

HP StorageWorks

XP Cluster Extension Software Installation Guide

This guide contains detailed instructions for installing and removing HP StorageWorks XP Cluster Extension Software in AIX, Windows, Solaris, and Linux environments. The intended audience has independent knowledge of related software and of the HP StorageWorks XP disk array and its software.



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1 Preparing to install XP Cluster Extension Software

This chapter describes the general prerequisites for installing XP Cluster Extension in cluster environments structured with the HP XP family of storage systems.

Installation overview

To install this product:

1. Complete the general prerequisites described in this chapter.
For more information, see [“General installation prerequisites”](#) on page 8.
2. Install XP Cluster Extension.
 - [Installing XP Cluster Extension Software for AIX](#), page 11
 - [Installing XP Cluster Extension Software for Windows](#), page 17
 - [Installing XP Cluster Extension Software for Solaris](#), page 33
 - [Installing XP Cluster Extension Software for Linux](#), page 37
3. Complete the AutoPass licensing process (Windows and Linux only).
For instructions, see [“Licensing”](#) on page 41.

To upgrade this product from an earlier version, see:

- [Upgrading XP Cluster Extension Software for AIX](#), page 13
- [Upgrading XP Cluster Extension Software for Windows](#), page 23
- [Upgrading XP Cluster Extension Software for Solaris](#), page 35
- There is no Linux upgrade support for this release because this release discontinues HP Serviceguard support and adds SUSE Linux High Availability Extension and Red Hat Cluster Suite support.

Required disk space and system memory

AIX, Solaris, Linux

100 MB for `/opt/hpclx`
10 MB for `/etc/opt/hpclx`
100 MB for `/var/opt/hpclx`

Windows

100 MB for the XP Cluster Extension installation directory (`%hpclx_path%`). HP recommends that at least 25 MB of system memory be available for XP Cluster Extension installation.

General installation prerequisites

△ CAUTION:

If you do not meet the prerequisite conditions for XP RAID Manager, the XP Cluster Extension installation might complete successfully, but you will not be able to complete the XP Cluster Extension configuration procedures.

Before installing XP Cluster Extension, ensure that:

- Software patches, FC adapter firmware, and drivers are the latest versions.
- XP RAID Manager is installed and configured on each cluster node.
- XP RAID Manager versions are the same on all nodes in a cluster.
- XP RAID Manager command devices are configured.
- XP RAID Manager *horcmX.conf* files have been created and tested.
- One XP RAID Manager device group is configured for each XP disk array pair.
- LDEVs are mapped to redundant XP CHAs, and host modes and Fibre Channel port settings have been customized.
- XP Continuous Access links (including all extender hardware) are redundant and bidirectional.
- Alternate I/O paths between the server and the XP disk array are set up.
- The cluster and client networks are redundant.
- The cluster software is installed on all servers (AIX, Linux, and Solaris only; MSCS is part of the Windows OS installation).
- The cluster is set up, and clustered servers can communicate with each other (AIX, Linux, and Solaris only).
- The pair/resync monitor port is set up in the */etc/services* file (AIX, Linux, and Solaris only). For more information, see the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.
- A failover test proves bidirectional communications in the XP Continuous Access setup for all configured XP CUs.
- Download the XP Cluster Extension Software.
 1. Browse to <http://www.hp.com/go/softwaredepot>.
 2. Click **Storage and NAS** in the product category list.
 3. Follow the on-screen instructions to download the installer.

Requirements for XP RAID Manager instances

When working with XP RAID Manager instances, be aware of the following:

- XP RAID Manager instances can communicate using the most reliable network (heartbeat network) and at least one alternate network.
- Application services using XP Cluster Extension must use the same XP RAID Manager instances.
- To provide the best failover capability, XP RAID Manager instances should be running at all times. XP Cluster Extension provides a script to start XP RAID Manager instances in the system boot process.
- For rolling disaster protection, use the same XP RAID Manager instances to manage XP Business Copy pairs.

For more information about the XP Cluster Extension dependency on XP RAID Manager, see the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.

Required XP microcode and software

Failover operations depend on the XP microcode and XP RAID Manager versions installed. Host mode and Fibre Channel port settings for XP CHAs vary depending on the operating system and XP microcode version. For specific microcode and software versions, see the SPOCK website: <http://www.hp.com/storage/spock>.

2 Installing XP Cluster Extension Software for AIX

XP Cluster Extension is installed on IBM servers using a standard installation package. This package can be installed using SMIT or the `installp` command-line utility.

 **NOTE:**

For information on configuring, integrating, and removing XP Cluster Extension in an IBM HACMP environment, see the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.

Prerequisites

Before installing XP Cluster Extension, perform the following tasks:

1. Check “[General installation prerequisites](#)” on page 8 to make sure your setup meets the general installation prerequisites.
2. Install version 8.0.0.4 or later of the xLC Runtime Environment Components for AIX. You can download this software from the IBM website.
3. Install and configure HACMP.

Set up the HACMP cluster configuration as described in IBM's HACMP documentation.

The clustered servers of the primary data center must have access to the XP disk array of the local data center; the clustered servers of the remote data center must have access to the remote XP disk array.

4. Enable XP RAID Manager for startup.
See “[RAID Manager XP startup \(HACMP\)](#)” on page 11 for instructions.
5. Optional: Install and configure appropriate multipathing software for AIX.
6. Optional: Configure logical volumes using SMIT HACMP Fast Path.
See “[Configuring logical volumes](#)” on page 12 for instructions.

XP RAID Manager startup

To enable XP RAID Manager instances (for example, instances 11 and 22) to start at system boot, apply the following changes to the system configuration:

1. Add a local entry to the `/etc/inittab` file.

Example

```
# mkitab -i rcnfs "rcraidmanager:2:wait:/etc/rc.raidmanager >/dev/console2>&1"
```

2. Edit or create the `/etc/rc.raidmanager` file and add the following:

Example (instances 11 and 22)

```
echo "Starting local application"
HORCMBIN=/opt/HORCM/usr/bin
PATH=/bin:/usr/bin:$HORCMBIN
export PATH
# Start RAID Manager XP instances
RAIDMGR_INSTANCES="11 22"
if [ ! -z "$RAIDMGR_INSTANCES" ]
then
    echo "Starting RAID Manager XP instances:      $RAIDMGR_INSTANCES"
    $HORCMBIN/horcstart.sh $RAIDMGR_INSTANCES
fi
echo "Completed local application"
```

3. Ensure that `/etc/rc.raidmanager` has executable permissions.

Example

```
# chmod 700 /etc/rc.raidmanager
```

Configuring logical volumes

The shared data disks reside on the XP disk array, and are mirrored to the remote data center using XP Continuous Access. To access the mirrored disks in read/write mode, the P-VOL of the mirrored disk pair must be in the local data center. To make the S-VOL accessible to the remote system, you must switch the personalities of the disks:

- Create volume groups, logical volumes, and file systems on the first system for all resource groups.
- Use the XP RAID Manager `horctakeover` command to switch the XP RAID Manager device groups from site A to site B to make the shared disks accessible.
- Import volume groups, logical volumes, and file systems to the server on the remote site.
- Make sure that the volume groups are not automatically activated at boot time.

Installing XP Cluster Extension Software for AIX

The XP Cluster Extension Software is installed in three directory locations:

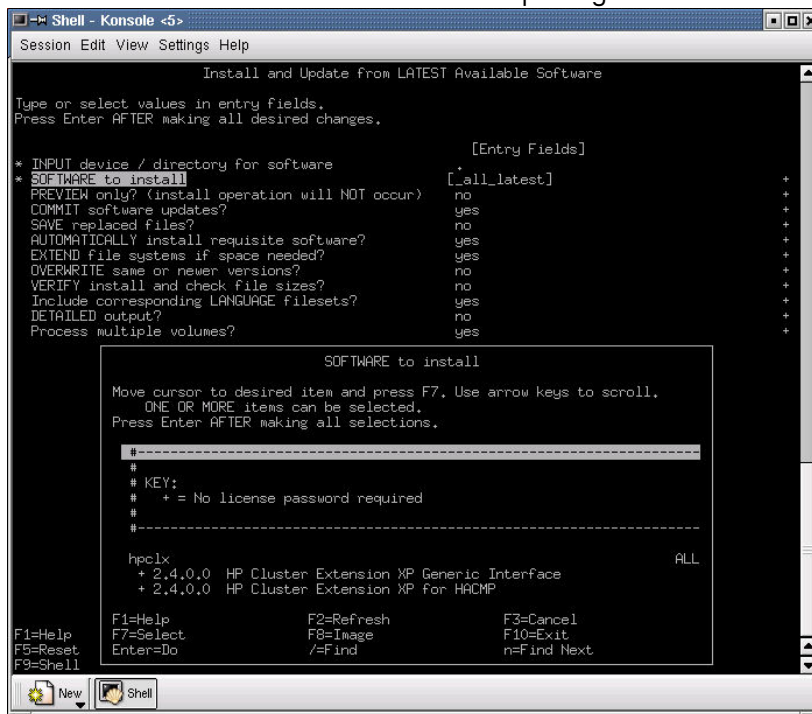
- `/etc/opt/hpclx`
- `/var/opt/hpclx`
- `/opt/hpclx`

Sample user configuration files (UCF.cfg) are in `/opt/hpclx/sample`.

