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Deployment of Microsoft Windows Advanced Server, Limited Edition on Compaq ProLiant DL590/64 Servers

Abstract: Compaq introduced a new server based on the Intel Itanium 64-bit processor architecture in July 2001. In addition to the new processor technology, the ProLiant DL590/64 platform introduces some other new technologies that make it substantially different from previous Intel processor-based platforms.

In support of the Itanium processor family, Microsoft is releasing the Microsoft® Windows® Advanced Server, Limited Edition operating system for Itanium-based servers. This document describes the level of support available for the Microsoft operating system on the ProLiant DL590/64 including:

- Recommended system configurations
- Supported software, storage options, and network adapters
- Recommended installation procedures
- Support limitations for Microsoft Windows, including known issues with workarounds

This document is intended to augment the documentation provided with the ProLiant DL590/64 server and the documentation provided with Microsoft Windows Advanced Server, Limited Edition. It is offered with the intent of enhancing the user's experience of Windows on the Itanium-based platform.

For the latest information, visit the following websites:

- ProLiant DL590/64 Product Marketing Site:
<http://www.compaq.com/products/servers/proliantdl590>
- Windows Advanced Server, Limited Edition Site:
<http://www.compaq.com/products/servers/software/microsoft/>

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Deployment of Microsoft Windows Advanced Server, Limited Edition on Compaq ProLiant DL590/64 Servers

Integration Note prepared by ISSG Technology Communications

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Introduction to the Architecture

The IA-64 architecture, upon which the ProLiant DL590/64 is built, is a dramatic departure from the IA-32 architecture. The IA-64 processor and platforms are capable of using 64-bits of directly addressable memory and can execute 64-bit instructions directly.

Apart from the processor enhancements, the supporting elements of the ProLiant DL590/64 platform provide a host of new features that make the ProLiant DL590/64 different from other members of the ProLiant family of servers. The following list highlights some of the more significant differences:

- Standard Basic I/O Services (BIOS) has been replaced with Extensible Firmware Interface (EFI)
 - EFI boot manager functions replace the old BIOS menu functions
 - EFI partition(s) on disks, CDs or floppies provide a means of storing components that support the EFI environment
 - ROM is more intelligent in the selection of settings and defaults, reducing the effort and attention required by the system operator during initial setup
- 8-bit (DOS) and 16-bit applications are not supported, though 32-bit Windows applications are supported in compatibility mode
- Master Boot Record (MBR) boot devices have been replaced with GUID Partition Table (GPT) devices

Default Configurations

Table 1 lists the default configurations of the ProLiant DL590/64 server models available for purchase.

Table 1: ProLiant DL590/64 default configurations

	Configuration 1	Configuration 2
Processors	2 x 733 MHz/2 MB (4 proc sockets)	2 x 800 MHz/4 MB (4 proc sockets)
Memory Boards	1 memory board (32 DIMM sockets)	2 memory boards (64 DIMM sockets)
SDRAM	1 GB (4 x 256 MB)	4 GB (8 x 512 MB)
Memory Expansion¹	Multiples of 4 C100 v1.2 CL2 up to 32 GB	Multiples of 4 C100 v1.2 CL2 up to 64 GB
Hard Drives	Optional	Optional
Power Supply	1 (support for 3)	2 (support for 3)

continued

Table 1: ProLiant DL590/64 default configurations (continued)

	Configuration 1	Configuration 2
DC Module	1 (support for 3)	2 (support for 3)
PCI Hot Plug	Standard	Standard
Redundant Hot Plug Fans	Standard	Standard
Network Interface	Dual Port 10/100	Dual Port 10/100
RAID Controller	Embedded	Embedded
LS-120	Standard	Standard
CD – ROM	Standard	Standard
Form Factor	7U Rack	7U Rack

Note 1: Memory for the ProLiant DL590/64 must meet very tight specifications due to timing requirements of the memory support chipset used in the server. All memory used within the ProLiant DL590/64 must conform to those exact specifications. For this reason, Compaq does not support transferring memory modules from other non-Itanium platforms into the ProLiant DL590/64.

Supported Software

Table 2 lists supported Compaq utilities for use with the ProLiant DL590/64.

Table 2. Supported Compaq utilities

Utility	Version	Location
Compaq Array Configuration Utility XE	1.10.4.0	ProLiant DL590/64 Server Support CD
Compaq Enhanced Integrated Management Display Service	1.0.0.0	ProLiant DL590/64 Server Support CD
Compaq PCI Hot Plug Controller Driver	6.0.0.19	ProLiant DL590/64 Server Support CD

Note 1: All Compaq support software that is supported for use on the ProLiant DL590/64 is included on the Compaq ProLiant DL590/64 Server Support CD.

IMPORTANT: Even though Microsoft ships a 64-bit version of Windows XP Professional Edition, Compaq does not support the use of the Professional Edition on server platforms.

