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# Clustering Tips for Microsoft Windows Advanced Server, Limited Edition on Compaq ProLiant DL590/64 Server

**Abstract:** Compaq will facilitate the experience of customers who will cluster the new Microsoft Windows Advanced Server, Limited Edition operating system on Compaq ProLiant DL590/64 servers. This new operating system and new servers both use a 64-bit architecture.

This document will reveal tips on how to set up a cluster using Microsoft® Advanced® Server, Limited Edition Cluster Services on Compaq ProLiant DL590/64 servers. Installation procedures and known issues will also be detailed.

The scope of this document does not include the 32-bit Windows operating systems, or the Windows Datacenter operating systems.

The use of the Windows Advanced Server, Limited Edition clusters on Compaq ProLiant DL590/64 servers is intended for a non-production environment such as in development and beta testing.

At the time of publication, the information in this document was complete and accurate.

For current information regarding Windows Advanced Server, Limited Edition and Compaq DL590/64 servers, visit the following links:

<http://www.compaq.com/partners/microsoft/whistler/index.html>,

<http://www.compaq.com/products/servers/proliantdl590/index.html>,

<http://www.microsoft.com/>.

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Clustering Tips for Microsoft Windows Advanced Server, Limited Edition on Compaq ProLiant DL590/64 Server White Paper prepared by High Availability Systems Engineering

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# Introduction to Clustering in Windows Advanced Server, Limited Edition

The Windows Advanced Server operating system offers cluster functionality improvements over previous Windows versions. Cluster services are no longer provided as an add-on component of the operating system. Instead, cluster services are installed as part of the base operating system installation. A cluster can consist of two to four server nodes. Compaq supports a fibre channel interconnect for cluster storage. New features offered are listed in Table 1.

**Table 1: New features of Microsoft Advanced Server, Limited Edition Cluster Services**

Feature	Description
64-bit support	The Limited Edition of the operating system offers support for the Itanium 64 processor architecture.
Improved Terminal Server installation	Terminal Server (also known as Terminal Services in application server mode) is no longer blocked on servers in a cluster. In Windows 2000, the installation of Terminal Server was blocked if the server was a member of a cluster.
Improved print driver installations	In Windows 2000, each printer driver had to be manually installed on every node of the cluster. This improved feature installs a printer driver on a virtual cluster and propagates it to all nodes of the cluster.
Simplified cluster installation wizard	This feature provides a new Cluster Configuration wizard that simplifies the process of installing and configuring the cluster.
Improved Generic Script resource	The cluster scripting feature simplifies the process of clustering applications. It provides a run-time environment that takes care of complex issues. It also allows for easy creation of new resource types. Features of this new "generic script" resource type include the following: <ul style="list-style-type: none"> <li>• Monitoring of cluster resources and instrumentation for applications and services</li> <li>• Simplifying the implementation new resource types.</li> <li>• Simplifying scriptable application instrumentation by making the applications cluster-aware</li> <li>• Allows a run-time hosting environment</li> <li>• Existing COM automation servers may be reused</li> </ul>
4-node cluster support	The Limited Edition operating system supports from two to four cluster nodes.
Cluster Server Extension	This feature provides an extension of the DeviceIOControl call that allows applications to determine whether a disk is a cluster disk. This call is meant for applications and services that intend to write to the disk.
Central administration for creating and adding nodes to a cluster	The administrator can use the remote console to configure all servers that form a cluster.
Feasibility analysis during the cluster setup process	During cluster setup, the installation wizard will provide an analysis of the system to ensure the system is correctly set up and the installation is performed properly.
COM+ 1.x Enhancement: Configure applications as Windows NT Services	This enhancement of COM+ 1.x allows the ability to configure a COM+ server application as a Windows service and implement the Windows service as a COM+ server application. This provides control over when the COM+ application starts. Marking the application to run as a Windows service means that the component's Dynamic Link Library (DLL) is loaded into memory when the system boots.  When the COM+ application is configured as a Windows service, a Generic Service cluster resource can be configured for the application. Adding the COM+ application to a cluster makes the application highly available.