To install the XP Cluster Extension Software, execute the following procedure on each server in the cluster that will run XP Cluster Extension:

1. Log in as `root`.
2. Download the file `hpclxxp_vx.xx.xx.tar.gz` (where `x.xx.xx` is the current XP Cluster Extension version) to a temporary directory on your system.
3. Uncompress and extract the install package in the `hpclxxp_vx.xx.xx` subdirectory (created during extraction).
4. Use SMIT or the `installp` utility to install XP Cluster Extension:

```
#smitty install_update
```
5. Select `Install` and `Update` from `LATEST Available Software`.
6. Specify the path to `hcclxxp` as the target directory for the update.
7. Choose one of the following options:
 - Press **Enter** to start installation right away and continue with [Step 9](#).
 - Press **F4** to list the contents of the installation package and continue with [Step 8](#).



8. Select either `HP Cluster Extension XP For HACMP` or `HP Cluster Extension XP Generic Interface`, which installs the CLI for AIX.
9. When the installation is finished, press **F10** to exit SMIT.

Upgrading XP Cluster Extension Software for AIX

You can upgrade the XP Cluster Extension Software while the cluster is running.

**TIP:**

Stop the cluster on the node that is to be upgraded before starting the upgrade process.

To upgrade XP Cluster Extension for HACMP:

1. Move the resource groups that use XP Cluster Extension to another cluster system, or stop the resource groups.
2. Remove the currently installed version of XP Cluster Extension.

For instructions, see “[Removing XP Cluster Extension Software for AIX](#)” on page 14.

If the XP Cluster Extension CLI (`clxrun`) is used, make sure that all associated resources that were previously online are offline after running `clxrun`; then, remove the XP Cluster Extension generic interface.

3. Install the new version of XP Cluster Extension.

For instructions, see “[Installing XP Cluster Extension Software for AIX](#)” on page 12.

Removing XP Cluster Extension Software for AIX

Before removing XP Cluster Extension, consider the following cautions:

△ **CAUTION:**

Before you can remove XP Cluster Extension from the system, you must first stop the resource group or switch the resource group to another system, and then remove the pre-event entry for XP Cluster Extension from the `get_disk_vg_fs` and `release_vg_fs` events.

△ **CAUTION:**

Deleting the XP Cluster Extension integration from an online resource group or cluster does not remove the `resource_name.online` file. It also does not remove the device group from the list of monitored device groups if the pair/resync monitor is used to monitor the XP Continuous Access link. Therefore, the device group must be deleted from the list of monitored device groups manually using the `clxchkmon` command after deleting the XP Cluster Extension resource. See “Stopping the pair/resync monitor” in the “XP Cluster Extension and CLI” chapter of the *HP StorageWorks XP Cluster Extension Software Administrator Guide* for instructions.

△ **CAUTION:**

Failure to delete the monitored device group from the list of monitored device groups can cause data corruption if the `ResyncMonitorAutoRecover` attribute is set to `YES`.

The following command removes XP Cluster Extension for AIX from the system:

```
#smitty deinstall
```

To deinstall XP Cluster Extension for AIX:

1. Select **software**.
2. Press **F4**.
3. Select the XP Cluster Extension component you want to remove from the system, and then press **Enter**.
4. When the deinstallation process is complete, press **F10** to exit SMIT.

3 Installing XP Cluster Extension Software for Windows

This chapter describes the installation of XP Cluster Extension in MSCS environments with HP XP disk arrays.

This version of XP Cluster Extension allows you to install, uninstall, modify, and repair XP Cluster Extension on all of the nodes in a cluster by running the installer from one node in the cluster. This feature is not available for performing XP Cluster Extension upgrade procedures. When upgrading, you must run the installation package separately on each cluster node.

 **NOTE:**

For information on configuring XP Cluster Extension in an MSCS environment, see the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.

Prerequisites

Before installing XP Cluster Extension, perform the following tasks:

1. Check “[General installation prerequisites](#)” on page 8 to make sure your setup meets the general installation prerequisites.

2. Install and configure the HP MPIO Full-Featured Device Specific Module (DSM) for XP Disk Arrays (called the HP MPIO XP DSM in this guide) to enable alternative pathing for Windows.

HP MPIO XP DSM is available for Windows and is required to take advantage of I/O-path failover, a feature that is not available with Windows operating systems.

HP MPIO XP DSM must be installed on the server cluster systems before you connect the server to the second I/O path.

3. If you plan to use the XP Cluster Extension cluster-wide installation feature, verify that the WMI service is running.

4. Prepare the data centers for XP Cluster Extension Software installation and configuration.

For more information, see “[Pre-installation procedures](#)” on page 18.

5. Download the XP Cluster Extension Software installer.

- a. Browse to <http://www.hp.com/go/softwaredepot>.
- b. Click **Storage and NAS** in the product category list.
- c. Follow the on-screen instructions to download the installer.

Pre-installation procedures

This section describes the procedures you must perform to prepare the data centers for XP Cluster Extension installation and configuration. Perform these procedures before you install XP Cluster Extension.

ⓘ IMPORTANT:

If you are not familiar with the following steps for configuring the disk array, contact your HP service representative for assistance.

1. Establish bidirectional links between the disk arrays at the two sites (local and remote).
For greater fault tolerance, use two or more diversely routed links in each direction between the two data centers.
2. [Create volumes in the XP disk arrays and map them to servers](#), page 18.
3. [Partition physical disks](#), page 19.
4. [Create the XP RAID Manager configuration file and pair disk pairs](#), page 19.
5. [Create a Microsoft cluster](#), page 19.

Create volumes in the XP disk arrays and map them to servers

You must create volumes in the XP disk arrays and map them to servers at the local and the remote site.

Creating and mapping volumes at the local (primary) site

1. Create a 36-MB volume as the command device for the XP RAID Manager instance that will be used by the XP Cluster Extension resource.
2. Create the array volumes that will be used as data disks that support your applications and shares in the cluster.

NOTE:

You can set up additional command devices to provide for additional redundancy or use other HP integration products such as HP OpenView Data Protector Zero Downtime Backup Integration.

The CVS volumes can usually be created from available free space on a disk parity group.

The application/data disks can be of any size supported by the disk array.

3. Assign the command device and application/data disks to the FC ports that will be connected to the local cluster nodes.
4. Record the volume assignment details for the XP RAID Manager configuration files.

Creating and mapping volumes at the remote (secondary) site

1. Coordinate with the administrator at the remote site to configure the disk array as described in “Creating and mapping volumes at the local (primary) site” on page 18.

The disks in the remote XP array must be of the same size and emulation type as the disks in the local XP array.

2. Record the volume assignment details for the XP RAID Manager configuration files.

Partition physical disks

1. Partition command devices on the first server at the local site.
 - a. Create a partition on the device.
 - b. Do not format partitions.
 - c. Do not assign drive letters.
2. Partition data/application devices on the first server at the local site.
 - a. Create a partition on the device.
 - b. Format partitions.
 - c. Assign drive letters.
3. Complete [Step 1](#) only for the command device for the first server at the remote site.
4. Open Disk Manager on all cluster nodes at the local site and confirm that you can view the partitions.

Create the XP RAID Manager configuration file and pair disk pairs

1. Ensure that the XP RAID Manager software is installed on all nodes at both sites. Create the XP RAID Manager `HORCM` configuration files and configure them with device groups for the data/application disks created and mapped to the cluster nodes in the previous steps. For more information, see “Setting up XP RAID Manager” in the *HP StorageWorks XP Cluster Extension Software Administrator Guide*, and the *HP StorageWorks XP RAID Manager User's Guide*.
2. At the local site, Use XP RAID Manager to create the data/application disk pairs. Choose the fence levels appropriate for your environment for the data/application disks. For example:
`paircreate -g device group name -f fence level -vl -c 15`, where:
 - `device group name` is the disk pair used for the data disk specified in a previously created RAID Manager configuration file.
 - `fence level` is DATA, NEVER, ASYNC, or JOURNAL.



NOTE:

After the disks are paired, reboot the servers at the remote site (S-VOL side). This will allow them to recognize the correct disk signature.

Create a Microsoft cluster

1. Start Failover Cluster Management (Windows Server 2008/2008 R2) or Cluster Administrator (Windows Server 2003) on a server in the local data center.

2. Create a new cluster and add all of the local nodes.
3. Start Failover Cluster Management (Windows Server 2008/2008 R2) or Cluster Administrator (Windows Server 2003) on a server in the remote data center.
4. Add all of the remote cluster nodes to the existing cluster.
5. For Windows Server 2008/2008 R2 clusters only, run ClusPrep, the MSCS validation tool, to validate your cluster.

If the Failover Cluster Validation Report lists a failed storage test, you can ignore this error. For more information, see the document *Failover Cluster Step-by-Step Guide: Validating Hardware for a Failover Cluster*, available at <http://technet.microsoft.com>.

You can configure the XP disks that are mapped to the cluster nodes from the XP arrays as the cluster resources. Both the local and the remote sites are prepared so that you can install the XP Cluster Extension Software on the cluster nodes.

