.file-max	Maximum number of file descriptors (system-wide).
net.core.somaxconn	Maximum length to which the queue of pending connections for listen socket may grow.
net.ipv4.tcp_max_syn_backlog	Maximum number of remembered connection requests, which still did not receive an acknowledgment from the connecting client.

Also, the default values for the pre-process limits are stored in the following location:

`/etc/limits.conf`

(OR)

`/etc/security/limits.conf`

Problem

Data transfer happens through single port

During this per-port rate limiters like Ubuntu iproute2 or CISCO router can impact Data Protector performance greatly.

Action

If you observe drop in performance, either disable single port feature on affected MA hosts, or remove per-port rate limit.

Troubleshooting installation on UNIX systems

Problem

Remote installation of UNIX clients fails

Remote installation or upgrade of a UNIX client fails with the following error message:

```
Installation/Upgrade session finished with errors.
```

When installing or upgrading UNIX clients remotely, the available disk space on a client system in the folder `/tmp` should be at least the size of the largest package being used for the installation. On Solaris client systems, the same amount of disk space should be available also in the `/var/tmp` folder.

Action

Check if you have enough disk space in the above mentioned directories and restart the installation or upgrade procedure.

For disk space requirements, see ["Installing Data Protector clients" on page 55](#).

Problem

Problems with the installation of an HP-UX client

When adding a new HP-UX client to a Data Protector cell, the following error message is displayed:

```
/tmp/omni_tmp/packet: you do not have the required permissions to perform this SD function.....
```

Access denied to root at to start agent on registered depot /tmp/omni_tmp/packet.
No insert permission on host.

Action

Stop the `swagent` daemon and restart it by either killing the process and then restarting it by running the `/opt/omni/sbin/swagentd` command, or by running the `/opt/omni/sbin/swagentd -r` command.

Ensure that you have a local host, loopback entry in the hosts file (`/etc/hosts`).

Problem

Problems with the installation of a Mac OS X client

When adding a Mac OS X client to a Data Protector cell, the `com.hp.omni` process is not started.

Action

On Mac OS X, `launchd` is used to start the `com.hp.omni` process.

To start the service, go to:

```
cd /usr/omni/newconfig/System/Library/LaunchDaemons
```

Execute:

```
launchctl load com.hp.omni
```

Problem

Inet process cannot be started after installing the UNIX Cell Manager

When starting the Cell Manager, the following error is displayed:

```
ERROR: Cannot start "omniinet" service, system error: [1053] Unknown error 1053.
```

Action

Check if the `inetd` or `xinetd` service is running:

HP-UX systems: `ps -ef | grep inetd`

Linux systems: `ps -ef | grep xinetd`

To start the service, execute:

HP-UX systems: `/usr/sbin/inetd`

Linux systems: `rcxinetd start`

Troubleshooting installation on Red Hat 7 systems

Problem

Installation of Data Protector 9.00 on Red Hat 7 systems fails

While installing the Data Protector 9.00 MR Cell Manager, the installation of Cell Server packet fails with the following output:

```
Installing OB2-CS packet
Preparing... ##### [100%]
Updating / installing...
1:OB2-CS-A.09.00-1 ##### [100%]
NOTE: No Data Protector A.09.00 Internal Database found. Initializing...
Configuring and starting up Internal Database... Done!
Configuring and starting up Internal Database Connection Pool... Done!
Initializing Internal Database version A.09.00... Done!
Configuring and starting up Application Server...
ERROR: Unable to reload Application Server (Return code = 1)
For more detail please refer to /var/opt/omni/server/log/DPIDBsetup_14124.log
warning: %post(OB2-CS-A.09.00-1.x86_64) scriptlet failed, exit status 3
```

Action

After a failed Data Protector 9.00MR Cell Manager installation, follow these steps to make the Cell Manager fully operational:

1. Stop all Data Protector services:

```
omnisv -stop
```

Note: Ensure that no Data Protector processes are left running by executing: `ps -ef | grep omni` command and stop any running processes, if found.

2. Replace the `omnigencert.pl` script. Perform the following:

- Create temporary folder and change the current path to the created folder:

```
mkdir /tmp/omni_tmp
cd /tmp/omni_tmp
```

- Download 9.05 (or newer) Cell Server patch to `/tmp/omni_tmp`.

- Extract `omnigencert.pl` script from the Cell Server patch:

```
rpm2cpio DPLNX_00417.rpm | cpio -id ./opt/omni/sbin/omnigencert.pl
```

- Replace existing omnigencert.pl with the extracted one:
`cp /tmp/omni_tmp/opt/omni/sbin/omnigencert.pl /opt/omni/sbin/`
3. Execute IDBSetup.sh:
`/opt/omni/sbin/IDBsetup.sh`
 4. Update /etc/opt/omni/client/omni_info with cs component:
`/opt/omni/bin/omnicc -put_component_str cs client/omni_format client/omni_info A.09.00`
 5. Re-import the Cell Manager host and Installation Server(if installed) to the cell:
`omnicc -import_host cm_hostname`
`omnicc -import_is cm_hostname`
 6. Continue with the normal procedure for applying the latest patches.

Problem

Installation of Data Protector 9.00 on SUSE Linux Enterprise Server 12.2 systems fails

While installing the Data Protector 9.00 MR Cell Manager, the installation of Cell Server packet fails with the following output:

Installing OB2-CS packet

```
Preparing... ##### [100%]
```

```
Updating / installing...
```

```
1:OB2-CS-A.09.00-1 ##### [100%]
```

```
NOTE: No Data Protector A.09.00 Internal Database found. Initializing...
```

```
Configuring and starting up Internal Database...
```

```
ERROR: Unable to Initialize Internal Database storage area (Return code = 1)
```

```
For more detail please refer to /var/opt/omni/server/log/DPIDBsetup_<PID>.log
```

```
warning: %post(OB2-CS-A.09.00-1.x86_64) scriptlet failed, exit status 3
```

Where “/var/opt/omni/server/log/DPIDBsetup_<PID>.log” reports following:

```
++ su - hpdp -c 'LD_LIBRARY_PATH=/opt/omni/idb/lib:/opt/omni/lib:/opt/omni/lib/arm  
/opt/omni/idb/bin/initdb -E utf8 -A md5 --pwfile /tmp/omni_tmp/pgpass.<PID> -D  
/var/opt/omni/server/db80/pg -U hpdp'
```

```
sh: /opt/omni/idb/lib/libreadline.so.6: no version information available (required  
by sh)
```

```
sh: relocation error: sh: symbol rl_filename_stat_hook, version READLINE_6.3 not  
defined in file libreadline.so.6 with link time reference
```

```
no data was returned by command ""/opt/omni/idb/bin/postgres" -V"
```

The program **postgres** is needed by `initdb` but was not found in the same directory as
`/opt/omni/idb/bin/initdb`.

Check your installation.

Action

After a failed Data Protector 9.00 MR Cell Manager installation, follow these steps to make the Cell Manager fully operational:

1. Stop all Data Protector services by running the following command:

```
omnisv -stop
```

Note: Ensure that no Data Protector processes are left running by executing: `ps -ef | grep omni` command and stop any running processes, if found.

2. Replace the **IDBsetup.sh** script. Perform the following steps:
 - Create temporary folder and change the current path to the created folder path:
mkdir /tmp/omni_tmp
cd /tmp/omni_tmp
 - Download 9.09 (or newer) Cell Server patch to **/tmp/omni_tmp**.
 - Extract **IDBsetup.sh**, **dp-licenseprovider.war** and **dp-config-server.war** files from the Cell Server patch:
rpm2cpio DPLNX_20201.rpm | cpio -id ./opt/omni/sbin/IDBsetup.sh
rpm2cpio DPLNX_20201.rpm | cpio -id ./opt/omni/bin/components/dp-licenseprovider.war
rpm2cpio DPLNX_20201.rpm | cpio -id ./opt/omni/bin/components/dp-config-server.war
 - Replace existing **IDBsetup.sh** with the extracted one and copy other extracted files:
cp /tmp/omni_tmp/opt/omni/sbin/IDBsetup.sh /opt/omni/sbin/
cp /tmp/omni_tmp/opt/omni/bin/components/dp-licenseprovider.war /opt/omni/bin/components/
cp /tmp/omni_tmp/opt/omni/bin/components/dp-config-server.war /opt/omni/bin/components/
3. Execute **IDBSetup.sh**:
/opt/omni/sbin/IDBsetup.sh
4. Update **/etc/opt/omni/client/omni_info** with cs component:
/opt/omni/bin/omnicc -put_component_str cs client/omni_format client/omni_info A.09.00
5. Re-import the Cell Manager host and Installation Server(if installed) to the cell:
/opt/omni/bin/omnicc -import_host cm_hostname
/opt/omni/bin/omnicc -import_is cm_hostname
6. Install and apply Data Protector 9.09 (or newer) patch bundle.

Troubleshooting installation on Windows systems

Problem

Remote installation of Windows clients fails

Remote installation of a Data Protector client to a Windows system fails and reports the following error message:

```
[Normal] Connecting to client computer.company.com...
```

```
[Normal] Done.
```

```
[Normal] Installing the Data Protector bootstrap service on client  
computer.company.com...
```

```
[Critical] Cannot connect to the SCM (Service Control Manager) on client  
computer.company.com: [5] Access is denied.
```

Action

1. On the Installation Server system, execute the following command to mark a user account from the local operating system Administrators user group to be used by the Installation Server during remote installation:

```
omniinetpasswd -inst_srv_user User@Domain
```

Note that the user account must already be added to the local Inet configuration. For details, see the `omniinetpasswd` command description in the *HPE Data Protector Command Line Interface Reference*.

2. Start remote installation of the Data Protector client once again.

Problem

Remote installation of Windows clients fails (Windows XP)

When a Windows XP system is a member of a workgroup and the Simple File Sharing security policy setting is turned on, users attempting to access this system through the network are forced to use the Guest account. During remote installation of a Data Protector client, Data Protector repeatedly asks for a valid username and password because administrator rights are required for the remote installation.

Action

Turn off Simple File Sharing: in Windows XP, open **Windows Explorer** or **My Computer**, click the **Tools** menu, click **Folder Options**, click the **View** tab, then clear the **Use simple file sharing (Recommended)** check box.

The Simple File Sharing policy is ignored:

- when the computer is a member of a domain
- when the Network access: Sharing and security model for local accounts security policy setting is set to Classic: Local users authenticate as themselves

Problem

Digital signature verification might fail, if Windows 7 or Windows 2008 R2 systems are disconnected.

Digital signature verification fails with the following error message:

```
[Critical] <computer.company.com> [70:32] Digital Signature verification of the  
install kit failed.
```

Action

Perform either one of the following:

- Enable internet connection and wait until the proper certificates are imported into the trusted root and intermediate certificate authorities automatically.

(Or)

- Refer to the following articles to understand how to update the trusted root certificates on disconnected systems:

<https://support.microsoft.com/en-us/kb/3004394>

<https://support.microsoft.com/en-us/kb/2813430>

Problem

When installing a Cell Manager, the Application Server service fails to start

The Application Server service fails to start with the message

```
Timeout reached before Data Protector Application Server started.
```

The following error is logged to the installation summary log file:

```
Caused by: org.jboss.as.cli.
```

```
CommandLineException: The controller is not available at localhost:9999
```

The installation process cannot access various utilities because the PATH system environment variable does not contain the directory %SystemRoot%\system32.

Action

Add the %SystemRoot%\system32 directory to the PATH variable.

Note: The following files are placed (depending on the components selected) in the %SystemRoot%\system32 folder on Windows systems:

BrandChgUni.dll	This is a resource library. It is used only internally; however, it also contains the path to registry settings, so it must be located in a well-known location where it can be accessed by integration libraries.
ob2informix.dll	This library is used to integrate with the Informix Server database.
snmpOB2.dll	This library is used to implement system SNMP traps.

Verifying Data Protector client installation

Verifying Data Protector client installation consists of the following:

- Checking the DNS configuration on the Cell Manager and client systems, and ensuring that the results of the `omnicheck -dns` command on the Cell Manager and client system match the specified system.
- Checking the software components installed on the client.
- Comparing the list of files required for a certain software component to be installed with the files installed on the client.
- Verifying the checksum for every read-only file required for a certain software component.

Prerequisite

An Installation Server must be available for the type of client system (UNIX, Windows) that you select.

Limitation

To verify a Data Protector installation using the Data Protector GUI:

1. In the Context List, click **Clients**.
2. In the Scoping Pane, expand **Clients**, right-click the Cell Manager system, and then click **Check Installation** to start the wizard.
3. Follow the wizard to verify the installation of the systems in the cell. The Check Installation window opens, displaying the results of the installation.

For details, see the *HPE Data Protector Help*.

If your installation has not succeeded, see ["Using log files" on page 345](#).

On how to verify the installation on UNIX systems using the Data Protector CLI, see the `ob2install` man page.

Troubleshooting upgrade

Problem

Upgrading fails if the previous version of the product is installed in a long path

Data Protector does not support installing the Cell Manager to a path longer than 80 characters. As a consequence, the upgrade fails.

Action

1. Copy the `omnimigrate.pl` script from the installation DVD, from the directory `x8664\tools\Upgrade`, to a temporary directory, for example `c:\temp`.
2. Export the IDB using the `omnimigrate` command:

```
perl c:\temp\omnimigrate.pl -export -shared_dir c:\output
```

Use the Perl version that is a part of the Data Protector installation and resides in the default commands directory.

3. Remove the previous version of Data Protector, but leave the configuration and database data. Do not remove the *Data_Protector_program_data\db40* directory.
4. Install Data Protector 9.09. Make sure the path you install to is shorter than 80 characters.
5. Stop all Data Protector services:

```
omnisv -stop
```
6. Copy the files from the old *Data_Protector_program_data\db40* directory (left after the removal of the previous version of Data Protector) to the new *Data_Protector_program_data\db40* folder. Make sure that you do *not* move the DCBF directories.
7. Copy the configuration from the old *Data_Protector_program_data\Config\Server* folder to the new one:
 - a. Copy the old configuration directory to the new one, but keep the old files. Do not copy the files from the directory *Data_Protector_program_data\Config\Server\install*.
 - b. If you want to keep the cell configuration (clients, Installation Server), copy and overwrite the *Data_Protector_program_data\Config\Server\cell\cell_info* and *Data_Protector_program_data\Config\Server\cell\installation_servers* files.
8. Merge the new notification and global options file:
 - a. To merge the notifications, execute the *omnnotifupg.exe* tool:

```
omnnotifupg.exe -quiet
```
 - b. To merge the global options file, execute:

```
mrgcfg.exe -global -except BackupDeviceIdle -rename  
DbFVerLimit=DbFNamesDatLimit,SessSuccessfulWhenNoObjectsBackedUp  
=SessSuccessfulWhenNoObjectsBackedUp
```

Alternatively, you can manually merge the global options file from the old installation.
9. Start the Data Protector services:

```
omnisv -start
```
10. Import the IDB to the new installation. Execute:

```
omnimigrate.pl -import -shared_dir c:\output -force
```

Problem

Upgrading fails if the previous version of the product is installed in a path with unsupported characters

Data Protector does not support installing the Cell Manager to a path that:

- contains non-ASCII characters
- contains the characters "@" or "#"
- contains a directory that ends with the character "!"

As a consequence, the upgrade fails.

Action

1. Copy the `omnimigrate.pl` script from the installation DVD, from the directory `x8664\tools\Upgrade`, to a temporary directory, for example `c:\temp`.

2. Create two directories with ASCII names for example:

```
c:\output\cdb
```

```
c:\output\mmdb
```

3. Export the MMDB and CDB:

```
omnidbutil -writedb -cdb c:\output\cdb -mmdb c:\output\mmdb
```

This process can take a while. You can stop the `omnidbutil` process using **Ctrl+C** when it starts exporting filenames because this data is not needed for upgrade.

4. Export the IDB using the `omnimigrate` command:

```
perl c:\temp\omnimigrate.pl -exportNonASCII -shared_dir c:\output
```

Use the Perl version that is a part of the Data Protector installation and resides in the default commands directory.

5. Create a ANSI charset file, `c:\output\old_cm`. The file should contain the following two lines:

```
OLDCM_SHORTNAME=OldCmName
```

```
OLDCM_ENDIANNES=LITTLE_ENDIAN
```

Replace *OldCmName* with the short name of the Cell Manager.

6. Remove the previous version of Data Protector, but leave the configuration and database data. Do not remove the `Data_Protector_program_data\db40` directory.

7. Install Data Protector. Make sure the path you install to does not contain any non-ASCII characters.

8. Stop all Data Protector services:

```
omnisv -stop
```

9. Copy the files from the old `Data_Protector_program_data\db40` directory (left after the removal of the previous version of Data Protector) to the new `Data_Protector_program_data\db40` folder. Make sure that you do *not* move the DCBF directories.

10. Copy the configuration from the old `Data_Protector_program_data\Config\Server` folder to the new one:

- a. Copy the old configuration directory to the new one, but keep the old files. Do not copy the files from the directory `Data_Protector_program_data\Config\Server\install`.
- b. If you want to keep the cell configuration (clients, Installation Server), copy and overwrite the `Data_Protector_program_data\Config\Server\cell\cell_info` and `Data_Protector_program_data\Config\Server\cell\installation_servers` files.

11. Merge the new notification and global options file:

- a. To merge the notifications, execute the `omnnotifupg.exe` tool:

```
omnnotifupg.exe -quiet
```

- b. To merge the global options file, execute:

```
mrgcfg.exe -global -except BackupDeviceIdle -rename  
DbFVerLimit=DbFNamesDatLimit,SessSuccessfulWhenNoObjectsBackedUp  
=SessSuccessfulWhenNoObjectsBackedUp
```

Alternatively, you can manually merge the global options file from the old installation.

12. Start the Data Protector services:

```
omnisv -start
```

13. Import the IDB to the new installation. Execute:

```
omnimigrate.pl -import -shared_dir c:\output -force
```

Problem

The upgrade process is aborted if the old (Raima DB based) IDB is corrupted

During upgrade, the following corrupted fields in the IDB are detected and corrected:

- media blocks_used is set to 0
- media blocks_total is set to blocks_used
- pool media_age_limit is set to the default value (the media_age_limit for the default pool with the same media class)
- pool media_overwrite_limit is set to the default value (the media_overwrite_limit for the default pool with the same media class)

However, if any other fields in the IDB are corrupted, the upgrade is aborted.

Action

Revert your Data Protector installation back to the old version:

1. Remove the current version of Data Protector.
2. Reinstall the previous version of Data Protector.
3. Restore the old IDB.

Before attempting another upgrade, you need to fix the old IDB. Contact HPE support for further assistance.

Problem

After upgrading, omnidbcheck -bf fails with error

In previous releases of Data Protector, omnidbcheck -bf did not correctly report errors due to inconsistency between the actual size and header size of media in the DC binary files.

The omnidbcheck -bf correctly reports any errors in consistency that may have existed in the IDB prior to the upgrade.

Action

If some DC binary files are corrupted, you can remove the DC binary files and recreate them by importing the media with proper logging level. The only impact of removing the files is that some media positions point to the non-existent binary files, and thus an error message is displayed when browsing the relevant filesystems.

1. From the `omnidbcheck -dc` output, identify the Medium ID of the corrupted DC binary file.
2. Run the `omnimm -media_info medium-id` command to get other attributes of the medium, such as medium label and media pool.
3. Identify the DC binary file for the affected medium. DC binary files are named: `MediumID_TimeStamp.dat` (in the MediumID, colons ":" are replaced with underscores "_").
4. Remove the corrupted DC binary files.
5. Run the `omnidbutil -fixmpos` command to establish consistency between media positions (mpos) and binary files.
6. Import catalog from media to recreate the binary files.

For more information, see *HPE Data Protector Help* and *HPE Data Protector Troubleshooting Guide* "handling minor IDB corruption in the DCBF part". Contact HPE support for further assistance.

Problem

The upgrade process is aborted if the Velois IDB is corrupted

During upgrade, the following corrupted fields in the IDB are detected and corrected:

- `media blocks_used` is set to 99
- `media blocks_total` is set to `blocks_used`
- `pool media_age_limit` is set to the default value (the `media_age_limit` for the default pool with the same media class)
- `pool media_overwrite_limit` is set to the default value (the `media_overwrite_limit` for the default pool with the same media class)

However, if any of the following fields in the IDB are corrupted, the upgrade is aborted.

