



**Hitachi Storage Command Suite
Hitachi Protection Manager Software
for Microsoft SQL Server
Getting Started Guide**

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Referenced Documents

- *Hitachi Protection Manager User's Guide* (MK-94HC070)
- *Hitachi Protection Manager Console User's Guide* (MK-94HC071)
- *Hitachi Protection Manager Command Reference* (MK-94HC072)
- *Hitachi Protection Manager Messages* (MK-94HC073)

Related Documents

- *Hitachi Command Control Interface (CCI) User and Reference Guide* (MK-90RD011)
- *Hitachi TagmaStore Adaptable Modular Storage Command Control Interface (CCI) User and Reference Guide* (MK-95DF701)
- *Hitachi Freedom Storage Thunder 9520 V Series Command Control Interface (CCI) User and Reference Guide* (MK-94DF687)
- *Hitachi Freedom Storage Thunder 9500 V Series Command Control Interface (CCI) User and Reference Guide* (MK-92DF609)
- *Hitachi Freedom Storage Thunder 9200 Command Control Interface (CCI) for ShadowImage User and Reference Guide* (MK-91DF557)

Readme and Release Notes Contents

These files can be found on the installation CD. They contain requirements and notes for use of Hitachi Protection Manager that may not be fully described in the manual. Be sure to review these files before installing Hitachi Protection Manager.

Preface

The *Hitachi Protection Manager Getting Started Guide for Microsoft SQL Server* describes how to install and setup Hitachi Protection Manager (HPtM) for SQL Server. It also contains information about the prerequisite components, which include CCI and PVOL/SVOL setup.

This document is not intended to replace product manuals; rather, it is a concise reference for those who need to implement Protection Manager and must quickly grasp the implementation procedures. Therefore, this document should be used as a supplemental reference to the complete product manuals and release notes. Please consult those documents for detailed instructions and background information.

Software Version

This document revision applies to Hitachi Protection Manager version 6.3.

Comments

Please send us your comments on this document. Make sure to include the document title, number, and revision. Please refer to specific section(s) and paragraph(s) whenever possible.

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Chapter 1 Overview

This chapter provides an overview of the SQL database backup process, using the following sections:

- Understanding the SQL Database Backup Procedure (section 1.1)

1.1 Understanding the SQL Database Backup Procedure

Figure 1-1 provides a visual representation of the SQL backup process. The HPtM main program (Protection Manager) is designed to be installed on the production SQL server. If you intend to back the SQL database up to tape from secondary volumes (SVOL) using HPtM and tape backup software, you need to install HPtM on the Backup server.

In a tape backup procedure, HPtM can mount the target SVOLs to the Backup server after creating shadow copy from primary volumes (PVOLs) to SVOLs. Then HPtM can launch the backup command for TAPE backup software to start backing up data from SVOLs to tape. After that, HPtM can unmount the mounted SVOL from the Backup server.

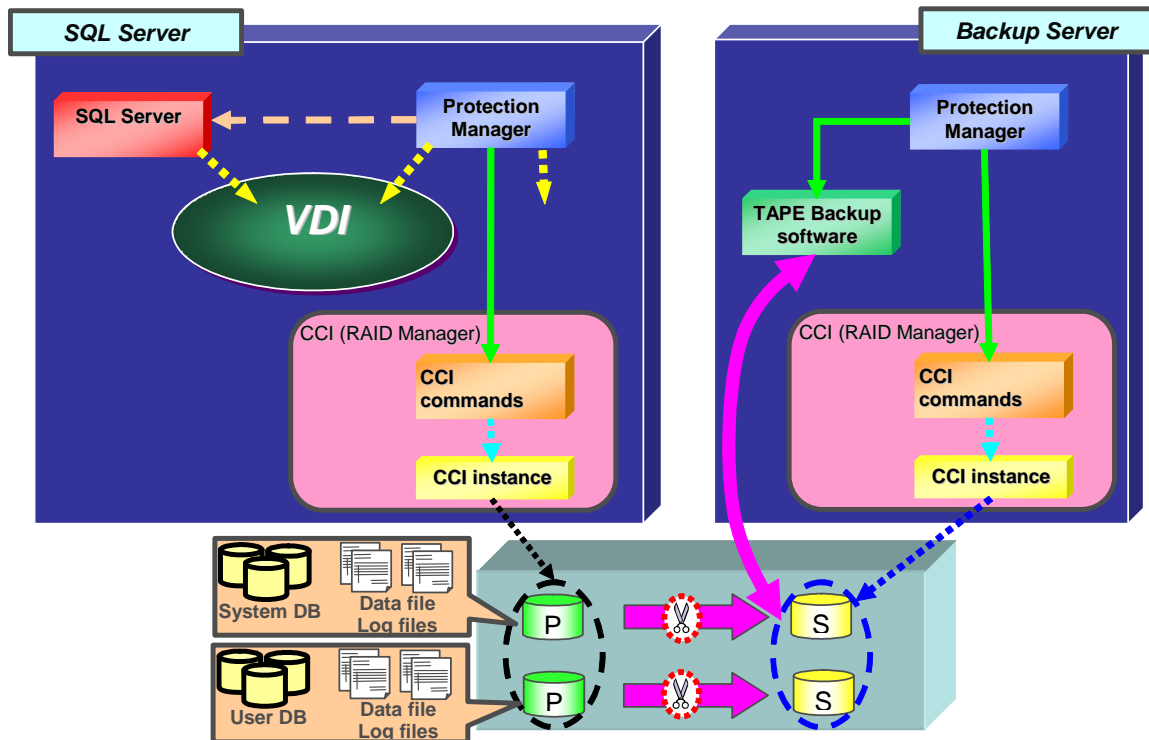


Figure 1-1 VDI Backup Process

1.1.1 Reviewing the Process Flow

Table 1.1 lists the order of the processes for the SQL Backup procedure.

Regarding the SQL database states:

- **Online** indicates that the read and write access is available.
- **Online (Freeze)** indicates that the read access is available, but the write access is pending.

Table 1.1 SQL Backup Process Flow

Step	Server	Procedure	CCI Pair Status	SQL Database
1	SQL	HPiM checks the cluster resources related to the target SQL server, if cluster environment	PSUS/SSUS or PAIR	Online
2	SQL	HPiM gets the information of the SQL database		
3	SQL	HPiM selects the target SVOL for this backing up		
4	SQL	HPiM starts up the CCI instance on SQL server, if not started		
5	SQL	HPiM sets the CCI environment variables (HORCMINST, HORCC_MRCF) for the pair operations		
6	SQL	HPiM checks the target CCI copy pair status	PAIR or COPY	
7	SQL	HPiM resyncs (pairresync) the target CCI copy pair, if not PAIR status		
8	SQL	HPiM deletes the old backup catalog information related to the target SVOL in HPiM internal repository		
9	SQL	HPiM checks whether the target CCI copy pair status is PAIR or not	PAIR	
10	SQL	HPiM creates VDI (Virtual Device Interface) by using COM object.		
11	SQL	HPiM runs SQL statement with specifying VDI and SQL Server extracts the SQL meta data to the meta file		
12	SQL	HPiM calls VDI API and SQL Server freezes the target SQL database with VDI		
13	SQL	HPiM splits the target CCI copy pair	PSUS/SSUS	Online (Freeze)
14	SQL	HPiM calls VDI API and SQL Server thaws the target SQL database and closes VDI session		Online
15	SQL	HPiM checks whether the CCI copy pair status is PSUS/SSUS or not		
16	SQL	HPiM registers the this backup catalog information to HPiM internal repository		

Chapter 2 Reviewing Prerequisites for SQL Backup

This chapter describes the components that are required for backing up an SQL database.

- Reviewing and Gathering Requirements (section 2.1)

2.1 Reviewing and Gathering Requirements

If you backup an SQL database from the secondary volume (SVOL) to TAPE device, you need to install HPtM on the Backup server.