Installing XP Cluster Extension Software for Windows

XP Cluster Extension Software provides a standard InstallShield wizard for Windows. The setup program includes integration with MSCS and the generic software interface. The installer includes the following features:

- The XP Cluster Extension resource type
- CLI
- XP Cluster Extension documentation

To install XP Cluster Extension:

1. Make sure that the cluster service is running.
2. Make sure that the cluster management application is not running on the cluster nodes where you plan to install XP Cluster Extension.



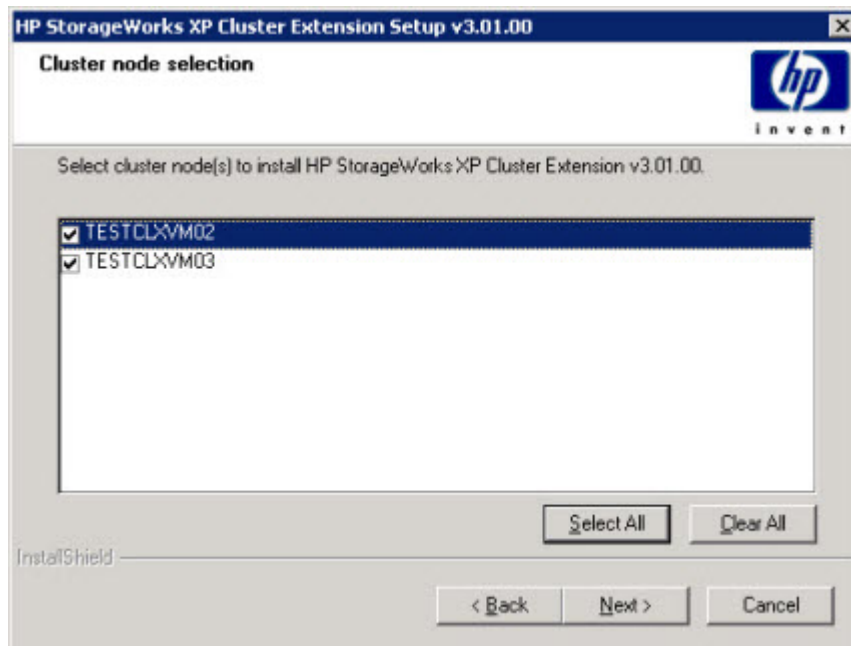
NOTE:

Failover Cluster Management is used on Windows Server 2008/2008 R2, and Cluster Administrator is used on Windows Server 2003.

3. Run the installer by doing one of the following:
 - Double-click the XP Cluster Extension installation package.
 - Run the XP Cluster Extension installation package from the command prompt. This option is used for Server Core or Hyper-V Server installation. For more information about installing applications in a Server Core or Hyper-V Server environment, see your Microsoft documentation.
4. Follow the instructions to accept the license agreement and enter your identification.
The Setup Type dialog box appears.

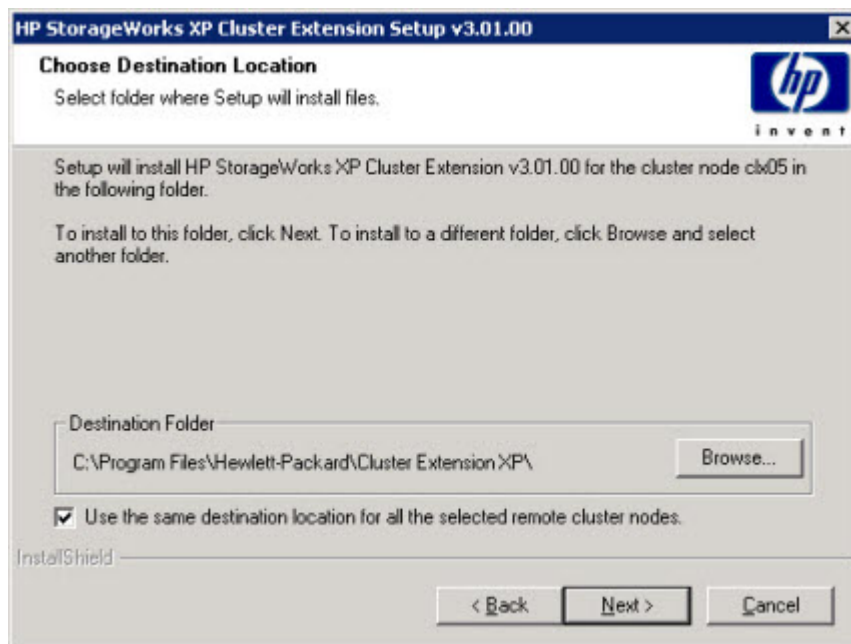
5. In the Setup Type dialog box, select one of the following options, and then click **Next**:
- Select **Typical** to install the resource DLL, cluster administrator extension DLL, and documentation.
 - Select **Compact** to install only the resource DLL and cluster administrator extension DLL.
 - Select **Custom** to select specific components to install.

The Cluster node selection dialog box appears.



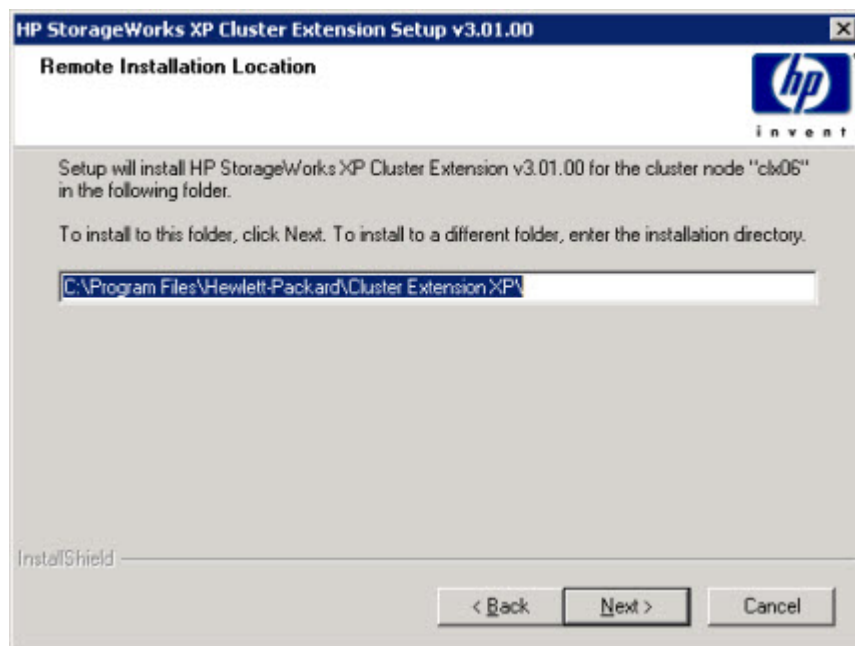
6. Select the cluster nodes for XP Cluster Extension installation, and then click **Next**.

The Choose Destination Location dialog box appears.



7. Accept the default location, or click **Browse** and specify a new destination.
8. Specify whether the installation directory will apply to all nodes selected for installation:
 - If you want to use the same destination location for all nodes selected in the previous step, select the **Use the same destination location for all the selected remote cluster nodes** check box, and then click **Next**.
 - If you do not want to use the same destination for all nodes selected in the previous step, do not select the **Use the same destination location for all the selected remote cluster nodes** check box, and click **Next** to continue.
9. If you specified the same location for all cluster nodes, skip to [Step 11](#).

If you did not specify the same location for all of the selected cluster nodes, the Remote Installation Location window opens for each selected cluster node. Continue to [Step 10](#).



10. For all remote cluster nodes: Accept the default location or enter a new location, and then click **Next**.
11. The installer asks if you want to install a permanent license. Click **Yes** to install a permanent license. Follow the instructions in [“Licensing”](#) on page 41 to retrieve and install the license, and then click **Finish**.



NOTE:

You must perform the permanent license installation procedure separately on each cluster node. Cluster-wide installation does not install a permanent license on remote cluster nodes.



TIP:

To start the configuration tool at the end of the installation, select the **Launch Configuration Tool** check box before you click **Finish**.

12. To perform the required configuration steps, follow the instructions in the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.

Upgrading XP Cluster Extension Software for Windows

The upgrade procedure that you use depends on the installed version of XP Cluster Extension. For instructions on upgrading XP Cluster Extension for Windows, see the following sections:

- [Upgrading from XP Cluster Extension 2.08.01 \(Windows Server 2003 QFS\)](#), page 23
- [Upgrading from XP Cluster Extension 2.08.01 \(Windows Server 2003 MNS\)](#), page 23
- [Upgrading from XP Cluster Extension 3.0x.00 \(Windows Server 2003/2008/2008 R2\)](#), page 24

Upgrading from XP Cluster Extension 2.08.01 (Windows Server 2003 QFS)

This version of XP Cluster Extension does not support the QFS configuration. If you try to upgrade XP Cluster Extension when a local quorum (shared quorum) is configured, the installer stops the upgrade process and instructs you to first migrate your QFS configuration to a Majority Node Set (MNS) configuration.