Media: `LAST_SEGMENT`

Positions:

`SEQUENCE_NR`

`START_SEGMENT`

`START_OFFSET`

`LOG_LEVEL`

`DCBF_OFFSET`

`DCBF_NUMOFDIRS`

`DCBF_NUMOFITEMS`

`DCBF_SIZE`

Action

Revert your Data Protector installation back to the old version:

1. Remove the current version of Data Protector.
2. Reinstall the previous version of Data Protector.
3. Restore the old IDB.

Before attempting another upgrade, you need to fix the old IDB. Contact HPE support for further assistance.

Problem

IDB and configuration files are not available after upgrade

After upgrading the Cell Manager from a previous release version, the IDB and all configuration files are not available. This occurs if the upgrade procedure was interrupted for any reason.

Action

Restore Data Protector from the backup made before the upgrade, eliminate the reason of the interruption, and start the upgrade again.

Problem

Old Data Protector patches are not removed after upgrade

Old Data Protector patches are listed among installed programs if the `swlist` command is run after the Data Protector upgrade has finished. The patches were removed from your system during the upgrade, but they remained in the sw database.

To check which Data Protector patches are installed, ["Verifying Data Protector patches using the GUI" on page 243](#).

Action

To remove the old patches from the sw database, run the following command:

```
swmodify -upatch.\*patch
```

For example, to remove a patch "PHSS_30143" from the sw database, run the following command:

```
swmodify -u PHSS_30143.\* PHSS_30143
```

Problem

Upgrade of a Media Agent client which uses the StorageTek Library causes connectivity problems

After you upgrade the Data Protector Media Agent component on a system which uses the StorageTek Library, connectivity to the library is lost, and the Data Protector sessions which involve the library may stop responding or terminate abnormally.

Action

Restarting the StorageTek Library supporting service or daemon may solve the problem:

Windows systems: Using the administrative tool Services, restart the LibAttach service.

HP-UX and Solaris systems: Run the commands `/opt/omni/acs/ssi.sh stop` and `/opt/omni/acs/ssi.sh start ACSLS_hostname` where `ACSLs_hostname` is the name of the system on which the Automated Cartridge System library software is installed.

AIX systems: Run the commands `/usr/omni/acs/ssi.sh stop` and `/usr/omni/acs/ssi.sh start ACSLS_hostname` where `ACSLs_hostname` is the name of the system on which the Automated Cartridge System library software is installed.

Problem

After upgrading to Data Protector 9.09 or later version, when you perform a restore operation, a DCBF error message appears. In the Data Protector GUI, Restore context, when you select an object and try to browse files, the following message appears:

```
[12:10907] Invalid format of detail catalog binary file.
```

However, the `omnidbcheck -dc` reports NO errors, as the DCBF files are NOT really corrupt. This happens because of a version mismatch as two files of different versions are read.

Action

Option 1: Go to the Restore Sessions context and try restoring single files.

Option 2: Export/import the medium, the DCBF catalog is recreated. For more information, see the "Importing Media" and "Exporting a Media" sections of the *HPE Data Protector Help*.

Option 3: Catalog migration. `perl omnimigrate.pl -start_catalog_migration`

Note: Once the full catalog migration is done (after there are no old catalogs), change the global variable `SupportOldDCBF` to 0.

Problem

After upgrading to Data Protector 9.09 or later versions, if you select an individual disk, which is backed up using Data Protector 7.03, for restore, then the Data Protector GUI displays the following error messages:

```
Object scsi0:<disk number> does not have version information. Most probably backup of this object was not completed - restore will not be possible.
```

```
There is a problem with restore object '<VCenter host> Virtual Environment [<Data center>]'. It might not have any version information or there is some other conflict. Restore was aborted.
```

Action

Select the complete virtual machine for restore.

Troubleshooting remote upgrade on Windows systems

Problem

Error starting setup process

When using Data Protector remote installation functionality to upgrade Windows clients, you get the following error:

```
Error starting setup process, err=[1326] Logon failure: unknown user name or bad password.
```

The problem is that the `Data Protector Inet` service on the remote computer is running under a user account that does not have access to the OmniBack share on the Installation Server computer. This is most probably a local user.

Action

Change the user for the Data Protector Inet service to one that can access the Data Protector share.

Problem

The Data Protector Cell Request Server (CRS) fails to start after upgrade

The following error message is displayed when starting CRS manually:

Windows could not start the Data Protector CRS on Local Computer.

For more information, review the System Event Log. If this is a non-Microsoft service, contact the service vendor, and refer to service-specific error code 1007.

The following error message is displayed after installation:

Timeout reached before Data Protector CRS started.

Action

- Stop the Data Protector services with `omnisv stop` command.
- Open the Task Manager and end the remaining Data Protector processes.
- Start the Data Protector services with `omnisv start` command.

Manual process for local upgrade on UNIX systems

Normally, you upgrade Data Protector 6.20, 7.00, 8.00 on UNIX Cell Manager and Installation Server by executing the `omnisetup.sh` command, which performs an automated upgrade procedure. However, you can also perform the upgrade manually. See ["Upgrading on HP-UX and Linux systems using native tools" on page 354](#).

Using log files

If you run into problems installing Data Protector, you can examine any of the following log files to determine your problem:

- setup log files (Windows)
- system log files (UNIX)
- Data Protector log files

Which log files to check in case of installation problems depends on the type of the installation (local or remote) and on the operating system.

Local installation

In case of problems with local installation, check the following log files:

HP-UX Cell Manager:

- `/var/adm/sw/swinstall.log`
- `/var/adm/sw/swagent.log` (for more details)

Linux Cell Manager:

`/var/opt/omni/log/debug.log`

Windows client (the system where setup is running):

- `Temp\SetupLog.log`
- `Temp\OB2DBG_did__setup_HostName_DebugNo_setup.txt` (for more details)

where:

- *did* (debugging ID) is the process ID of the first process that accepts the debugging parameters. This ID is used as an ID for the debugging session. All further processes will use this ID.
- *HostName* is the name of the host where the trace file is created.
- *DebugNo* is a number generated by Data Protector.
- `Temp\CLUS_DBG_DebugNo.TXT` (in cluster environments)

The location of the *Temp* directory is specified by the `TEMP` environment variable. To examine the value of this variable, run the `set` command.

Remote installation

In case of problems with remote installation, check the following log files:

UNIX Installation Server:

`/var/opt/omni/log/IS_install.log`

Windows client (the remote system to which components are to be installed):

- `SystemRoot\TEMP\OB2DBG_did_INSTALL_SERVICE_DebugNo_debug.txt`
- `SystemRoot\TEMP\CLUS_DBG_DebugNo.TXT`

The location of the *Temp* directory is specified by the `TEMP` environment variable, and *SystemRoot* is a path specified in the `SystemRoot` environment variable.

In case the setup log files are not created, run the remote installation with the debug option. See ["Creating installation execution traces" on the next page](#).

Data Protector log files

The Data Protector log files listed below are located in:

Windows Vista, Windows 7, Windows 8, Windows Server 2008, and Windows Server 2012:

`Data_Protector_program_data\log`

Other Windows systems: `Data_Protector_home\log`

HP-UX, Solaris, and Linux systems: `/var/opt/omni/log` and `/var/opt/omni/server/log`

Other UNIX systems and Mac OS X systems: `/usr/omni/log`

The following log files are important for troubleshooting installation:

debug.log	Contains unexpected conditions. While some can be meaningful to you, the information is mainly used by the support organization.
inet.log	Contains requests made to the Data Protector inet service. It can be useful to check the recent activity of Data Protector on clients.
IS_install.log	Contains a trace of remote installation and resides on the Installation Server.
omnisv.log	Contains information on when Data Protector services were stopped and started.
upgrade.log	This log is created during upgrade and contains upgrade core part (UCP) and upgrade detail part (UDP) messages.
OB2_Upgrade.log	This log is created during upgrade and contains traces of the upgrade process.

For more log files, see the *HPE Data Protector Troubleshooting Guide*.

Creating installation execution traces

Run the installation with the `debug` option if this is requested by the HPE Customer Support Service. For more information on debugging, including the debug options below, and preparing data to be sent to the HPE Customer Support Service, see the *HPE Data Protector Troubleshooting Guide*.

For debugging remote installation, run the Data Protector GUI with the debug option:

```
Manager -debug 1-200 DebugPostfix
```

Once the session is finished/aborted, collect the debug output from the following locations:

- On the Installation Server system:
`Data_Protector_program_data\tmp\OB2DBG_did__BM_ Hostname_DebugNo_DebugPostfix`
- On the remote system:
`SystemRoot:\Temp\OB2DBG_did__INSTALL_SERVICE_ Hostname_DebugNo_DebugPostfix`

Appendix A: Installing and upgrading using UNIX system native tools

This appendix describes how to install and upgrade Data Protector on UNIX systems, using the native installation tools — `swinstall` on HP-UX systems and `rpm` on Linux systems.

Note: The recommended method for installing or upgrading Data Protector is using the `omnisetup.sh` script. See ["Installing and upgrading using UNIX system native tools "](#) above and ["Upgrading the UNIX Cell Manager and Installation Server"](#) on page 271.

Installing on HP-UX and Linux systems using native tools

Note: It is recommended to install Data Protector using `omnisetup.sh`. For more information, see ["Installing on HP-UX and Linux systems using native tools"](#) above.

Use these native installation procedures on HP-UX and Linux *only* if you intended to install an Installation Server with a limited set of remote installation packages.

Installing a Cell Manager on HP-UX systems using `swinstall`

To install the UNIX Cell Manager on an HP-UX system

1. Insert and mount the HP-UX installation DVD-ROM and run the `/usr/sbin/swinstall` utility.
2. In the Specify Source window, select **Network Directory/CDROM**, and then enter `Mountpoint/hpux/DP_DEPOT` in the **Source Depot Path**. Click **OK** to open the SD Install - Software Selection window.
3. In the list of available packages for the installation, the Data Protector product is displayed under the name B6960MA.
4. Right-click **DATA-PROTECTOR**, and then click **Mark for Install** to install the whole software.
In case you do not need all subproducts, double-click **DATA-PROTECTOR** and then right-click an item from the list. Click **Unmark for Install** to exclude the package or **Mark for Install** to select it for installation.

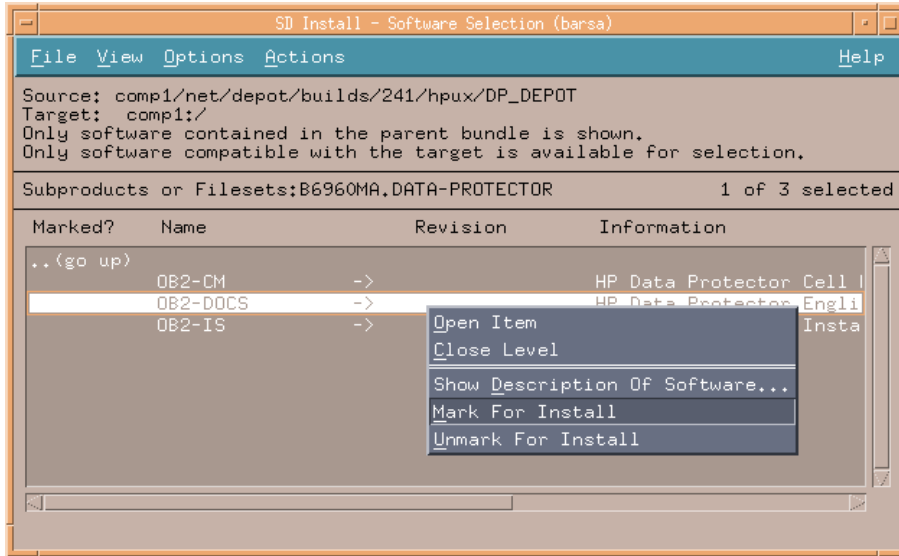
The following subproducts are included in the product:

OB2-CM	Cell Manager software
OB2-DOCS	Data Protector documentation subproduct that includes the Data Protector guides in the PDF format and the <i>HPE Data Protector Help</i> in the WebHelp format.
OB2-IS	The Data Protector Installation Server

Make sure that the Marked? status value next to the OB2-CM package is set to Yes if you are installing the Cell Manager for UNIX on the system. See "[SD install - software selection window](#)" below.

Note: If you are using user IDs longer than 32 bits, you must remotely install the User Interface component (OMNI-CS) on the Cell Manager after you have installed the Core Cell Manager software component.

SD install - software selection window



- In the Actions list, click **Install (analysis)**, then click **OK** to proceed. If the Install (analysis) fails, displaying an error message, click **Logfile** to view the file.

Note: To install software from a tape device across the network, you first need to mount the source directory on your computer.

Installing the Cell Manager on Linux systems using rpm

To install the Cell Manager on a Linux system

- Insert and mount the Linux installation DVD-ROM.
- Change to the directory `linux_x86_64/DP_DEPOT`.
- To install a component, execute:

```
rpm -i package_name-A.09.00-1.x86_64.rpm
```

where *package_name* is the name of the respective sub-product package.

The following components must be installed:

OB2-CORE	Data Protector Core software.
OB2-TS-CORE	Data Protector Core Technology Stack Libraries

OB2-CC	Cell Console software. This contains the command-line interface.
OB2-TS-CS	Cell Manager Technology Stack Libraries.
OB2-TS-JRE	Java Runtime Environment for use with Data Protector.
OB2-TS-AS	Data Protector Application Server
OB2-WS	Data Protector Web Services
OB2-JCE-DISPATCHER	Job Control Engine Dispatcher
OB2-JCE-SERVICEREGISTRY	Job Control Engine Service Registry
OB2-CS	Cell Manager software.
OB2-DA	Disk Agent software. This is required, otherwise it is not possible to back up the IDB.
OB2-MA	The General Media Agent software. This is required to attach a backup device to the Cell Manager.
OB2-DOCS	Data Protector documentation subproduct that includes the Data Protector guides in the PDF format and the <i>HPE Data Protector Help</i> in the WebHelp format.

The components on Linux are dependent on each other. You should install the components in the order in which they are listed above.

- Restart the Data Protector services:

```
omnisv stop
omnisv start
```

Installing an Installation Server on HP-UX systems using swinstall

- Insert and mount the HP-UX installation DVD-ROM and run the `/usr/sbin/swinstall` utility.
- In the Specify Source window, select **Network Directory/CDROM**, and then enter `Mountpoint/hpux/DP_DEPOT` in the **Source Depot Path**. Click **OK** to open the SD Install - Software Selection window.
- In the list of available components for the installation, the Data Protector product is displayed under the name B6960MA. Double-click it to display the DATA-PROTECTOR product for UNIX systems. Double-click it to display the contents.

The following sub-product components are included in the product:

OB2-CM	Cell Manager software
OB2-DOCS	Data Protector documentation subproduct that includes the Data Protector guides in the PDF format and the <i>HPE Data Protector Help</i> in the WebHelp format.
OB2-IS	The Data Protector Installation Server

4. In the SD Install - Software Selection window, double-click **DATA-PROTECTOR** to list the software for the installation. Right-click **OB2-IS**, and then click **Mark for Install**.
5. From the Actions menu, click **Install (analysis)**. Click **OK** to proceed.

When the installation is finished, the software depot for UNIX is located in the `/opt/omni/databases/vendor` directory.

If you do not install the Installation Server for UNIX on your network, you will have to install every UNIX client locally from the HP-UX installation DVD-ROM. Furthermore, patching of components on Data Protector clients will not be possible.

Installing an Installation Server on Linux systems using rpm

Local installation on Linux

To install the Installation Server for UNIX on a Linux system

1. Insert the Linux installation DVD-ROM.
2. Change to the directory containing the installation archive (in this case `Mount_point/linux_x86_64/DP_DEPOT`).
3. For each component, execute:

```
rpm -i package_name-A.09.00-1.x86_64.rpm
```

The following components (*package_name*) related to Installation Server installation are included in the product:

OB2-CORE	Data Protector Core software. Note that this is already installed, if you are installing the Installation Server on the Cell Manager system.
OB2-TS-CORE	Data Protector Core Technology Stack Libraries.
OB2-CORE-IS	Installation Server Core software.
OB2-CFP	Common Installation Server Core software for all UNIX platforms.
OB2-TS-CFP	Common Installation Server Technology Stack software for all UNIX platforms
OB2-DAP	Disk Agent remote installation packages for all UNIX systems.

OB2-MAP	Media Agent remote installation packages for all UNIX systems.
OB2-NDMPP	The NDMP Media Agent component.
OB2-CCP	Cell Console remote installation packages for all UNIX systems.

Also, if you are setting up an independent Installation Server (that is, not on the Cell Manager) and want to use the user interface:

OB2-CC	Cell Console software. This contains the command-line interface.
--------	--

4. Once you have installed these components, use `rpm` to install the remote installation package for all the components you will want to install remotely. For instance:

OB2-INTGP	Data Protector Integrations Core software. This component is necessary to install integrations.
OB2-TS-PEGP	PEGASUS Technology Stack component.
OB2-OR8P	Oracle Integration component.
OB2-MYSQLP	MySQL Integration component.
OB2-POSTGRESQLP	PostgreSQL Integration component.
OB2-SAPP	SAP Integration component.
OB2-SAPDBP	SAP MaxDB Integration component.
OB2-SAPHANAP	SAP HANA Integration component.
OB2-INFP	Informix Integration component.
OB2-LOTP	Lotus Notes/Domino Integration component.
OB2-SYBP	Sybase Integration component.
OB2-DB2P	DB2 Integration component.
OB2-EMCP	EMC Symmetrix Integration component.
OB2-EMCVNXP	EMC VNX Integration component.
OB2-EMCVMAXP	EMC VMAX Integration component.
OB2-SMISAP	HPE P6000 / HPE 3PAR SMI-S Agent component.
OB2-SSEAP	HPE P9000 XP Agent component.
OB2-NETAPPP	NetApp Storage Provider component.

OB2-VEPAP	Virtual Environment Protection Agent component.
OB2-SODAP	StoreOnce Software Deduplication component.
OB2-AUTODRP	Automatic Disaster Recovery component.
OB2-VMWAREGRE-AGENTP	VMware Granular Recovery Extension component.
OB2-DOCSP	English Documentation (Guides, Help) component.
OB2-FRAP	French Documentation (Guides, Help) component.
OB2-JPNP	Japanese Documentation (Guides, Help) component.
OB2-CHSP	Simplified Chinese Documentation (Guides, Help) component.

For a complete list of components and dependencies, see ["Installing a UNIX Cell Manager" on page 29](#).

When the installation is finished, the software depot for UNIX is located in the `/opt/omni/databases/vendor` directory.

If you do not install an Installation Server for UNIX on your network, you will have to install every UNIX client locally from the Linux installation DVD-ROM.

install Data Protector to linked directories, for instance:

```
/opt/omni/ -> /prefix/opt/omni/
/etc/opt/omni/ -> /prefix/etc/opt/omni/
/var/opt/omni/ -> /prefix/var/opt/omni/
```

you must create the links before the installation and ensure that the destination directories exist.

Next steps

At this point, you should have the Installation Servers for UNIX installed on your network. Now you should perform the following tasks:

1. If you have set up an independent Installation Server (that is, not on the Cell Manager) you must manually add (import) the system to the Data Protector cell. See ["Importing an Installation Server to a cell" on page 189](#).

Note: When an Installation Server is imported, the file `/etc/opt/omni/server/cell/installation_servers` on the Cell Manager is updated to list the installed remote installation packages. This can be used from the CLI to check the available remote installation packages. For this file to be kept up to date, you should export and re-import an Installation Server whenever remote installation packages are installed or deleted. This applies even if an Installation Server is installed on the same system as the Cell Manager.

2. Install the Installation Server for Windows in case you have any Windows systems in your Data

- Protector cell. See ["Installing on HP-UX and Linux systems using native tools" on page 348](#).
3. Distribute the software to clients. See ["Installing Data Protector clients" on page 55](#).

Installing the clients

The clients are not installed during a Cell Manager or Installation Server installation. The clients must be installed either by using `omnisetup.sh` or by remotely installing the components from the Data Protector GUI. For detailed information on how to install the clients, see ["Installing Data Protector clients" on page 55](#).