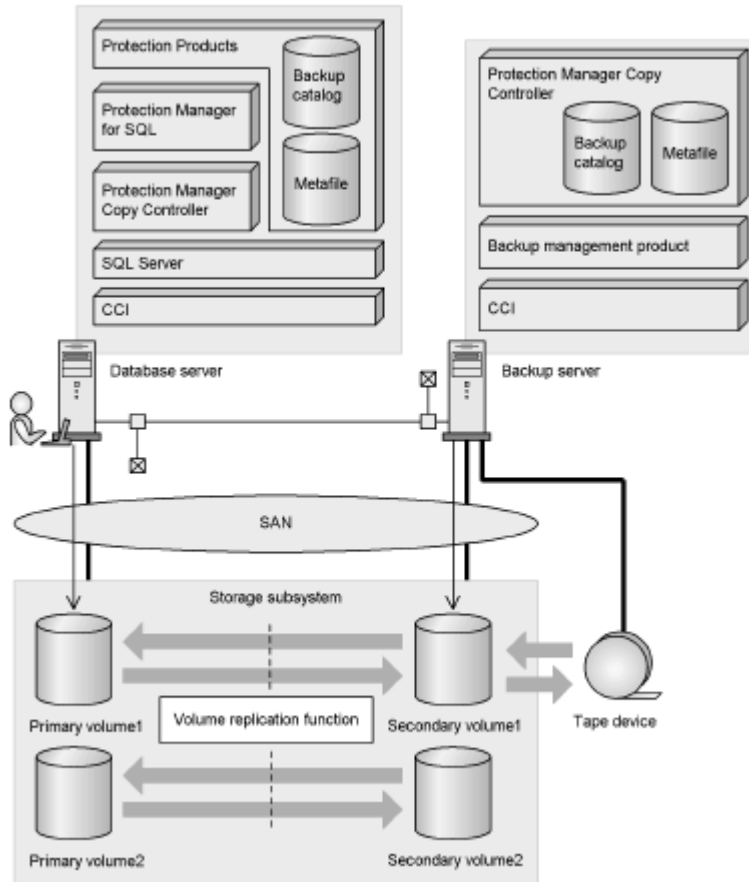


Figure 2-1 Example Hardware and Server Configuration

2.1.1 Hardware and Server Requirements

Table 2.1 lists the hardware and server requirements.

Table 2.1 List of Hardware and Server Requirements (Operating System)

Requirement	Details
Operating Systems	<p>Windows 2000 Server (SP4)</p> <p>Windows 2000 Advanced Server (SP4)</p> <p>Windows 2000 Datacenter Server (SP4)</p> <p>Windows Server 2003 Standard Edition (SP2)</p> <p>Windows Server 2003 Enterprise Edition (SP2)</p> <p>Windows Server 2003 Datacenter Edition (SP2)</p> <p>Windows Server 2003 Enterprise Edition for Itanium-based systems (SP2)</p> <p>Windows Server 2003 Datacenter Edition for Itanium-based systems (SP2)</p> <p>Windows Server 2003 Standard x64 Edition (SP2)</p> <p>Windows Server 2003 Enterprise x64 Edition (SP2)</p> <p>Windows Server 2003 Datacenter x64 Edition (SP2)</p> <p>Windows Server 2003 R2, Standard Edition (SP2)</p> <p>Windows Server 2003 R2, Enterprise Edition (SP2)</p> <p>Windows Server 2003 R2, Datacenter Edition (SP2)</p> <p>Windows Server 2003 R2, Standard x64 Edition (SP2)</p> <p>Windows Server 2003 R2, Enterprise x64 Edition (SP2)</p> <p>Windows Server 2003 R2, Datacenter x64 Edition (SP2)</p> <p>Windows Server 2008 Standard Edition (no SP/SP2)</p> <p>Windows Server 2008 Enterprise Edition (no SP/SP2)</p> <p>Windows Server 2008 Datacenter Edition (no SP/SP2)</p> <p>Windows Server 2008 for Itanium-based systems (no SP/SP2)</p> <p>Windows Server 2008 R2, Standard Edition (no SP)</p> <p>Windows Server 2008 R2, Enterprise Edition (no SP)</p> <p>Windows Server 2008 R2, Datacenter Edition (no SP)</p> <p>Windows Server 2008 R2 for Itanium-based systems (no SP)</p>

2.1.2 CCI Requirements

Table 2.2 lists the CCI requirements.

Table 2.2 List of CCI Requirements

Requirement	Details
Installation	CCI (RAID Manager) must be installed on the SQL server. If you use HPTM on the Backup server for re-using the backed up secondary volume, install CCI (RAID Manager) on the Backup server.
Commands	CCI copy pairs must be created before executing HPTM commands. HPTM commands operate the pair volumes for the following replication products:

	<ul style="list-style-type: none"> ▪ Shadow Image ▪ Quick Shadow ▪ Copy-On-Write (COW) ▪ True Copy (Sync/Async) ▪ Universal Replicator
MU Numbers	<ul style="list-style-type: none"> ▪ When using True Copy, do not enter an MU number in the MU# setting in the CCI definition file (horcm#.conf). If 0 is defined for the MU# setting, volume information for the "True Copy pair will not be stored in the dictionary map. ▪ When using Universal Replicator, define h0 (h and a generation number) for the MU# setting in the CCI definition file (horcm#.conf). If 0 is defined for MU#, the Universal Replicator information will not be stored in the dictionary map. ▪ To backup multiple primary volumes to multiple generations, specify the same dev_group name for all pair volumes that have the same MU#.
Primary and Secondary Volumes	When the CCI instance for the primary volume and the secondary volume are defined on the different servers, make sure that you start the CCI instance for the secondary volume in advance.

2.1.3 Microsoft SQL Server Requirements

Table 2.3 lists the hardware and server requirements.

Table 2.3 List of Hardware and Server Requirements

Requirement	Details
Microsoft SQL Server	<ul style="list-style-type: none"> Microsoft SQL Server 2000 Standard Edition (SP4) Microsoft SQL Server 2000 Enterprise Edition (SP4) Microsoft SQL Server 2005 Workgroup Edition (SP1/SP2/SP3) Microsoft SQL Server 2005 Standard Edition (SP1/SP2/SP3) Microsoft SQL Server 2005 Enterprise Edition (SP1/SP2/SP3) Microsoft SQL Server 2008 Workgroup Edition (no SP/SP1) Microsoft SQL Server 2008 Standard Edition (no SP/SP1) Microsoft SQL Server 2008 Enterprise Edition (no SP/SP1)
	<p>The following files under the target SQL instance are backed up by HPTM for SQL Server:</p> <ul style="list-style-type: none"> Data files: *.mdf, *.ndf Transaction log files: *.ldf VDI meta files: *.dmp (this file name is <i>backup-ID_database-ID.dmp</i>)
Databases	<p>When you execute <code>drmsqlbackup</code> command for backing up SQL database with specifying "-system" option, HPTM for SQL Server backs up the following databases:</p> <ul style="list-style-type: none"> master model msdb User database VDI meta file #1 <p>When you execute <code>drmsqlbackup</code> command for backing up SQL database without "-system" option, HPTM for SQL Server backs up the following databases:</p> <ul style="list-style-type: none"> User database VDI meta file #1 <p>#1 The VDI meta file is stored in the directory registered by <code>drmsqlinit</code> command. The file name is <i>backup-ID_database-ID.dmp</i>. When you don't specify VDI meta file directory with <code>drmsqlinit</code> command, VDI meta files are backed up to the SVOL which the data files of SQL database are backed up to.</p>
Files	<ul style="list-style-type: none"> The all files to be backed up must be placed on a RAID volume defined and created as a CCI copy pair. Configure the files that comprise one SQL instance on one disk. Do not place the files that comprise multiple SQL instances on one disk.
Backup/Restore/Repair	<ul style="list-style-type: none"> The SQL distribution database is not backed up. In a cluster environment, specify the user existing on each node for the owner of the target database to be backed up. If failover is performed to another node where the database owner does not exist, backup procedure fails because the database owner is unknown. When you don't specify the UNDO directory in <code>drmsqlinit</code> command execution, you can not restore or recover the backed up database with specifying "-undo" option. When you don't specify the transaction log backup directory in

	<code>drmsqlinit</code> command execution, you can not backup the transaction log by using <code>drmsqllogbackup</code> command.
--	--

2.1.4 Other Requirements

- When performing backup or restoration on an SQL server, first make sure that the secondary volumes involved are not mounted to any server.
- Update the dictionary map file (`drmsqldisplay -refresh`) before performing backup in any of the following situations concerning SQL Server objects, File Systems, and/or CCI definition files (`horcm#.conf`):
 - A new SQL database was added.
 - A file path of SQL data file or transaction log file was changed.
 - A new file system to do with target SQL Server was mounted.
 - A file system related to the target SQL Server was unmounted.
 - CCI definition file (`horcm#.conf`) concerning backup target SQL Server was changed, such as the adding or deleting of a CCI copy pair.
- When using Windows firewall function provided by the operating system, note the following:
 - You must specify firewall settings for the communication ports for CCI.
 - To execute the extended commands for FTP transmission (`EX_DRM_FTP_PUT` and `EX_DRM_FTP_PUT`), you must specify firewall settings for the FTP Publishing Service.
For details, see *Port requirements for Microsoft Windows server system* (<http://support.microsoft.com/default.aspx?scid=kb;en-us;832017>).
- If Protection Manager takes multiple generations of backup configured in MSCS, these SVOLs must be hidden from the operating system. Because the SVOLs taken by array-based replication are exact replicas of PVOLs and have the same disk signature, the operating system tends to overwrite when multiple SVOLs are presented. Restoring the SVOL results in MSCS failing to bring the PVOL back online, because MSCS perceives that it is not available. Selecting **Dynamic recognition of secondary volume** option on Setup GUI prevents this from happening. For the details of the procedure, see sections 4.2, and 4.3.