To migrate from a QFS configuration to a Microsoft MNS configuration, follow the instructions in the white paper *Migrating HP StorageWorks XP Cluster Extension Quorum Filter Service Implementations to Microsoft Majority Node Set Quorum Configurations*, which is available at <http://www.hp.com>.

Upgrading from XP Cluster Extension 2.08.01 (Windows Server 2003 MNS)

If you try to install this version of XP Cluster Extension on a system where XP Cluster Extension 2.08.01 already exists with an MNS configuration, the installer prompts you to locate and perform the following procedure, which allows you to upgrade without losing your existing cluster resource configuration information.

 **NOTE:**

During the upgrade process, do not access the XP Cluster Extension resource Parameters page on any node on which the upgrade has not been completed.

1. Download the XP Cluster Extension Software from SUM. You can access SUM from the ITRC website: <http://www.itrc.hp.com>.
2. Move all of the applications from the current node to any other node.
3. Uninstall XP Cluster Extension from the current node.
 - a. Select **Start > Control Panel > Add or Remove Programs**.
 - b. Select **Cluster Extension XP**, and then click **Change/Remove**.
 - c. When the installer asks if you want to unregister the resource type, click **Yes**.
 - d. When the installer notifies you that XP Cluster Extension resources still exist in the cluster, click **Yes** to continue the uninstall procedure.
 - e. If the message `Warning: Unable to rename clxmscs.dll` appears, ignore this message and continue by clicking **OK**.

4. Install XP Cluster Extension only on the local node.

For installation instructions, see “Installing XP Cluster Extension Software for Windows” on page 20.

❗ **IMPORTANT:**

Perform the upgrade procedure on each node locally. XP Cluster Extension does not support remote upgrades.

5. Restart the cluster service on the node.
6. Repeat [Step 2](#) through [Step 5](#) for additional nodes in the cluster.

Upgrading from XP Cluster Extension 3.0x.00 (Windows Server 2003/2008/2008 R2)

❗ **IMPORTANT:**

Before starting the upgrade procedure, save the XP Cluster Extension configuration file, if it exists. You can save the file by using the Export feature in the XP Cluster Extension configuration tool. For instructions on saving the file, see the *HP StorageWorks XP Cluster Extension Administrator Guide*. After completing the upgrade procedure in this section, use the Import feature in the XP Cluster Extension configuration tool to import the saved configuration file.

❗ **IMPORTANT:**

Perform the upgrade procedure on each node locally. XP Cluster Extension does not support remote upgrades.

To upgrade from XP Cluster Extension 3.0x.00:

1. Download the XP Cluster Extension Software from SUM. You can access SUM from the ITRC website: <http://www.itrc.hp.com>.
2. Move all of the applications from the current node to any other node.
3. Double-click the XP Cluster Extension installation package, and then follow the on-screen instructions.
4. Restart the cluster service on the node.
5. Repeat this procedure for all other nodes that are running XP Cluster Extension 3.0x.00.

XP Cluster Extension maintenance

After installation, you can modify, repair, or remove XP Cluster Extension.

In the Server Core or Hyper-V Server environment, the Control Panel Programs and Features function is not available. To perform maintenance operations in a Server Core or Hyper-V Server environment, run the XP Cluster Extension installation package from the command prompt. HP recommends saving a copy of the XP Cluster Extension installation package in case it is needed for performing maintenance operations on Server Core or Hyper-V Server systems.

Modifying the XP Cluster Extension installation

Once XP Cluster Extension is installed, you can modify the installation by adding or removing components.

1. Start the XP Cluster Extension InstallShield wizard:
 - a. Depending on your version of Windows, do one of the following:
 - For Windows Server 2003: Select **Start > Control Panel > Add or Remove Programs**.
 - For Windows Server 2008/2008 R2: Select **Start > Control Panel > Programs and Features**.
 - For Server Core or Hyper-V Server: Run the XP Cluster Extension installation package from the command line. Continue to [Step 3](#).
 - b. Select **HP StorageWorks XP Cluster Extension**. Click **Change/Remove** (Windows Server 2003) or **Uninstall/Change** (Windows Server 2008/2008 R2).

The InstallShield wizard prompts you to close any cluster administration programs.
2. Close any open cluster administration programs, and then click **OK**.

The InstallShield maintenance window appears.
3. Select **Modify**, and then click **Next**.

The Select Features window appears.
4. Select the check boxes next to the features you want to install, clear the check boxes next to the features you want to remove, and then click **Next**.

The Cluster node selection window appears.
5. Select the cluster nodes to modify, and then click **Next**.

The InstallShield wizard notifies you that remote maintenance is in progress. For each selected cluster node, the wizard notifies you that maintenance was successful or unsuccessful.
6. For each remote maintenance confirmation window, click **OK**.

The Maintenance Complete window appears.
7. Click **Finish** to close the InstallShield wizard.

Repairing the XP Cluster Extension installation

Once XP Cluster Extension is installed, you can repair the installation.

1. Start the XP Cluster Extension InstallShield wizard:
 - a. Depending on your version of Windows, do one of the following:
 - For Windows Server 2003: Select **Start > Control Panel > Add or Remove Programs**.
 - For Windows Server 2008/2008 R2: Select **Start > Control Panel > Programs and Features**.
 - For Server Core or Hyper-V Server: Run the XP Cluster Extension installation package from the command line. Continue to [Step 2](#).
 - b. Select **HP StorageWorks XP Cluster Extension**. Click **Change/Remove** (Windows Server 2003) or **Uninstall/Change** (Windows Server 2008/2008 R2).

The InstallShield maintenance window appears.

2. Select **Repair**, and then click **Next**.
The Cluster node selection window appears.
3. Select the cluster nodes to repair, and then click **Next**.
The InstallShield wizard notifies you that remote maintenance is in progress.
4. For each remote maintenance confirmation window, click **OK**.
The Maintenance Complete window appears.
5. Click **Finish** to close the InstallShield wizard.

Removing XP Cluster Extension for Windows

1. Make sure that the cluster management application is not running.
Failover Cluster Management is used on Windows Server 2008/2008 R2, and Cluster Administrator is used on Windows Server 2003.
2. Start the XP Cluster Extension InstallShield wizard:
 - a. Depending on your version of Windows, do one of the following:
 - For Windows Server 2003: Select **Start > Control Panel > Add or Remove Programs**.
 - For Windows Server 2008/2008 R2: Select **Start > Control Panel > Programs and Features**.
 - For Server Core or Hyper-V Server: Run the XP Cluster Extension installation package from the command line. Continue to [Step 3](#).
 - b. Select **HP StorageWorks XP Cluster Extension**. Click **Change/Remove** (Windows Server 2003) or **Uninstall/Change** (Windows Server 2008/2008 R2).
The InstallShield maintenance window appears.
3. Select **Remove**, and then click **Next**.
The InstallShield wizard prompts you to confirm the uninstall request.
4. Click **Yes** to confirm the request.
The Cluster node selection window appears.
5. Select the cluster nodes for XP Cluster Extension removal, and then click **Next**.
6. Click **OK** to continue.
The install wizard prompts you to save the `cl1xXpCfg` file. This file contains information about the XP Cluster Extension configuration. If you save the file, you could import it to restore your XP Cluster Extension configuration.
7. Do one of the following:
 - Click **Yes** if you want to save the file. Enter a file name, and then click **Save**.
 - Click **No**.

8. Click **OK**.

The install wizard asks if you want to unregister the cluster resource type from all nodes in the cluster. HP recommends that you do not unregister the cluster resource type until you are uninstalling XP Cluster Extension from the last node in the cluster. Do one of the following:

- If you have not unregistered the cluster resource type, and this is the last node in the cluster, click **Yes**.
- If you have unregistered the cluster resource type from one of the other cluster nodes, click **No**.

The installer asks if you want to save the `clxcfg.txt` file, which contains information about the installation.

9. Click **Yes** if you want to save the file, or click **No**.

The Uninstall Complete window appears.

10. Click **Finish**.

Troubleshooting the Windows installation

This section provides information for troubleshooting installation on Windows systems.

Troubleshooting installation and maintenance problems

This section helps you locate and identify installation and maintenance problems. The cluster-wide installation feature allows you to install XP Cluster Extension on multiple nodes in a cluster by running the installer from one node in the cluster. Cluster-wide installation is no different than local installation on each individual node.

Cluster-wide installation can fail to obtain the remote installation status if a remote node becomes unreachable. This can happen if the network connection or remote cluster node fails. If this type of failure occurs, find the error code in the file `%WINDIR%\CLXSetup_nodename.result`, available on the unreachable node, and then locate the error in [Table 1](#) on page 28.

In addition to showing the results of the installation process, the `.result` file helps you identify the status of remote maintenance if cluster level maintenance (modify, repair, remove) fails.

 **NOTE:**

If the `.result` file is not found on the remote cluster node, run the XP Cluster Extension setup by logging on to the remote cluster node locally.

If you receive an error similar to `Another installation is already in progress...`, then stop the process `IDriver.exe` (and `msiexec.exe`), or reboot the node and rerun the XP Cluster Extension setup locally.