## Cluster Configuration Environment

The ProLiant DL590/64 is the Compaq server for the Windows Advanced Server, Limited Edition platform. The StorageWorks Modular Array 8000 (MA8000) is the Compaq shared storage unit that is for use with Windows Advanced Server, Limited Edition clusters.

Table 2 below lists the Compaq options validated on the Windows Advanced Server, Limited Edition cluster:

**Table 2: Compaq Cluster Options for Microsoft Advanced Server, Limited Edition**

Cluster Option	Description
Servers	ProLiant DL590/64
Storage system	StorageWorks MA8000/EMA12000
HSG80 controller firmware	ACS 8.6F
Supported controller modes	Single, or Dual Redundant (if two controllers)
Fibre Channel Host Bus Adapter (HBA)	64-Bit/33-MHz PCI-to-Fibre Channel Host Bus Adapter (LP8000)
HBA driver	CPQKGPSA.SYS, v.6-4.52a8 or later
HBA firmware	3.81a1 or later
Compaq Fibre Channel interconnects	Fibre Channel SAN Switch /8 Fibre Channel SAN Switch 8-EL Fibre Channel SAN Switch /16 Fibre Channel SAN Switch 16-EL

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**Note:** The use of the Windows Advanced Server, Limited Edition clusters on Compaq ProLiant DL590/64 servers is intended for a non-production environment such as in development and beta testing.

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## Hardware and Software Configuration Tips

For tips on setting up the ProLiant DL590/64 servers, see the white paper, *Deployment of Windows Advanced Server on Compaq ProLiant DL590/64 Servers*. This white paper may be found at the following link:

<http://www.compaq.com/support/techpubs/whitepapers/158m-0801a-wwen.html>

For more information on the Compaq StorageWorks MA8000 system see the following link:  
<http://www.compaq.com/products/storageworks/MA8kEMA12k/index.html>.

To configure the cluster with the Compaq StorageWorks MA8000 storage subsystem follow the guidelines in the *Compaq ProLiant Cluster HA/F500 Administrator Guide*. Use the basic configuration with switches. The guide may be found at the following link:

[ftp://ftp.compaq.com/pub/supportinformation/techpubs/installation\\_guides/355220-002.pdf](ftp://ftp.compaq.com/pub/supportinformation/techpubs/installation_guides/355220-002.pdf)

The fiber channel host bus adapter will require the Compaq 64-bit SCSI miniport driver, CPQKGPSA.SYS, Version 6-4.52a8 or later. Unlike the HA/F500 cluster, the Windows Advanced Server, Limited Edition cluster will not use any fibre channel filter driver.

## Storage Configuration Tips

### Shared Storage Drives must be NTFS

The shared storage volumes in a cluster must be configured as Basic, Master Boot Record (MBR), NTFS volumes. Dynamic drives and Globally Unique Identifier (GUID) Partition Table (GPT) drives are not supported in a cluster. The local drives and other drives that are not cluster resources do not have this restriction.

### Drive Letter Assignment

Before adding or removing hardware from a cluster, make sure the drive letter assigned to the Windows Advanced Server, Limited Edition system partition (typically C or D) is fixed. The drive letter assignment must remain constant because references to this drive letter are recorded in the registry, and your cluster is affected by these references.

### Consistent Drive Letters for Each Cluster Node

It is also necessary for drive letters on the cluster shared storage device to remain constant and for the drive letter assignments to be the same on each cluster node. In addition, drive letters for the cluster shared storage device must not conflict with any local drive letters.

### Use Mount Points to Access More Than 23 Devices

If you assign drive letters to the cluster shared storage devices, Windows Advanced Server, Limited Edition limits the total number of such devices to 23. Mount points are not subject to this limit. You can use mount points to access more than 23 cluster shared storage devices in your cluster. Mount points must fail over together with their “host” drive, therefore they both must reside in the same resource group. The “host” drives must also have a dependency on their mount points.