Chapter 3 Configuring the SQL Database Backup

This chapter explains the procedures for configuring the SQL database.

- Preparing the SQL Database for Backup (section 3.1)

3.1 Preparing the SQL Database Backup

The following table outlines the sequence of volume configuration and installation steps that are required before Protection Manager can be installed and configured.

Table 3.1 Sequence of Volume Configuration and Installation Steps

Configuring the Storage Volume		
Step	Procedure	Server
1	Create the Logical Units and CMD	—
2	Assign the Logical Units and CMD	—
Configuring the Server Volume		
3	Map LUN to the each server	SQL Backup
4	Format and Mount the volumes	SQL
Setting up CCI (RAID Manager)		
5	Install the CCI (RAID Manager)	SQL Backup
6	Define the CCI copy pairs	SQL Backup
7	Create the CCI copy pairs	SQL

3.1.1 Configuring the Storage Volume

When configuring the storage volume, create the Logical Unit (LU) for the primary volume (PVOL), secondary volume (SVOL), and command device (CMD), then assign to the SQL and Backup servers.

For detailed instructions, please refer to the appropriate Storage Navigator Modular or Storage Navigator product manuals.

3.1.2 Configuring the Server Volume

This section describes LUN mapping on both the SQL server and Backup server, using the Emulex Configuration Tool (elxcfg) as an example of an HBA application. The following procedure must be performed on both the SQL server (PVOL) and Backup server (SVOL).

To configure the server volume:

1. Map the target LUN to each server:
 - a) Start the Emulex Configuration Tool (elxcfg).
 - b) Select the target "World Wide Port Name," then click the **Lun Map** button.
 - c) When the new dialog displays, click the **Add** button.
 - d) Select the target LUN, then click the **OK** button.
 - e) Click the **Done** button. From the **File** menu, select **Apply**, then **Exit** to close the application.
 - f) Start the Disk Management tool, then select **Rescan Disks** to recognize the new LUN. Verify that Windows recognizes the new LUN.
2. Initialize the volumes:
 - a) Right-click the **Not Initialized** disk and select **Initialize Disk**.
 - b) Select one or more disks to be initialized, then click the **OK** button.
3. Format and mount the volumes:
 - a) Right-click the target disk and select **New Partition...**
 - b) Within the Wizard, click the **Next** button.
 - c) Select the drive letter to be assigned, then click the **Next** button.
 - d) Select any necessary format options, then click the **Next** button.
 - e) Confirm the format options, then click the **Finish** button.
4. Replace the SQL database:

IF you backup both of SQL system database and SQL user database:

 - a) After formatting and mounting the primary volumes, you need to install Microsoft SQL Server.
 - b) In a SQL Server installation, you need to specify the path on the paired RAID disks to the path of SQL system database.
 - c) In a SQL user database creation, you need to specify the path on the paired RAID disks to the path of SQL user database.

IF you backup only SQL user database:

 - a) After formatting and mounting the primary volumes, you need to replace the path of data files and transaction log files of SQL user database to the path on the paired RAID disks.

3.1.3 Setting up CCI (RAID Manager)

To set up CCI:

1. Install CCI on both the SQL server and the Backup server:

- a) Run the installation file, **Setup.exe**.
- b) Click the **Next** button in the Welcome dialog box.
- c) Click the **Next** button in the **Attention...** dialog box.
- d) Select the installation folder, then click the **Next** button.
- e) Click the **Finish** button.

2. *Optional*: Check the version of CCI by using “raidqry” command.

Note: If you can create the horcm#.conf file by yourself, or if you prefer to use “mkconf.exe” to create the CCI configuration file, you can skip the copy pair definition procedure (steps 3-12). For detailed information about how to use the mkconf.exe command, see the CCI (RAID Manager) User and Reference Guide.

```
C:\HORCM\Tool>mkconf
Usage : mkconf
  -g[g] <group> Specify the dev_group for a configuration file.
                  If not specified, 'VG' will be used as default.
  [-m <mu#> ] Specify the mirror descriptor for BC(MRCF) volume.
                  Specify the mirror descriptor as '-m h1' for UR volume.
                  CA(HORC) volume dose not specify the mirror descriptor.
  [-i <inst#>] Specify the instance number for HORCM.
                  No running HORCM instance must be specified.
  [-s <service>] Specify the service name for a configuration file.
                  If not specified, '52323' will be used as default.
  [-c <drive#>] Specify the drive# in order to discover the CMDDEVs.
                  If not specified, '$PhysicalDrive' will be used as default.
                  If '-a' option is specified, this option is invalid.
  [-a] Specify an addition of the group for a configuration file.

Example:
type dev_file | mkconf -g dev_group -i 9 [-m 0] [-a]
echo hd10-20 | mkconf -g dev_group -i 9 [-m 0] [-a]
echo $Phys | mkconf -g dev_group -i 9 [-m 0] [-a]
$variable specifies as follows.
$LETALL -> All of the Drive Letter
$Phys -> All of the Physical Drives
$Volume -> All of the LDM Volumes for Windows2000/2003
```

Note: The following procedure (steps 3-12) assumes creation of “horcm0.conf” on the SQL server, and “horcm1.conf” on the backup server. If you want to create a HORCM definition file, replace the number with your preferred in the following procedure.

- Define copy pairs using CCI: On the SQL server, find the CMD (Command Device) for the target storage subsystem.

```
C:\HORCM\etc>ingraid $Phys -sort -CM
HORCM_CMD
#dev_name          dev_name          dev_name
#UnitID 0 (Serial# 116)
\\.\PhysicalDrive21
#UnitID 1 (Serial# 5368)
\\.\PhysicalDrive11
#UnitID 2 (Serial# 55014)
\\.\PhysicalDrive20
C:\HORCM\etc>
```

- Create the temporary HORCM definition file (in this case, "horcm0.conf"). Only define the CMD and the arbitrary port number.

```
HORCM_MON
#ip_address      service      poll(10ms)      timeout(10ms)
localhost        50000        1000             3000

HORCM_CMD
#dev_name          dev_name          dev_name
\\.\PhysicalDrive11

HORCM_DEV
#dev_group        dev_name          port#            TargetID         LU#              MU#

HORCM_INST
#dev_group        ip_address        service
```

- Start up the temporary HORCM instance: Run the `horcmstart` command and specify the temporary HORCM instance number.

```
E:\HORCM\etc>horcmstart 0
starting HORCM inst 0
HORCM inst 0 starts successfully.
```

- Specify the temporary HORCM instance number to HORCMINST variable, then activate the HORCC_MRCF variable.

```
C:\HORCM\etc>set HORCMINST=0
C:\HORCM\etc>set HORCC_MRCF=1
```

- Check the RAID disks connected to the SQL server: Run the `raidscan` command with the `-find` option.

```
C:\HORCM\etc>raidscan -pi $Phys -find -CLI
DEVICE_FILE      UID  S/F PORT  TARG LUN   SERIAL  LDEV  PRODUCT_ID
Harddisk20       -   -   CL2-A  -    -    -        5014   55      OPEN-3-CM
Harddisk21       -   -   CL2-A  -    -    -        116    88      DF600F-CM
Harddisk4        0   F   CL2-C  1    4    5368     4      DF600F
Harddisk5        0   F   CL2-C  1    5    5368     5      DF600F
Harddisk6        0   F   CL2-C  1    6    5368     6      DF600F
Harddisk7        0   F   CL2-C  1    7    5368     7      DF600F
Harddisk11       0   F   CL2-C  1    20   5368    20      DF600F-CM
Harddisk12       0   F   CL2-C  1    21   5368    21      DF600F
```

