

HP Data Protector software Cell Manager failover process (standby Cell Manager) white paper



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Executive summary

This white paper provides information on how to configure and maintain an HP Data Protector client in a Data Protector cell to act as a standby Cell Manager.

Solution description

Due to potential incompatibilities among hardware and/or backup software between multiple sites of a company, it would be quite difficult to perform data recovery if a disaster were to occur.

The following scenario requires compatible hardware infrastructure at the sites where data recovery using HP Data Protector is being performed.

The assumption is made that an HP Data Protector Cell Manager manages backup and recovery tasks at two physically separated sites. The production Cell Manager is located at site(A) whereas the designated standby Cell Manager is located at site(B).

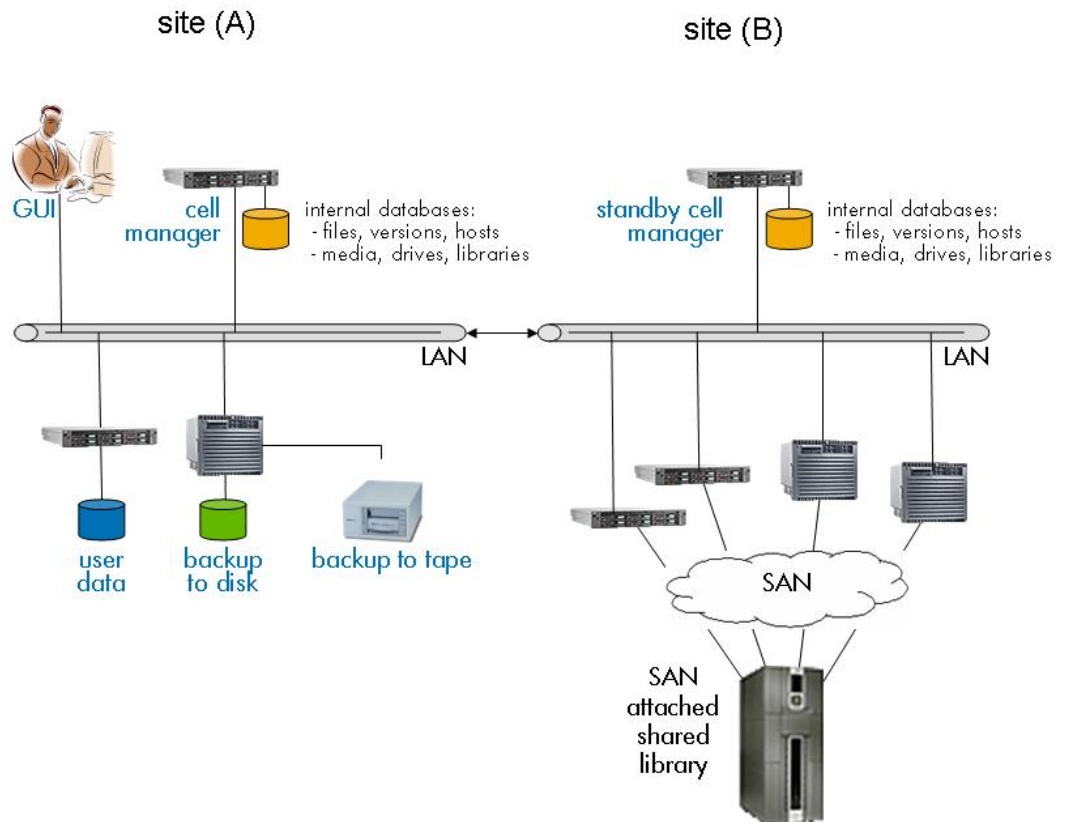
Backup jobs have been configured to back up the Internal Database (IDB) and configuration files of the production Cell Manager and replicate them to the standby Cell Manager at the site(B). In addition, a second copy of the IDB is written to an LTO tape drive for increased data retention. Backup jobs are running on a daily basis.

Recovery of the Cell Manager and restoration of selected data to nominated servers have been tested using HP Data Protector 6.0 on Microsoft® Windows® 2003 Server operating system software and HP-UX11.23 Itanium® (ia64) operating system software.

It is strongly recommended to thoroughly test the scripts and procedures described in this white paper prior going into production with it. This recommendation also applies if the scripts and procedures are used in conjunction with HP Data Protector versions higher than version 6.0.

Figure 1 outlines the preceding described setup.

Figure 1.



Standby Cell Manager installation and configuration

Note

The following tasks require in-depth knowledge in both areas of Microsoft/HP-UX system administration tasks and HP Data Protector administration tasks.