## Installing Cluster Services

Since the cluster services are installed as part of the operating system, the user must simply configure the cluster service by setting up a cluster profile. Before installing a cluster verify the shared volumes are MBR, Basic volumes, not GPT or Dynamic.

### Adding the First Node

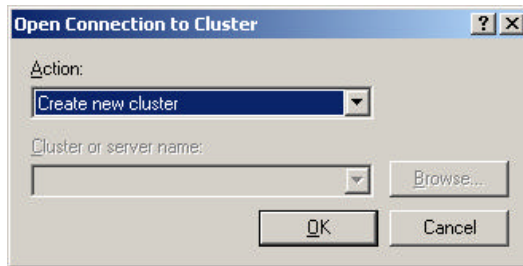
To add the first node, follow these procedures:

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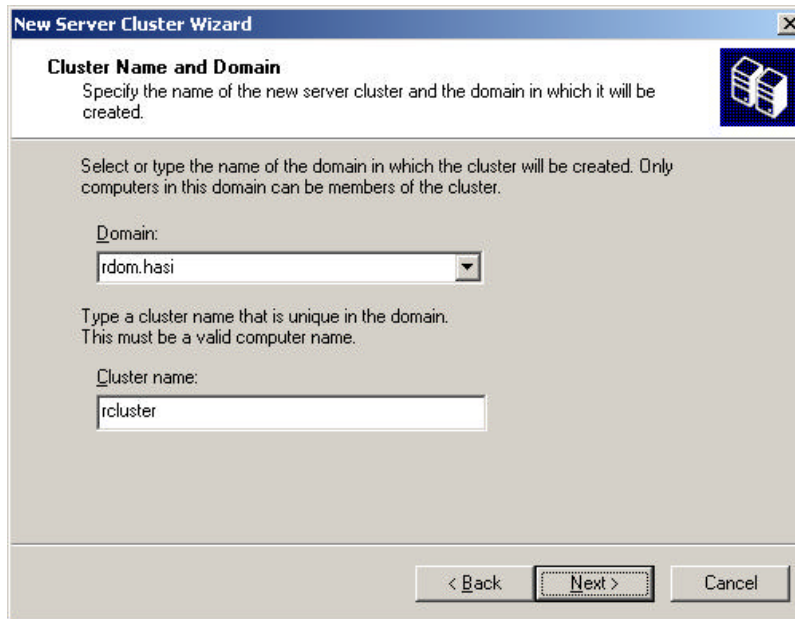
**Note:** You must be an administrator to create a cluster.

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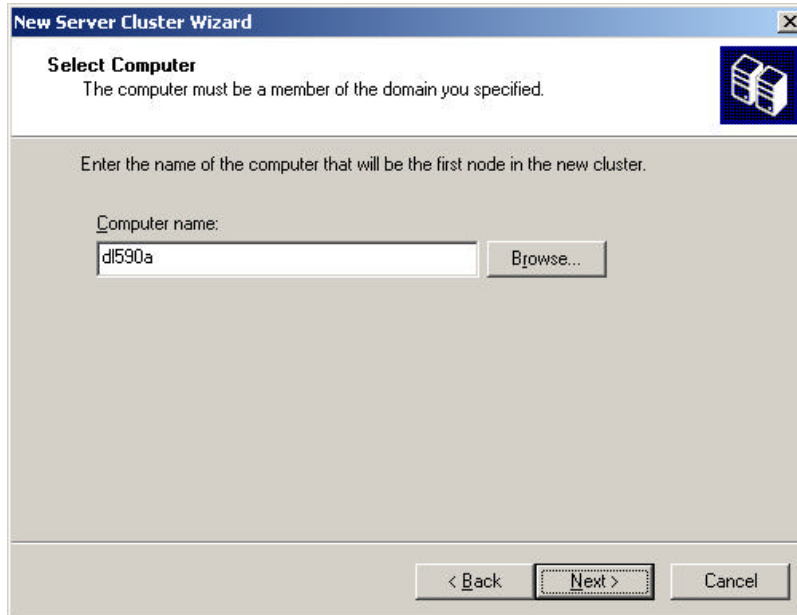
1. Log on to a server you wish to be the first member in the cluster.
2. Open Cluster Administrator by clicking **Start** → **Programs** → **Administrative Tools** → **Cluster Administrator**. A window will pop up prompting to open a connection to a cluster.
3. Select **Create a new cluster** in the Action field.