- Define the name of `dev_group` and `dev_name` and select the target disk by specifying the `port#`, `TargetID`, and `LU#` in the `HORCM_DEV` entry.

```
HORCM_MON
#ip_address      service      poll(10ms)  timeout(10ms)
localhost        50000       1000        3000

HORCM_CMD
#dev_name        dev_name      dev_name
\\.\PhysicalDrive11

HORCM_DEV
#dev_group      dev_name      port#      TargetID      LU#      MU#
GR01            vol01         CL2-C      1              4         0
GR01            vol02         CL2-C      1              5         0

HORCM_INST
#dev_group      ip_address    service
GR01            xx.xx.xxx.xx 50000
```

- Restart the HORCM instance: Run the `horcmshutdown` and `horcmstart` commands by specifying the target HORCM instance.

```
C:\HORCM\etc>horcmshutdown 0
inst 0:
HORCM Shutdown inst 0 !!!

C:\HORCM\etc>horcmstart 0
starting HORCM inst 0
```

- On the backup server, find the CMD (Command Device), create the temporary HORCM definition file (in this case, "horcm1.conf"), and check the RAID disks connected to the backup server (steps 3-7, above).

```
C:\horcm\etc>raidscan -pi $Phys -find -CLI
```

DEVICE_FILE	UID	S/F	PORT	TARG	LUN	SERIAL	LDEV	PRODUCT_ID
Harddisk5	0	F	CL2-C	1	11	5368	11	DF600F
Harddisk6	0	F	CL2-C	1	12	5368	12	DF600F
Harddisk7	0	F	CL2-C	1	13	5368	13	DF600F
Harddisk8	0	F	CL2-C	1	14	5368	14	DF600F
Harddisk9	0	F	CL2-C	1	15	5368	15	DF600F
Harddisk10	0	F	CL2-C	1	16	5368	16	DF600F
Harddisk11	0	F	CL2-C	1	17	5368	17	DF600F
Harddisk12	0	F	CL2-C	1	32	5368	32	DF600F-CM

- Define the name of dev_group and dev_name and set the target disk by specifying the port#, TargetID, and the LU# in the HORCM_DEV entry.

```
HORCM_MON
#ip_address      service      poll(10ms)    timeout(10ms)
localhost        50000       1000          3000

HORCM_CMD
#dev_name        dev_name      dev_name
\\.\PhysicalDrive12

HORCM_DEV
#dev_group       dev_name      port#          TargetID       LU#           MU#
GR01             vol01         CL2-C         1              11            0
GR01             vol02         CL2-C         1              12            0

HORCM_INST
#dev_group       ip_address    service
GR01             xx.xx.xxx.xx 50000
```

- Restart the HORCM instance: Run the horcmshutdown and horcmstart commands by specifying the target HORCM instance.

```
C:\HORCM\etc>horcmshutdown 1
inst 1:
HORCM Shutdown inst 1 !!!

C:\HORCM\etc>horcmstart 1
starting HORCM inst 1
```

- Create copy pairs by using CCI: On the SQL server, specify the temporary HORCM instance number to the HORCMINST variable, then activate the HORCC_MRCF variable.

```
C:\HORCM\etc>set HORCMINST=0

C:\HORCM\etc>set HORCC_MRCF=1
```

- Create the HORCM copy pair: Run the paircreate command with the -v1 option, and specify the target HORCM copy pair name.

```
C:\HORCM\etc>paircreate -g GR01 -v1 -c 15

C:\HORCM\etc>
```


Chapter 4 Installing and Setting up Protection Manager

This chapter describes how to install and set up Protection Manager.

- Gathering and Installing the Required Components (section 4.1)
- Setting up the SQL Server (section 4.2)
- Setting up the Backup Server (section 4.3)
- Running HPtM Configuration Checker on the Backup Server (section 4.4)

4.1 Gathering and Installing the Required Components

Before you set up the SQL server, the Backup server and the cluster environment, please ensure that you have completed the following tasks:

- **Install:**
 - SQL server: Install HPtM Copy Controller, HPtM for SQL Server module, and the HPtM Console module. For instructions, see section 4.2.
 - Backup server: Install HPtM Copy Controller and HPtM Console module (If you backup SQL database from the secondary volumes to the TAPE by using HPtM). For instructions, see section 4.3.

- **Verify:**
 - Backup server: Run configuration check function to verify the system configuration. For instructions, see section 4.4.

Notes:

- SQL server recognizes command device (CM) and primary volumes (PVOL).
- The Backup server recognizes command device (CM) and secondary volumes (SVOL).
- SQL server should not recognize SVOLs and Backup server should not recognize PVOLs.
- Before installing HPtM Console module, you need to install Java Runtime Environment (JRE) 1.4.2 or 1.5.

4.2 Setting Up the SQL Server

To set up the SQL server:

1. Install Hitachi Protection Manager Copy Controller:
 - a) Run the installation file Setup.exe. The welcome dialog box displays.
 - b) Click the **Next** button. The install path selection dialog box displays.
 - c) Select the folder where Setup will install the files, then click the **Next** button. After the file copy procedure is finished, a completion dialog displays.
 - d) Enter Windows account and password for Protection Manager Service.
2. Install Hitachi Protection Manager for MS SQL Server:
 - a) Run the Setup.exe file. The welcome dialog box displays.
 - b) Click the **Next** button. The license registration method dialog box displays.
 - c) Specify the registration option you want to use, then click the **Next** button.
 - d) Enter the license key, then click the **Next** button. After the file copy procedure is finished, a completion dialog displays.

3. Install Hitachi Protection Manager Console:
 - a) Run the Setup.exe file. The welcome dialog box displays.
 - b) Click the **Next** button. The install path selection dialog box displays.
 - c) Select the folder where Setup will install the files, then click the **Next** button. After the file copy procedure is finished, a completion dialog displays.
4. Set up shared volume for dictionary map files in cluster configuration:

If you installed Protection Manager on cluster configuration of SQL server, the following procedure is required to setup shared volume:

 - a) Map a LUN to the SQL server, then initialize and format the volume.
 - b) Add the volume to the SQL cluster group as a physical disk cluster resource (see Figure 4-1). This disk is supposed to store the dictionary map files of Hitachi Protection Manager, which allows Protection Manager to share the object mapping information and the backup information on both of the cluster node.
5. Set up Hitachi Protection Manager:
 - a) Start the Console: From the **Start** menu, select **Hitachi Protection Manager Console**, then choose **Console**.
 - b) Open the GUI Setup window: From the Console, select **Tools**, then choose **Setup**.
 - c) Within the **Configuration Settings** tab [Step 1/10], select **Database/File server** for the server type, and **SQL** for the backup object. Depends on the SQL server configuration, select **Non Cluster Configuration** or **Cluster Configuration** for the cluster configuration. Afterward, the total procedure that you should specify is displayed in the Setup Steps area. For an example for a cluster configuration, see Figure 4-2. Click the **Next** button.
 - d) Optional: Within the **Operation Setup** tab [Step 2/10], set the retry parameters, the log output level and the number of trace log files. For more detailed information, refer to Chapter 5, "*Setting Up an Environment for Protection Manager Using Setup GUI*" in the *Hitachi Protection Manager User's Guide*. Click the **Next** button. If the SQL servers are cluster configured, enter the virtual server name in the **Dictionary map file path**, then click the **Browse...** button. Select the location on the shared disk in which the dictionary map files are stored, then click the **Add** button. Select the new entry, then click the **Create** button to create the dictionary map files. (see Figure 4-3)
 - e) Within the **RAID Manager Linkage** tab [Step 3/10], check and set the CCI instance number and its install path for HORCMINST, HORCMINST_AUX, and INSTALLPATH entries (see Figure 4-4). Afterward, click the **Next** button.

Field definitions:

- HORCMINST
Specify the CCI instance number managing the PVOLs (in this case, "0").
- HORCMINST_AUX
Specify the CCI instance number managing the SVOLs (in this case, "-").

Selecting **Pair split** on the **Pair Status when Backup Fail** is recommended so that Protection Manager split the pair even if the backup has failed. If you configured multiple generations of SVOL in clustered SQL server, select the **Dynamic recognition of secondary volume** to make HPtM hide the SVOL from the operating system.