Installation of Data Protector software

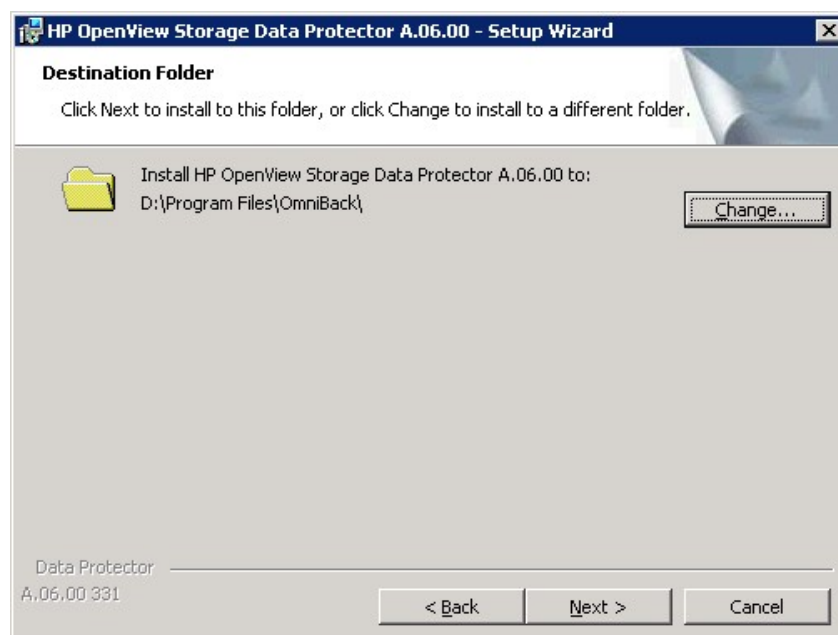
The following tasks were performed to install Data Protector software on the standby Cell Manager and configure it as a "client" in the production Data Protector cell.

The following routines require system administrator/root privileges.

1. Install Data Protector software accepting all defaults with the exception shown in Figure 2.

Change the destination folder from C:\Program Files\Omniback\
to
D:\Program Files\Omniback\ to match the configuration of the production Cell Manager.

Figure 2.



If program folders do not match after the installation, you may see "IDB corruption" error messages after the replicated configuration files are being used on the standby Cell Manager. On HP-UX the standard installation routine `/mountpoint/LOCAL_INSTALL omnisetup.sh -CM -IS` found on the installation DVD has been used.

Note

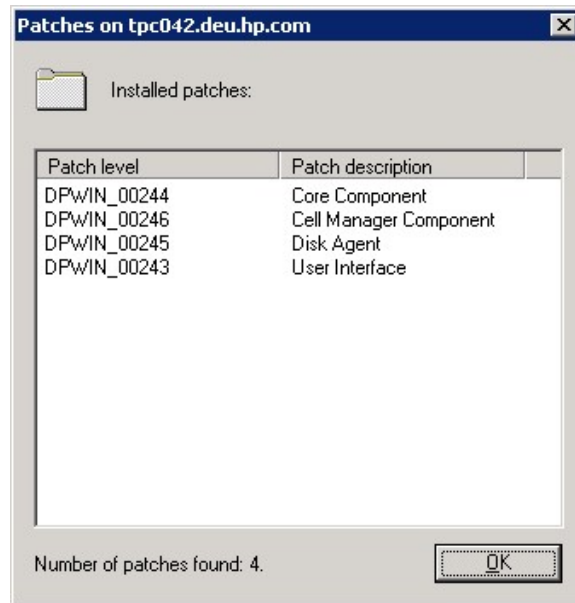
The MMDB and CDB, parts of the IDB, are implemented using an embedded database consisting of table spaces. The DCBF, SMBF, and SIBF parts of the IDB consist of binary files. Updates are direct (no transactions). The location of the DCBF, SMBF, and SIBF files can be on any drive/directory of the Cell Manager host, even on remote systems. If DCBF, SMBF, and/or SIBF are not located in the standard `<Data_Protector_home>\db40\` directory, a more thorough planning of this standby implementation in terms of the complexity of the restore of IDB files is required.

This white paper assumes that the standard `<Data_Protector_home>\db40\` directory is being used.

Patches

Be sure to have the same patch level on either Cell Manager host. Figure 3 illustrates a sample patch list off a Cell Manager running on Windows 2003 Server.

Figure 3.



Configuration

The following tasks apply to the newly installed standby Cell Manager on Windows 2003 Server.

1. Stop Data Protector services on standby Cell Manager.

Open a Windows command box and type:

```
D:\Program Files\Omniback\bin\omnisv -stop
```

2. Copy the contents of the IDB and configuration directories to a save location in case they are required in the future.

```
D:\Program Files\Omniback\config\ -> D:\Save\config\
```

```
D:\Program Files\Omniback\db40\ -> D:\Save\db40\
```

3. Change the following registry key value from the FQDN of the standby Cell Manager to that of the production Cell Manager.