Example

If you start a cluster-wide installation on Node1 of a 3-node cluster, with all nodes selected for installation, and the network connection to Node2 and Node3 is lost by Node1, then the cluster-wide installation process cannot get the status of the remote node installation. In this situation, use the `%WINDIR%\CLXSetup_nodename.result` file to obtain the remote node installation status. To check the `.result` file for the remote nodes, log on to Node2 and Node3, and access the file

%WINDIR%\CLXSetup_nodename.result on each node. Compare the errors in the file to the information in [Table 1](#) on page 28.

Table 1 Windows remote installation error codes

ERROR code	Description	Corrective action
ERROR_INSTALLATION_SUCCESS	Installation was successful on the local cluster node.	N/A
ERROR_REMOVAL_SUCCESS	XP Cluster Extension was successfully removed from the local cluster node.	N/A
ERROR_REPAIR_SUCCESS	XP Cluster Extension was successfully repaired on the local cluster node.	N/A
ERROR_MODIFY_SUCCESS	XP Cluster Extension was successfully modified on the local cluster node.	N/A
ERROR_READ_INPUT_FILE_FAILED	Setup failed on the local cluster node. The silent input file is corrupted.	Run the setup on the local cluster node.
ERROR_INVALID_HANDLE	Setup failed on the local cluster node. Internal Error. Could not invoke the DLL.	Run the setup on the local cluster node.
SILENT_INPUT_FILE_CORRUPTED	Setup failed on the local cluster node. The silent input file is corrupted or could not be found.	Run the setup on the local cluster node.
LOCAL_NODE_NAME_NOT_FOUND	Setup failed on the local cluster node. Could not find the local node name.	Run the setup on the local cluster node.
ERROR_CLXMSCS_REGISTER_FAILED	Installation completed on the local cluster node. Setup was unable to register the resource type Cluster Extension XP.	Register the resource type by running the following cluster command: cluster restype "Cluster Extension XP" /create /dll:clxmscs.dll /type:"Cluster Extension XP"
ERROR_CLXMSCSEX_REGISTER_FAILED	Installation completed on the local cluster node. Setup was unable to register the Cluster Extension XP DLL.	Register the resource extension DLL by running the following cluster command: Cluster /regadminext:clxmscsex.dll
ERROR_INSTALLDIR_NOT_FOUND	Setup failed on the local cluster node. Setup was not able to get the INSTALLDIR value.	Run the setup on the local cluster node.
ERROR_CLUS_SERVICE_UNKNOWN	Setup failed on the local cluster node. Setup is not able to determine whether the cluster service is running.	Run the setup on the local cluster node.
ERROR_CLUS_SERVICE_NOT_RUNNING	Setup failed on the local cluster node. The cluster service is not running. Please start the cluster service.	Start the cluster service on the local node and run the XP Cluster Extension setup.

ERROR code	Description	Corrective action
ERROR_PCF_CREATION_FAILED	Installation failed on the local cluster node. The PCF file could not be created. Use <code>clxpcfgen.exe</code> to create the PCF file.	Run the setup on the local cluster node.
ERROR_AUTOPASS_INSTALL_FAILED	Setup completed on the local cluster node. The AutoPass package was not installed properly. XP Cluster Extension will not function correctly until the AutoPass package is properly installed.	Check the <code>eventlog</code> for more information, and then run the XP Cluster Extension setup with the repair option.
ERROR_CLXAUTOPASS_INSTANTON_FAILED	Installation completed on the local cluster node. Setup was unable to run <code>clxautopass.exe -installinstanton</code> on the local cluster node.	Install the instant-on license on the local node by running the following command: <code>clxautopass.exe -installinstanton</code>
ERROR_AUTOPASS_REMOVAL_FAILED	Uninstall completed on the local cluster node. Setup was unable to run the <code>msiexec.exe</code> command.	Make sure <code>msiexec.exe</code> can be executed, and then run the XP Cluster Extension setup on the local cluster node.
ERROR_RESOURCE_STATE_UNKNOWN	Uninstall failed on the local cluster node. Setup is not able to determine whether a Cluster Extension XP resource is still running.	Run the setup on the local cluster node.
ERROR_RESOURCE_EXISTS	Uninstall failed on the local cluster node. Setup is unable to remove the Cluster Extension XP resource type. Cluster Extension XP resource(s) are still configured in this cluster.	Remove all Cluster Extension XP-type resource(s) from this cluster, and then run the XP Cluster Extension setup.
ERROR_RESOURCE_STATE_ONLINE	Uninstall failed on the local cluster node. A Cluster Extension XP resource is still online.	Remove all Cluster Extension XP-type resource(s) from this cluster, and then run the XP Cluster Extension setup.
ERROR_CLXMSCSEX_UNREGISTER_FAILED	Uninstall failed on the local cluster node. Setup was unable to unregister the XP Cluster Extension extension DLL.	Unregister the resource extension DLL by running the following cluster command: <code>Cluster / unregadminext:clxmscsex.dll</code>
ERROR_PCF_REMOVAL_FAILED	Uninstall completed on the local cluster node. Setup was unable to delete the PCF file.	Delete the file <code>clxpcf</code> from <code>INSTALL_DIR\bin</code> .
CLXUNSETPATH_FAILED	Uninstall completed on the local cluster node. Could not unset the path variables.	Remove the environment variable <code>HPCLX_PATH</code> from the local cluster node.

ERROR code	Description	Corrective action
ERROR_DELETE_EVENTLOG_DLL_FAILED	Uninstall completed on the local cluster node. Could not delete clxeventlog.dll from the following registry entry: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\SharedDlls	Delete the clxeventlog.dll from the following registry entry: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\SharedDlls
ERROR_UNINSTALL_DRS_FILES_FAILED	Uninstall completed on the local cluster node. Could not delete clxmcs.dll and clxmcssex.dll from the following registry entry: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\SharedDlls	Delete clxmcs.dll and clxmcssex.dll from the following registry entry: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\SharedDlls

If cluster installation fails with the message Could not get the system drive for the cluster node or Setup was unable to run the installation in remote machine, check whether the WMI service is running. To use the XP Cluster Extension cluster-wide installation feature, the WMI service must be running.

Log files

The clxcfg.txt log file helps you locate and identify installation problems.

The following sample %WINDIR%\clxcfg.txt file shows the successful installation of the XP Cluster Extension on an IA-64 server:

```

2008-04-09_142055: *****
2008-04-09_142055: HP XP Cluster Extension setup started.
2008-04-09_142055: *****
2008-04-09_142058: Please exit from all Cluster Administrator programs.
2008-04-09_142108: Cluster Extension XP version 3.00.00 Installation:
Cluster Resource selected for installation.
CLX documentation selected for installation.
2008-04-09_142108: Host Information:
2008-04-09_142108:
2008-04-09_142108: Operating System:
2008-04-09_142108: IA-64 Architecture
2008-04-09_142108: Screen Resolution: 1148 x 934 Pixels
2008-04-09_142108: Language: English
2008-04-09_142108:
2008-04-09_142121: Now configuring Cluster Resource.
2008-04-09_142121: MSCS Resource: Machine specific product configuration file
successfully created.
2008-04-09_142121:           C:\Program Files\Hewlett-Packard\Cluster Extension
XP\bin\clxpcfggen.exe
2008-04-09_142121: MSCS Resource: Cluster Extension XP resource successfully
installed.
2008-04-09_142121:           C:\Windows\system32\cluster.exe resourcetype
"Cluster Extension XP" /create /dllname:clxmcs.dll /type:"Cluster Extension
XP"

```

```
2008-04-09_142123: Checking for AutoPass version 5.51.064 ...
2008-04-09_142123: Installing or upgrading to AutoPass version 5.51.064 ...
2008-04-09_142136: HP CLX code [{44AB884E-4AFB-4397-86AB-FDD3BF94369C}] found
in AutoPass dependency list.
2008-04-09_142154: Please run the following command manually to obtain a
permanent
license and restart the cluster service to reflect the change.
C:\Program Files\Hewlett-Packard\Cluster Extension XP\bin\clxautopass.exe
-ovlicensemgr
```

Registering the resource type and resource extension DLL manually

If a problem occurs during installation, execute the following commands from the command line to register the resource type:

1. Confirm that the resource type is registered with MSCS by entering the following cluster command:

```
cluster resourcetype
```

If the resource type is registered, the output includes the following information:

Display Name	Resource Type Name
Cluster Extension XP	Cluster Extension XP

If the resource type is not registered:

- a. Enter `cluster resourcetype "Cluster Extension XP" /CREATE /DLLNAME:clxmscs.dll /TYPE:"Cluster Extension XP"`.
 - b. Run the `cluster resourcetype` command again to verify that the resource type is now registered.
2. Check whether the cluster administrator extension DLL is registered with MSCS to provide the Cluster Administrator GUI functionality by entering:

```
cluster resourcetype "Cluster Extension XP" /PROPERTIES
```

If the DLL is registered, the output includes the following information:

```
M Cluster Extension XP AdminExtensions {ADD4FC7D-6DF5-40FF-9371-BBFC8619393D}
```

If the DLL is not registered:

- a. Enter `cluster /REGADMINEXT:clxmscsex.dll`.
- b. Run the `cluster resourcetype` command again to verify that the DLL is now registered.