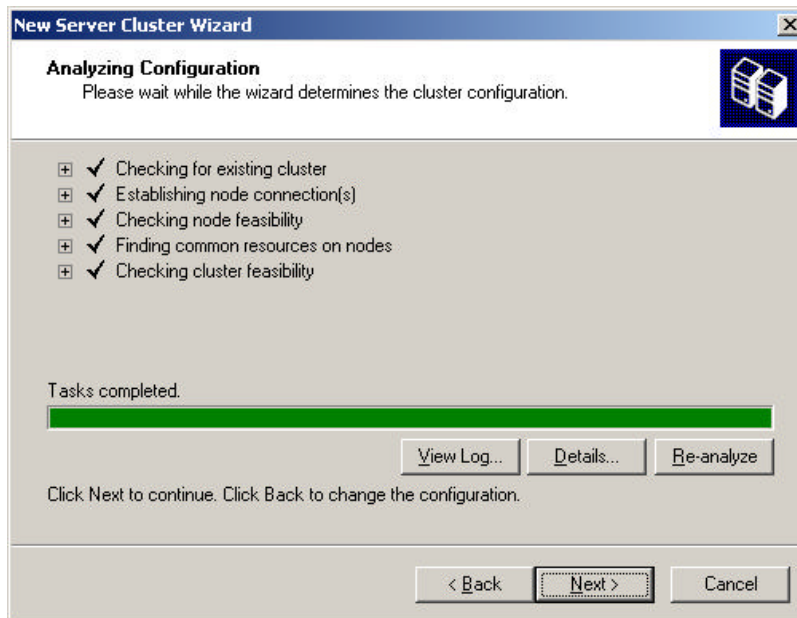
4. Click **OK**. The New Server Cluster Wizard will start. Click **Next** to continue.
5. Enter the domain and name of the cluster. Click **Next**.



6. Enter the computer name of the first node to be added to the cluster. Click **Next**.



The wizard will analyze the system configuration to determine if a cluster is feasible. If there are issues that arise during the analysis, the user may need to cancel the installation and troubleshoot. Once the analysis is complete and no issues arise, click **Next** to continue.



7. Enter an IP address for the new cluster. Click **Next**.
8. Enter a user name and password for the Cluster Service account. The user name must have Domain Admin rights. Click **Next**.
9. On the next window, verify the cluster configuration. The user may use the **Back** button to make changes if necessary. The Quorum drive may be changed by clicking the **Quorum** button and selecting the desired drive. Click **Next**. The cluster will now be created on the node.

10. Click **Next** once all tasks are complete. The wizard is now complete. You may view the log of the installation.
11. Click **Finish** to close the wizard.

## Adding Additional Nodes

To add additional nodes to the cluster, follow these procedures:

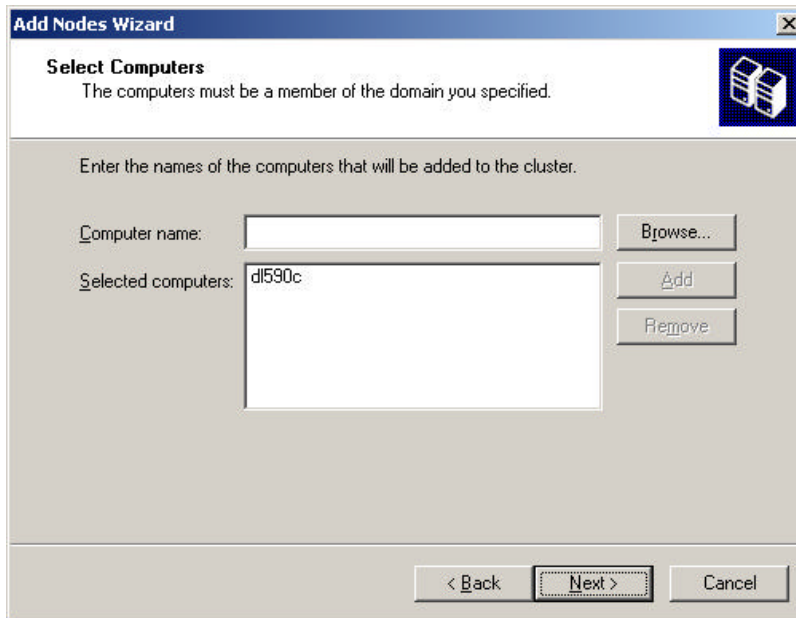
1. Log on to the node you wish to add to the cluster.
2. Open Cluster Administrator by clicking **Start** → **Programs** → **Administrative Tools** → **Cluster Administrator**.

If the following popup window appears, select **Add nodes to a cluster**. Enter, or browse to search for, the name of the cluster.



The Add Nodes Wizard will start.

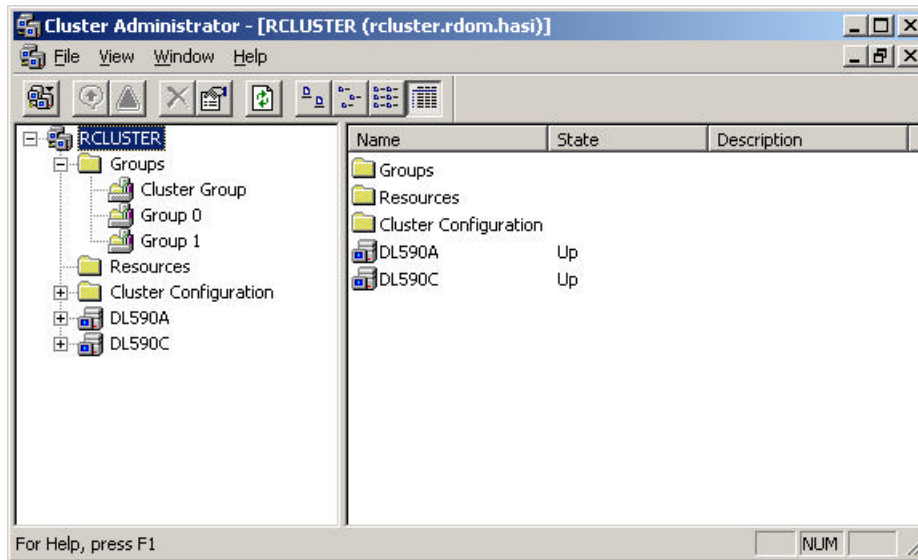
3. Click **Next** to continue.
4. Enter, or click **Browse** to search for, each server that will be added to the cluster and click the **Add** button. Up to three more servers may be added for a total of four nodes in the cluster. Click **Next**.





The wizard will analyze the system configuration to determine if a cluster is feasible. If there are issues that arise during the analysis, the user may need to cancel the installation and troubleshoot. Once the analysis is complete and no issues arise, click **Next** to continue.

5. Enter the password of the Cluster Service account. Click **Next**.
6. Verify the configuration settings and click **Next**. The cluster will now be installed on the node(s).
7. Click **Next** once all tasks are complete. The wizard is now complete. You may view the log of the installation.
8. Click **Finish** to close the wizard.



The installation of the cluster on all nodes is now complete.