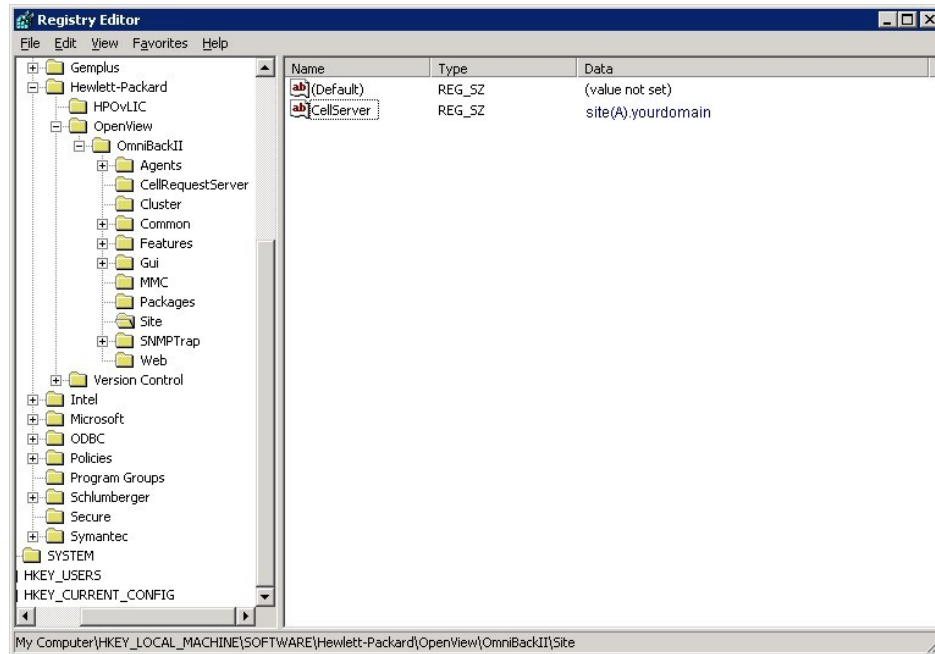
Note

Manipulating the registry file of the operating system requires special care.

```
My Computer\HKEY_LOCAL_MACHINE\\SOFTWARE\Hewlett-Packard\Open  
View\Omniback\Site\CellServer
```

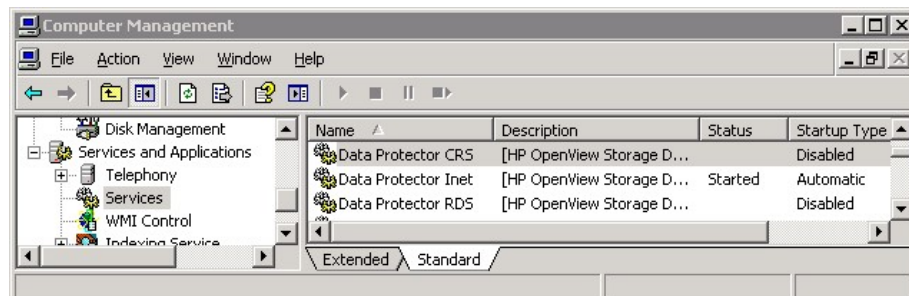
Figure 4 shows the Microsoft registry editor with the relevant value name dialog.

Figure 4.



4. Change the Startup Type of the Data Protector services Data Protector CRS and Data Protector RDS from Automatic to Disabled.

Figure 5.



5. Manually start/restart the following service on the standby cell manager:
Data Protector Inet

The following tasks apply to the newly installed standby Cell Manager on HP-UX11.23.

1. Manually add a user to the admin group of Data Protector 6.0 on HP-UX11.23 using the following command:

```
# ./opt/omni/bin/omniusers -add -type W -usergroup admin -name  
your_name -group \* -client \*
```

Note

This command adds a Windows (-type W) user (-name your_name) allowing to use the Data Protector GUI for Data Protector backup/restore management purposes.

2. Stop Data Protector services on the standby Cell Manager.

Open a Terminal window and type:

```
# /opt/omni/sbin/omnisv -stop  
HP OpenView Storage Data Protector services successfully  
stopped.
```

```
# /opt/omni/sbin/omnisv -status  
ProcName  Status  [PID]  
=====
```

rds	: Down
crs	: Down
mmd	: Down
omnitrig	: Down

```
Sending of traps disabled.  
=====
```