Unregistering the resource type and resource extension DLL manually

Enter the following command to unregister the resource extension DLL:

```
cluster /UNREGADMINEXT:clxmscsex.dll
```

Enter the following command to unregister the resource type:

```
cluster resourcetype "Cluster Extension XP" /delete
```

4 Installing XP Cluster Extension Software for Solaris

XP Cluster Extension provides three standard installation packages for Sun Solaris:

- The `HWPclxvcs` package includes the XP Cluster Extension integration with VCS.
- The `HWPclxgen` package includes the XP Cluster Extension generic interface.
- The `HPOvLic` package includes the HP AutoPass licensing components.

All three packages are bundled into a single data-stream format package named `HWPclxXP.pkg`.

NOTE:

For information on configuring and integrating XP Cluster Extension in a VCS environment, see the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.

Prerequisites

Before installing XP Cluster Extension, perform the following tasks:

1. Check “[General installation prerequisites](#)” on page 8.
2. Enable XP RAID Manager for startup.
See “[RAID Manager XP startup \(VCS\)](#)” on page 33 for instructions.
3. Install and configure VxVM.
4. Install and configure VCS.

XP RAID Manager startup

To enable XP RAID Manager instances to start at system boot, configure the `/etc/init.d/raidmgr` file.

Example The following example enables instances 11 and 22:

```
#!/usr/bin/ksh
# Copyright 2000 Hewlett-Packard, All Rights Reserved.
# Generic init script for RAID Manager XP provided with Cluster
# Extension XP
#
# Note that there are two methods by which we can start
# RAID Manager XP at boot time.
# The default method is to look for files of the form
# /etc/horcm<instance number>.conf
# and thus determine the instance numbers.
#
# However, we recommend to statically define the instances which need
```

```
# to be started, then uncomment and edit the following line:
#
RAIDMGR_INSTANCES="11 22"
```

Installing XP Cluster Extension Software for Solaris

1. Log in as `root`.
2. Download the file `gzip -d hpclxxpx.xx.xx.tar.zip` (where `x.xx.xx` is the current XP Cluster Extension version) installation package to a temporary directory on your server.
3. Uncompress and extract the install package to the `hpclxxp` subdirectory (created during extraction) by entering the following command:

```
#tar -xvf hpclxxpx.xx.xx.tar
```

4. Change to the `hpclxxp` directory.
5. Enter the following command to install the XP Cluster Extension Software:

```
#pkgadd -d HWPclxXP.pkg
```

The `pkgadd` program displays the packages available in the `HWPclxXP.pkg` bundle and prompts you to select the package(s) you want to install. Enter **all** (default) to install all packages, or select individual packages.

ⓘ **IMPORTANT:**

If you choose to install individual packages, the `HPOvLic` package is a prerequisite for the XP Cluster Extension packages and must be installed before you install the XP Cluster Extension packages.

6. After the installation is complete, follow the instructions in “[Licensing](#)” on page 41 to retrieve and install the necessary licenses for XP Cluster Extension packages.
7. Repeat this procedure on each server that will run the XP Cluster Extension resource in the cluster.

Importing the XP Cluster Extension Software resource types configuration file

1. Log in to the server as `root`.
2. Copy the XP Cluster Extension resource types configuration file.

Copy:

```
$VCS_CONF/sample_hpclx/ClusterExtensionXPTypes.cf
```

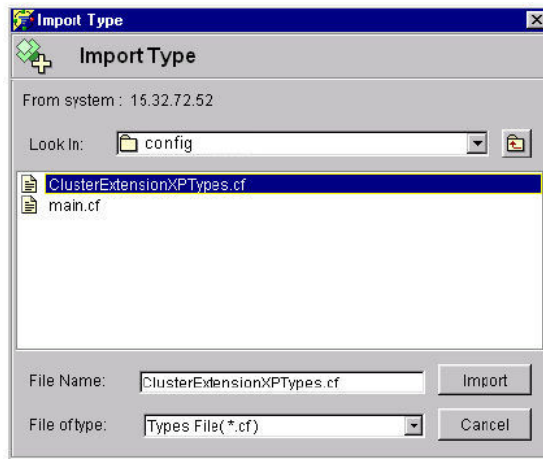
to:

```
$VCS_CONF/config/ClusterExtensionXPTypes.cf
```

To import the XP Cluster Extension resource types configuration file from the VCS Cluster Manager GUI while the cluster is running:

1. Using Cluster Explorer, select **File > Import**.

2. Enter the path to the XP Cluster Extension resource types configuration file (`/etc/VRTSvcs/conf/config`) in the Look In box.
3. Select **ClusterExtensionXPTypes.cf**, and then click **Import**.



(Optional, non-GUI) You can also import the Cluster Extension XP resource types configuration file by editing the configuration file `$VCS_CONF/config/main.cf` to include the following line:

```
include ClusterExtensionXPTypes.cf
```

Upgrading XP Cluster Extension Software for Solaris

NOTE:

If you are installing XP Cluster Extension for the first time, this section is not applicable.

The ClusterExtensionXP agent for VCS can be upgraded while the cluster is running.

TIP:

Stop the cluster on the node to be upgraded before starting the upgrade process.

To upgrade XP Cluster Extension:

1. Move the ClusterExtensionXP resources to another cluster server, or stop the ClusterExtensionXP resources.
2. Stop the ClusterExtensionXP agent by entering the following command:


```
haagent -stop ClusterExtensionXP
```
3. Check `engine_A.log` for details.
4. Deinstall XP Cluster Extension and install the new version of XP Cluster Extension.
5. If the XP Cluster Extension CLI (`clxrun`) is used, make sure that all associated resources that were previously online are offline after `clxrun` has run, then uninstall XP Cluster Extension Generic Interface and install the new version of XP Cluster Extension.

Removing XP Cluster Extension for Solaris

Use the following command to remove XP Cluster Extension from the system:

For VCS:

```
#pkgrm HWPclxvcs
```

For a generic interface:

```
#pkgrm HWPclxgen
```

Removing the HP AutoPass license components

If there are no other package dependencies on the HPOvLic package, remove the HPOvLic package from the system by entering the following command:

```
#pkgrm HPOvLic
```

5 Installing XP Cluster Extension Software for Linux

This chapter describes how to install the XP Cluster Extension Software in a Linux environment. The software provides integration with SUSE Linux Enterprise High Availability Extension, Red Hat Cluster Suite, and a standalone application that can be used for other solutions.



NOTE:

For information on configuring XP Cluster Extension Software in a Linux environment, see the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.

Prerequisites

Before installing XP Cluster Extension, perform the following tasks:

1. Check “[General installation prerequisites](#)” on page 8 to make sure your setup meets the general installation prerequisites.



NOTE:

XP RAID Manager command devices must use `udev`-generated device file names. For more information on `udev`, see the HP High Availability website: <http://docs.hp.com/en/ha.html>.

2. For the cluster software versions and XP arrays that are supported with XP Cluster Extension, see the HP SPOCK website: <http://www.hp.com/storage/spock>.
3. Make sure you have the latest supported software and microcode versions, fixes, FC adapter firmware, and driver versions.
4. Complete the Linux pre-installation procedures.
See “[Pre-installation procedures](#)” on page 37 for more information.

Pre-installation procedures

Before installing XP Cluster Extension, complete the following configuration tasks:

1. Enable XP RAID Manager for startup.
For instructions, see “[Enabling XP RAID Manager instances](#)” on page 38.
2. Configure multipath software.
For more information, see “[Configuring multipath software](#)” on page 38.

3. Configure LVM.

For instructions, see “[Configuring LVM](#)” on page 38.

4. Install and configure the cluster software on each cluster node.

For more information, see “[Installing and configuring the cluster software](#)” on page 39.

Enabling XP RAID Manager instances

To enable XP RAID Manager instances to start at system boot, configure the `/etc/init.d/raidmgr` file.

In the following example, instances 11 and 22 are enabled:

```
# Generic init script for RAID Manager XP provided with Cluster Extension XP
#
# Note that there are two methods by which we can start
# RAID Manager XP at boot time.
# The default method is to look for files of the form
# /etc/horcm<instance number>.conf
# and thus determine the instance numbers.
#
# However, we recommend to statically define the instances which need to be
# started, then uncomment and edit the following line:
#
RAIDMGR_INSTANCES="11 22"
...
```

Configuring multipath software

For information about installing and configuring the Multi-path Device Mapper for Linux Software, see the Multi-path Device Mapper for Linux Software application and release notes. You can find these documents on the Manuals page of the HP Business Support Center website: <http://www.hp.com/support/manuals>. In the Storage Software section, click **Multi-path Device Mapper for Linux Software**.

To use an HBA driver's native multipath failover, follow the instructions in the documentation provided by the manufacturer.

Load balancing affects multipath performance. To ensure optimal load balancing, see the installation and configuration procedures in your multipath software documentation.

NOTE:

For a list of supported multipath software, see the XP array information on the HP SPOCK website: <http://www.hp.com/storage/spock>.

Configuring LVM

The shared data disks used by XP Cluster Extension reside on an XP disk array that is mirrored to the remote data center using XP Continuous Access. The P-VOLs have read/write access and the S-VOLs have read-only access. To access disks that are in read/write mode, the P-VOL of the mirrored disk pair must be in the local (currently active) data center.