## Removing Cluster Services

Windows Advanced Server, Limited Edition does not offer the ability to remove the cluster services from a node that is part of an existing cluster. The following procedures will effectively remove the cluster services from a node in an existing cluster.

To remove the cluster services from a node, follow these procedures:

1. Open a Command Prompt.
2. Enter the following command:

```
cluster node /force
```

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**Note:** This command will forcibly remove any cluster-related services from the server node.

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3. Repeat steps 1-2 on each node in which the cluster services must be removed.

## Known Issues

The following is a list of issues of the Microsoft Windows Advanced Server, Limited Edition clusters on Compaq ProLiant DL590/64 servers. The information is current as of the writing of this document. This list is not comprehensive. For more information review the operating system and server release notes.

### **Compaq Foundation Agent Does Not Start in a Cluster**

In a cluster, the Compaq Foundation agent will not start if it is set to retrieve “Clustering information” from the Compaq Management Agent applet in the Control Panel. This setting will limit Management functionality of the cluster from Compaq Insight Manager and Compaq Insight Manager XE.

#### **Solution:**

To resolve this issue, open the Compaq Management Agent applet in the Control Panel. Remove the “Clustering information” agent from the list of “Active Agents” to the list of “Inactive Agents”. Restart the Foundation agent. Compaq is working on a permanent solution to this issue.

### **FTDisk Reports Errors While Reading Disk Structures**

Following moves of physical drive resources in the cluster (for example, move ownership of Node 1 resources to Node 3), the Windows fault tolerant driver (FTDisk) reports a failure reading the disk structures to the System Event log (event 31) of the receiving node.

#### **Solution:**

Compaq is working with Microsoft to resolve this issue.

### **Frequent SCSI Timeouts and Disk Errors During Disk Failovers**

When cluster disk groups are moved, or failed over, there are errors reported by the Windows disk and HBA drivers. The Windows disk driver will report errors encountered during paging operations in the System Event log (event 51). The Compaq cpqkgpsa.sys driver will report SCSI timeouts (event 9).

#### **Solution:**

Compaq is working with Microsoft to resolve this issue.

### **Extended Screen Blackout During the Installation of the Operating System**

When first installing the Windows Advanced Server, Limited Edition operating system, the display may black out for one and a half to two minutes. This black out occurs after the device drivers are first loaded and before Windows prompts the user to begin the installation by pressing the **Enter** key. The server is not locked and the installation will continue normally.

#### **Solution:**

Compaq is working with Microsoft to resolve this issue.

### **Disk Management Refresh Issues**

If the Disk Management utility is open on a cluster node while a group is moved from or to that cluster node, the Disk Management utility may produce unreliable disk information. The disk resources that are moved may appear in Disk Management blanked out or unreadable.

**Solution:**

To resolve this issue, perform a disk rescan and restart Disk Management.

**Ghost Volume Images Exist Following Storage Reconfiguration**

If access to the storage system is momentarily broken from all cluster nodes (for instance, by resetting the controllers or rebooting the fiber switch), the cluster service will lose access to the quorum. The cluster service will shutdown and retry access in a minute. When the storage system is accessible and the cluster service successfully restarts, some hosts may have volume images. These “ghost” volumes are disk resources owned by other hosts before the storage system went down. There is limited list and read access to these volumes. A reboot of the host will clear these “ghost” volumes.

**Solution:**

Compaq is working with Microsoft to resolve this issue.

**Controller Does Not Fail a Raidset When Two Drives Are Removed From a RAID 5 LUN**

When two drives are removed from a RAID 5 unit, the controller may not mark the unit as failed. If the units are replaced in their original slots, the controller may mark the unit as online with only one disk marked as failed.

**Solution:**

Compaq is working to resolve this issue.

**Cluster Service Hangs Are Reported After Boot**

The cluster service may report in the event logs that it could not start after boot. The cluster service then logs a successful start seconds later.

**Solution:**

Compaq is working with Microsoft to resolve this issue.