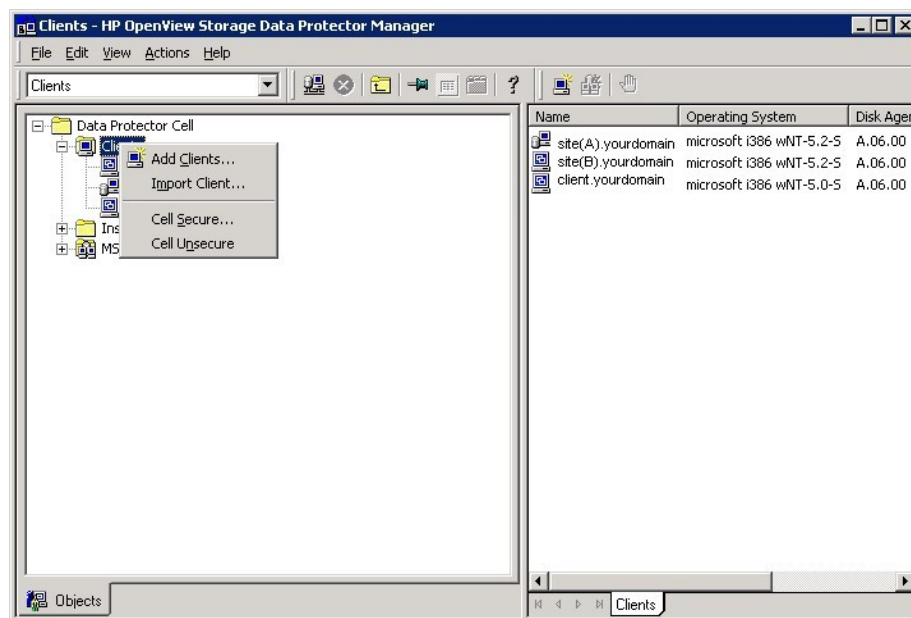
Status: At least one of Data Protector relevant processes/services is not running.

3. Change the cell_server in /etc/opt/omni/client/cell_server from the FQDN of the standby Cell Manager to that of the production Cell Manager. Change site(B).yourdomain to site(A).yourdomain.
4. To prevent Data Protector Services from automatically restarting after a reboot of the system, set the OMNI variable in /etc/rc.config.d/omni from "1" to "0" (zero).

The following tasks apply to the designated production Cell Manager on Windows 2003 Server or HP-UX11.23.

1. Import the standby Cell Manager (site(B)) into the production Cell Manager (site(A)) cell using the GUI.

Figure 6.



2. Modify the following parameters in the global options file on the production Cell Manager (site(A)).

```
ScriptOutputTimeout=600
```

This was increased to 600 minutes to allow enough time for the "dp_database1-pre.bat" script to complete.

Note

```
# ScriptOutputTimeout=TimeoutInMinutes  
# default: 15 minutes  
# This timeout is used by the Backup SM. The session pre-exec  
# or post-exec script should send some output at least every  
# ScriptOutputTimeout minutes, or the session gets aborted by  
# the Session Manager
```

```
FileMediumCapacity=10240
```

Note

```
# FileMediumCapacity=MaxSizeInMBytes  
# default: 100  
# If you are using "file" devices, you should change this to  
# specify the maximum size of a "file" medium. When Data Protector  
# writes specified size of data in one file, you will get a  
# mount prompt. Or if you are using "file" exchanger, the next  
# "file medium" will be loaded. If the global option is  
# changed, the logical medium must be exported and the file  
# removed before initialization. Otherwise the original size  
# will be used.
```

Note**Global Options File**

A file that allows you to customize Data Protector. It explains the global options, which cover various aspects of Data Protector, typically time-outs and limits, and affect the entire Data Protector cell. The file is located in the `/etc/opt/omni/server/options` directory on HP-UX and Solaris systems and in the `<Data_Protector_home>\Config\Server\Options` directory on Windows systems.

Note

The preceding settings may have to be modified as the IDB size (and backup time) increases.

The standby Cell Manager is now ready to participate as a client in the production cell.

Data Protector database replication

The IDB is replicated from site(A) to site(B) by way of two Data Protector backup jobs (`dp_database1` and `dp_database2`) and several pre-exec and post-exec scripts. Essentially, this is archived by first backing up the IDB to a file library defined on the standby Cell Manager. Following this, a second copy of the IDB is backed up to tape at the production Cell Manager. On completion of the IDB backup to tape, the IDB is then restored from the file library to the `D:\DP Database Restore\` directory on the standby cell Manager to facilitate a simple promotion from client to Cell Manager.

Replication job flow

Figure 7 shows the logical structure of the backup jobs involved in the backup and copy of the IDB data and configuration files.

Figure 7.