Complete the following procedure to make each disk accessible to the nodes in the remote data center:

1. On the P-VOL side (local data center), create the volume groups, logical volumes, and file systems that will be used with the Linux clusters.
2. Use the XP RAID Manager `horctakeover` command to switch the XP RAID Manager device groups from site A to site B. This allows nodes in the remote data center to access the shared disks with read/write access.
3. Create mount points on each node in the remote data center, and then use `vgscan` to import volume groups and logical volumes.
4. Make sure that the volume groups are not activated automatically at system boot time.

 **NOTE:**

For more information about using LVM, see your Linux cluster software documentation.

Installing and configuring the cluster software

Install and configure the cluster software for your Linux operating system. See the SLE HA and RHCS documentation for detailed installation procedures.

 **NOTE:**

A properly configured and fully functioning cluster solution is a prerequisite for the XP Cluster Extension Software.

Installing XP Cluster Extension Software for Linux

XP Cluster Extension Software provides an installation script for Linux. This script installs the software with SLE HA or RHCS.

To install the software:

1. Log in as `root`.
2. Download the XP Cluster Extension Software installer.
 - a. Browse to <http://www.hp.com/go/softwaredepot>.
 - b. Click **Storage and NAS** in the product category list.
 - c. Follow the on-screen instructions to download the installer.
3. Uncompress and extract the contents of this downloaded file to the `hpclxxp_version` directory (created during extraction) by entering the following command:

```
# tar xvfz downloaded_file
```
4. Enter `cd hpclxxp_version` to change to the `hpclxxp_version` directory.
5. Enter `./INSTALL` to run the installation script.

6. The installer prompts you to install a permanent license key. Do one of the following:
 - If you already have a permanent license key, click **Yes**. Follow the instructions in [“Licensing”](#) on page 41 to retrieve and install the license key.

 **NOTE:**

You must perform the permanent license key installation procedure separately on each cluster node. Cluster-wide installation does not install a permanent license key on remote cluster nodes.

- If you do not yet have a permanent license key, click **No**. An instant-on license key that is valid for 60 days will be installed. When you are ready to install the permanent license key, follow the instructions in [“Licensing”](#) on page 41.
7. Repeat [Step 1](#) through [Step 6](#) on each system that will run XP Cluster Extension.
 8. To perform the required configuration steps, follow the instructions in the *HP StorageWorks XP Cluster Extension Software Administrator Guide*.
 9. After installation, read the release notes in the `/opt/hpplx/docs` directory.

 **NOTE:**

After you install a permanent license key on a cluster node, make sure the instant-on license is removed. For instructions, see [“Removing an instant-on license key”](#) on page 42.

Removing XP Cluster Extension Software for Linux

To remove the XP Cluster Extension software from a node, move all of the XP resources to another node, or delete the XP resources and then enter the following command:

```
#!/opt/hpplx/bin/CLX_UNINSTALL
```

This command removes all files and resets all environment variables installed by the installation script.

6 Licensing

This chapter explains how to obtain and install the product license keys. A license key is required to use all of the product features. The License Entitlement Certificate provides instructions on how to obtain a license key. In the meantime, a temporary, instant-on license key is available so that you can immediately start using all of the features. The instant-on key is valid for 60 days from the first use. Upon expiration of the instant-on license key, the features will be disabled; you must obtain a permanent license key to continue using the features.

Retrieving a license key

When you purchase this product, you receive a License Entitlement Certificate. You will need information from this certificate to retrieve and enter your license keys.

You can use any of the following methods to request a license key:

- Obtain a license key from <http://webware.hp.com>.
- Use AutoPass to retrieve permanent license keys. See “Using AutoPass to retrieve permanent license keys” on page 41.
- Fax the Password Request Form that came with your License Entitlement Certificate. See the certificate for fax numbers in your area.
- Call or email the HP Password Center. See the certificate for telephone numbers in your area or email addresses.

Using AutoPass to retrieve permanent license keys

To retrieve permanent license keys:

1. Start AutoPass, located in the product's `bin` directory:

```
clxautopass -ovlicensemgr
```

AutoPass requires that a JRE and/or SDK be installed on the cluster node. See the AutoPass documentation for the latest supported JRE versions.

2. Take one of the following actions:
 - If you have an Internet connection, click **Retrieve/Install License Key**.
 - If you installed the product on a system that does not have an Internet connection, click **Retrieve License Key through Email/Fax**. When you receive the license key in email, start AutoPass and click **Install/Restore License Key**.
3. For MSCS environments only: After installing the permanent license keys, restart the product so the license will be recognized. You can restart the product by restarting the Microsoft cluster service.

Using the clxautopass command-line utility

In addition to using the `clxautopass` command to start AutoPass, you can also use the command at the CLI to install the instant-on license and import a password from the license key file.

Installing the license

If the installation process failed to install the license, you can use the command line to install it. First repair any conditions that may have caused the license installation to fail, and then run the following command to install the license:

```
clxautopass -installinstanton
```

Importing a license key from a file

When you receive the license key file by email, import the license key by running the following command:

```
clxautopass -addpasswords license file path
```

Where *license file path* is the full (absolute) path name to the license key file.

This command is equivalent to using the Install/Restore License Key from file option in AutoPass.

Using the XP Cluster Extension registration tool (Windows only)

To install a license key:

1. Select **Start > All Programs > Hewlett-Packard > HP StorageWorks XP CLX Registration Tool**.
2. Click **Browse**.
3. Browse to your license key file, and then click **Install License**.
4. Click **Close** when you are done installing license keys.

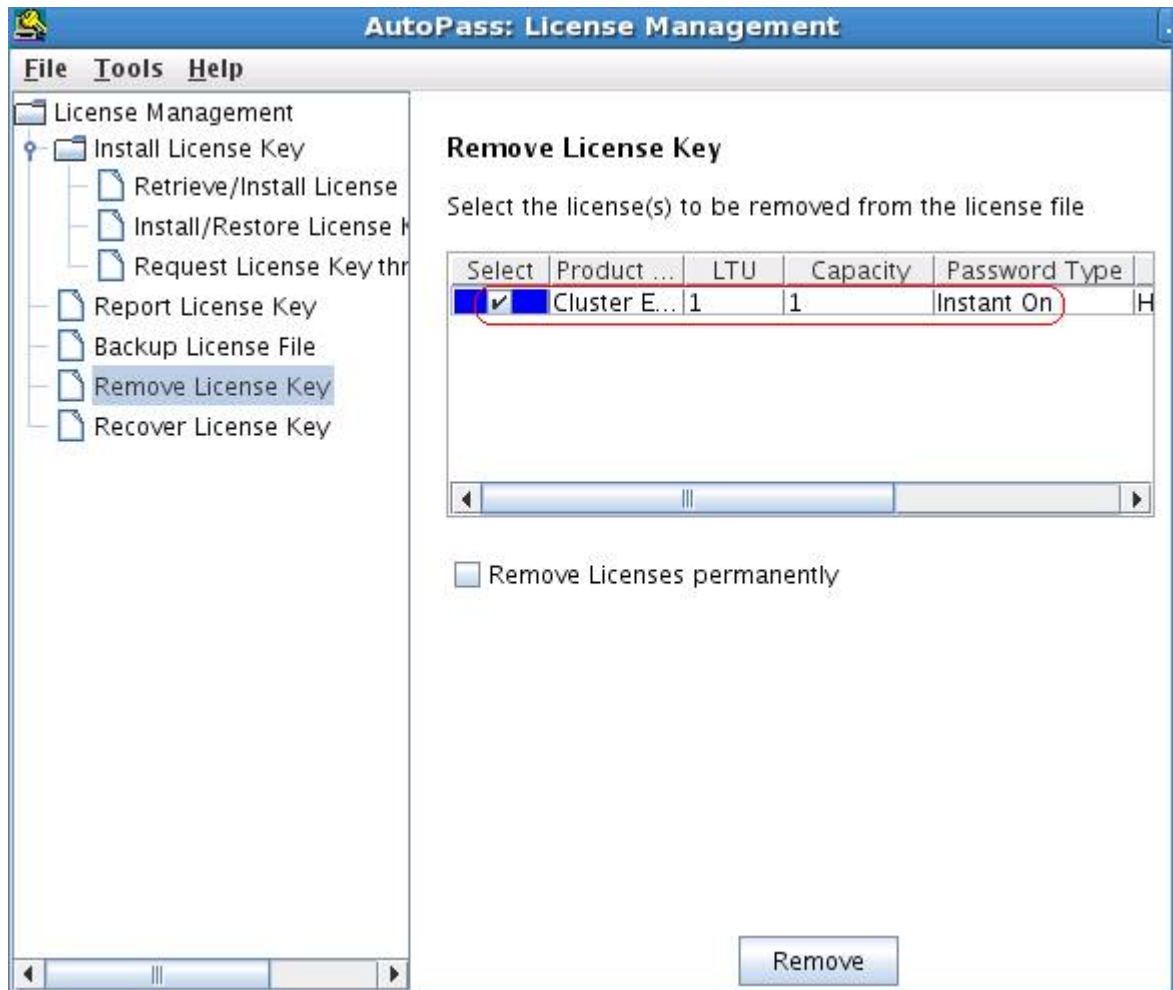
Removing an instant-on license key

1. Start AutoPass, located in the product's `bin` directory:

```
clxautopass -ovlicensemgr
```

2. Click **Remove License Key**.

3. Select any installed instant-on license key, and then click **Remove**.



7 Support and other resources

Contacting HP

For worldwide technical support information, see the HP support website:

<http://www.hp.com/support>

Before contacting HP, collect the following information:

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

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

<http://www.hp.com/go/e-updates>

After registering, you will receive e-mail notification of product enhancements, new driver versions, firmware updates, and other product resources.