- f) If needed, set the retry parameters for turning the performance within the **RAID Manager Operation** tab [Step 4/10]. For details, refer to Chapter 5, "*Setting Up an Environment for Protection Manager Using Setup GUI*" in the *Hitachi Protection Manager User's Guide*. Click the **Next** button.
- g) Within the **Cluster Configuration** tab [Step 5/10], select the cluster product name (Microsoft Cluster Service (MSCS) or VERITAS Cluster Server (VCS). For details, refer to Chapter 5, "*Setting Up an Environment for Protection Manager Using Setup GUI*" in the *Hitachi Protection Manager User's Guide*. Click the **Next** button.
- h) Within the **Database Configuration** Tab [Step 6/10], set the name of the target SQL instance in **SQL Instance name** entry. Set the paths of VDI meta file directory, UNDO log file directory and the backed up transaction log file directory in each entry. Specify the VDI generation timeout interval (0-3600). For more detailed information, refer to the section "*5. Setting Up an Environment for Protection Manager Using Setup GUI*" of the manual "*Hitachi Protection Manager User's Guide*". And then click the **Next** button (see Figure 4-5).
- i) This step is not necessary, within **VSS Definition** Tab [Step 7/10], click the **Next** button.
- j) This step is not necessary, within **VSS Environment** Tab [Step 8/10], click the **Next** button.
- k) Within the **Protection Manager Service** tab [Step 9/10], specify the TCP port number for Protection Manager Service. This number has to be consistent between SQL server and backup server (see Figure 4-6).
- l) Within the **Update Dictionary Map** tab [Step 10/10], check the **SQL** box(see Figure 4-1), then click the **Save** button (see Figure 4-7). If you configure cluster of SQL server, also select the virtual server name specified on **Operation Setup** tab [Step 2/9]. Protection Manager starts to collect the object mapping (including SQL objects, File System and horcm replication information) by using the "`drmdisplay.exe -refresh`" command. It is not necessary to specify the target SQL instance name in this tab. If you intend to update only the information about SQL Server object without File System and horcm replication information, enter the target SQL instance name. In this case, HPtM starts "`drmsqldisplay.exe SQL-instance-name -refresh`" command.
- m) Click the **Cancel** button to exit the Setup GUI.