Replication job content (Windows 2003 Server)

The following section shows the content of the pre- and post-execution scripts and how they are being used in the backup datalists.

site(A):dp_database1-pre.bat

```
"d:\Program Files\OmniBack\bin\omnistat"  
"d:\Program Files\OmniBack\bin\omnib" -datalist dp_database2
```

Note

omnistat generates a list of eventually running backup jobs in the Data Protector GUI. You must **not** run IDB backups during currently running or scheduled backup sessions. omnib calls the backup list specified.

site(B):dp_database2-pre.bat

```
if exist "D:\IDBrestore\D$" rmdir /s /q "D:\IDBrestore\D$"
```

Note

This script removes existing files within the IDB restore destination directory on the standby Cell Manager.

site(A):dp_database1-post.bat

```
"d:\Program Files\Omniback\bin\omnir" -omnidb site(A).yourdomain":/  
"[Database]: site(A).yourdomain" -session 2007/03/14-2 -tree / -into  
"D:\IDBrestore" -target site(B).yourdomain
```

Note

This is an automatically generated script by the site(A):database2-post.bat script. You must **not** create or edit this script.

site(A):dp_database2-post.bat

```
echo "d:\Program Files\Omniback\bin\omnir" -omnidb site(A).yourdomain:/  
"[Database]: site(A).yourdomain " -session %SESSIONID% -tree / -into  
"D:\IDBrestore" -target site(B).yourdomain > "d:\Program  
Files\Omniback\bin\dp_database1-post.bat"
```

Note

This script pipes its output into the site(A):dp_database1-post.bat script upon finishing Backup Job2.

All scripts must reside in the d:\Program Files\Omniback\bin directory of their relevant systems.

Replication job content (HP-UX 11.23)

The following section shows the content of the pre- and post-execution scripts and how they are being used in the backup datalists.

site(A):dp_database1-pre.sh

```
#!/bin/ksh  
  
# This is a sample dp_databases1-pre.sh script  
  
/opt/omni/bin/omnistat  
  
/opt/omni/bin/omnib -datalist dp_database2
```

Note

omnistat generates a list of eventually running backup jobs in the Data Protector GUI. You must **not** run IDB backups during currently running or scheduled backup sessions. omnib -datalist calls the backup datalist specified.

site(B):dp_database2-pre.sh

```
#!/bin/ksh  
  
# This is a sample dp_database2-pre.sh script  
  
if [ -d /IDBrestore ]  
then  
    echo Directory exists && echo Will empty directory && rm -r /IDBrestore  
    && mkdir /IDBrestore  
else  
    echo Directory does not exist. Nothing to remove.
```

fi

Note

This script removes existing files within the IDB restore destination directory on the standby Cell Manager.

site(A):dp_database1-post.sh

```
#!/bin/ksh

# This is a sample dp_database1-post.sh script

banner performing restore

/opt/omni/bin/omnir -omnidb site(A).yourdomain:/ "[Database]:
site(A).yourdomain" -session 2007/05/25-14 -tree / -into /IDBrestore -
target site(B).yourdomain
```

Note

This is an automatically generated script by the site(A):database2-post.sh script. You must **not** create or edit this script.

site(A):dp_database2-post.sh

```
#!/bin/ksh

# This is a sample dp_database2-post.sh script

echo '#!/bin/ksh' > /opt/omni/lbin/dp_database1-post.sh

echo '# This is a sample dp_database1-post.sh script' >>
/opt/omni/lbin/dp_database1-post.sh

echo 'banner performing restore' >> /opt/omni/lbin/dp_database1-post.sh

echo /opt/omni/bin/omnir -omnidb site(A).yourdomain:/ \"[Database]:
site(A).yourdomain\" -session `echo ${SESSIONID}` -tree / -into
/IDBrestore -target site(B).yourdomain >> /opt/omni/lbin/dp_database1-
post.sh

chmod 744 /opt/omni/lbin/dp_database1-post.sh
```

Note

This script pipes its output into the site(A):dp_database1-post.sh script upon finishing Backup Job2.

All scripts must reside in the /opt/omni/lbin directory of their relevant systems.

- site(A).yourdomain dp_database1-pre.sh
 dp_database1-post.sh
 dp_database2-post.sh
- site(B).yourdomain dp_database2-pre.sh

Data Protector datalist

To successfully run the IDB backup/replication task, a backup administrator needs to set up two backup specifications (datalists) using the Data Protector GUI.