Upgrading on HP-UX and Linux systems using native tools

Upgrading Data Protector on HP-UX systems using swinstall

An upgrade of a Cell Manager must be performed from HP-UX installation DVD-ROM.

If you are upgrading a Cell Manager with an Installation Server installed, you must first upgrade the Cell Manager and then the Installation Server.

Client components that are installed on the Cell Manager system are *not* upgraded during a Cell Manager upgrade and must be upgraded either by using `omnisetup.sh` or by remotely installing the components from the Installation Server. For details, see ["Local installation on UNIX and Mac OS X systems" on page 98](#) or ["Remote installation" on page 90](#).

Upgrade procedure

To upgrade to Data Protector 9.09, using `swinstall`

1. **Data Protector 6.20 or 7.00:**

Export the existing IDB:

- a. Copy the `omnimigrate.pl` script to a temporary directory:

```
cp -p MountPoint/hpux/DP_DEPOT/DATA-PROTECTOR/OMNI-  
CS/opt/omni/sbin/omnimigrate.pl /tmp
```

- b. Export the IDB using the `omnimigrate.pl` command:

```
/opt/omni/bin/perl /tmp/omnimigrate.pl -shared_dir  
/var/opt/omni/server/exported-export
```

2. Log in as `root` and stop the Data Protector services by executing the `omnisv -stop` command. Type `ps -ef | grep omni` to verify whether all the services have been shut down. There must be no Data Protector services listed after executing the `ps -ef | grep omni` command.
3. To upgrade a Cell Manager or/and an Installation Server, follow the procedures described ["Installing a Cell Manager on HP-UX systems using swinstall" on page 348](#) or/and ["Installing an](#)

[Installation Server on HP-UX systems using swinstall" on page 350.](#)

The installation procedure will automatically detect the previous version and upgrade *only the selected* components. If a component that was installed in the previous version of Data Protector is not selected, it is *not* upgraded. Therefore, you must ensure that you select all components that must be upgraded.

Note: The `Match what target` has option is *not* supported if you are upgrading both, the Cell Manager and Installation Server on the same system.

Upgrading Data Protector on Linux systems using rpm

To upgrade the Linux Cell Manager or Installation Server, uninstall the old version and install the new version of the product.

Client components that are installed on the Cell Manager system are *not* upgraded during a Cell Manager upgrade and must be upgraded either by using `omnisetup.sh` or by remotely installing the components from the Installation Server. For details, see "[Local installation on UNIX and Mac OS X systems" on page 98](#) or "[Remote installation" on page 90](#)."

Upgrade procedure

To upgrade to Data Protector 9.09 using rpm

1. **Data Protector 6.20 or 7.00:**

- a. Copy the `omnimigrate.pl` script to a temporary directory:

```
cp -p MountPoint/hpux/DP_DEPOT/DATA-PROTECTOR/OMNI-CS/opt/omni/sbin/omnimigrate.pl /tmp
```

- b. Export the IDB using the `omnimigrate.pl` command:

```
/opt/omni/bin/perl /tmp/omnimigrate.pl -shared_dir /var/opt/omni/server/exported-export
```

2. Log in as `root` and stop the Data Protector services executing the `omnisv -stop` command.

Type `ps -ef | grep omni` to verify whether all the services have been shut down. There must be no Data Protector services listed after executing the `ps -ef | grep omni` command.

3. Uninstall Data Protector using `rpm`.

The configuration files and the database are preserved during this procedure.

4. Run the `rpm -q` command to verify that you uninstalled the old version of Data Protector. Old versions of Data Protector should not be listed.

Verify that the database and configuration files are still present. The following directories should still exist and contain binaries:

- `/opt/omni`
- `/var/opt/omni`
- `/etc/opt/omni`

5. If you are upgrading a Cell Manager, insert and mount the Linux installation DVD-ROM and use

rpm to install the Cell Manager. For detailed steps, see ["Installing the Cell Manager on Linux systems using rpm" on page 349](#).

If you are upgrading an Installation Server, insert and mount the Linux installation DVD-ROM and install the Installation Server. For detailed steps, see ["Installing an Installation Server on Linux systems using rpm" on page 351](#).

Appendix B: System preparation and maintenance tasks

This appendix provides some additional information about tasks that are beyond the scope of this guide but strongly influence the installation procedure. These tasks include system preparation and maintenance tasks.

Network configuration on UNIX systems

When you install Data Protector on a UNIX system, Data Protector Inet is registered as a network service. Typically this involves the following steps:

- Modification of the `/etc/services` file for registering a port on which Data Protector Inet will listen.
- Registration of Data Protector Inet in the system's `inetd` daemon or its equivalent (`xinetd`, `launchd`).

When you modify a network configuration, the initial Data Protector Inet configuration may become incomplete or even invalid. This happens whenever you add or remove Internet Protocol version 6 (IPv6) network interfaces, due to the system-specific settings for adding IPv6 support to network services. It may happen in other circumstances as well.

In order to update the Data Protector Inet configuration, you can use the `dpsvcsetup.sh` utility. This utility, also used by the installation, which gathers the necessary information and accordingly updates the system configuration, is located in the directory `/opt/omni/sbin` (HP-UX, Solaris, and Linux systems) or `/usr/omni/bin` (other UNIX systems).

- To update the Data Protector Inet configuration, execute:
`dpsvcsetup.sh -update.`
- To register the Data Protector Inet as a network service, execute:
`dpsvcsetup.sh -install.`
- To unregister the Data Protector Inet as a network service, execute:
`dpsvcsetup.sh -uninstall.`

Checking the TCP/IP setup

An important aspect of the TCP/IP configuration process is the setup of a hostname resolution mechanism. Each system in the network must be able to resolve the address of the Cell Manager as well as all clients with Media Agents and physical media devices attached. The Cell Manager must be able to resolve the names of all clients in the cell.

Once you have the TCP/IP protocol installed, you can use the `ping` and `ipconfig/ifconfig` commands to verify the TCP/IP configuration.

Note that on some systems the `ping` command cannot be used for IPv6 addresses, the `ping6` command should be used instead.

To check the TCP/IP setup

1. At the command line, run:

Windows systems: `ipconfig /all`

UNIX systems: `ifconfiginterface` or `ifconfig -a` or `netstat -i`, depending on the system

The precise information on your TCP/IP configuration and the addresses that have been set for your network adapter. Check if the IP address and subnet mask are set correctly.

2. Type `ping your_IP_address` to confirm the software installation and configuration. By default, you should receive four echo packets.
3. Type `ping default_gateway`.

The gateway should be on your subnet. If you fail to ping the gateway, check if the gateway IP address is correct and that the gateway is operational.

4. If the previous steps have worked successfully, you are ready to test the name resolution. Enter the name of the system while running the `ping` command to test the hosts file and/or DNS. If your machine name was `computer`, and the domain name was `company.com`, you would enter: `ping computer.company.com`.

If this does not work, verify that the domain name in the TCP/IP properties window is correct. You should also check the hosts file and the DNS. Be sure that the name resolution for the system, which is intended to be the Cell Manager, and the systems, which are intended to be the clients, is working in both ways:

- On the Cell Manager you can ping each client.
- On the clients you can ping the Cell Manager and each client with a Media Agent installed.

Note: When using the hosts file for the name resolution, the above test does not guarantee that name resolution works properly. In this case, you may want to use **DNS check tool** once Data Protector is installed.

If the name resolution, as specified above, is not working, Data Protector cannot be installed properly.

Also note that the Windows computer name must be the same as the hostname. Otherwise, Data Protector setup reports a warning.

5. After Data Protector has been installed and a Data Protector cell has been created, you can use the DNS check tool to check that the Cell Manager and every client with a Media Agent installed resolve DNS connections to all other clients in the cell properly and vice versa. You do this by executing the `omnicheck -dns` command. Failed checks and the total number of failed checks are listed.

For detailed information on the `omnicheck` command, see the *HPE Data Protector Command Line Interface Reference*.

Changing the default Data Protector ports

Changing the default Data Protector Inet port

The Data Protector Inet service (process), which starts other processes needed for backup and restore, should use the same port on each system within the Data Protector cell.

By default, Inet uses the port number 5555. To verify that this particular port is not used by another program, inspect the local `/etc/services` file (UNIX systems) or the output of the locally invoked `netstat -a` command (Windows systems). If the port is already in use by another program, you must reconfigure Inet to use an unused port. Such reconfiguration must be done on *each* system of the cell so that *all* systems in the cell use the same port.

Once changed on the Cell Manager which also acts as the Installation Server, or on a standalone Installation Server, the new port is automatically used by all clients which are remotely installed using this Installation Server. The Inet port can, therefore, be changed most easily when establishing the cell.

Caution: Do not change the default Inet listen port on systems that are prepared for disaster recovery. In the opposite case, if such systems are struck by a disaster, the disaster recovery process may fail.

UNIX systems

To change the Inet port on a UNIX system that will become your Cell Manager, Installation Server, or Data Protector client, follow the steps:

- Create the file `/tmp/omni_tmp/socket.dat` with the desired port number.

To change the Inet port on a UNIX system that is already your Cell Manager, Installation Server, or Data Protector client, follow the steps:

1. Edit the `/etc/services` file. By default, this file should contain the entry:

```
omni 5555/tcp # DATA-PROTECTOR
```

Replace the number 5555 with the number of an unused port.

2. If the files `/etc/opt/omni/client/customize/socket` and `/opt/omni/newconfig/etc/opt/omni/client/customize/socket` exist on the system, update their content with the desired port number.
3. Restart the Inet service by terminating the process concerned using the `kill -HUP inetd_pid` command. To determine the process ID (`inetd_pid`), run the `ps -ef` command.
4. If you are reconfiguring Inet on the Cell Manager, set a new value for the Port global option.
5. If you are reconfiguring Inet on the Cell Manager, restart the Data Protector services:
 - `omnisv stop`
 - `omnisv start`

Windows systems

To change the `Inet` port on a Windows system that will become your Cell Manager, Installation Server, or Data Protector client

1. From the command line, run `regedit` to open the Registry editor.
2. Under the key `HKEY_LOCAL_MACHINE\SOFTWARE\Hewlett-Packard\OpenView\OmniBackII\Common`, create the registry entry `InetPort`:

Name of the registry entry: `InetPort`

Type of the registry entry: `REG_SZ` (string)

Value of the registry entry: *PortNumber*

To change the `Inet` port on a Windows system that is already your Cell Manager, Installation Server, or Data Protector client

1. From the command line, run `regedit` to open the Registry editor.
2. Expand **HKEY_LOCAL_MACHINE, SOFTWARE, Hewlett-Packard, OpenView, OmniBack**, and select **Common**.
3. Double-click **InetPort** to open the Edit String dialog box. In the Value data text box, enter the number of an unused port. The same must be done in the Parameters subfolder of the Common folder.
4. In the Windows Control Panel, open **Administrative Tools, Services**, then select the **Data Protector Inet** service, and restart the service by clicking the **Restart** icon on the toolbar.

Changing the default Data Protector IDB ports and user accounts on UNIX systems

On UNIX systems the installation is performed by the `omnisetup.sh` script and is not interactive. You must change the port values in the file `/tmp/omni_tmp/DP.dat` before you start the installation.

The following port entries correspond to the IDB services:

- HPE Data Protector IDB (`hpd-idb`) service port: `PGPORT`
- HPE Data Protector IDB Connection Pooler (`hpd-idb-cp`) port: `PGCPORT`
- HPE Data Protector Application Server (`hpd-as`) service port: `APPSSPORT`
- HPE Data Protector Application Server (`hpd-as`) management port: `APPSNATIVEMGTPORT`

You can change the default user account under which the IDB is run by setting the variable `PGOSUSER`.

Example `DP.dat` file:

```
PGPORT=7112
PGCPORT=7113
PGOSUSER=hpdp
APPSSPORT=7116
APPSNATIVEMGTPORT=7119
```


Preparing a Microsoft server cluster running on Windows Server 2008 or Windows Server 2012 for Data Protector installation

To enable cluster-aware installation of Data Protector on a server cluster with Microsoft Cluster Service (MSCS) running on the Windows Server 2008 or Windows Server 2012 operating system, you need to prepare the cluster in advance. Failing to do so may result in failed sessions for backing up the local CONFIGURATION object, which must be backed up during preparation for disaster recovery, and potentially even in a data loss. For information for which combinations of Data Protector cell roles and Windows operating system releases cluster awareness is supported, see the latest support matrices at <https://softwaresupport.hpe.com/>.

Prerequisites

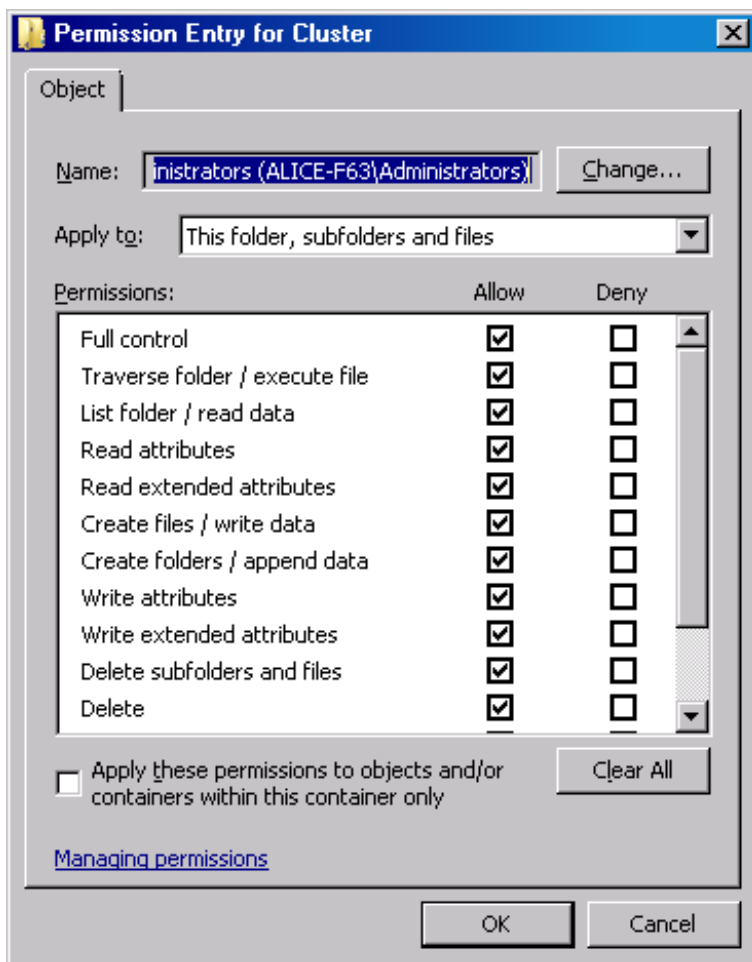
- Ensure that you are logged on to the system with a domain user account. The domain user account must be a member of the local Administrators group.

Preparation procedure

To properly prepare your cluster for Data Protector installation, perform the following:

1. On both cluster nodes, start Windows Firewall and enable exceptions for the program File and Printer Sharing.
2. On the active cluster node, start Failover Cluster Management, and verify that the witness disk in quorum resource is online. If the resource is offline, bring it online.
Perform the steps that follow on the active cluster node only.
3. If you are preparing a cluster without a Majority Node Set (MNS) configured, start Windows Explorer and change ownership of the folder *WitnessDiskLetter:\Cluster* to the local Administrators group. While changing the ownership in the Advanced Security Settings for Cluster window, ensure that the option **Replace owner on subcontainers and objects** is selected. In the Windows Security dialog box, confirm the suggested action by clicking **Yes**, and confirm the notification that follows by clicking **Yes**.
4. If you are preparing a cluster without an MNS configured, in Windows Explorer, change permissions of the folder *WitnessDiskLetter:\Cluster* to allow full control for the SYSTEM and local Administrators groups. Verify that the permission settings for both groups match the settings shown on "[Appropriate permissions for the Cluster folder and local users group Administrators](#)" on the next page.

Appropriate permissions for the Cluster folder and local users group Administrators



5. If you are preparing a cluster which will take the role of the Data Protector Cell Manager, in Failover Cluster Management, add a Cluster Access Point resource. Select **Add a resource** and click **1- Client Access Point** to start the New Resource wizard:
 - a. On the Client Access Point pane, enter the network name of the virtual server in the Name text box.
 - b. Enter the IP address of the virtual server in the Address text box.
6. If you are preparing a cluster which will take the role of the Data Protector Cell Manager, in Failover Cluster Management, add a shared folder to the cluster. Start the Provision a Shared Folder wizard by clicking **Add a shared folder**:
 - a. On the Shared Folder Location pane, enter a directory path in the Location text box. Ensure that the chosen directory has sufficient free space to store data created during the Data Protector installation. Click **Next**.
 - b. On the NTFS Permissions, Share Protocols, and SMB Settings panes, leave the default option values unchanged. Click **Next** to move to the next pane.
 - c. On the SMB Permissions pane, select the option **Administrators have Full Control; all other users and groups have only Read Access and Write Access**. Click **Next**.

- d. On the DFS Namespace Publishing, leave the default option values. Click **Next**.
- e. On the Review Settings and Create Share pane, click **Create**.

Installing Data Protector on Microsoft Cluster Server with Veritas Volume Manager

To install Data Protector on Microsoft Cluster Server (MSCS) with Veritas Volume Manager, first follow the general procedure for installation of Data Protector on MSCS. See "[Installing Data Protector on a Microsoft Cluster Server](#)" on page 173.

After you have completed the installation, some additional steps are required to enable the Data Protector `Inet` service to differentiate between local and cluster disk resources which use their own resource driver and not the Microsoft resource driver:

1. Initiate maintenance mode by execute the `omnisv -maintenance` command on the Cell Manager.
2. Define a new system environment variable `OB2CLUSTERDISKTYPES` with `Volume Manager Disk Group` as a value, or set the `omnirc` option on both cluster nodes as follows:

```
OB2CLUSTERDISKTYPES=Volume Manager Disk Group
```

To specify additional proprietary disk resources, such as NetRAID4 disk, simply append the resource type name to the `OB2CLUSTERDISKTYPES` environment variable value:

```
OB2CLUSTERDISKTYPES=Volume Manager Disk Group;NETRaid4M Diskset
```

For more information on using the `omnirc` file options, see the *HPE Data Protector Troubleshooting Guide*.

3. Quit the maintenance mode by executing the `omnisv -maintenance -stop` command.

Preparing a NIS server

This procedure enables your NIS server to recognize your Data Protector Cell Manager.

To add the Data Protector information to your NIS server

1. Log in as `root` on the NIS server.
2. If you are managing the `/etc/services` file via NIS, append the following line to the `/etc/services` file:

```
omni 5555/tcp # Data Protector for Data Protector inet server
```

Replace 5555 with an alternative if this port it is not available. See "[Changing the default Data Protector Inet port](#)" on page 359.

If you are managing the `/etc/inetd.conf` file via NIS, append the following line to the `/etc/inetd.conf` file:

```
#Data Protector
```

```
omni stream tcp nowait root /opt/omni/sbin/inet -log /var/opt/omni/log/inet.log
```

3. Run the following command so that the NIS server reads the file and updates the configuration.

```
cd /var/yp; make
```

Note: In the NIS environment, the `nsswitch.conf` file defines the order in which different configuration files will be used. For example, you can define whether the `/etc/inetd.conf` file will be used on the local machine or from the NIS server. You can also insert a sentence in the file, stating that the `nsswitch.conf` file controls where the names are kept. See the man pages for detailed information.

If you have already installed Data Protector, you must prepare the NIS server, and then restart the `inet` service by killing the process concerned, using the command `kill -HUP pid` on every NIS client that is also a Data Protector client.

Troubleshooting

- If the Data Protector `Inet` service does not start after you have installed Data Protector in your NIS environment, check the `/etc/nsswitch.conf` file.

If you find the following line:

```
services: nis [NOTFOUND=RETURN] files
```

replace the line with:

```
services: nis [NOTFOUND=CONTINUE] files
```

Changing the Cell Manager name

When Data Protector is installed it uses the current hostname for the Cell Manager name. If you change the hostname of your Cell Manager, you need to update the Data Protector files manually.