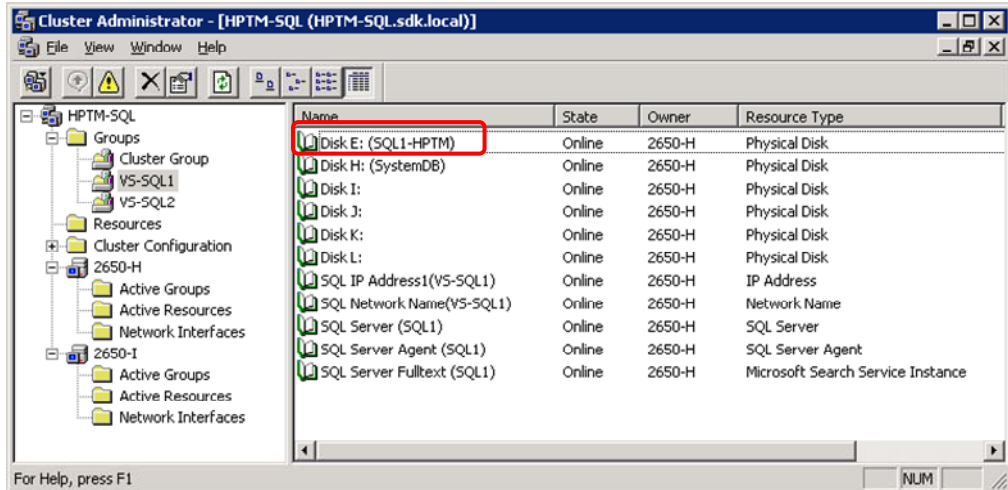


Figure 4-1 Adding a Physical Disk to SQL Cluster Group

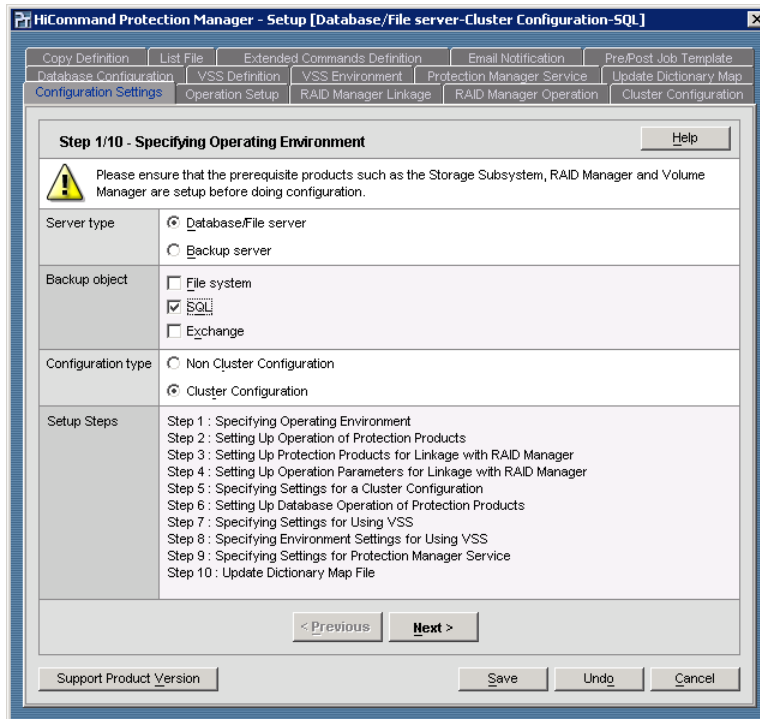


Figure 4-2 Configuration Settings: Step 1/10

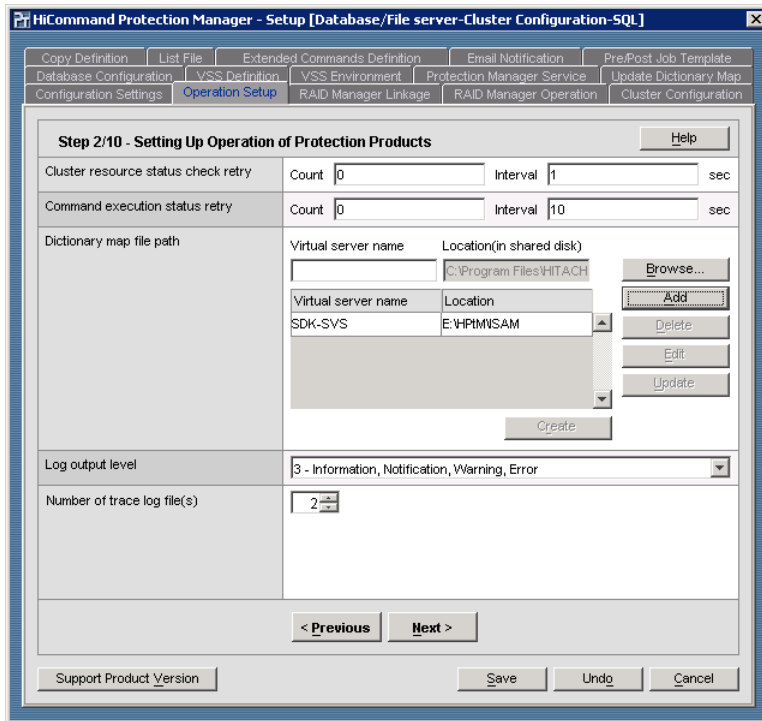


Figure 4-3 Operation Setup: Step 2/10

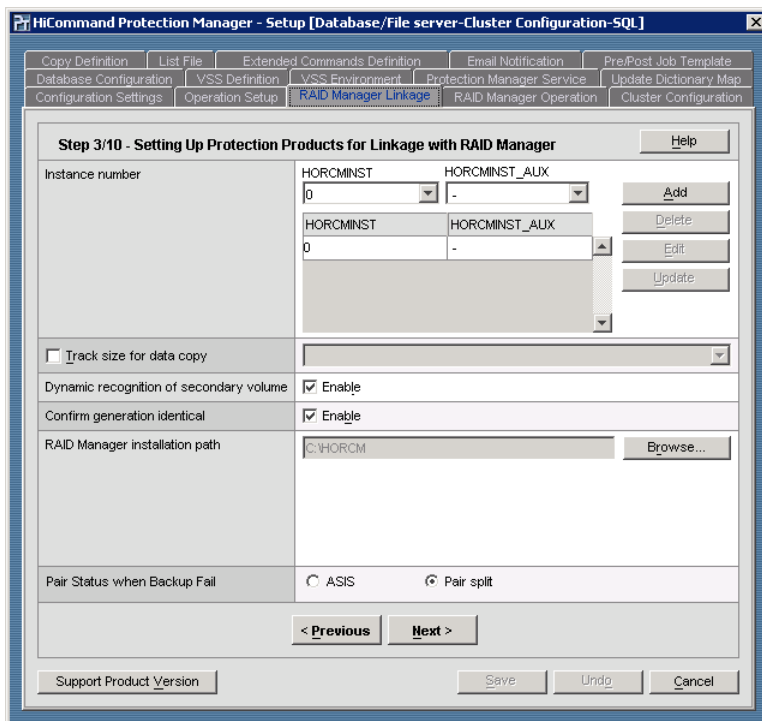


Figure 4-4 RAID Manager Linkage: Step 3/10

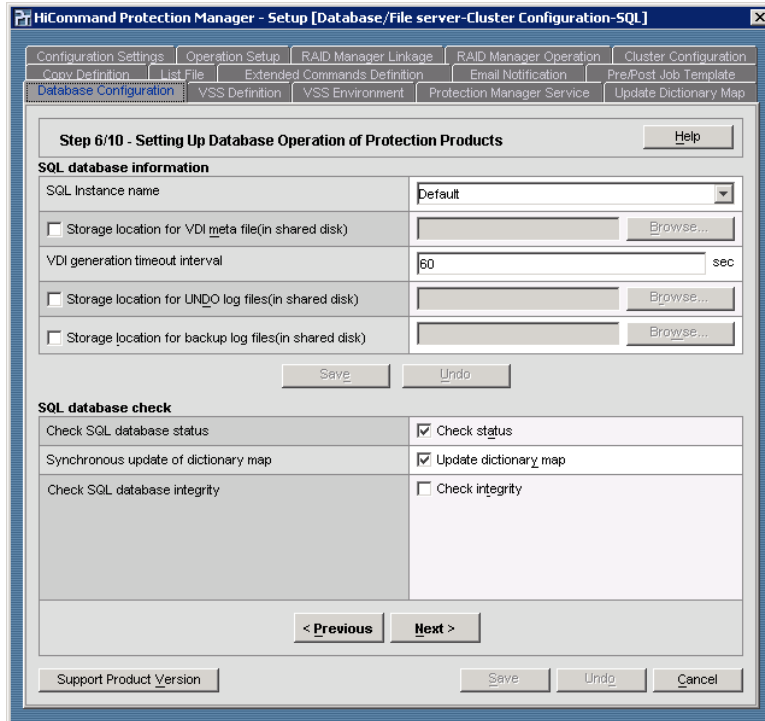


Figure 4-5 Database Configuration: Step 6/10

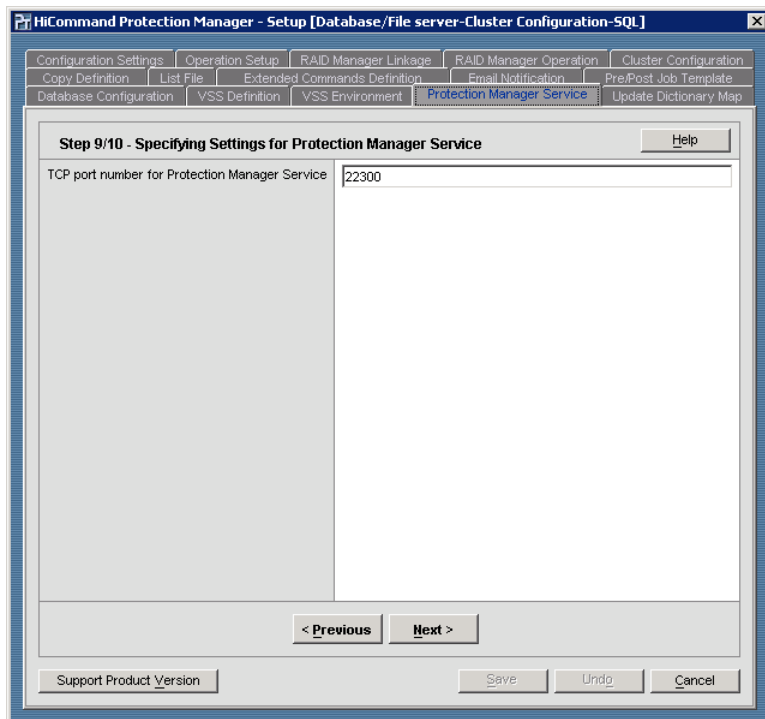


Figure 4-6 Protection Manager Service: Step 9/10

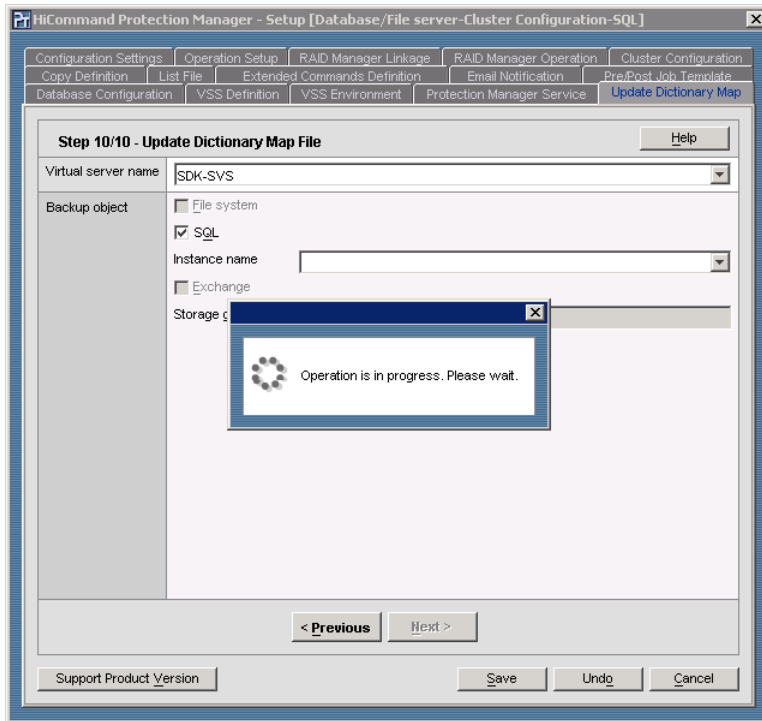


Figure 4-7 Update Dictionary Map: Step 10/10

4.3 Setting Up the Backup Server

(If you backup SQL database from the secondary volumes to the primary volumes by using HPtM)

To set up the Backup server:

1. Install Hitachi Protection Manager Copy Controller:
 - a) Run the installation file Setup.exe. The welcome dialog box displays.
 - b) Click the **Next** button. The install path selection dialog box displays.
 - c) Select the folder where Setup will install files, then click the **Next** button. The setup type selection dialog displays.
 - d) Click the **Next** button. After the file copy procedure is finished, a completion dialog displays.
 - e) Enter Windows account and password for Protection Manager Service.
2. Install Hitachi Protection Manager Console:
 - a) Run the installation file Setup.exe. The welcome dialog box displays.
 - b) Click the **Next** button. The install path selection dialog box displays.
 - c) Select the folder where Setup will install files, then click the **Next** button. The setup type selection dialog displays.
 - d) Click the **Next** button. After the file copy procedure is finished, a completion dialog displays.
3. Set up Hitachi Protection Manager:
 - a) Start the Console: From the **Start** menu, select **Hitachi Protection Manager Console**, then choose **Console**.
 - b) Open the GUI Setup window: From the Console, select **Tools**, then choose **Setup**.
 - c) Within the **Configuration Settings** tab [Step 1/9], select **Backup server** for the server type, and **Non Cluster Configuration** for the cluster configuration. Selecting the backup object is not required on the Backup server. Afterward, the total procedure that you should specify is displayed in the Setup Steps area. For an example for a cluster configuration, see Figure 4-8. Click the **Next** button.
 - d) Optional: Within the **Operation Setup** tab [Step 2/9], set the retry parameters, the log output level and the number of trace log files. For more detailed information, refer to Chapter 5, "Setting Up an Environment for Protection Manager Using Setup GUI" in the *Hitachi Protection Manager User's Guide*. Click the **Next** button.
 - e) Within the **RAID Manager Linkage** tab [Step 3/9], check and set the CCI instance number and its install path for HORCMINST, HORCMINST_AUX, and INSTALLPATH entries (see Figure 4-9). Afterward, click the **Next** button.