Supported Storage Options

IMPORTANT: Providing support for storage options on the ProLiant DL590/64 requires drivers that have been ported to the 64-bit architecture. The 32-bit drivers used on other Compaq server platforms will not load or function properly on ProLiant DL590/64 servers. As a result, only the storage options displayed in Table 3 are supported for use in ProLiant DL590/64 servers. Attempting to install unsupported storage options and drivers into the ProLiant DL590/64 may render the system unusable.

Table 3 lists supported Compaq storage options and driver revisions needed to interface with Windows.

Table 3. Supported Compaq storage options

Option	Driver	Location
Compaq 4.3 – 72 GB Hard Disk Drives	DISK.SYS	Windows CD
Compaq 4x-56x CD-ROM Drives	Varies	Windows CD
Compaq 64-Bit/66-MHz Single Channel Wide Ultra3 SCSI Adapter	ADPU160M.SYS	Windows CD
Compaq 64-Bit/66-Mhz Dual Channel Wide Ultra3 SCSI Adapter	ADPU160M.SYS	Windows CD
Compaq Drive Array Notification	CPQDAEN.SYS	ProLiant DL590/64 Server Support CD
Compaq Integrated Smart Array Controller	CPQARRY2.SYS	Windows CD
Compaq Smart Array 5300 Controller	CPQCISSM.SYS	Windows CD
Compaq Smart Array 5300 Notification Driver	CPQCISSE.SYS	ProLiant DL590/64 Server Support CD
Compaq Smart Array 523 Controller	CPQCISSM.SYS	Windows CD
Compaq StorageWorks 64-bit/33 MHz PCI-to-Fiber Channel Adapter	CPQKGPSA.SYS	Compaq website
Compaq StorageWorks 64bit/66MHz Fibre Channel Host Bus Adapter	CPQFCALM.SYS	ProLiant DL590/64 Server Support CD
Compaq StorageWorks Fibre Channel Array Class Driver	CPQFCAC.SYS	ProLiant DL590/64 Server Support CD
Compaq StorageWorks Fibre Channel Filter Driver	CPQFCFTR.SYS	ProLiant DL590/64 Server Support CD

Note 1: Many of these devices have firmware upgrades available through the Options ROMPaq. The latest version of the Options ROMPaq is available on the Compaq Server Software Download Center website at <http://www.compaq.com/support/files/server/us/index.html>.

Note 2: Many of the devices whose drivers are on the Windows media have driver upgrades available from the Compaq Support Paq for Windows. After installing Windows, users should update those drivers to enhance their reliability and functionality. Compaq management functionality is not available on the Windows CD.

Supported Network Interface Controllers

IMPORTANT: Providing support for network interface controllers on the ProLiant DL590/64 requires drivers that have been ported to the 64-bit architecture. The 32-bit drivers used on other Compaq server platforms will not load or function properly on ProLiant DL590/64 servers. As a result, only network interface controllers displayed in Table 4 are supported for use in ProLiant DL590/64 servers. Attempting to install unsupported network interface controllers and drivers into the ProLiant DL590/64 may render the system unusable.

Table 4 lists Compaq network interface controllers supported for use with the ProLiant DL590/64 running Windows.

Table 4. Supported Compaq network interface controllers

Compaq NIC	Driver	Location
Compaq NC3123 Fast Ethernet NIC	N100645.SYS	ProLiant DL590/64 Server Support CD
Compaq NC3133 Fast Ethernet Module	N100645.SYS	ProLiant DL590/64 Server Support CD
Compaq NC3134 Fast Ethernet NIC	N100645.SYS	ProLiant DL590/64 Server Support CD
Compaq NC3135 Fast Ethernet Module	N100645.SYS	ProLiant DL590/64 Server Support CD
Compaq NC6132 Gigabit Module	N1000645.SYS	ProLiant DL590/64 Server Support CD
Compaq NC6133 Gigabit Module	N1000645.SYS	ProLiant DL590/64 Server Support CD
Compaq NC6136 Gigabit Ethernet NIC	N1000645.SYS	ProLiant DL590/64 Server Support CD
Compaq NC7131 10/100/1000 Ethernet NIC	N1000645.SYS	ProLiant DL590/64 Server Support CD

Note 1: Many of the devices whose drivers are on the Windows media have driver upgrades available from the Compaq Support Paq for Windows. After installing Windows, users should update those drivers to enhance their reliability and functionality.

Supported System Management Software

Table 5 lists the supported system management software included on the Compaq ProLiant DL590/64 Server Support CD.

Table 5. Supported Compaq system management components

Compaq System Management Component	Version	Location
Compaq Advanced System Management Controller Driver	5.20.21.0	ProLiant DL590/64 Server Support CD
Compaq Array Configuration Utility XE	1.10.4.0	ProLiant DL590/64 Server Support CD
Compaq Enhanced Integrated Management Display Service	5.10.0.0	ProLiant DL590/64 Server Support CD
Compaq Foundation Agent	5.10.0.0	ProLiant DL590/64 Server Support CD
Compaq NIC Agent	5.10.0.0	ProLiant DL590/64 Server Support CD
Compaq Server Agent	5.10.0.0	ProLiant DL590/64 Server Support CD
Compaq Storage Agent	5.10.0.0	ProLiant DL590/64 Server Support CD
Compaq Survey Utility	2.36.12.0	ProLiant DL590/64 Server Support CD
Compaq ProLiant Administrative Tools	1.0.1.0	ProLiant DL590/64 Server Support CD

Installation Procedures

Installation of the ProLiant DL590/64 occurs in five distinct phases:

- Pre-Installation Checks
- Disk Array Configuration
- Text Mode Setup
- Graphical User Interface
- Post-Installation Updates

Compaq Supported Installation

To install Windows Advanced Server, Limited Edition on the ProLiant DL590/64 so that it is fully supported by Compaq and Microsoft, first read the following sequence of steps completely and then follow them carefully.