It is necessary to update the client information about the Cell Manager name. Before changing the hostname of your Cell Manager, export the clients from the cell. For the procedure, see ["Exporting clients from a cell" on page 192](#). After you have changed the hostname, import the clients back to the cell. For the procedure, see ["Importing clients to a cell" on page 187](#).

Note: Any devices and backup specifications that were configured using the old Cell Manager name must be modified to reflect the correct name.

On UNIX systems

On a UNIX Cell Manager, do the following:

1. Change the computer or domain name.

Note: Ensure that the new hostname is resolved by DNS by all members and in both directions. Do not continue this procedure, if the name resolution does not work.

2. Execute the following command:

```
omnisv stop
```

Note: Ensure that no instances of the old hostname exists in the following file:

```
/etc/opt/omni/client/components
```

You can execute the following command:

```
"grep -rn /etc/opt/omni/client/components -e "<OLD_HOSTNAME_FQDN>"
```

3. Change the Cell Manager hostname entries in the following files:

```
/etc/opt/omni/client/cell_server  
/etc/opt/omni/server/cell/cell_info  
/etc/opt/omni/server/config  
/etc/opt/omni/server/cell/installation_servers  
/etc/opt/omni/server/users/UserList
```

4. Regenerate the certificate by executing the following command:

```
# perl -CA /opt/omni/sbin/omnigencert.pl -server_id <NEW_HOSTNAME_FQDN> -  
server_san dns:<short_hostname>,dns:< NEW_HOSTNAME_FQDN > -user_id hpd -store_  
password <STORE_PASSWORD>
```

Note: You can find the keystorepassword by executing the following command:

```
# grep keystorePassword  
/etc/opt/omni/client/components/webservice.properties
```

5. Execute the following command:

```
omnisv start
```

6. Change the Cell Manager name in the IDB by executing:

```
omnidbutil -change_cell_name
```

7. Connect to the Cell Manager using the Data Protector GUI and accept the new certificate
8. If a tape device is connected to the Cell Manager, navigate to **Devices and Media**, and change the hostname in the properties of the tape device.
9. In case of a configured file device:

- a. To view the configured devices, use the following:

```
"omnidownload -list_libraries [-detail]" and "omnidownload -dev_info"
```

- b. To modify the hostname in the Library, navigate to # omnidownload -library <LIBRARY_NAME> >/tmp/file_lib.txt and edit the file_lib.txt file as follows:

```
# omniupload -modify_library <LIBRARY_NAME> -file /tmp/file_lib.txt
```

- c. To modify the hostname in Devices, navigate to # omnidownload -device <DRIVE_NAME> >/tmp/writer_0.txt and edit the writer_0.txt file as follows:

```
# omniupload -modify_device <DRIVE_NAME> -file /tmp/writer_0.txt
```

10. Delete the backup specification in the Data Protector IDB and recreate a new one.
11. Change the other backup specifications that are affected by the hostname change.
12. Update the UNIX or LINUX clients for the Cell Server hostname change in the following:
/etc/opt/omni/client/cell_server
13. Update the Windows clients for the Cell Server hostname change in the registry:

```
HKEY_LOCAL_MACHINE -> SOFTWARE -> Hewlett Packard -> OpenView -> OmniBack II ->
Site -> CellServer
```

14. Check the following config file for the old hostname:

```
# grep -rn /etc/opt/omni -e "<OLD_HOSTNAME_FQDN>"
```

Note: It is fine to view the old hostname in the following locations:

```
/etc/opt/omni/server/dr/p1s -> If the system recovery data has been stored
in the past.
```

```
/etc/opt/omni/server/certificates -> old certificate
```

```
/etc/opt/omni/client/certificates -> old certificate
```

15. Check the IDB content and export it to the following file:

```
/opt/omni/sbin/omnidbutil -writedb /tmp
```

<ENTER>

Note: The dpidb.dat file contains the main part of the Internal Database. Tables where the old hostname can still remain is as follows:

```
dp_frontend_application
```

```
dp_catalog_object
```

```
dp_catalog_object_datastream (in case the old device name(s) contain the old
hostname)
```

```
dp_management_session
```

```
dp_medmng_library (in case the current device name(s) contain the old
hostname)
```

```
dp_medmng_media_pool (in case the old pool name(s) contain the old hostname)
```

```
dp_medmng_cartridge (in case the old pool name(s) contain the old hostname)
```

Also, the dpjce.dat file contains the Job Control Engine (JCE) database. It contains few URL entries that are essential for advanced scheduler. The old hostname must not exist in this file

If you find the old hostname in the jce_service_description table, proceed as follows:

- a. Login to the hpjce database.

Note: You can find the database credentials in

```
/etc/opt/omni/server/idb/idb.config file
```

```
# grep PGSUPERPASSWORD /etc/opt/omni/server/idb/idb.config
```

```
PGSUPERPASSWORD='a2ZudGV4cjBpdTZnMg==';
```

```
# export PGPASSWORD=`echo 'a2ZudGV4cjBpdTZnMg==' | base64 -d`
```

```
# echo $PGPASSWORD
```

```
kfntexr0iu6g2
```

- b. Create a connection. Proceed as follows:
 - i. In a command prompt, navigate to the bin location (/opt/omni/idb/bin/).
 - ii. Execute the following command to login to the hpjce database using the hpdp user:

```
# /opt/omni/idb/bin/psql -h localhost -p 7112 -U hpdh hpdpidb
psql (9.1.9)
Type "help" for help.
```

- iii. Check the current content by executing the following command in the hpjce database:

```
hpjce=# select url from jce_service_description;
```

Note: If you need to change the hostname, execute the following commands:

```
hpjce=# update jce_service_description
hpjce=# set url=replace(url, 'old_hostname', 'new_hostname');
hpjce=# \q
```

On Windows systems

On a Windows Cell Manager, do the following:

1. Change the computer or domain name.

Note: Ensure that the new hostname is resolved by DNS by all members and in both directions. Do not continue this procedure, if the name resolution does not work.

2. Execute the following command:

```
omnisv stop
```

3. Change the Cell Manager name in the following registry keys:

```
HKEY_LOCAL_
MACHINE\SOFTWARE\HewlettPackard\OpenView\OmniBackII\Site\CellServer\newnameHKE
Y_LOCAL_MACHINE\SOFTWARE\Hewlett-Packard\OpenView\OmniBackII\Packages\newname
```

4. Navigate to the following file to ensure that no instances of the old hostname still exists:

```
Data_Protector_program_data\Config\client\components
```

Note: Use the Windows find in file function.

5. Change the Cell Manager hostname entries in the following files:

```
Data_Protector_program_data\Config\Server\users\UserList
Data_Protector_program_data\Config\Server\config
Data_Protector_program_data\Config\Server\cell\cell_info
Data_Protector_program_data\Config\Server\cell\installation_servers
```

6. Regenerate the certificate by executing the following command from C:\Program Files\OmniBack\bin folder:

```
perl omnigencert.pl -server_id <NEW_HOSTNAME> -server_san
dns:<hostname>,dns:<FQDN> -user_id hpdh -store_password <PASSWORD>
```

Note: You can find the keystorepassword from the following location:

```
Data_Protector_program_data\Config\client\components\webservice.properties
```

7. Execute the following command:

```
omnisv start
```

8. Change the Cell Manager name in the IDB by executing:

```
omnidbutil -change_cell_name
```

9. Connect to the Cell Manager using the Data Protector GUI and accept the new certificate.
10. If a tape device is connected to the Cell Manager, navigate to **Devices and Media**, and change the hostname in the properties of the tape device.

11. In case of a configured file device:

- a. To view the configured devices, use the following:

```
"omnidownload -list_libraries [-detail]" and "omnidownload -dev_info"
```

- b. To modify the hostname in the Library, navigate to "omnidownload -library <LIBRARY_NAME> > c:\temp\file_lib.txt" and edit the file_lib.txt file as follows:

```
omniupload -modify_library <LIBRARY_NAME> -file c:\temp\file_lib.txt
```

- c. To modify the hostname in Devices, navigate to "omnidownload -device <Device Name> > c:\temp\device.txt" and edit the device.txt file as follows:

```
omniupload -modify_device <Device Name> -file c:\temp\device.txt
```

12. Delete the backup specification in the Data Protector IDB and recreate a new one.
13. Change the other backup specifications that are affected by the hostname change.
14. Update the UNIX or LINUX clients for the Cell Server hostname change in the following:

```
/etc/opt/omni/client/cell_server
```

15. Update the Windows clients for the Cell Server hostname change in the registry:

```
HKEY_LOCAL_MACHINE -> SOFTWARE -> Hewlett Packard -> OpenView -> OmniBack II -> Site -> CellServer
```

16. Check the following config file using the Windows "find in file" function to search the old hostname:

```
Data_Protector_program_data\Config
```

Note: It is fine to view the old hostname in the following locations:

```
Data_Protector_program_data\Config\Server\dr -> If system recovery has been stored in the past.
```

```
Data_Protector_program_data\Config\Server\certificates -> old certificate
```

```
Data_Protector_program_data\Config\client\certificates -> old certificate
```

17. Check the IDB content and export it to the following file:

```
omnidbutil -writedb e:\idb_export
```

```
<ENTER>
```

Note: The dpidb.dat file contains the main part of the Internal Database. Tables where the old hostname can still remain is as follows:

```
dp_frontend_application
```

```
dp_catalog_object
```



```
dp_catalog_object_datastream (in case the old device name(s) contain the old
hostname)
dp_management_session
dp_medmng_library (in case the current device name(s) contain the old
hostname)
dp_medmng_media_pool (in case the old pool name(s) contain the old hostname)
dp_medmng_cartridge (in case the old pool name(s) contain the old hostname)
```

Also, the `dpjce.dat` file contains the Job Control Engine (JCE) database. It contains few URL entries that are essential for advanced scheduler. The old hostname must not exist in this file.

If you find the old hostname in the `jce_service_description` table, proceed as follows:

- a. Login to the `hpjce` database.

Note: You can find the database credentials in `Data_Protector_program_data\Config\Server\idb\idb.config` file. You can use the following link to decode the PGSUPERPASSWORD:

<https://www.base64decode.org>

- b. Create a connection. Proceed as follows:

- i. In a command prompt, navigate to the bin location (`C:\Program Files\OmniBack\idb\bin`).
- ii. Execute the following command to login to the `hpjce` database using the `hpd` user:


```
.\psql -h localhost -p 7112 -d hpjce -U hpd <Enter the decoded password>
```
- iii. Check the current content by executing the following command in the `hpjce` database:


```
hpjce=# select url from jce_service_description;
```

Note: If you need to change the hostname, execute the following commands:

```
hpjce=# update jce_service_description
hpjce=# set url=replace(url, 'old_hostname', 'new_hostname');
hpjce=# \q
```

Changing the hostname in Job Control Engine (JCE) database

On UNIX systems

To change the hostname in JCE database with PGADMIN3, proceed as follows:

1. Navigate to `/var/opt/omni/server/db80/pg/pg_hba.conf` file.
2. Change host all all 127.0.0.1/32 md5 to host all all 10.17.0.0/16 md5.

(OR)

Change host all all 127.0.0.1/32 md5 to connect to a specific host (host all all 10.17.16.121/32 md5) only.

3. Reload the pg config file and execute the following commands:

```
su hpdp
```

```
/opt/omni/idb/bin/pg_ctl reload -D /var/opt/omni/server/db80/pg
```

4. Connect to pgAdmin3.

On Windows systems

To change the hostname in JCE database using the command line with PGADMIN3, proceed as follows:


1. Execute the following command:

```
omnidbutil -set_passwd hpdp
```

2. Set the password.

3. Navigate to the C:\Program Files\OmniBack\idb\bin folder and run **pgadmin3.exe**.

The pgAdmin3 program gets started.

4. Add the server by clicking on the  plug-in.

The New Server Registration window is displayed.

5. In the New Server Registration window, perform the following:

- a. In the Name field, enter local or as per your requirement.

For example, enter jce_service_description.

- b. In the Host field, enter localhost.

- c. In the Port field, enter 7112.

- d. In the Service field, leave it empty.

- e. In the Maintenance DB field, select hpdpidb.

- f. In the Username field, enter hpdp.

- g. In the Password field, enter the password that you set with the `omnidbutil -set_passwd hpdp` command in [Step 1](#).

6. Click **OK**.

7. In the Object browser area, expand the server that you added by expanding Databases > hpjce > Schemas > hpjce_app > Tables.

For example: You can see the jce_service_description table name. Click jce_service_description.

8. Select the SQL button in the tool bar.

You get to view the SQL Editor with the following command:

```
UPDATE jce_service_description
```

```
SET url=replace (url, 'old_hostname', 'new_hostname');
```

For example, you can use `testHostname.1` as the `old_hostname` and `testHostname` as the `new_hostname`. Then execute this command with the Play button.

In the Data Output tab, you get to view the message stating the number of rows that were changed.

Using CLI

To change hostname in the JCE database without PGADMIN3, proceed as follows:

1. Execute the following:

On Windows system:

```
C:\Program Files\OmniBack\idb\psql --port=7112 -U hpdp -d hpjce -h localhost
```

On UNIX system:

```
/opt/omni/idb/bin/psql --port=7112 -U hpdp -d hpjce -h localhost
```

2. Execute the following commands:

```
hpjce=# select url from jce_service_description;
```

```
hpjce=# update jce_service_description
```

```
hpjce=# set url=replace(url, 'old_hostname', 'new_hostname');
```

```
hpjce=# \q
```

Running large backup sessions on Windows Cell Manager

To run large number of backup sessions on Windows Cell Manager, you should adjust the desktop heap limit in Windows registry. Desktop heap is controlled by the following registry key:

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Session  
Manager\SubSystems\Windows
```

The default value of this registry key is as follows:

```
%SystemRoot%\system32\csrss.exe ObjectDirectory=\Windows  
SharedSection=1024,20480,768 Windows=On SubSystemType=Windows ServerDll=basesrv,1  
ServerDll=winsrv:UserServerDllInitialization,3 ServerDll=sxssrv,4  
ProfileControl=Off MaxRequestThreads=16
```

Data Protector is affected by the `SharedSection` parameter, which includes the following values:

- 1024: Shared heap size common to all desktops. It should not be changed to address issues related to desktop heap exhaustion.
- 20480: Size of the desktop heap for each desktop associated with an interactive window station.
- 768: Size of the desktop heap for each desktop associated with a non-interactive window station.

You should set the third value (768) of the `SharedSection` parameter to 20480. The modified value of the Windows registry key will look like the following:

```
%SystemRoot%\system32\csrss.exe ObjectDirectory=\Windows  
SharedSection=1024,20480,20480 Windows=On SubSystemType=Windows ServerDll=basesrv,1
```