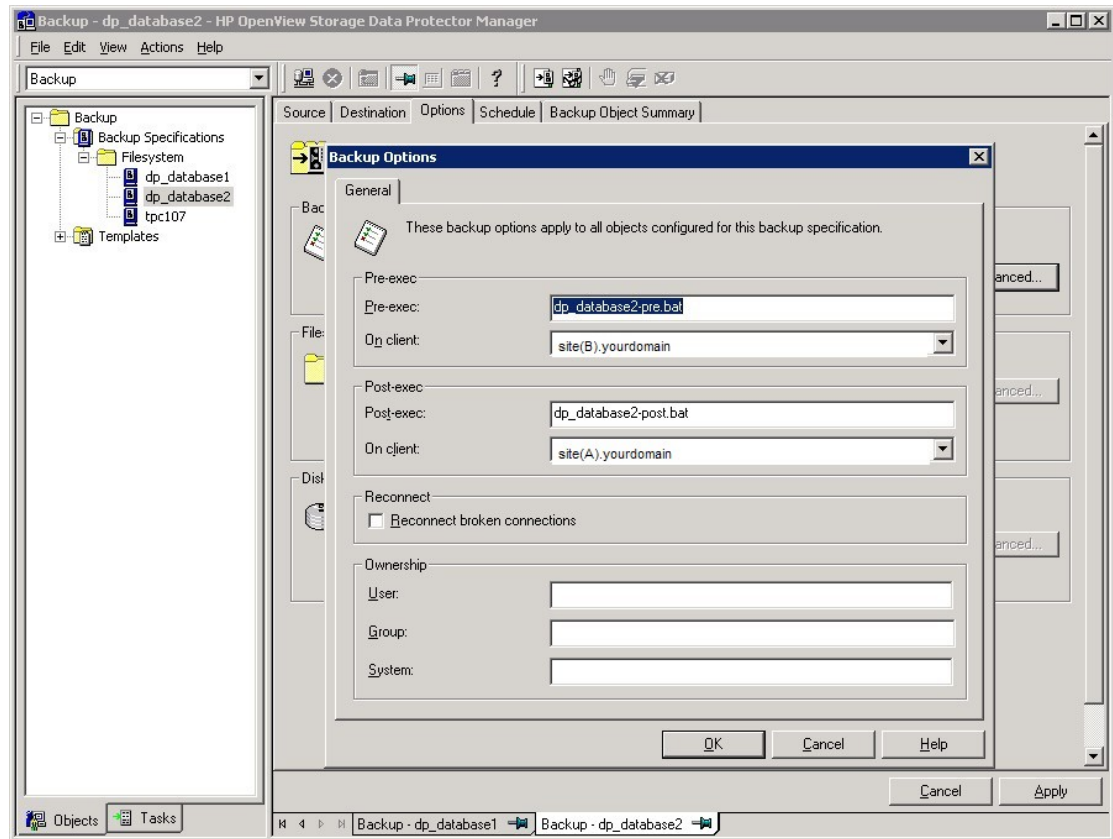
In Figure 8 two backup datalists are shown representing the IDB backup/replication task: dp_database1 (backup job1) and dp_database2 (backup job2).

On the datalist Option tab, open the Backup Specification Options menu and enter the relevant script definitions and hosts where they run on.

Note

dp_database2 list must not be started manually. Always initiate the IDB backup/replication task by running datalist dp_database1.

Figure 8.



```
DATALIST "dp_database1"
GROUP "standby_group"
DYNAMIC 1 1
PREEXEC "dp_database1-pre.bat" -on_host site(A).yourdomain
POSTEXEC "dp_database1-post.bat" -on_host site(A).yourdomain
DEFAULTS
{
  FILESYSTEM
  {
```

```

    }
    RAWDISK
    {

    }
}

DEVICE "HP:Ultrium 3-SCSI_site(A)"
{
}

OMNIDB "[Database]: site(A).yourdomain" site(A).yourdomain: "/"
{
} -protect weeks 4


DATALIST "dp_database2"
GROUP "standby_group"
DYNAMIC 1 1
PREEXEC "dp_database2-pre.bat" -on_host site(B).yourdomain
POSTEXEC "dp_database2-post.bat" -on_host site(A).yourdomain
DEFAULTS
{
    FILESYSTEM
    {

    }

    RAWDISK
    {

    }
}

DEVICE "File_Library_on_Standby_Writer0"
{
}

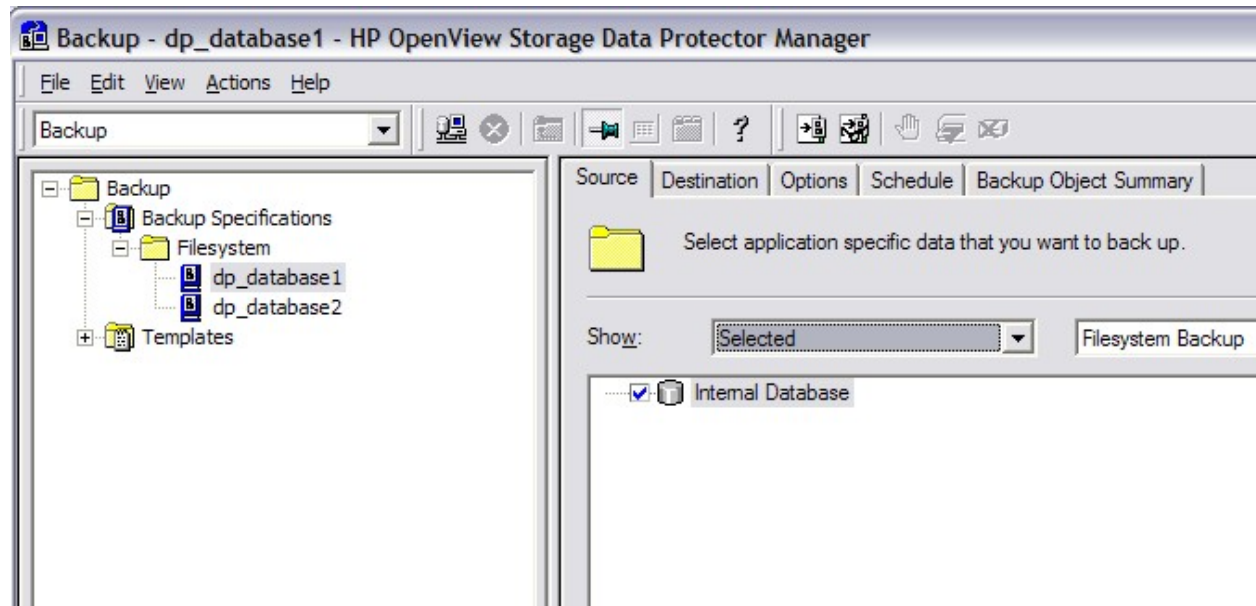
OMNIDB "[Database]: site(A).yourdomain" site(A).yourdomain: "/"