New and changed information in this edition

The following additions and changes have been made for this edition:

- The following information has been updated:
 - Installing XP Cluster Extension for Linux

Related information

The following documents provide related information:

- *HP StorageWorks XP Cluster Extension Software Administrator Guide*
- *HP StorageWorks XP RAID Manager User's Guide*
- *HP StorageWorks XP Continuous Access Software User Guide*
- *HP StorageWorks XP Continuous Access Software Journal User Guide*
- *HP StorageWorks XP Business Copy Software User Guide*
- *HP StorageWorks XP LUN Manager User Guide*

You can find HP documents on the Manuals page of the HP Business Support Center website:

<http://www.hp.com/support/manuals>

In the Storage section, click **Storage software**, and then select your product.

White papers

The following white papers are available at www.hp.com/storage/whitepapers:

- *Live Migration across data centers and disaster tolerant virtualization architecture with HP StorageWorks Cluster Extension and Microsoft Hyper-VTM*
- *Considerations in HP StorageWorks XP Cluster Extension configurations to stop automatic XP CA disk pair resynchronization when CA link is suspended*
- *Implementing HP StorageWorks Cluster Extension for Windows in a VMware Virtual Machine*
- *Migrating HP StorageWorks XP Cluster Extension Quorum Filter Service Implementations to Microsoft Majority Node Set Quorum Configurations*
- *Migrating an HP Serviceguard for Linux Cluster to a Novell SUSE Linux Enterprise High Availability Extension Cluster*
- *Migrating an HP Serviceguard for Linux Cluster to Red Hat Cluster Suite in Red Hat Enterprise Linux 5 Advanced Platform*

HP websites

For additional information, see the following HP websites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- http://www.hp.com/service_locator
- <http://www.hp.com/support/manuals>
- <http://www.hp.com/storage/spock>
- www.hp.com/storage/whitepapers
- <http://www.itrc.hp.com>
- <http://docs.hp.com/en/ha.html>

Typographic conventions

Table 2 Document conventions

Convention	Element
Blue text: Table 2	Cross-reference links and e-mail addresses
Blue, underlined text: http://www.hp.com	Website addresses
Bold text	<ul style="list-style-type: none">• Keys that are pressed• Text typed into a GUI element, such as a box• GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes
<i>Italic</i> text	Text emphasis

Convention	Element
Monospace text	<ul style="list-style-type: none"> • File and directory names • System output • Code • Commands, their arguments, and argument values
<i>Monospace, italic text</i>	<ul style="list-style-type: none"> • Code variables • Command variables
Monospace, bold text	Emphasized monospace text

 **CAUTION:**

Indicates that failure to follow directions could result in damage to equipment or data.

 **IMPORTANT:**

Provides clarifying information or specific instructions.

 **NOTE:**

Provides additional information.

 **TIP:**

Provides helpful hints and shortcuts.

HP product documentation survey

Are you the person who installs, maintains, or uses this HP storage product? If so, we would like to know more about your experience using the product documentation. If not, please pass this notice to the person who is responsible for these activities.

Our goal is to provide you with documentation that makes our storage hardware and software products easy to install, operate, and maintain. Your feedback is invaluable in letting us know how we can improve your experience with HP documentation.

Please take 10 minutes to visit the following web site and complete our online survey. This will provide us with valuable information that we will use to improve your experience in the future.

<http://www.hp.com/support/storagedocsurvey>

Thank you for your time and your investment in HP storage products.

Glossary

CHA	Channel adapter. A device that provides the interface between the array and the external host system. Occasionally, this term is used synonymously with the term channel host interface processor (CHIP).
CLI	Command-line interface. An interface comprised of various commands which are used to control operating system responses.
command device	A volume on the disk array that accepts HP StorageWorks Continuous Access or HP StorageWorks Business Copy control operations which are then executed by the array.
CU	Control unit.
CVS	Custom volume size. CVS devices (OPEN-x CVS) are custom volumes configured using array management software to be smaller than normal fixed-size OPEN system volumes. Synonymous with volume size customization (VSC).
DLL	Dynamic-link library.
DSM	Device Specific Module.
failover	Disconnecting a failed unit or path and replacing it with an alternative unit or path to continue functioning.
FC	Fibre Channel. A network technology primarily used for storage networks.
fence level	A method of setting rejection of XP Continuous Access Software write I/O requests from the host according to the condition of mirroring consistency.
GUI	Graphical User Interface.
GUID	Globally unique identifier.
HACMP	High Availability Cluster Multi-Processing. An IBM application for AIX software.
HBA	Host bus adapter.
heartbeat	A periodic synchronization signal issued by cluster software or hardware to indicate that a node is an active member of the cluster.
JRE	Java Runtime Environment.
LD, LDEV	Logical device. An LDEV is created when a RAID group is carved into pieces according to the selected host emulation mode (that is, OPEN-3, OPEN-8, OPEN-9). The number of resulting LDEVs depends on the selected emulation mode. The term LDEV is also known as <i>term volume</i> .
LU	Logical unit.

LUN	Logical unit number.
LUSE	The LUSE feature is available when the HP StorageWorks LUN Manager product is installed, and allows a LUN, normally associated with only a single LDEV, to be associated with 1 to 36 LDEVs. Essentially, LUSE makes it possible for applications to access a single large pool of storage. <i>See also LD, LDEV</i>
LVM	Logical Volume Manager.
MMC	Microsoft Management Console.
MNS	Majority node set quorum. A quorum-capable resource introduced by Microsoft with Windows Server 2003. A single quorum resource that allows you to build clusters with nodes that are geographically separated.
MSCS	Microsoft Cluster Service.
MU	Mirror unit.
path	A path is created by associating a port, a target, and a LUN ID with one or more LDEVs. Also known as a <i>LUN</i> .
PCF	Product Configuration File.
port	A physical connection that allows data to pass between a host and the disk array. The number of ports on an XP disk array depends on the number of supported I/O slots and the number of ports available per I/O adapter. The XP family of disk arrays supports FC ports as well as other port types. Ports are named by port group and port letter, such as CL1-A, where CL1 is the group and A is the port letter.
primary site	The data center location that owns the cluster group (quorum resource).
P-VOL	Primary volume.
QFS	Quorum Filter Service.
quorum	In MSCS, a cluster resource that has been configured to control the cluster, maintaining essential cluster data and recovery information. In the event of a node failure, the quorum acts as a tie-breaker and is transferred to a surviving node to ensure that data remains consistent within the cluster.
RAID	Redundant array of independent disks.
RHCS	Red Hat Cluster Suite
rolling disaster	A rolling disaster is a catastrophic event or outage that affects the data stored on remote mirrored disk pairs. In a rolling disaster, data stored on remote mirrored disk pairs can be entirely lost during a recovery attempt.
RPM	Red Hat package manager.
SCSI	Small Computer Systems Interface. A standard, intelligent parallel interface for attaching peripheral devices to computers, based on a device-independent protocol.
SDK	Software Developer Kit.

secondary site	The data center location with the mirror copy of the quorum disk pair.
SLE HA	SUSE Linux Enterprise High Availability Extension
SMIT	System Manager Information Tool.
split-brain syndrome	A state of data corruption that can occur if a cluster is re-formed as subclusters of nodes at each site, and each subcluster assumes authority, starting the same set of applications and modifying the same data.
SPOCK	Single Point of Connectivity Knowledge website. SPOCK is the primary portal used to obtain detailed information about supported HP StorageWorks product configurations.
SPOF	Single point of failure.
SUM	Software Update Manager.
S-VOL	Secondary or remote volume. The copy volume that receives the data from the primary volume.
SVP	Service processor. A notebook computer built into the disk array. The SVP provides a direct interface to the disk array and used only by the HP service representative.
UCF	User configuration file.
VCS	VERITAS Cluster Server.
volume	On the XP array, a volume is a uniquely identified virtual storage device composed of a control unit (CU) component and a logical device (LDEV) component separated by a colon. For example 00:00 and 01:00 are two uniquely identified volumes; one is identified as CU = 00 and LDEV = 00, and the other as CU = 01 and LDEV = 00; they are two unique separate virtual storage devices within the XP array.
VSC	Volume size customization. Also known as CVS.
VxVM	VERITAS Volume Manager.
WMI service	The Windows Management Instrumentation service.
XP Business Copy Software	XP Business Copy lets you maintain up to nine local copies of logical volumes on the disk array.
XP Continuous Access Software	XP Continuous Access lets you create and maintain duplicate copies of local logical volumes on a remote disk array.

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