```
ServerDll=winsrv:UserServerDllInitialization,3 ServerDll=sxssrv,4  
ProfileControl=Off MaxRequestThreads=16
```

Note: Do not set a very high value, as it is in kilobytes.

After setting the new value, you must restart the system.

Appendix C: Device and media related tasks

This Appendix provides some additional Data Protector specific information about tasks that are beyond the scope of this guide. These tasks include device driver configuration, managing SCSI robotics, maintaining the SCSI environment, and similar.

Using tape and robotics drivers on Windows systems

Data Protector supports the native tape drivers that are loaded by default for an enabled tape drive attached to a Windows system. The Windows native drivers loaded for Medium changers (robotics) devices are not supported by Data Protector.

In the examples below, an HPE 4mm DDS tape device is attached to the Windows system. The native driver loaded for medium changer devices needs to be disabled if the HPE 4mm DDS tape device is connected to the Windows system and will be configured for use with Data Protector. This section describes the related procedures.

Tape drivers

A driver is usually delivered with Windows, if the device is listed in the Hardware Compatibility List (HCL). HCL is a list of the devices supported by Windows and can be found at the following site:

<http://www.microsoft.com/whdc/hcl/default.mspix>

The device drivers then load automatically for all enabled devices once the computer has been started. You do not need to load the native tape driver separately, but you can update it.

To update or replace the native tape driver on a Windows system

1. In the Windows Control Panel, double-click **Administrative Tools**.
2. In the **Administrative Tools** window, double-click the **Computer Management**. Click **Device Manager**.
3. Expand Tape Drives. To check which driver is currently loaded for the device, right-click the tape drive and then click **Properties**.
4. Select the **Driver** tab and click **Update Driver**. Then, follow the wizard, where you can specify if you want to update the currently installed native tape driver or replace it with a different one.
5. Restart the system to apply the changes.

If a device has already been configured for Data Protector without using the native tape driver, you have to rename the device files for all configured Data Protector backup devices that reference the particular tape drive (for example, from `scsi1:0:4:0` to `tape3:0:4:0`).

For details, see "[Creating device files \(SCSI Addresses\) on Windows systems](#)" on page 375.

Robotics drivers

On Windows, the robotics drivers are automatically loaded for enabled tape libraries. In order to use the library robotics with Data Protector, you have to disable the respective driver.

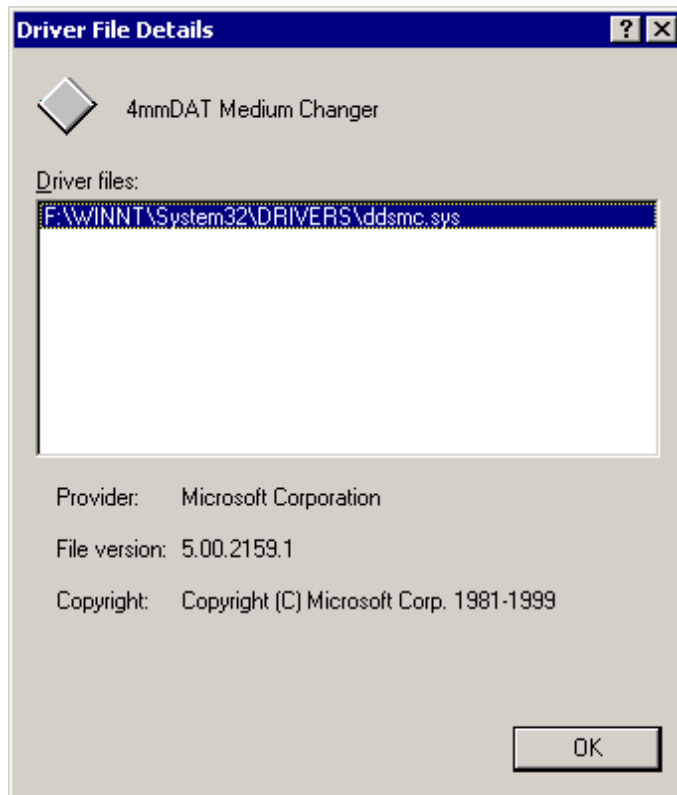
An HPE 1557A tape library using the 4mm DDS tapes is used in the example below.

To disable the automatically loaded robotics driver (ddsmc.sys) on a Windows system

1. In the Windows Control Panel, double-click **Administrative Tools**.
2. In the Administrative Tools window, double-click the **Computer Management**. Click **Device Manager**.
3. In the Results Area of the Device Manager window, expand Medium Changers.
4. To check which driver is currently loaded, right-click the **4mm DDS Medium Changer** and then **Properties**.

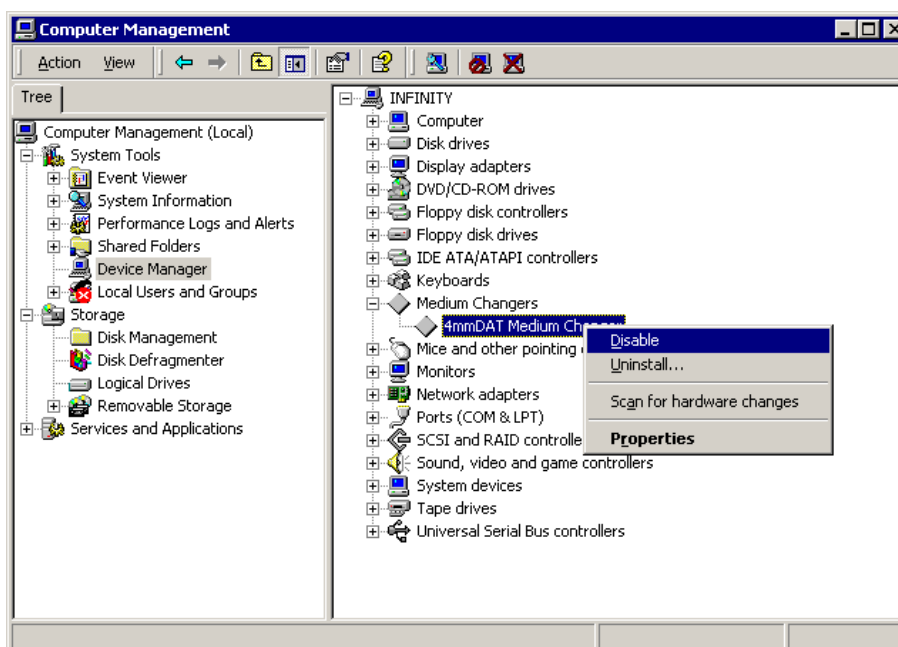
Select the **Driver** tab and click **Driver details**. In this case, the following window will display:

Medium changer properties



To disable the native robotics driver, right-click the **4mm DDS Medium Changer** and then select **Disable**.

Disabling robotics drivers



5. Restart the system to apply the changes. The robotics can now be configured with Data Protector.

Creating device files (SCSI Addresses) on Windows systems

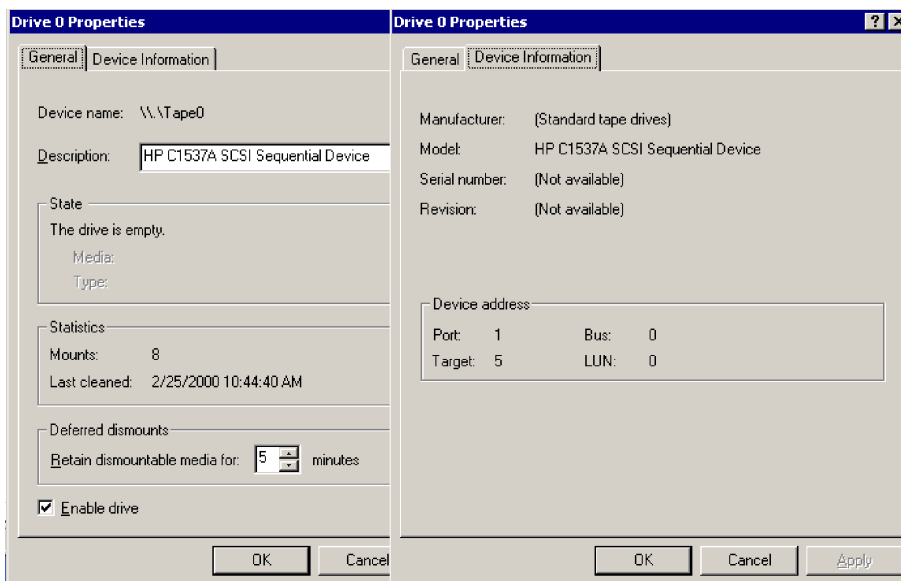
The tape device filename syntax depends on whether the native tape driver was loaded (`tapeN:B:T:L`) or unloaded (`scsiP:B:T:L`) for a tape drive.

Windows using the native tape driver

To create a device file for a tape drive connected to a Windows system that uses the native tape driver, proceed as follows:

1. In the Windows Control Panel, double-click **Administrative Tools**.
2. In the Administrative Tools window, double-click the **Computer Management**. Expand Removable Storage, then Physical Locations. Right-click the tape drive and select **Properties**.
3. If the native tape driver is loaded, the device file name is displayed in the General property page. Otherwise, you can find the relevant information in the Device Information property page. See "[Tape drive properties](#)" below.

Tape drive properties



The file name for the tape drive in " [Tape drive properties](#) " on the previous page is created as follows:

Native Tape Driver Used	Tape0 or Tape0:0:5:0
Native Tape Driver NOT Used	scsii1:0:5:0

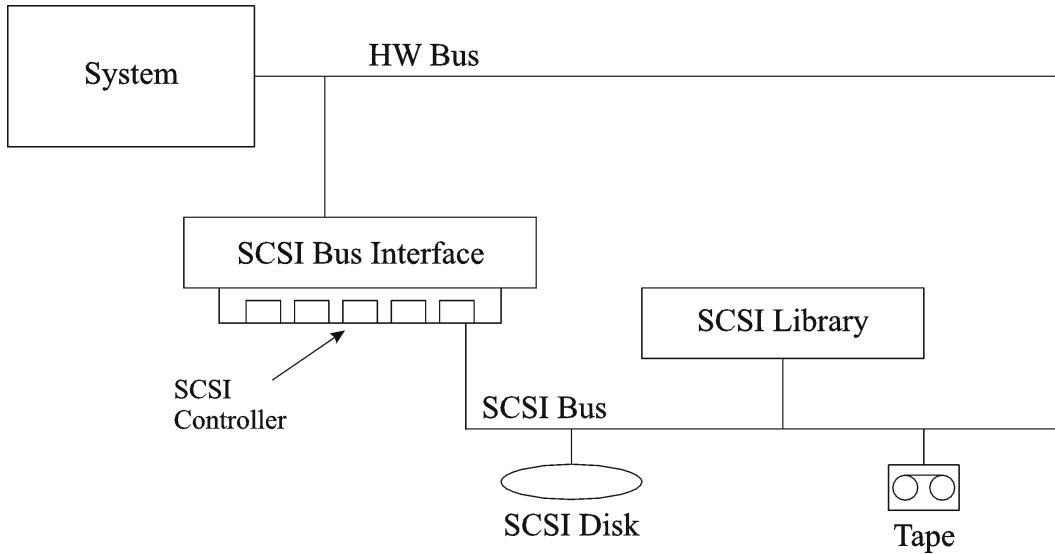
Magneto-optical devices

If you connect a magneto-optical device to a Windows system, a drive letter is assigned to the device after you restart the system. This drive letter is then used when you create the device file. For example, E: is the device file created for a magneto-optical drive which has been assigned a drive letter E.

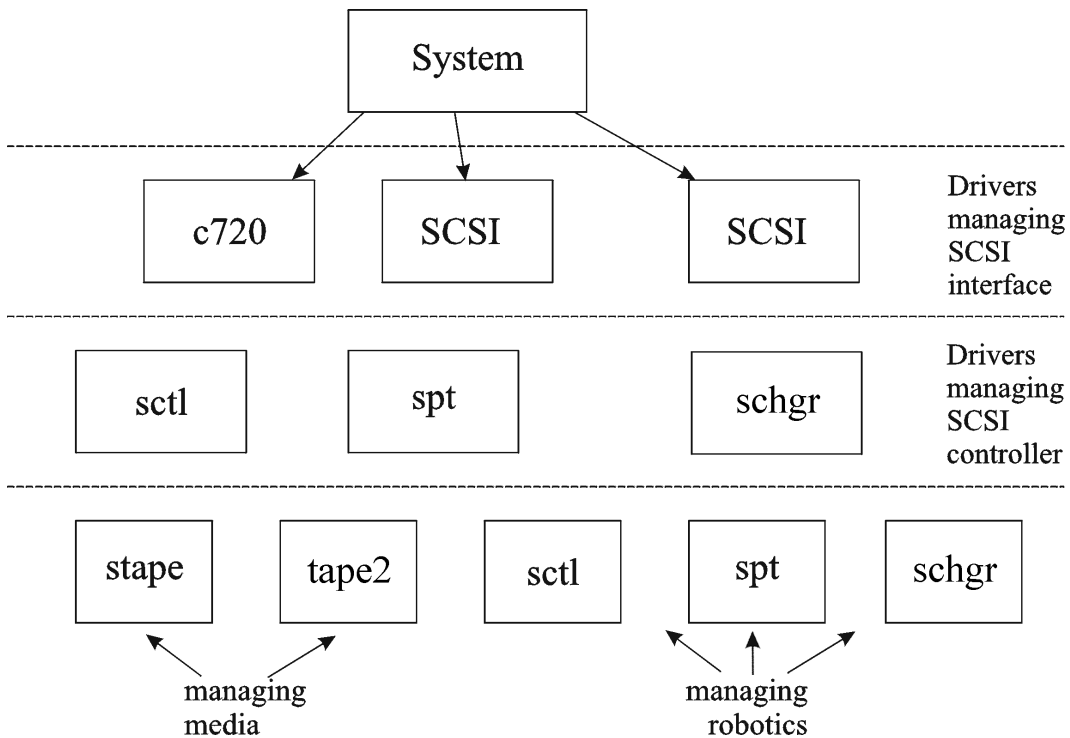
SCSI robotics configuration on HP-UX systems

On HP-UX systems, a SCSI Pass-Through Driver is used to manage the SCSI controller *and* control device (also referred to as robotics or picker) of the Tape Library devices (like HPE 12000e). The control device in a library is responsible for loading/unloading media to/from the drives and importing/exporting media to/from such a device.

SCSI controlled devices



Managing devices



The type of SCSI Robotic Driver in use depends on the hardware. Systems equipped with the GSC/HSC or PCI bus have the SCSI Autochanger Driver named `schgr`, and systems equipped with the EISA bus have the SCSI Pass-Through Driver named `sctl`, which is already built in the kernel. However, the SCSI Pass-Through Driver used on HPE Servers with an NIO Bus is named `spt`. It is installed on the system without being built into the kernel by default.

If the SCSI Robotic Driver driver has not already been linked to your current kernel, you have to add it yourself and assign it to the robotics of the connected Tape libraries.

The steps beneath explain how to *manually* add the SCSI Robotic Driver to the kernel and manually rebuild a new one.

Tip: On the HP-UX platform, you can also build the kernel using the *HPE System Administration Manager (SAM)* utility. See ["Installing HP-UX clients " on page 68.](#)

Use the `/opt/omni/sbin/ioscan -f` command to check whether or not the SCSI Robotic Driver is assigned to the library that you want to configure.

Status of the SCSI pass-through driver (sctl)

```

root@superhik$ ioscan -f
-----
Class      I  H/W Path      Driver      S/W State H/W Type  Description
-----
bc         0                      root        CLAIMED   BUS_NEXUS
bc         1  8              ccio        CLAIMED   BUS_NEXUS  I/O Adapter
unknown   -1 8/0            ext_bus     CLAIMED   DEVICE     GSC-to-PCI Bus Bridge
ext_bus    0 8/12           c720        CLAIMED   INTERFACE  GSC Fast/Wide SCSI Interfac
e
target     0 8/12.0         tgt         CLAIMED   DEVICE
disk       0 8/12.0.0       sdisk      CLAIMED   DEVICE     SEAGATE ST19171W
target     1 8/12.1         tgt         CLAIMED   DEVICE
tape       5 8/12.1.0       stape      CLAIMED   DEVICE     QUANTUM DLT7000
target     2 8/12.2         tgt         CLAIMED   DEVICE
ctl        0 8/12.2.0       sctl       CLAIMED   DEVICE     EXABYTE EXB-210
target     3 8/12.7         tgt         CLAIMED   DEVICE
ctl        0 8/12.7.0       sctl       CLAIMED   DEVICE     Initiator
ba         0 8/16           bus_adapter CLAIMED   BUS_NEXUS  Core I/O Adapter
ext_bus    2 8/16/0         CentIf     CLAIMED   INTERFACE  Built-in Parallel Interface
audio      0 8/16/1         audio      CLAIMED   INTERFACE  Built-in Audio
tty        0 8/16/4         asio0      CLAIMED   INTERFACE  Built-in RS-232C
ext_bus    1 8/16/5         c720        CLAIMED   INTERFACE  Built-in SCSI
target     4 8/16/5.2       tgt         CLAIMED   DEVICE
disk       2 8/16/5.2.0     sdisk      CLAIMED   DEVICE     TOSHIBA CD-ROM XM-5401TA
target     7 8/16/5.3       tgt         NO_HW     DEVICE
tape       3 8/16/5.3.0     stape      NO_HW     DEVICE     SONY SDX-300C
target     6 8/16/5.5       tgt         NO_HW     DEVICE
tape       0 8/16/5.5.0     stape      NO_HW     DEVICE     SONY SDX-300C
target     5 8/16/5.7       tgt         CLAIMED   DEVICE
  
```

In " [Status of the SCSI pass-through driver \(sctl\)](#) " above, you can see the `sctl` SCSI Pass-Through Driver assigned to the control device of the Exabyte tape device. The matching hardware path (H/W Path) is `8/12.2.0`. (SCSI=2, LUN=0)

There is also a tape drive connected to the same SCSI bus, but the driver controlling the tape drive is `stape`. The matching hardware path (H/W Path) is `8/12.1.0`. (SCSI=0, LUN=0)

The SCSI address 7 is always used by SCSI controllers, although the corresponding line may not appear in the output of the `ioscan -f` command. In this example, the controller is managed by `sctl`.

Status of the SCSI pass-through driver (spt)

```
# iocscan -f
Class      I  H/W Path  Driver      S/W State H/W Type  Description
-----
bc         0          root        CLAIMED    BUS_NEXUS
ext_bus    0  52        scsil       CLAIMED    INTERFACE HP 28655A - SCSI Interface
target     4  52.1      target      CLAIMED    DEVICE
disk       4  52.1.0    disc3       CLAIMED    DEVICE      SEAGATE ST15150N
target     1  52.2      target      CLAIMED    DEVICE
disk       0  52.2.0    disc3       CLAIMED    DEVICE      TOSHIBA CD-ROM XM-4101TA
target     3  52.4      target      CLAIMED    DEVICE
tape       0  52.4.0    tape2       CLAIMED    DEVICE      HP C1533A
spt        1  52.4.1    spt         CLAIMED    DEVICE      HP C1553A
target     6  52.5      target      CLAIMED    DEVICE
disk       5  52.5.0    disc3       CLAIMED    DEVICE      SEAGATE ST15150N
target     2  52.6      target      CLAIMED    DEVICE
disk       1  52.6.0    disc3       CLAIMED    DEVICE      SEAGATE ST15150N
lanmux     0  56        lanmux0     CLAIMED    INTERFACE LAN/Console
tty        0  56.0      mux4        CLAIMED    INTERFACE
lan        0  56.1      lan3        CLAIMED    INTERFACE
lantty     0  56.2      lantty0     CLAIMED    INTERFACE
processor  0  62        processor   CLAIMED    PROCESSOR Processor
memory     0  63        memory      CLAIMED    MEMORY      Memory
# █
```

In " [Status of the SCSI pass-through driver \(spt\)](#) " on the previous page, you can see an example of a connected tape device with robotics controlled by the `spt` SCSI Pass-Through Driver. The particular device is an HPE 12000e tape library device that uses the SCSI address 4 and is connected to the SCSI bus with the H/W Path 52. The matching hardware path is 52.4.1. The robotics is correctly assigned to the `spt` SCSI Pass-Through Driver.

If the `sctl`, `spt`, or `schgr` driver is not assigned to the robotics, you have to add the H/W Path of the robotics to the driver statement in the `system` file and rebuild the kernel. Follow the procedure below.

The following procedure explains how to *manually* add a SCSI Robotic Driver to the kernel, assign it to the robotics, and then manually rebuild a new kernel:

1. Login as a `root` user and switch to the build directory:

```
cd /stand/build
```

2. Create a new system file from your existing kernel:

```
/usr/sbin/sysadm/system_prep -s system
```

3. Check which SCSI Robotic Driver is already built in your current kernel. From the `/stand` directory, execute the following command:

```
grep SCSIRoboticDriver system
```

where the `SCSIRoboticDriver` can be either `spt`, `sctl`, or `schgr`. The system will display the corresponding line if the driver is already built in the current kernel.

4. Use an editor to append a driver statement:

```
driver H/W Path spt
```

to the `/stand/build/system` file, where `H/W Path` is the complete hardware path of the device.

For the HPE 12000e Tape library from the previous example you would enter:

```
driver 52.4.1 spt
```

For several libraries connected to the same system, you have to add a driver line for each library robotics with the appropriate hardware path.

When configuring the `schgr` driver, append the following line to a driver statement:

```
schgr
```

5. Enter the `mk_kernel -s./system` command to build a new kernel.
6. Save the original old system file using a different name and move the new system file to the original name so that it becomes the current one:

```
mv /stand/system /stand/system.prev  
mv /stand/build/system /stand/system
```
7. Save the old kernel with a different name and move the new kernel to the original name so that it becomes the current one:

```
mv /stand/vmunix /stand/vmunix.prev  
mv /stand/vmunix_test /stand/vmunix
```
8. Restart the system from the new kernel by entering the following command:

```
shutdown -r 0
```
9. Once you have restarted the system, verify the changes you have made using the `/usr/sbin/ioscan -f` command.

Creating device files on HP-UX systems

Prerequisites

Before you create a device file, you should have the backup device already connected to the system. Use the `/usr/sbin/ioscan -f` command to check whether the device is properly connected. Use the `/usr/sbin/infs -e` command to create device files for some backup devices automatically.

If the device files that correspond to a particular backup device have not been created during the system initialization (boot process) or after running the `infs -e` command, you have to create them manually. This is the case with the device files required to manage the library control device (library robotics).

We will use an example of creating a device file for the robotics of the HPE 12000e library device connected to an HP-UX system. The device file for the tape drive has already been created automatically after the restart of the system, while the device file for the control device must be created manually.

In "[Status of the SCSI pass-through driver \(spt\)](#)" on page 378, you can see the output of the `ioscan -f` command on the selected HP-UX system.

List of connected devices

```
# ioscan -f
Class      I  H/W Path  Driver      S/W State H/W Type  Description
-----
bc         0                root        CLAIMED   BUS_NEXUS
ext_bus    0  52        scsil       CLAIMED   INTERFACE HP 28655A - SCSI Interface
target     4  52.1      target      CLAIMED   DEVICE
disk       4  52.1.0    disc3       CLAIMED   DEVICE      SEAGATE ST15150N
target     1  52.2      target      CLAIMED   DEVICE
disk       0  52.2.0    disc3       CLAIMED   DEVICE      TOSHIBA CD-ROM XM-4101TA
target     3  52.4      target      CLAIMED   DEVICE
tape       0  52.4.0    tape2       CLAIMED   DEVICE      HP      C1533A
spt        1  52.4.1    spt         CLAIMED   DEVICE      HP      C1553A
target     6  52.5      target      CLAIMED   DEVICE
disk       5  52.5.0    disc3       CLAIMED   DEVICE      SEAGATE ST15150N
target     2  52.6      target      CLAIMED   DEVICE
disk       1  52.6.0    disc3       CLAIMED   DEVICE      SEAGATE ST15150N
lanmux     0  56        lanmux0     CLAIMED   INTERFACE LAN/Console
tty        0  56.0      mux4        CLAIMED   INTERFACE
lan        0  56.1      lan3        CLAIMED   INTERFACE
lantty     0  56.2      lantty0     CLAIMED   INTERFACE
processor  0  62        processor   CLAIMED   PROCESSOR Processor
memory     0  63        memory      CLAIMED   MEMORY      Memory
# █
```

The SCSI bus interface is controlled by the `scsil` system driver. This is a SCSI NIO interface. To access the library robotics on the SCSI NIO bus we must use the `spt` SCSI Pass-Through driver that is already installed and assigned to the robotics of the HPE 12000e Tape device that uses the hardware path 52.4.1.

Note: If you do not use a SCSI NIO based bus interface, the `spt` driver is not required but the `sctl` driver is used instead.

To create the device file, you need to know the *Major number* character of the SCSI Pass-Through driver and the *Minor Number* character, which does not depend on the SCSI Pass-Through driver you use.

To obtain the character *Major number* belonging to `spt`, run the system command:

```
lsdev -d spt
```

In the example (see " [List of connected devices](#) " on the previous page) the command reported the *Major number* character 75.

To obtain the character *Major number* belonging to `sctl`, run the system command:

```
lsdev -d sctl
```

In our case, the command reported the *Major number* character 203.

The *Minor Number* character, regardless of which SCSI Pass-Through driver is in use, has the following format:

```
0xIIITL00
```

II -> The *Instance number* of the SCSI bus interface (NOT of the device) reported by the `ioscan -f` output is in the second column, labeled with I. In the example, the instance number is 0, so we must enter two hexadecimal digits, 00.

T -> The SCSI address of the library robotics. In the example, the SCSI address is 4, so we must enter 4.

L -> The LUN number of the library robotics. In the example, the LUN number is 1, so we must enter 1.

00 -> Two hexadecimal zeroes.

Creating the device file

The following command is used to create the device file:

```
mknod /dev/spt/devfile_name c Major # Minor #
```

Usually the device files for `spt` are located in the `/dev/spt` or `/dev/scsi` directory. In this case, we will name the control device file `/dev/spt/SS12000e`.

Thus, the complete command for creating a device file named `SS12000e` in the `/dev/spt` directory is:

```
mknod /dev/spt/SS12000e c 75 0x004100
```

If we create a device file for `sctl`, which is named `SS12000e` and located in the `/dev/scsi` directory, the complete command is:

```
mknod /dev/scsi/SS12000e c 203 0x004100
```

Setting a SCSI controller's parameters

Data Protector allows you to change the device's block size, which might require additional configuration on some SCSI controllers.

On Windows systems, set the SCSI controller's parameters by editing the registry value for Adaptec SCSI controllers, and for some controllers with Adaptec's chipsets:

1. Set the following registry value: `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\aic78xx\Parameters\Device0\MaximumSGList`
2. Enter a `DWORD` value containing the number of 4 kB blocks, increased by one.
$$\text{MaximumSGList} = (\text{OBBlockSize in kB} / 4) + 1$$

For example, to enable block sizes up to 260 kB, `MaximumSGList` has to be at least $(260 / 4) + 1 = 66$.
3. Restart the system.

Note: This registry value sets the upper limit of the block size. The actual block size for a device must be configured using the Data Protector GUI for device configuration.

Finding the unused SCSI addresses on HP-UX systems

A backup device connected to an HP-UX system is accessed and controlled through a device file that must exist for each physical device. Before you can create the device file, you have to find out which SCSI addresses (ports) are still unused and available for a new device.

On HP-UX systems, the `/usr/sbin/ioscan -f system` command is used to display the list of the SCSI addresses that are already occupied. Thus, the addresses not listed in the output of the `/usr/sbin/ioscan -f` command are still unused.

In " [Output of the ioscan -f command on an HP-UX system](#) " below, there is the output of the /usr/sbin/ioscan -f command on an HP-UX 11.x system.

Output of the ioscan -f command on an HP-UX system

```
# ioscan -f
Class      I  H/W Path  Driver   S/W State H/W Type  Description
-----
bc         0                root     CLAIMED  BUS_NEXUS
ext_bus    0  52        scsil    CLAIMED  INTERFACE HP 28655A - SCSI Interface
target     4  52.1      target   CLAIMED  DEVICE
disk       4  52.1.0    disc3    CLAIMED  DEVICE      SEAGATE ST15150N
target     1  52.2      target   CLAIMED  DEVICE
disk       0  52.2.0    disc3    CLAIMED  DEVICE      TOSHIBA CD-ROM XM-4101TA
target     3  52.4      target   CLAIMED  DEVICE
tape       0  52.4.0    tape2    CLAIMED  DEVICE      HP C1533A
spt        1  52.4.1    spt      CLAIMED  DEVICE      HP C1553A
target     6  52.5      target   CLAIMED  DEVICE
disk       5  52.5.0    disc3    CLAIMED  DEVICE      SEAGATE ST15150N
target     2  52.6      target   CLAIMED  DEVICE
disk       1  52.6.0    disc3    CLAIMED  DEVICE      SEAGATE ST15150N
lanmux     0  56        lanmux0  CLAIMED  INTERFACE LAN/Console
tty         0  56.0      mux4     CLAIMED  INTERFACE
lan         0  56.1      lan3     CLAIMED  INTERFACE
lantty     0  56.2      lantty0  CLAIMED  INTERFACE
processor  0  62        processor CLAIMED  PROCESSOR Processor
memory     0  63        memory   CLAIMED  MEMORY      Memory
# █
```

Only the third (H/W Path) and the fifth (S/W State) columns are relevant for the purpose of determining the available SCSI addresses. A dismembered (H/W Path) format would look like this:

SCSI_bus_H/W_Path. SCSI_address. LUN_number

In this particular case, there is just one SCSI bus, using the H/W Path 52. On this bus, you can use the SCSI addresses 0 and 3 because they do not appear in the list.

You can see in " [Output of the ioscan -f command on an HP-UX system](#) " above which SCSI addresses on the selected SCSI bus are already occupied:

- SCSI address 1 by a SCSI disk
- SCSI address 2 by a CD-ROM
- SCSI address 4, LUN 0, by a tape drive
- SCSI address 4, LUN 1, by the tape library robotics
- SCSI address 5 by a SCSI disk
- SCSI address 6 by a SCSI disk
- SCSI address 7 by a SCSI controller

Note: The SCSI address number 7 is *not* listed although it is, by default, occupied by the SCSI controller.

All devices have the S/W State value set to CLAIMED and the H/W Type value set to H/W DEVICE, meaning that the devices are currently connected. If there was an UNCLAIMED value in the S/W State or NO-HW in the H/W Type column it would mean that the system cannot access the device.

The SCSI address 4 is claimed by the tape library that has the tape drive with LUN 0 and the robotics with LUN 1. The drive is controlled by the tape2 driver and the robotics is controlled by the spt SCSI Pass-Through driver. Looking at the description, you can see that the device is an HPE 12000e library;

it is easily recognized among the SCSI libraries because it uses the same SCSI address for the tape drive and robotics but uses different LUNs.

The whole SCSI bus is controlled by the `scsi1` interface module.

Finding the unused SCSI target IDs on Solaris systems

A backup device connected to a Solaris system is accessed and controlled through a device file. This device file is created automatically by the Solaris operating system, in the directory `/dev/rmt`, when the backup device is connected and the client system and backup device are powered up.

Before the backup device is connected, however, the available SCSI addresses must be checked and the address of the backup device set to an address not already allocated.

To list the available SCSI addresses on a Solaris system

1. Stop the system by pressing **Stop** and **A**.
2. Run the `probe-scsi-all` command at the `ok` prompt:

```
probe-scsi-all
```

You may be asked by the system to start the `reset-all` command before executing the `probe-scsi-all` command.
3. To return to normal operation, enter `go` at the `ok` prompt:

```
go
```

After listing the available addresses and choosing one to use for your backup device, you must update the relevant configuration files before connecting and starting up the device. See the next section for instructions on updating the configuration files.

Updating the device and driver configuration on Solaris systems

Updating configuration files

The following configuration files are used for device and driver configuration. They must be checked, and if necessary, edited before attached devices can be used:

- `st.conf`
- `sst.conf`

st.conf: all devices

This file is required on each Data Protector Solaris client with a tape device connected. It must contain device information and one or more SCSI addresses for each backup device connected to that client. A

single SCSI entry is required for a single-drive device and multiple SCSI entries are required for a multi-drive library device.

1. Check the unused SCSI addresses on the client, as described in the previous section, and choose an address for the device you want to attach.
2. Set the chosen SCSI address(es) on the backup device.
3. Power down the client system.
4. Attach the backup device.
5. First power up the device and then the client system.
6. Stop the system by pressing `Stop` and `A`.
7. Enter the `probe-scsi-all` command at the `ok` prompt:

```
probe-scsi-all
```

This will provide information on the attached SCSI devices, including the correct device ID string for the newly attached backup device.

8. Return to normal running:


```
go
```
9. Edit the `/kernel/drv/st.conf` file. This file is used by the Solaris `st` (SCSI tape) driver. It contains a list of devices officially supported by Solaris and a set of configuration entries for third party devices. If you are using a supported device, it should be possible to connect the device and use it without any further configuration. Otherwise, you should add the following types of entries to `st.conf`:

- A tape configuration list entry (plus a tape data variable definition). Example entries are supplied in the file, commented out. You can use one of these, if applicable, or modify one to suit your needs.

The entry must come before the first `name=` entry in the file and the required format is as follows:

```
tape-config-list= "Tape unit", "Tape reference name", "Tape data";
```

where:

<i>Tape unit</i>	The vendor and product ID string for the tape device. This must be correctly specified as described in the device manufacturer's documentation.
<i>Tape reference name</i>	The name you choose, by which the system will identify the tape device. The name you provide does not change the tape product ID, but when the system boots, the reference name will be displayed in the list of peripheral devices recognized by the system.
<i>Tape data</i>	A variable that references a series of additional tape device configuration items. The variable definition must also be supplied and be correctly specified, as described in the device manufacturer's documentation.

For example:

```
tape-config-list= "Quantum DLT4000", "Quantum DLT4000", "DLT-data";
```

```
DLT-data = 1,0x38,0,0xD639,4,0x80,0x81,0x82,0x83,2;
```

The second parameter, `0x38`, designates the DLTtape tape type as "other SCSI drive". The value specified here should be defined in `/usr/include/sys/mtio.h`.

Note: Ensure that the last entry in the `tape-config-list` is terminated with a semi-colon (;).

- For multidrive devices, target entries as follows:

```
name="st" class="scsi"
```

```
target=X lun=Y;
```

where:

X	is the SCSI port assigned to the data drive (or robotic mechanism).
Y	is the logical unit value.

For example:

```
name="st" class="scsi"
```

```
target=1 lun=0;
```

```
name="st" class="scsi"
```

```
target=2 lun=0
```

Normally target entries are required in `st.conf` only for the drives, not for the robotics mechanism, which is on a different target. Entries for these are usually provided in the `sst.conf` file (see below). However, there are some devices, for example the HPE 24x6, that treat the robotics mechanism similar to another drive. In this case two entries with the same target are required (one for the drive and one for the robotics), but with different LUNs.

For example:

```
name="st" class="scsi"
```

```
target=1 lun=0;
```

```
name="st" class="scsi"
```

```
target=1 lun=1
```

sst.conf: library devices

This file is required on each Data Protector Solaris client to which a multi-drive library device is connected. Generally speaking, it requires an entry for the SCSI address of the robotic mechanism of each library device connected to the client (there are some exceptions, such as the HPE 24x6 mentioned in the previous section).

1. Copy the `sst` driver (module) and configuration file `sst.conf` to the required directory:

- For 32-bit operating systems:

```
$cp /opt/omni/spt/sst /usr/kernel/drv/sst
```

```
$cp /opt/omni/spt/sst.conf /usr/kernel/drv/sst.conf
```

- For 64-bit operating systems:

```
$cp /opt/omni/spt/sst.64bit /usr/kernel/drv/sparcv9 /sst
```

```
$cp /opt/omni/spt/sst.conf /usr/kernel/drv/sst.conf
```

2. Edit the `sst.conf` file and add the following entry:

```
name="sst" class="scsi" target=X lun=Y;
```

where:

X	is the SCSI address of the robotic mechanism.
Y	is the logical unit.

For example:

```
name="sst" class="scsi" target=6 lun=0;
```

3. Add the driver to the Solaris kernel:

```
add_drv sst
```

Creating and checking device files

After setting up the configuration files and installing the drivers, you can create new device files as follows:

1. Remove all existing device files from the `/dev/rmt` directory:

```
cd /dev/rmt rm *
```

2. Enter the following to shut down the system:

```
shutdown -i0 -g0
```

3. Restart the system:

```
boot -rv
```

The `r` switch in the `boot` command enables a kernel compile and includes the creation of device special files used for communication with the tape device. The `v` switch enables verbose mode display of system startup. With verbose mode, the system should indicate that the device is attached by displaying the *Tape reference name* string you selected during the `/devices` directory configuration phase of boot.

4. Enter the following command to verify the installation:

```
mt -t /dev/rmt/0 status
```

The output of this command depends on the configured drive. It will be similar to the following:

```
Quantum DLT7000 tape drive: sense key(0x6)= Unit Attention residual= 0 retries=  
0 file no= 0 block no= 0
```

5. When the system restart has completed, you can check the device files that have been created using the command `ls -all`. For a library device, the output of this command might be:

<code>/dev/rmt/0hb</code>	for a first tape drive
<code>/dev/rmt/1hb</code>	for a second tape drive
<code>/dev/rsst6</code>	for a robotic drive

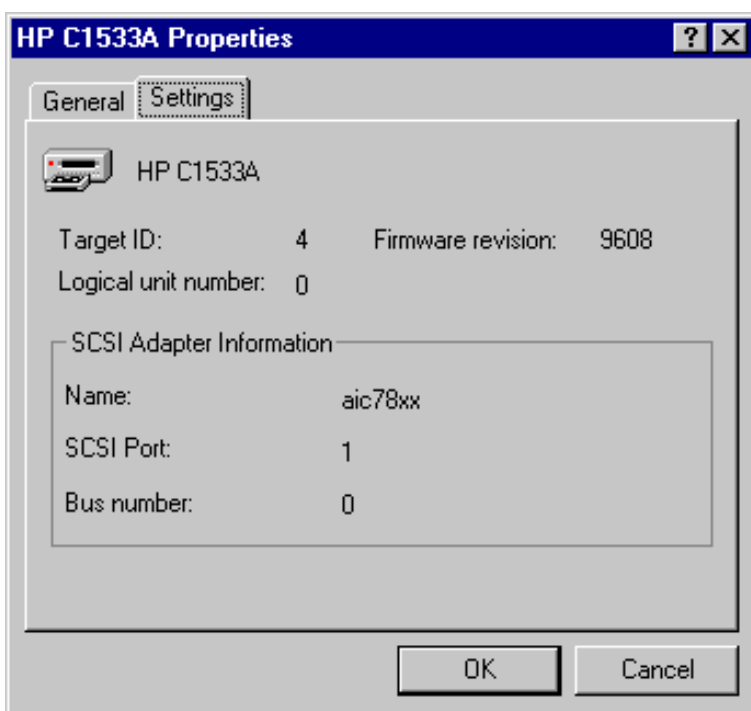
Finding unused SCSI target IDs on Windows systems

To determine the unused SCSI Target IDs (SCSI Addresses) on a Windows system

1. In the Windows Control Panel, click **SCSI Adapters**.
2. For each device connected to a SCSI Adapter in the list, check its properties. Double-click the name of a device, and then click **Settings** to open the property page. See "[Device settings](#)" below.

Remember the SCSI Target IDs and LUNs(Logical Unit Numbers) assigned to the device. This way you can find out which SCSI Target IDs and LUNs are already occupied.

Device settings



Setting SCSI IDs on an HPE 330fx library

Once you have chosen the unused SCSI IDs for the robotics and drives, you can check and configure them using the Control Panel of the library device.

Example

If you have a library model HPE 330fx, you can find the configured SCSI IDs as follows:

1. From the READY state, press **NEXT**, and then ADMIN* will appear.
2. Press **ENTER**, and then you will be asked for the password. Enter the password.
3. TEST* will appear, press **NEXT** until SCSI IDs * appears.
4. Press **ENTER**. VIEW IDs* appears.
5. Press **ENTER**. JKBX ID 6 LUN 0 appears.
6. Press **NEXT**. DRV 1 ID 5 LUN 0 appears.
7. Press **NEXT**. DRV 2 ID 4 LUN 0 appears, and so on.

You can return to the READY state by pressing CANCEL several times.

Connecting backup devices

The following procedure describes the general steps to follow in order to connect a backup device to an HP-UX, Solaris, Linux, or Windows system.

1. Select the client to which you will connect the backup device.
2. Install a Media Agent on the selected system. See ["Remote installation" on page 90](#).
3. Determine the unused SCSI address that can be used by the device. For HP-UX systems, see ["Finding the unused SCSI addresses on HP-UX systems" on page 382](#). For Solaris systems, see ["Finding the unused SCSI target IDs on Solaris systems" on page 384](#). For a Windows system, see ["Finding unused SCSI target IDs on Windows systems" on the previous page](#).
 - If connecting to an HP-UX system, check that the required drivers are *installed and built* into the current kernel. See ["Checking the kernel configuration on HP-UX" on page 69](#).
If you need to configure a SCSI Pass-Through Driver, see ["SCSI robotics configuration on HP-UX systems" on page 376](#).
 - If connecting to a Solaris system, check that the required drivers are installed and the configuration files are updated for the device to be installed. See ["Updating the device and driver configuration on Solaris systems" on page 384](#). This also tells you how to update the `sst.conf` file if you need to configure a SCSI Pass-Through Driver.
 - If connecting to a Windows client, the native tape driver can be loaded or disabled, depending on the Windows system version. See ["Using tape and robotics drivers on Windows systems" on page 373](#).
If you load the native tape driver for a device which has been already configured in Data Protector and did not use the native tape driver, make sure that you rename the device filenames for all configured Data Protector logical devices that reference this specific device (for example, from `scsi1:0:4:0` to `tape3:0:4:0`).
For more information on an appropriate device filename, see ["Creating device files \(SCSI Addresses\) on Windows systems" on page 375](#).
4. Set the SCSI addresses (IDs) on the device. Depending on the device type, this can be usually done using the switches on the device. For details, see the documentation that comes with the device.
For an example, see ["Setting SCSI IDs on an HPE 330fx library" on the previous page](#).

For details about supported devices, see <https://softwaresupport.hpe.com/>.

Note: On a Windows systems with the Adaptec SCSI adapter installed and a SCSI device connected, the Host Adapter BIOS option must be enabled so that the system does not have problems issuing SCSI commands.

To set the Host Adapter BIOS option, press **Ctrl+A** during the boot of the system to enter the SCSI Adapter menu, then select **Configure/View Host Adapter Settings > Advanced Configuration Options** and enable Host Adapter BIOS.

5. First, switch on the device, and then the computer, and then wait until the boot process completes. Verify that the system correctly recognizes your new backup device.

Windows systems: You can verify that the system correctly recognizes your new backup device if you use the `devbra` utility. In the default Data Protector commands directory, execute the `devbra -dev` command.

In the output of the `devbra` command you will find the following lines for each connected and properly recognized device:

```
backup device specification
hardware_path
media_type
.....
```

For example, the following output:

```
HP:C1533A
tape3:0:4:0
DDS
...
...
```

means that an HPE DDS tape device (with the native tape driver loaded) has the Drive instance number 3, and is connected to the SCSI bus 0, the SCSI Target ID 4 and LUN number 0.

Or, the following output:

```
HP:C1533A
scsi1:0:4:0
DDS
...
...
```

means that an HPE DDS tape device (with the native tape driver unloaded) is connected to the SCSI port 1, SCSI bus 0, and the tape drive has the SCSI Target ID 4, and LUN number 0.

HP-UX systems: Run the command `/usr/sbin/ioscan -fn` to display a list of connected devices with the corresponding hardware paths and device files, where you should find your newly connected device with the correct SCSI addresses.

If the device file has not been created automatically during the system startup process, you should create it manually. See "[Creating device files on HP-UX systems](#)" on page 380.

Solaris systems: Run the `ls -all` command on the `/dev/rmt` directory to display a list of connected devices with the corresponding hardware paths and device files, where you should find your newly connected device with the correct SCSI addresses.

Linux systems: Run the `ls -all` command on the `/dev/rmt` directory to display a list of connected devices with the corresponding hardware paths and device files, where you should find your newly connected device with the correct SCSI addresses.

AIX systems: Run the command `lsdev -C` to display the list of connected devices with the corresponding device files.

Hardware compression

Most modern backup devices provide built-in hardware compression that can be enabled when you create a device file or SCSI address in the device configuration procedure. For detailed steps, see the *HPE Data Protector Help*.

Hardware compression is done by a device that receives the original data from a Media Agent client and writes it to the tape in compressed mode. Hardware compression increases the speed at which a tape drive can receive data, because less data is written to the tape.

When software compression is used and hardware compression is disabled, the data is compressed by the Disk Agent and sent compressed to a Media Agent. The compression algorithm can take a substantial amount of resources from the Disk Agent system if software compression is used, but this reduces the network load.

To enable hardware compression on Windows systems, add "C" to the end of the device/drive SCSI address, for example: `scsi:0:3:0C` (or `tape2:0:1:0C` if tape driver is loaded). If the device supports hardware compression, it will be used, otherwise the C option will be ignored.

To disable hardware compression on Windows systems, add "N" to the end of the device/drive SCSI address, for example: `scsi:0:3:0N`.

To enable/disable hardware compression on UNIX systems, select a proper device file. Consult the device and operating system documentation for details.

Next steps

At this stage, you should have the backup devices connected that enable you to configure backup devices and media pools. For more information about further configuration tasks, see the *HPE Data Protector Help* index: "configuring, backup devices".

You must have a Media Agent installed on your system. See ["Remote installation" on page 90](#).

The following sections describe how to connect an HPE Standalone 24 Tape Device, HPE 12000e Library, and HPE DLT Library 28/48-Slot to an HP-UX and a Windows system.

Connecting an HPE 24 standalone device

The 24 DDS backup device is a standalone tape drive based on DDS3 technology.

Connecting to an HP-UX system

To connect the HPE 24 Standalone device to an HP-UX system

1. Check that the required drivers (`stape` or `tape2`) are *installed* and *built* into the current kernel. See ["Checking the kernel configuration on HP-UX" on page 69](#).
2. Determine an unused SCSI address that can be used by the tape drive. See ["Finding the unused SCSI addresses on HP-UX systems" on page 382](#).
3. Set the SCSI addresses (IDs) on the device. Use the switches at the back of the device.
For details, see the documentation that comes with the device.
4. First, switch on the device, and then the computer, and wait until the boot process completes.
5. Verify that the system correctly recognizes the newly connected tape drive. Use the `ioscan` utility:

```
/usr/sbin/ioscan -fn
```

to display a list of connected devices with the corresponding hardware paths and device files, where you should find your newly connected tape drive, which has the correct SCSI address. The device file for the drive has been created during the boot process.

Next steps

After properly connecting the device, see the *HPE Data Protector Help* index: “configuring, backup devices” for instructions about configuring a Data Protector backup device for your newly connected device.

Connecting to a Windows system

To connect the HPE 24 Standalone device to a Windows system

1. Determine an unused SCSI address (Target ID) that can be used by the tape drive. See ["Finding unused SCSI target IDs on Windows systems" on page 388](#).
2. Set the SCSI addresses (IDs) on the device. Use the switches at the back of the device. For details, see the documentation that comes with the device.
3. First, switch on the device, and then the computer, and then wait until the boot process completes.
4. Verify that the system correctly recognizes the newly connected tape drive. In the Data Protector commands directory, execute the `devbra -dev` command.

In the output of the `devbra` command, you should find the newly connected tape drive of the HPE 24 Standalone device.

What's next?

After properly connecting the device, see the *HPE Data Protector Help* index: “configuring, backup devices” for instructions about configuring a Data Protector backup device for your newly connected device.

Connecting an HPE DAT Autoloader

Both the HPE 12000e and the DAT24x6 libraries have a repository for six cartridges, one drive, and one robotic arm used for moving cartridges to and from the drive. The two libraries also have built-in dirty tape detection.

Connecting to an HP-UX system

To connect the HPE 12000e library device to an HP-UX system

1. On the rear side of the autoloader, set the mode switch to 6.
2. Check that the required drivers (`stape` or `tape2`) are *installed* and *built* into the current kernel. See ["Checking the kernel configuration on HP-UX" on page 69](#).
3. Check that the required SCSI Pass-Through drivers (`sctl` or `spt`) are *installed* and *built* into the current kernel. See ["SCSI robotics configuration on HP-UX systems" on page 376](#).
4. Determine an unused SCSI address that can be used by the tape drive and the robotics. See ["Finding the unused SCSI addresses on HP-UX systems" on page 382](#).

Note: The HPE 12000e Library uses the same SCSI address for the tape drive and for the robotics, but uses different LUN numbers.

5. Set the SCSI addresses (IDs) on the device. For details, see the documentation that comes with the device.
6. First, switch on the device, and then the computer, and then wait until the boot process completes.
7. Verify that the system correctly recognizes the newly connected tape drive. Use the `ioscan` utility

```
/usr/sbin/ioscan -fn
```

to display a list of connected devices with the corresponding hardware paths and device files, where you should find your newly connected tape drive, having the correct SCSI address.
8. The device file for the drive has been created during the boot process, while the device file for the robotics must be created manually. See ["Creating device files on HP-UX systems" on page 380](#).
9. Verify that the system correctly recognizes the newly created device file for the library robotics. Run the `ioscan` utility:

```
/usr/sbin/ioscan -fn
```

You should see your newly created device file in the output of the command.

Next steps

After properly connecting the library device, see the *HPE Data Protector Help* index: "configuring, backup devices" for instructions about configuring a Data Protector backup device for your newly connected device.

Connecting to a Windows system

To connect the HPE 12000e library device to a Windows system

1. On the rear side of the autoloader, set the mode switch to 6.
2. Determine an unused SCSI address that can be used by the tape drive and for the robotics. See ["Finding unused SCSI target IDs on Windows systems" on page 388](#).
3. Set the SCSI addresses (IDs) on the device. For details, see the documentation that comes with the device.

Note: The HPE 12000e Library uses the same SCSI address for the tape drive and for the robotics, but uses different LUN numbers.

4. First, switch on the device, and then the computer, and wait until the boot process completes.
5. Verify that the system correctly recognizes the newly connected tape drive and the robotics. In the default Data Protector commands directory, execute the `devbra -dev` command.

In the output of the `devbra` command, you should find the newly connected tape drive and the robotics of the HPE 12000e Library device.

Next steps

After properly connecting the library device, see the *HPE Data Protector Help* index: “configuring, backup devices” for instructions about configuring a Data Protector backup device for your newly connected device.

Connecting an HPE DLT Library 28/48-Slot

The HPE DLT Library 28/48-Slot is a multi-drive library for enterprise environments with 80-600 GB to back up. It has four DLT 4000 or DLT 7000 drives with multiple data channels, a mail slot, and a barcode reader.

Connecting to an HP-UX system

To connect the HPE DLT Library 28/48-Slot library device to an HP-UX system

1. Check that the required drivers (`stape` or `tape2`) drivers are *installed* and *built* into the current kernel. See ["Checking the kernel configuration on HP-UX" on page 69](#).
2. Check that the required SCSI Pass-Through drivers (`sct1` or `spt`) are *installed* and *built* into the current kernel. See ["SCSI robotics configuration on HP-UX systems" on page 376](#).
3. Determine an unused SCSI address that can be used by the tape drive and the robotics. See ["Finding the unused SCSI addresses on HP-UX systems" on page 382](#).

Note: The HPE DLT Library 28/48-Slot has four tape drives and the robotics, so you need five unused SCSI addresses in case you will be using all tape drives. The tape drives and the robotics must use different SCSI addresses.

4. Set the SCSI addresses (IDs) on the device. For details, see the documentation that comes with the device.
5. Switch on the device, and then the computer, and wait until the boot process completes.
6. Verify that the system correctly recognizes the newly connected tape drives. Use the `ioscan` utility

```
/usr/sbin/ioscan -fn
```

to display a list of connected devices with the corresponding hardware paths and device files, where you must find your newly connected tape drives, having the correct SCSI addresses.

7. The device files for the drives have been created during the boot process, while the device file for the robotics must be created manually. See ["Creating device files on HP-UX systems" on page 380](#).
8. Verify that the system correctly recognizes the newly created device file for the library robotics. Use the `ioscan` utility:

```
/usr/sbin/ioscan -fn
```

You should see your newly created device file in the output of the command.

Next steps

After properly connecting the HPE DLT Library 28/48-Slot library device, see the *HPE Data Protector Help* index: "configuring, backup devices" for instructions about configuring a Data Protector backup device for your newly connected device.

Connecting to a Solaris system

For this example, it is assumed that two drives are to be allocated to Data Protector.

To configure the HPE C5173-7000 library device on a Solaris system

1. Copy the `sst` driver (module) and configuration file `sst.conf` to the required directory:

- For 32-bit operating systems:

```
$cp /opt/omni/spt/sst /usr/kernel/drv/sst
```

```
$cp /opt/omni/spt/sst.conf /usr/kernel/drv/sst.conf
```

- For 64-bit operating systems:

```
$cp /opt/omni/spt/sst.64 /usr/kernel/drv/sparcv9 /sst
```

```
$cp /opt/omni/spt/sst.conf /usr/kernel/drv /sparcv9/sst.conf
```

2. Add the driver to the Solaris kernel:

```
add_drv sst
```

3. Remove all existing device files from the `/dev/rmt` directory:

```
cd /dev/rmt rm *
```

4. Stop the system by pressing **Stop** and **A**.

5. Run the `probe-scsi-all` command at the "ok" prompt to check which SCSI addresses are

available for use.

```
ok probe-scsi-all
```

The system may ask you to start the `reset-all` command before executing the `probe-scsi-all` command.

In our case, we will use port 6 for the SCSI control device, port 2 for the first drive, and port 1 for the second drive; lun is 0)

6. Return to normal running:

```
ok go
```

7. Copy the `st.conf` configuration file into the required directory:

```
$cp /opt/omni/spt/st.conf /kernel/drv/st.conf
```

The `st.conf` file is present on each Solaris Data Protector client and contains SCSI addresses for each backup device connected to the client.

8. Edit the `/kernel/drv/st.conf` file and add the following lines:

```
tape-config-list= "QUANTUM DLT7000", "Digital DLT7000", "DLT-data3";  
  DLT-data3 = 1,0x77,0,0x8639,4,0x82,0x83,0x84,0x85,3;  
name="st" class="scsi"  
  target=1 lun=0;  
name="st" class="scsi"  
  target=2 lun=0;  
name="st" class="scsi"  
  target=6 lun=0;
```

These entries provide the SCSI addresses for drive 1, drive 2, and the robotic drive, respectively.

9. Edit the `sst.conf` file (that you copied across in ["Copy the sst driver \(module\) and configuration file sst.conf to the required directory:"](#) on the previous page) and add the following line:

```
name="sst" class="scsi" target=6 lun=0;
```

Note: This entry must match that for the robotic drive in the `st.conf` file. See ["Edit the /kernel/drv/st.conf file and add the following lines:"](#) above above.

10. Power down the client system and attach the library device.
11. Power up the library device first and then the client system.

The system will now boot and automatically create device files for the robotic drive and tape drives. These can be listed using the command `ls -all`. In our case:

<code>/dev/rmt/0hb</code>	for a first tape drive
<code>/dev/rmt/1hb</code>	for a second tape drive
<code>/dev/rsst6</code>	for a robotic drive

What's next?

After properly connecting the HPE DLT Library 28/48-Slot library device, see the *HPE Data Protector Help* index: “configuring, backup devices” for instructions about configuring a Data Protector backup device for your newly connected device.

Connecting to a Windows system

To connect the HPE DLT 28/48-Slot library device to a Windows system

1. Determine the unused SCSI addresses (Target IDs) that can be used by the tape drive and by the robotics. See ["Finding unused SCSI target IDs on Windows systems" on page 388](#).
2. Set the SCSI addresses (Target IDs) on the device. For details, see the documentation that comes with the device.

Note: The HPE DLT Library 28/48-Slot has four tape drives and the robotics, so you need five unused SCSI addresses in case you will be using all tape drives. The tape drives and the robotics must use different SCSI Target IDs.

3. First, switch on the device, then the computer, and then wait until the boot process completes.
4. Verify that the system correctly recognizes the newly connected tape drives and the robotics. In the default Data Protector commands directory, execute the `devbra -dev` command.

In the output of the `devbra` command, you should find the newly connected tape drives and the robotics of the HPE DLT Library 28/48-Slot library device.

Next steps

After properly connecting the HPE DLT Library 28/48-Slot library device, see the *HPE Data Protector Help* index: “configuring, backup devices” for instructions about configuring a Data Protector backup device for your newly connected library device.

Connecting a Seagate Viper 200 LTO Ultrium Tape Drive

The Seagate Viper 200 LTO Ultrium Tape Drive is a standalone device for enterprise environments with 100-200 GB to back up.

Connecting to a Solaris system

To configure the Seagate Viper 200 LTO Ultrium Tape Drive on a Solaris system

1. Determine the unused SCSI addresses that can be used by the tape drive. Run the `modinfo` or `dmesg` command to find the SCSI controllers in use and the SCSI target devices installed:

```
dmesg | egrep "target" | sort | uniq
```

The following output should be received:

```
sd32 at ithps0: target 2 lun 0
sd34 at ithps0: target 4 lun 0
st21 at ithps1: target 0 lun 0
st22 at ithps1: target 1 lun 0
```

Note: It is recommended that you use either a `glm` or `isp` SCSI controller when connecting the Viper 200 LTO device to a Solaris system. It is also recommended that you use either Ultra2 SCSI or Ultra3 SCSI controllers.

2. Edit the `/kernel/drv/st.conf` file and add the following lines:

```
tape-config-list=
"SEAGATE ULTRIUM06242-XXX" , "SEAGATE LTO" , \
"SEAGATE_LTO";
SEAGATE_LTO = 1, 0x7a, 0, 0x1d679, 4, 0x00, 0x00, 0x00, \
0x00, 1;
```

3. Power down the client system and attach the device.
4. Power up the device first and then the client system.

The system will now boot and automatically create device files for the tape drive. These can be listed using the command `ls -all`.

What's next?

After properly connecting the Seagate Viper 200 LTO Ultrium Tape Drive, see the *HPE Data Protector Help* index: "configuring, backup devices" for instructions about configuring a Data Protector backup device for your newly connected device.

Connecting to a Windows system

To connect the Seagate Viper 200 LTO Ultrium Tape Drive to a Windows system

1. Determine the unused SCSI addresses (Target IDs) that can be used by the tape drive. See ["Finding unused SCSI target IDs on Windows systems" on page 388](#).
2. Set the SCSI addresses (Target IDs) on the device. For details, see the documentation that comes with the device.
 1. First, switch on the device, then the computer, and then wait until the boot process completes.
 2. Verify that the system correctly recognizes the newly connected tape drives and the robotics. In the default Data Protector commands directory, execute the `devbra -dev` command.

In the output of the `devbra` command, you should find the newly connected tape drive of the Seagate Viper 200 LTO Ultrium Tape Drive.

Next steps

After properly connecting the Seagate Viper 200 LTO Ultrium Tape Drive, see the *HPE Data Protector Help* index: “configuring, backup devices” for instructions about configuring a Data Protector backup device for your newly connected device.

Note: When configuring the Seagate Viper 200 LTO Ultrium Tape Drive with Data Protector, make sure that the compression mode is set. This is done by specifying the `C` parameter after the SCSI address of the drive, for example:

```
scsi2:0:0:0C
```

Appendix D: Command Line Interface changes after upgrading the Data Protector

The commands listed in this chapter have been changed or provide extended functionality in terms of new options in Data Protector. Commands and options marked with an asterisk (*) are only introduced, changed, or made obsolete in the most recent set of patches for this Data Protector release version. Check and modify the scripts that use the old commands. For usage synopses, see the *HPE Data Protector Command Line Interface Reference* or the corresponding man pages.

Depending on the version from which you upgraded your Cell Manager, see the corresponding table:

- After upgrading from Data Protector 6.20, see "[Upgrade from Data Protector 6.20](#)" below.
- After upgrading from Data Protector 7.00, see "[Upgrade from Data Protector 7.00](#)" on page 410
- After upgrading from Data Protector 8.00 and later, see "[Upgrade from Data Protector 8.00 and later](#)" on page 416

Upgrade from Data Protector 6.20

Command	Affected options or arguments, notes	Status
NNMpost.ovpl		OBSOLETE COMMAND
NNMpre.ovpl		OBSOLETE COMMAND
NNMScript.exe		OBSOLETE COMMAND
ob2install	saphana netapp mysql postgresql emcvnx emcvmax	NEW SOFTWARE COMPONENTS
	javagui ov	OBSOLETE SOFTWARE COMPONENTS
omnib	-storedrim -idb_list -priority	NEW OPTIONS

Command	Affected options or arguments, notes	Status
	-integ	
	-copy	UPDATED OPTION This option can be specified also for backup using the Microsoft SQL Server integration.
	-barmode	UPDATED OPTION The value <code>incr</code> can be specified also for backup of Microsoft Hyper-V virtual machines using the Virtual Environment integration.
	-netware -omnidb	OBSOLETE OPTIONS
omnib2dinfo	This command is available on systems with the Media Agent component installed.	NEW COMMAND
omnicc	-import_vcd	NEW OPTION
omnidb	-idb -saphana -integ	NEW OPTIONS
	-netware -omnidb	OBSOLETE OPTIONS
omnidbcheck	-connection -database_consistency -media_consistency -schema_consistency -verify_db_files	NEW OPTIONS
	-dc -extended	UPDATED OPTIONS

Command	Affected options or arguments, notes	Status
	-quick	
	-core -filenames	OBSOLETE OPTIONS
omnidbrestore		OBSOLETE COMMAND
omnidbupgrade		OBSOLETE COMMAND
omnidbutil	-all -autovacuum -cp -disabled -enabled -freeze_max_age -on_n_rows -on_percentage -param -set -set_passwd -sync_srv -table -to_default	NEW OPTIONS
	-info -readdb -show_db_files -writedb	UPDATED OPTIONS
	-cdb -check_overs -chktblspace -extendfnames -extendinfo	OBSOLETE OPTIONS

Command	Affected options or arguments, notes	Status
	<ul style="list-style-type: none"> -extendtblspace -filenames -force -list_large_directories -list_mpos_without_overs -maxsize -mmdb -modifytblspace -no_detail -purge_stop -top -upgrade_info 	
omnidbxp	<ul style="list-style-type: none"> -user -add -username -password -user -check -host -user -update -username -password -user -list -user -remove 	NEW OPTIONS AND OPTION COMBINATIONS
omnidbzdb	This command is available on Windows, HP-UX (Itanium), and Linux systems with the Data Protector User Interface component installed.	NEW COMMAND
omnidownload	<ul style="list-style-type: none"> -dev_info -list_devices -list_libraries -detail 	<p>UPDATED OPTIONS AND OPTION COMBINATIONS</p> <p>Updated options and option combinations for Backup to Disk devices.</p>
omnidr	-omit_deleted_files	NEW OPTION
omniinstlic		OBSOLETE COMMAND
omniiso	-out	NEW OPTIONS

Command	Affected options or arguments, notes	Status
	-net -use_raw_object -host -remotehost -move_to -unique_name -exec_script -password -anyobj	
	-session	CHANGED OPTION
	-iso	OBSOLETE OPTION Replaced by -out. Can be used for backward compatibility.
omnimm	-delete_unprotected_media	NEW OPTION New option for Backup to Disk devices.
	-all -recycle -remove_slots	UPDATED OPTIONS Updated options for Backup to Disk devices.
omniobjconsolidate	-priority	NEW OPTION
omniobjcopy	-replication -replist -idb -saphana -priority -integ	NEW OPTIONS

Command	Affected options or arguments, notes	Status
	-netware -omnidb	OBSOLETE OPTIONS
omniobjverify	-idb -saphana -priority -integ	NEW OPTIONS
	-netware -omnidb	OBSOLETE OPTIONS
omniofflr	The command was moved from the User Interface component to the Core installation component, thus becoming available on systems with any Data Protector component installed.	RELOCATED COMMAND
	-rawdisk -section -idb -autorecover -changedevhost -read -force -session -save -skiprestore -logview -opview	NEW OPTIONS
	-omnidb	OBSOLETE OPTION
omnir	-idb -priority	NEW OPTIONS
	-tail_log	NEW OPTION New option for Microsoft SQL Server restore.

Command	Affected options or arguments, notes	Status
	-host/cluster -resourcePool -specificHost -fromSession -untilSession	NEW OPTIONS New options for VMware vSphere using the Virtual Environment integration.
	-neworganization -virtual_datacenter_path -virtual_datacenter_uuid -vapp_path -vapp_uuid -vcenter_path -vcenter_uuid -network_name -network_uuid	NEW OPTIONS New options for VMware vCloud Director using the Virtual Environment integration.
	-restoredb -restoreconf -restoredcbf -pre -post -targetdir -port -nodbrecover -nouseasnewidb -keeprecent -nooverwrite	NEW OPTIONS New options for Data Protector Internal Database restore.
	-targetstoragepath	NEW OPTION New option for Microsoft Hyper-V using the Virtual Environment integration.

Command	Affected options or arguments, notes	Status
	-deleteafter -keep_for_forensics -new_name	NEW OPTIONS New options for VMware vSphere using the Virtual Environment integration.
	-deletebefore -skip	UPDATED OPTIONS These options can be specified also for Microsoft Hyper-V restore using the Virtual Environment integration.
	-copyback -check_config -no_check_config -force_prp_replica	UPDATED OPTIONS Added support for instant recovery on HPE 3PAR StoreServ Storage.
	-virtual-environment -method	UPDATED OPTIONS These options can be specified also for VMware vCloud Director using the Virtual Environment integration.
	-network_name	UPDATED OPTION This option can be specified also for VMware vSphere using the Virtual Environment integration.
	-integ -source_client -source_instance	NEW OPTIONS New options for the MySQL integration.

Command	Affected options or arguments, notes	Status
omnirpt	-database -binary_log -staging -import -inplace -include -roll_forward	
	-copy_back -target_dir	UPDATED OPTIONS These options can be specified also for the MySQL integration.
	-omnidb -netware -trustee -vsr_only	OBSOLETE OPTIONS
	-db_purge -db_purge_preview -db_system	OBSOLETE OPTIONS
omnisetup.sh	saphana netapp mysql postgresql emcvnx emcvmax	NEW SOFTWARE COMPONENTS
	javagui ov	OBSOLETE SOFTWARE COMPONENT
	-bundleadd -bundlerem	NEW OPTIONS

Command	Affected options or arguments, notes	Status
omnisrdupdate	-use_raw_object	NEW OPTION
	-session	CHANGED OPTION
	-anyobj	NEW OPTION
omni	-anyobj	NEW OPTION
omnisv	-maintenance -mom -mom_stop	NEW OPTIONS
util_cmd	-putopt[ion]	UPDATED OPTION These options can be specified also for the MySQL integration.
vepa_util.exe	--list-organizations	NEW OPTION New option for VMware vCloud Director using the Virtual Environment integration.
	--check-config --config --configvm --virtual-environment	UPDATED OPTIONS These options can be specified also for VMware vCloud Director using the Virtual Environment integration.
	--show-incremental-flag --enable-incremental --disable-incremental --list-vms	NEW OPTIONS New options for Microsoft Hyper-V using the Virtual Environment integration.
winomnimigrate.pl		OBSOLETE COMMAND

Upgrade from Data Protector 7.00

Command	Affected options or arguments, notes	Status
NNMpost.ovpl		OBSOLETE COMMAND
NNMpre.ovpl		OBSOLETE COMMAND
NNMScript.exe		OBSOLETE COMMAND
ob2install	saphana netapp mysql postgresql emcvnx emcvmax	NEW SOFTWARE COMPONENTS
	javagui ov	OBSOLETE SOFTWARE COMPONENT
omnib	-storedrim -idb_list -priority -integ	NEW OPTIONS
	-netware -omnidb	OBSOLETE OPTIONS
omnidb	-idb -saphana -integ	NEW OPTIONS
	-netware -omnidb	OBSOLETE OPTIONS
omnidbcheck	-connection -database_consistency -media_consistency -schema_consistency	NEW OPTIONS

Command	Affected options or arguments, notes	Status
	-verify_db_files	
	-dc -extended -quick	UPDATED OPTIONS
	-core -filenames	OBSOLETE OPTIONS
omnidbrestore		OBSOLETE COMMAND
omnidbupgrade		OBSOLETE COMMAND
omnidbutil	-all -autovacuum -cp -disabled -enabled -freeze_max_age -on_n_rows -on_percentage -param -set -set_passwd -sync_srv -table -to_default	NEW OPTIONS
	-info -readdb -show_db_files -writedb	UPDATED OPTIONS
	-cdb -check_overs	OBSOLETE OPTIONS

Command	Affected options or arguments, notes	Status
	<ul style="list-style-type: none"> -chktblspace -extendfnames -extendinfo -extendtblspace -filenames -force -list_large_directories -list_mpos_without_overs -maxsize -mmdb -modifytblspace -no_detail -purge_stop -top -upgrade_info 	
omnidbzd	<ul style="list-style-type: none"> --list -session --ir --excluded --original --datalist -show --purge --force --host --delete --reference --preview --force --sync_check 	NEW OPTIONS

Command	Affected options or arguments, notes	Status
	--diskarray	<p>CHANGED OPTION</p> <p>This option also accepts the new keywords:</p> <p>3PAR for Data Protector HPE P6000 / HPE 3PAR SMI-S Agent NetApp for NetApp Storage Provider EMCVNX for EMC VNX Storage Provider EMCVMAX for EMC VMAX Storage Provider</p>
omnidr	-omit_deleted_files	NEW OPTION
omniiso	-host -remotehost -move_to -unique_name -exec_script -password -anyobj	NEW OPTIONS
	-session	CHANGED OPTION
omniobjconsolidate	-priority	NEW OPTION
omniobjcopy	-idb -saphana -priority -integ	NEW OPTIONS
	-netware -omnidb	OBSOLETE OPTIONS
omniobjverify	-idb -saphana -priority -integ	NEW OPTIONS

Command	Affected options or arguments, notes	Status
	-netware -omnidb	OBSOLETE OPTION
omniofflr	The command was moved from the User Interface component to the Core installation component, thus becoming available on systems with any Data Protector component installed.	RELOCATED COMMAND
	-idb -autorecover -changedevhost -read -force -session -save -skiprestore -logview -opview	NEW OPTIONS
	-omnidb	OBSOLETE OPTION
omnir	-idb -priority -integ	NEW OPTIONS
	-restoredb -restoreconf -restoredcbf -pre -post -targetdir -port -nodbrecover	NEW OPTIONS New options for Data Protector Internal Database restore.

Command	Affected options or arguments, notes	Status
	-nouseasnewidb -keeprecent -nooverwrite	
	-omnidb -netware -trustee -vsr_only	OBSOLETE OPTIONS
	-copyback -check_config -no_check_config -force_prp_replica	UPDATED OPTIONS Added support for instant recovery on 3PAR StoreServ Storage.
	-integ -source_client -source_instance -database -binary_log -staging -import -inplace -include -roll_forward	NEW OPTIONS New options for the MySQL integration.
	-copy_back -target_dir	UPDATED OPTIONS These options can be specified also for the MySQL integration.
omnirpt	-db_purge -db_purge_preview -db_system	OBSOLETE OPTIONS
omnisetup.sh	saphana netapp	NEW SOFTWARE COMPONENTS

Command	Affected options or arguments, notes	Status
	mysql postgresql emcvnx emcvmax	
	javagui ov	OBSOLETE SOFTWARE COMPONENT
omnisrdupdate	-session	CHANGED OPTION
	-anyobj	NEW OPTION
omnisv	-maintenance -mom -mom_stop	NEW OPTIONS
util_cmd	-putopt[ion]	UPDATED OPTION These options can be specified also for the MySQL integration.
winomnimigrate.pl		OBSOLETE COMMAND

Upgrade from Data Protector 8.00 and later

Command	Affected options or arguments, notes	Status
ob2install	netapp mysql postgresql emcvnx emcvmax	NEW SOFTWARE COMPONENT
omnib	-integ	NEW OPTION
omnidb	-integ	NEW OPTION
omnidbzdb	--list -session --ir	NEW OPTIONS

Command	Affected options or arguments, notes	Status
	--excluded --original --datalist -show --purge --force --host --delete --reference --preview --force --sync_check	
	--diskarray	CHANGED OPTION This option also accepts the new keywords: NetApp for NetApp Storage Provider EMCVNX for EMC VNX Storage Provider EMCVMAX for EMC VMAX Storage Provider
omnidr	-omit_deleted_files	NEW OPTION
omniiso	-anyobj	NEW OPTION
omniobjcopy	-integ	NEW OPTION
omniobjverify	-integ	NEW OPTION
omnir	-copyback -check_config -no_check_config -force_prp_replica	UPDATED OPTIONS Added support for instant recovery on HPE3PAR StoreServ Storage.
	-integ -source_client	NEW OPTIONS New options for the MySQL

Command	Affected options or arguments, notes	Status
	-source_instance -database -binary_log -staging -import -inplace -include -roll_forward	integration.
	-copy_back -target_dir	UPDATED OPTIONS These options can be specified also for the MySQL integration.
omnisetup.sh	netapp mysql postgresql emcvnx emcvmax	NEW SOFTWARE COMPONENT
omnisrdupdate	-anyobj	NEW OPTION
util_cmd	-putopt[ion]	UPDATED OPTION These options can be specified also for the MySQL integration.

Appendix E: More Information

Note: The documentation set available at the HPE support website at <https://softwaresupport.hpe.com/> contains the latest updates and corrections.

You can access the Data Protector documentation set from the following locations:

- Data Protector installation directory.
Windows systems: `Data_Protector_home\docs`
UNIX systems: `/opt/omni/doc/C`
- **Help** menu of the Data Protector GUI.
- HPE Support website at <https://softwaresupport.hpe.com/>

Requirements for viewing Data Protector documentation

To view the Data Protector guides and the Data Protector Help, you must install a supported PDF document viewer and a supported Web browser. Below is a list of applications and versions that are supported. HPE recommends to use the newest version available for your operating system:

- For viewing the guides, you need Adobe Reader. The following versions are supported:

Windows, Solaris, and Linux systems:

- Adobe Reader 9 or later
You can download it at <http://get.adobe.com/reader/>.

HP-UX systems:

- Adobe Reader 7 or later
You can download it at <ftp://ftp.adobe.com/pub/adobe/reader/unix/7x/7.0.9/enu/>.

Other PDF document viewers may fulfill this requirement as well, but have not been tested.

- For viewing the Help, you need a Web browser that is able to run under the same account as the Data Protector GUI process. JavaScript must be enabled in the Web browser. The following Web browsers are supported:

Windows systems:

- Windows Internet Explorer 8.0 or later¹
Compatibility view should be disabled for locally stored websites.
You can download Windows Internet Explorer at <http://windows.microsoft.com/en-us/internet-explorer/download-ie>.

¹ This is also the requirement for viewing the HPE Data Protector Granular Recovery Extension for Microsoft Exchange Server Help.

- Mozilla Firefox 17.0.5 (Extended Support Release) or later
You can download it at <http://www.mozilla.org/en-US/firefox/organizations/all.html>.

Other Web browsers may fulfill this requirement as well, but have not been tested.

Help

You can access the Help from the top-level directory of any installation DVD-ROM without installing Data Protector:

Windows systems: Open DP_help.chm.

UNIX systems: Unpack the zipped tar file DP_help.tar.gz and open DP_help.htm.

Documentation map

The following table shows where to find information of different kinds. Squares shaded in gray are a good place to look first.

	Admin	Help	Getting Started	Concepts	Install	Troubleshooting	DR	CLI	PA	Integration VSS	Integration Guide				ZDB Guides		GRE Guide			
											MSFT	Oracle/SAP	IBM	Sybase/NDMP	Virtual Env	ZDB Admin	ZDB IG	Exchange	SharePoint	VMware
Admin tasks	X	X																		
Backup		X	X	X						X	X	X	X	X	X	X	X			
CLI								X												
Concepts, techniques		X		X						X	X	X	X	X	X	X	X	X	X	X
Disaster recovery				X		X														
Installation, upgrade			X		X				X											
Instant recovery				X	X											X	X			
Licensing					X				X											
Limitations		X			X	X			X	X	X	X	X	X	X		X			
New features		X							X											
Planning strategy		X		X																
Procedures, tasks	X	X			X	X	X			X	X	X	X	X	X	X	X	X	X	X
Recommendations				X					X											
Requirements					X				X	X	X	X	X	X	X					
Restore	X	X	X	X						X	X	X	X	X	X	X	X	X	X	X
Supported configurations				X																
Troubleshooting		X			X	X				X	X	X	X	X	X	X	X	X	X	X

Abbreviations

Abbreviations in the documentation map above are explained below. The documentation item titles are all preceded by the words “HPE Data Protector.”

Abbreviation	Documentation item	
Admin	Administrator's Guide	This guide describes administrative tasks in Data Protector.
CLI	Command Line Interface Reference	This guide describes the Data Protector command-line interface, command options, and their usage as well as provides some basic command-line examples.
Concepts	Concepts Guide	This guide describes Data Protector concepts, zero downtime backup (ZDB) concepts and provides background information on how Data Protector works. It is intended to be used with the task-oriented Help.
DR	Disaster Recovery Guide	This guide describes how to plan, prepare for, test, and perform a disaster recovery.
Getting Started	Getting Started Guide	This guide contains information to get you started with using Data Protector. It lists installation prerequisites, provides instructions on installing and configuring a basic backup environment and procedures for performing backup and restore. It also lists resources for further information.
GRE Guide	Granular Recovery Extension User Guide for Microsoft SharePoint Server, Exchange and VMware	<p>This guide describes how to configure and use the Data Protector Granular Recovery Extension for:</p> <ul style="list-style-type: none"> • Microsoft SharePoint Server • Exchange Server • VMware vSphere
Help	Help	
Install	Installation Guide	This guide describes how to install the Data Protector software, taking into account the operating system and architecture of your environment. This guide details how to upgrade Data Protector, as well as how to obtain the proper licenses for your environment.

Abbreviation	Documentation item	
Integration Guide	Integration Guide	<p>This guide describes the integrations of Data Protector with the following applications:</p> <ul style="list-style-type: none"> • MSFT: Microsoft SQL Server, Microsoft SharePoint Server, and Microsoft Exchange Server. • IBM: Informix Server, IBM DB2 UDB, and Lotus Notes/Domino Server. • Oracle/SAP: Oracle Server, SAP R3, SAP MaxDB, and SAP HANA Appliance. • Sybase/NDMP: Sybase and Network Data Management Protocol Server. • Virtual Env: Virtualization environments integration with VMware vSphere, VMware vCloud Director, Microsoft Hyper-V, and Citrix XenServer.
Integration VSS	Integration Guide for Microsoft Volume Shadow Copy Service	<p>This guide describes the integrations of Data Protector with Microsoft Volume Shadow Copy Service (VSS).</p>
IG IDOL	Integration with Autonomy IDOL Server	<p>This technical white paper describes all aspects of integrating Data Protector with Autonomy IDOL Server: integration concepts, installation and configuration, Data Protector backup image indexing, full content search-based restore, and troubleshooting.</p>
PA	Product Announcements, Software Notes, and References	<p>This guide gives a description of new features of the latest release. It also provides information on installation requirements, required patches, and limitations, as well as known issues and workarounds.</p>
Troubleshooting	Troubleshooting Guide	<p>This guide describes how to troubleshoot problems you may encounter when using Data Protector.</p>
ZDB Admin	ZDB Administrator's Guide	<p>This guide describes how to configure and use the integration of Data Protector</p>

Abbreviation	Documentation item	
		with HPE P4000 SAN Solutions, HPE P6000 EVA Disk Array Family, HPE P9000 XP Disk Array Family, HPE 3PAR StoreServ Storage, NetApp Storage, and EMC Symmetrix Remote Data Facility and TimeFinder. It is intended for backup administrators or operators. It covers the zero downtime backup, instant recovery, and the restore of filesystems and disk images.
ZDB IG	ZDB Integration Guide	This guide describes how to configure and use Data Protector to perform zero downtime backup, instant recovery, and standard restore of Oracle Server, SAP R/3, Microsoft Exchange Server, Microsoft SQL Server databases, and Virtual Environment for VMware .

Integrations

Software Application Integrations

Software application	Guides
Autonomy IDOL Server	IG IDOL
IBM DB2 UDB	Integration Guide
Informix Server	Integration Guide
Lotus Notes/Domino Server	Integration Guide
Microsoft Exchange Server	Integration Guide, ZDB IG, GRE Guide
Microsoft Hyper-V	Integration Guide
Microsoft SharePoint Server	Integration Guide, ZDB IG, GRE Guide
Microsoft SQL Server	Integration Guide, ZDB IG
Microsoft Volume Shadow Copy Service (VSS)	Integration VSS
Network Data Management Protocol (NDMP) Server	Integration Guide

Software application	Guides
Oracle Server	Integration Guide, ZDB IG
SAP HANA Appliance	Integration Guide
SAP MaxDB	Integration Guide
SAP R/3	Integration Guide, ZDB IG
Sybase Server	Integration Guide
VMware vCloud Director	Integration Guide
VMware vSphere	Integration Guide, ZDB IG, GRE Guide

Disk Array System Integrations

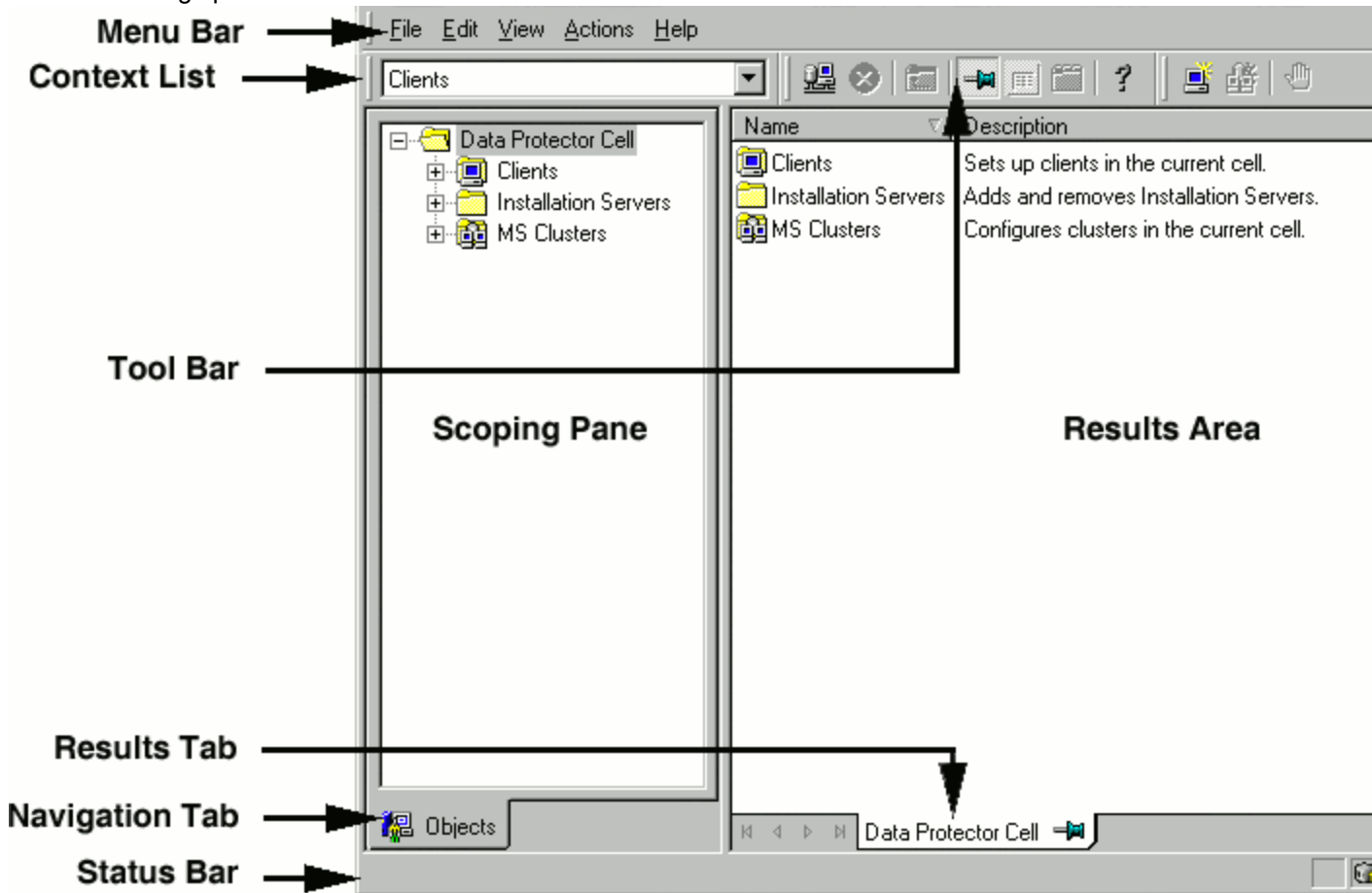
Look in these guides for details of the integrations with the following families of disk array systems:

Disk array family	Guides
EMC Symmetrix	all ZDB
HPE P4000 SAN Solutions	Concepts, ZDB Admin, Integration Guide
HPE P6000 EVA Disk Array Family	all ZDB, Integration Guide
HPE P9000 XP Disk Array Family	all ZDB, Integration Guide
HPE 3PAR StoreServ Storage	Concepts, ZDB Admin, Integration Guide
NetApp Storage	all ZDB

Data Protector graphical user interface

Data Protector provides a graphical user interface for Microsoft Windows operating systems. For information about it, see the *HPE Data Protector Help*.

Data Protector graphical user interface



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