```

```
{  
} -protect days 2
```

The previous two datalists require the IDB to be selected as a backup object. Figure 9 shows the backup object detail for both datalists.

Figure 9.



Backup device configuration

The described backup procedure uses two backup devices to archive proper data security and different data retention policies.

Figure 10 shows configuration details of the used backup devices.

Figure 10.



Promotion of client to Cell Manager

Promoting site(B) to become a Cell Manager requires the following steps to be taken:

1. Copy the following directories (and files) from the restore area (Windows):

D:\IDBrestore\D\$\Program Files\Omniback\Config\Server\

to

D:\Program Files\Omniback\Config\Server

D:\IDBrestore\D\$\Program Files\Omniback\db40

to

D:\Program Files\Omniback\db40

2. Copy the following directories (and files) from the restore area (HP-UX 11.23):

```
# cp -R /IDBrestore/etc/opt/omni/* /etc/opt/omni
```

Note

This copy routine copies the server directory to its designated location.

```
# cp -R /IDBrestore/var/opt/omni/server/* /var/opt/omni/server
```

Note

This copy routine copies the db40 directory to its designated location.

Note

Moving the configuration files into place will activate all backup schedules as they were configured on the production Cell Manager site(A) (after the Cell Manager services are started). This may not be desirable during a testing situation. To prevent site(B) from attempting to run the same backups simultaneously as site(A), either disable each individual backup by way of the GUI or delete all backup schedule files:

```
rm D:\Program Files\OmniBack\Config\Server\Schedules\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\db2\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\Informix\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\Lotus\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\Mailbox\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\MSESE\*
rm D:\Program
Files\OmniBack\Config\Server\Barschedules\MSEExchange\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\MSSQL\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\MSVSSW\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\Oracle8\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\SAP\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\SAPDB\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\Stream\*
rm D:\Program Files\OmniBack\Config\Server\Barschedules\Sybase\*

# rm /etc/opt/omni/server/schedules/*
# rm -R /etc/opt/omni/server/barschedules/*
```

3. Move the new license key file into place (required due to different Cell Manager IP address):

<OMNIHOME>\Config\Server\cell\lic.dat

or

/etc/opt/omni/server/cell/lic.dat

Note

An alternate license codeword file site(B).lic.dat has been created on site(A), which contains code words for site(B)'s IP address. This file is copied to site(B) as part of the replication process. If either extra licenses are purchased for site(A) or if the IP address of site(B) is changed, new code words should be generated and added to this file.

4. On Windows, change the following registry key value from the (fully qualified) hostname of the production Cell Manager to that of the alternate Cell Manager (site(B)):
My Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Hewlett-Packard\OpenView\OmniBack\Site\CellServer
5. On HP-UX 11.23, change the cell_server in /etc/opt/omni/client/cell_server from the FQDN of the production Cell Manager to that of the standby Cell Manager.
Change site(A).yourdomain to site(B).yourdomain.
6. Change the Startup Type of the following services from Disabled to Automatic:

Data Protector CRS

Data Protector RDS

7. Start (and check) all Data Protector services:

```
D:\Program Files\OmniBack\bin\omnisv -stop
D:\Program Files\OmniBack\bin\omnisv -start
D:\Program Files\OmniBack\bin\omnisv -status
# /opt/omni/sbin/omnisv -stop
HP OpenView Storage Data Protector services successfully stopped.
# /opt/omni/sbin/omnisv -start
HP OpenView Storage Data Protector services successfully started.
# /opt/omni/sbin/omnisv -status

  ProcName  Status  [PID]
=====
      rds    : Active  [13772]
      crs    : Active  [13784]
      mmd    : Active  [13783]
      omnitrig: Active
      Sending of traps disabled.

=====
Status: All Data Protector relevant processes/services up and running.
```