Field definitions:

- HORCMINST
Specify the CCI instance number managing the SVOLs (in this case, "1").
- HORCMINST_AUX
Specify the CCI instance number managing the PVOLs (in this case, "-").

Selecting **Pair split** on the **Pair Status when Backup Fail** is recommended so that Protection Manager split the pair even if the backup has failed. If you configured multiple generations of SVOL in clustered SQL server, select the **Dynamic recognition of secondary volume** to make HPtM hide the SVOL from the operating system.

- f) If needed, set the retry parameters for turning the performance within the **RAID Manager Operation** tab [Step 4/9]. For details, refer to Chapter 5, "*Setting Up an Environment for Protection Manager Using Setup GUI*" in the *Hitachi Protection Manager User's Guide*. Click the **Next** button.
- g) This step is not necessary, within **VSS Environment Tab** [Step 5/9], click the **Next** button.
- h) Within the **Protection Manager Service** tab [Step 6/9], you can change the TCP port of the communication between the Microsoft SQL server and the backup server by setting the specified port number in the **TCP port number for Protection Manager Service** area. Click the **Next** button.
- i) If you don't backup SQL data from SVOL to TAPE by VERITAS Net Backup or VERITAS Backup Exec, the steps within the **Backup Linkage** tab [Step 7/9] and the **Tape Backup** tab [Step 8/9] are unnecessary. For details, refer to Chapter 5, "*Setting Up an Environment for Protection Manager Using Setup GUI*" in the *Hitachi Protection Manager User's Guide*. Click the **Next** button.
- j) Skip **Update Dictionary Map File** [Step 9/9]. Protection Manager doesn't have object mapping on the backup server, so this step is unnecessary.
- k) Click the **Cancel** button to exit the Setup GUI.
- l) If you configured multiple generations of SVOL in clustered SQL server, launch a **Command Prompt**, then execute the `drmdevctl` command with "`-detach`" option to conceal the SVOLs on the Backup Server. The command allows Protection Manager to execute the `raidvchkset` command with the "`-vg idb`" option, then rescan the disk and volume with `diskpart` command.

```
C:\HORCM\etc>drmdevctl -detach
KAVX0001-I The drmdevctl command will now start.
KAVX0232-I Hid sqlsia,sqldataa.
KAVX0232-I Hid sqlsia,sqltloga.
KAVX0232-I Hid sqlsib,sqlatab.
KAVX0232-I Hid sqlsib,sqltlogb.
KAVX0232-I Hid sqlsi2,sqlsystem.
KAVX0232-I Hid sqlsi2,sqluser.
KAVX0234-I Rerecognizes the physical volume.
KAVX0235-I Rerecognized the physical volume.
KAVX0002-I The drmdevctl command will now end.
```

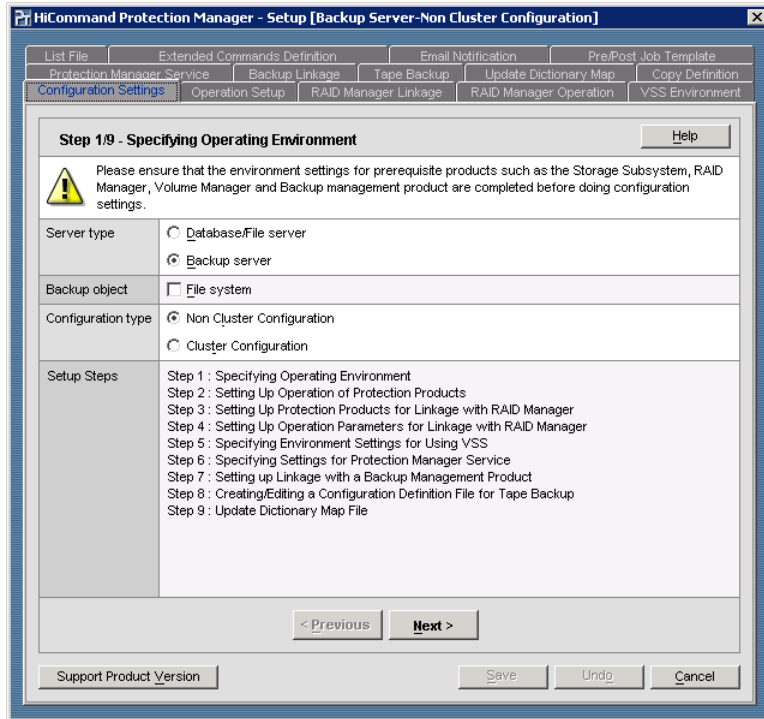


Figure 4-8 Configuration Settings: Step 1/9

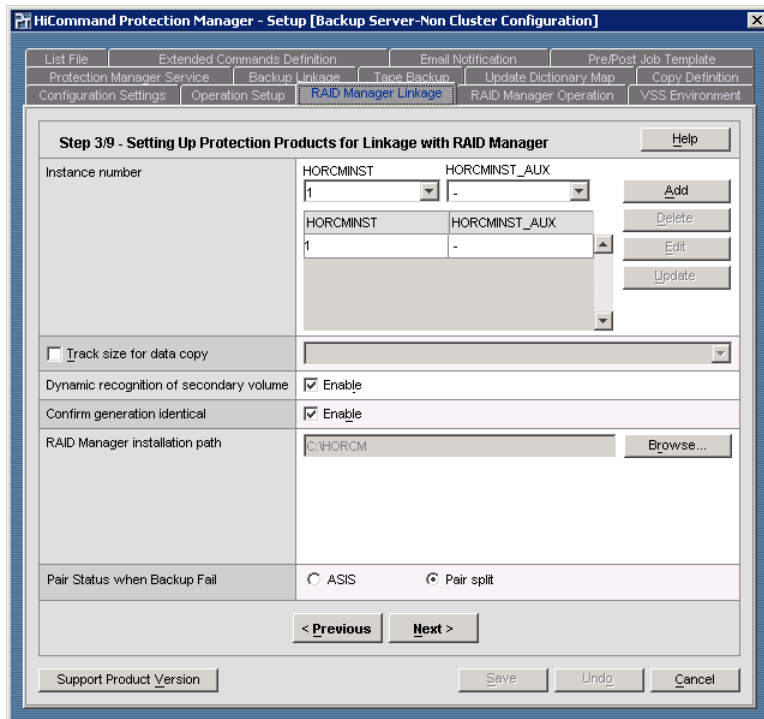


Figure 4-9 RAID Manager Linkage: Step3/9

4.4 Running HPtM Configuration Checker on the Backup Server

Protection Manager provides a configuration check function for verifying the system configuration and ensuring that it is appropriate for proper functioning of Protection Manager. Whenever a new system using Protection Manager is built or an existing system configuration is modified, the configuration check function should be used to verify the system configuration.

1. Executing the Configuration Check Function

To execute the configuration check function:

- a. Launch Protection Manager Console on the Backup server.
- b. Select **Tools**, and then **Check Configuration** to launch the Input Servers dialog box (see Figure 4-10).
- c. In the **DB Servers** list box, register either the host name or IP address for the SQL server to be verified. If the SQL servers are in cluster configuration, register all the nodes of SQL servers. The host name or IP address for virtual server can not be registered.
 - To add a server, perform one of the following operations:
 - Right-click the position in the list box where a line is to be added, and choose **Insert Row** from the pop-up menu.
 - Select a position in the list box where a line is to be added, and press the **Insert** key.
 - Select the last line in the list box, and press the **Tab** key.
 - To delete a server, perform one of the following operations:
 - In the list box, right-click the line to be deleted, and select **Delete Row(s)** from the pop-up menu.
 - In the list box, select the line to be deleted, and press the **Delete** key.
- d. In the **BK Servers** list box, register the host name or IP address for the backup server to be verified. See Step 3 for the registration method.
- e. In **Backup Object**, select the **SQL server** check box.
- f. Click the **Check** button to start verification. The check results are displayed in the Check Results dialog box.

2. Reviewing the Check Results

To review the check results of the configuration check function:

- a) Review the contents output in the Check Results dialog box (see Figure 4-11).
- b) Identify items with error or warning result, and check the messages.
- c) Double click the item and review the information with the Result dialog box (see Figure 4-12), then fix the problem according to the information displayed on **Action** field.
- d) Click the **Close** button to closes the Result dialog box.
- e) Repeat Steps from b) to d) for all the items with error or warning.

- f) Click the Close button to close the Check Results dialog box. Then execute the configuration check function again to ensure the error has fixed.

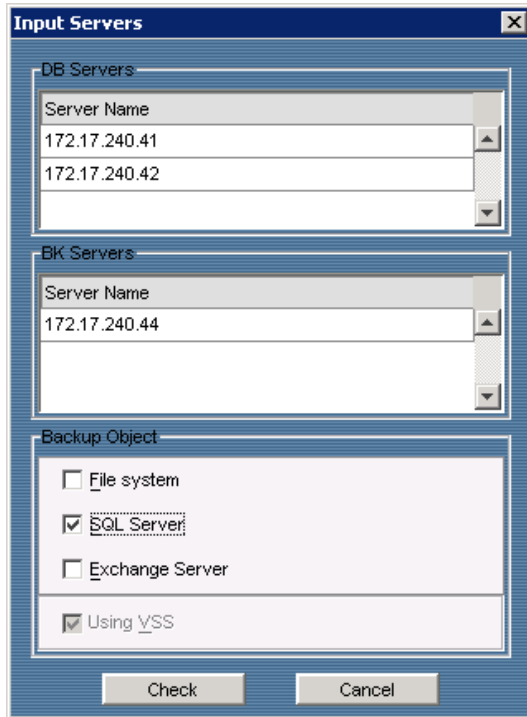


Figure 4-10 Input Servers Dialog Box

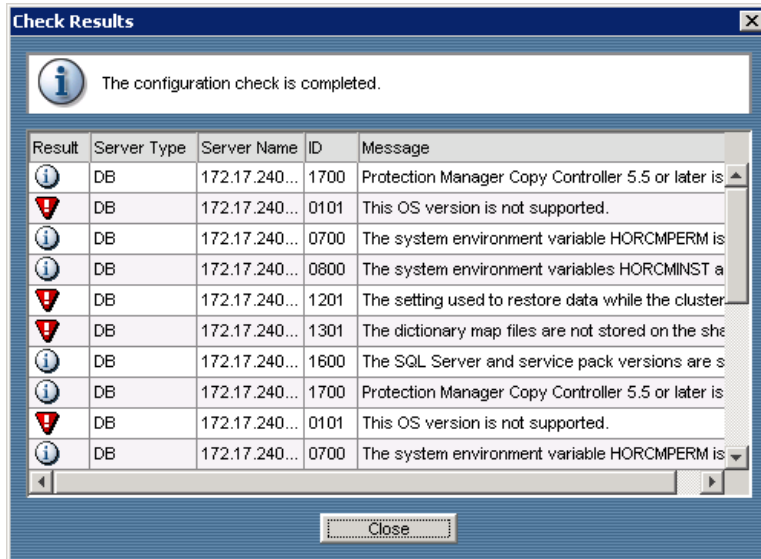


Figure 4-11 Check Results Dialog Box

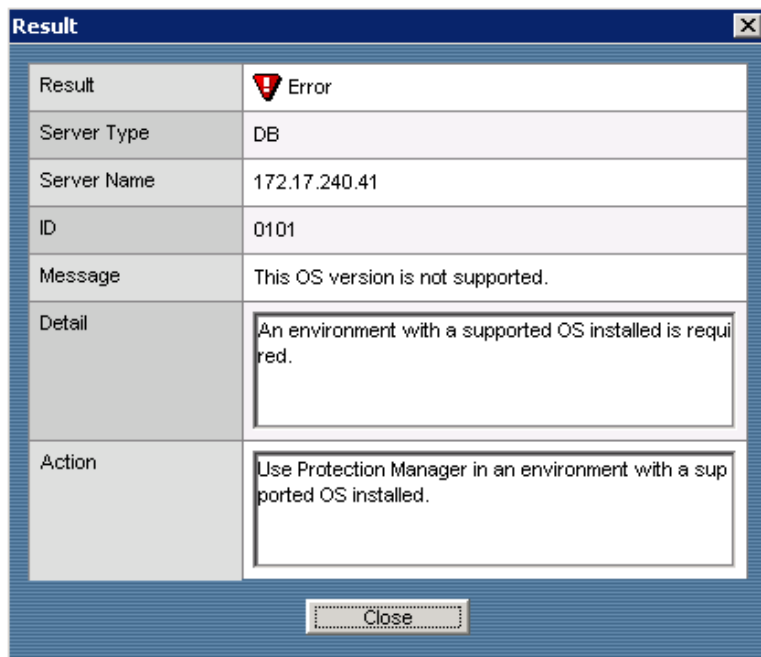


Figure 4-12 Result Dialog Box

Chapter 5 Troubleshooting

This chapter explains how to handle any problems that may occur while you are working with SQL Backup.

- Troubleshooting SQL Backup Errors (see section 5.1)
- Calling the Hitachi Data Systems Support Center (see section 5.2)

5.1 Troubleshooting SQL Backup Errors

The following table lists the common errors you may encounter during SQL backup, and it describes the steps to troubleshoot those issues. For any troubleshooting case that is not listed in this table, please refer to the actual product manuals. For errors that cannot be resolved, please see section 5.2 for information about contacting the Hitachi Data Systems Support Center.

Table 5.1 Error Causes and Troubleshooting Steps

Issue	Cause	Verify	Troubleshooting Steps
<code>drmsqlxxx</code> command failed with "KAVX1004-E"	The specified instance name does not exist on SQL Server.	Verify that there is not the SQL Server service of the instance by the "Services" administrative tool.	Specify the instance name correctly.
	The environment for the specified instance has not been configured.	There is not a configuration file named " <i>HPIM-Installation-Directory</i> \conf\MSSQL\InstanceName.dat".	Execute <code>drmsqlinit</code> command and re-execute <code>drmsqldisplay</code> command with <code>-refresh</code> option.
<code>drmsqlxxx</code> command failed with "KAVX1010-E"	A user who does not have permission to use SQL Server executed a command.	Verify that the user executing a Protection Products command does not have been registered as a member having the sysadmin fixed server role for the SQL Server by using the Enterprise Manager of SQL Server 2000 or the SQL Server Management Studio of SQL Server 2005.	Register the user as a member having the sysadmin fixed server role for the SQL Server and re-execute the <code>drmsqlxxx</code> command.
<code>drmsqlbackup</code> command failed with "KAVX1212-E"	SQL Server 2000 problem shown in the Microsoft Knowledge Base 891268.	SQL Server 2000 SP4 or later is not applied.	Apply SQL Server 2000 SP4 or later.
	The VDI generation timeout time value which you specified with the <code>drmsqlinit</code> command or with the Setup GUI of HPIM - Console is too small.	Execute " <code>drmsqlinit -v InstanceName</code> " or the Setup GUI of HPIM - Console and confirm the VDI generation timeout time value.	Re-execute " <code>drmsqlinit InstanceName</code> " or the Setup GUI of HPIM - Console and set the VDI generation timeout time to larger value.

5.2 Calling the Hitachi Data Systems Support Center

The Hitachi Data Systems customer support staff is available 24 hours a day, seven days a week. If you need technical support, please call:

- United States: (800) 446-0744
- Outside the United States: (858) 547-4526

Acronyms and Abbreviations

API	application programming interface
BMP	bitmap
CCI	Command Control Interface
CD-ROM	compact disk - read only memory
CMD	command device
COW	Copy-On-Write
DLL	dynamic linking library
DNS	domain name system
elxcfg	Emulex Configuration Tool
FQDN	fully qualified domain name
GUI	graphical user interface
HPtM	Hitachi Protection Manager
I/O	input/output
JRE	Java Runtime Environment
LAN	local area network
LU	logical unit
MB	megabytes
MSCS	Microsoft Cluster Service
OS	operating system
PVOL	primary volume
SAN	storage area network
SVOL	secondary volume
UDP	user datagram protocol
VCS	VERITAS Cluster Server

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