8. Change ownership of the Data Protector database to the new Cell Manager (and check):

```
D:\Program Files\OmniBack\bin\omnidbutil -show_cell_name
D:\Program Files\OmniBack\bin\omnidbutil -change_cell_name
D:\Program Files\OmniBack\bin\omnidbutil -show_cell_name

# /opt/omni/sbin/omnidbutil -show_cell_name
# Catalog database owner: "site(A).yourdomain"
# /opt/omni/sbin/omnidbutil -change_cell_name
# This will change ownership of libraries, pools devices and # media.
# Are you sure (y/n)?y
# DONE!
# /opt/omni/sbin/omnidbutil -show_cell_name
# Catalog database owner: " site(B).yourdomain "
```

Test

You may want to perform an integrity check on the newly promoted standby Cell Manager.

IDB check

```
D:\Program Files\OmniBack\bin>omnidbcheck -extended

Check Level          Mode          Status
=====
Core                 -core         OK
```

Filenames	-filenames	OK
DCBF(presence and size)	-bf	OK
SIBF(readability)	-sibf	OK
OMNIDC(consistency)	-dc	OK

DONE!

Note

The contents of the IDB must be logically correct. In other words, the parts must be consistent and in good working order. For example, all details must link to valid tablespace entries, all filenames must be part of existing objects, and so on.

You can manually perform consistency checks for specific parts of the IDB and for the whole IDB. Data Protector checks the consistency of the IDB by default before the IDB is backed up (quick check). This is extremely important for recovering the IDB and backed-up data in case of a disaster.

Perform a restore of an object to a test system that has previously backed up on the production cell server.

Services and mediapool check

```
#/opt/omni/sbin/omnihealthcheck
```

```
Health check started: 06/29/07 13:46:10.
```

```
=====> Running: /opt/omni/sbin/omnisv -status
      ProcName  Status  [PID]
```

```
=====
```

```
      rds       : Active  [28478]
```

```
      crs       : Active  [28495]
```

```
      mmd       : Active  [28494]
```

```
      omnitrig: Active
```

```
      Sending of traps disabled.
```

```
=====
```

```
Status: All Data Protector relevant processes/services up and running.
```

```
Exit code: 0
```

```
=====> Running: /opt/omni/bin/omnimmm -list_pools
```

Status	Pool name	Media Type	MS	# of media	Free [MB]
=====					
Good	Default AIT	AIT	No	0	0
Good	Default DDS	DDS	No	0	0
Good	Default DLT	DLT	No	0	0
Good	Default DTF	DTF	No	0	0

Good	Default	Exabyte	ExaByte	No	0	0
Good	Default	File	File	No	0	0
Good	Default	LTO-Ultrium	LTO-Ultrium	No	0	0
Good	Default	Optical	Optical	No	0	0
Good	Default	QIC	QIC	No	0	0
Good	Default	SAIT	SAIT	No	0	0
Good	Default	SD-3	SD-3	No	0	0
Good	Default	SuperDLT	SuperDLT	No	0	0
Good	Default	T3480/T4890/T9490	T3480/T4890/T9490	No	0	0
Good	Default	T3590	T3590	No	0	0
Good	Default	T3592	T3592	No	0	0
Good	Default	T9840	T9840	No	0	0
Good	Default	T9940	T9940	No	0	0
Good	Default	Tape	Tape	No	0	0
Good	File_Library-ita010_1_Med	File		No	9	86779
Good	File_Library_ita9_1_Media	File		No	10	16711
Good	File_Library_ita9_2_Media	File		No	2	3386

Exit code: 0

```
=====> Running: /opt/omni/sbin/omnidbutil -show_cell_name
Catalog database owner: "site(B).your.domain"
```

Exit code: 0

```
=====
Health check ended: 06/29/07 13:46:11
Health check result: Successful
Health check exit code: 0
```

Considerations

- The standby Cell Manager requires the following LTUs to function properly as a standby Cell Manager:
 - cell server LTU
 - drive LTU
 - library LTU
 - online backup LTU
 - open file backup LTU
 - ZDB LTU
 - Instant recovery LTU
 - direct backup LTU
 - encryption LTU
- Backup sessions performed on the standby Cell Manager do not appear in the production cell server after it has become operational again. A manual copy operation of the IDB from the standby

cell server to the production cell server will make sessions run on the standby cell server reappear on the production cell server (this is not part of this white paper).

For more information

For more information on HP Data Protector, visit <http://www.hp.com/go/dataprotector>.

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