Pre-Installation Checks

1. Verify the completeness and correctness of your hardware configuration before powering on your system.
 - Make sure that you are using only supported storage options (see Table 3).
 - Confirm that you are using only supported network interface controllers (see Table 4).
 - Ensure that you have not installed any memory that was not provided for use with Itanium-based platforms.
 - Make certain that you have installed some type of disk storage (not included with the system), either on the embedded storage bays or as external storage.
 - Confirm that you have cabled the system correctly, according to instructions included with the ProLiant DL590/64 Setup and Installation Guide (included with the server).

Disk Array Configuration

2. Power the server up and run through the preliminary setup and configuration steps documented in the ProLiant DL590/64 Setup and Installation Guide (included with the server).
 - Use the ROM-based array configuration utility to configure the logical drive onto which the OS will be loaded.
 - Perform the following steps to prepare the disk for use as a boot device, if physical drives used for OS installation were previously used by other controllers and are connected to any controller or SCSI adapter other than the integrated array controller:

Note: These steps are not necessary for drives attached to the integrated array controller.

1. Insert the Windows Advanced Server, Limited Edition CD into the CD-ROM drive.
2. Power up the server. Do not boot off of the Windows CD. When the CD prompts you to "Press any key to boot from CD," allow the timeout period to expire. A prompt will then be presented allowing you to return to the EFI Boot Manager window.

3. Select the **System Maintenance** option from the Boot menu.
4. Enter the EFI Shell by selecting the **Shell** option.
5. From the EFI shell, select the CD-ROM drive and browse forward (using DOS commands) to the W64 directory.
6. Run the Microsoft diskpart.efi utility (using the /clean option) from the EFI shell for each logical drive created. This action properly prepares each logical drive so that the OS can correctly create the necessary EFI system partitions and Microsoft reserved partitions. A list of diskpart commands can be brought up by typing the following:
/help
7. Reboot the system for changes to take effect.

Text Mode Setup Phase

3. Insert the Microsoft Windows Advanced Server, Limited Edition CD into the CD-ROM drive to begin installation. As the system comes up, watch closely for the prompt “Press any key to boot from CD-ROM.” The prompt only lasts for a few seconds, so act quickly when it appears.
 - Allow Setup to format the partition that will be used as the system disk. This procedure will include creation of a System Partition as well as a Microsoft Reserved partition. The operating system (OS) requires both. The system disk must be formatted as a GPT and cannot be formatted as MBR.
 - The System Partition contains the OSLOADER image that is used to start the OS. Do not attempt to resize or remove the System Partition or the Microsoft Partition that are created by default when configuring the disk space on the boot device.
 - When selecting the partition that will hold the OS, be sure to select a device that has been formatted using the GUID partition table (GPT).

IMPORTANT: Do not attempt to install the OS into either the System Partition (marked “Partition1: [FAT]”) or the reserved partition (marked “Partition2 [Reserved]”). Instead, use the Unpartitioned Space on the device that contains those two partitions. Do not attempt to install Windows onto a device that has been set up as an MBR device.

Graphical User Interface Phase

4. Complete the standard Windows Advanced Server installation by following the instructions provided in the user guide.

Note: The installation timer displayed by the GUI underestimates the duration of the installation. The installation may take longer than the countdown timer states.

Post-Installation Updates

5. Perform the following steps to install the Simple Network Management Protocol (SNMP) required by the Compaq Management Agents:
 - Log into the newly installed Windows environment using the Administrator account and password specified during setup.
 - Open up Control Panel and select **Add/Remove Programs**.

- Click the **Add/Remove Windows Components** button located on the left.
 - Select **Management and Monitoring Tools**, and click the **Details** button.
 - Make certain the checkbox for Simple Network Management Protocol is set and install that component.
6. Remove the Windows Advanced Server, Limited Edition CD from the CD-ROM drive and insert the ProLiant DL590/64 Support CD.

Upon inserting the CD into the CD-ROM drive of the ProLiant DL590/64, you should see a screen entitled “ProLiant DL590/64 Server Support CD.”
 7. Follow all instructions shown on the ProLiant DL590/64 Server Support CD screen to install the software and enable your system to perform standard server management functions.

IMPORTANT: The default Web browser included with Windows Advanced Server, Limited Edition (64-bit version of Internet Explorer 6.0) does not include native support for Java applications or Java applets. Compaq Web-based management tools use Java applets and will not function properly with the default browser. The ProLiant DL590/64 Server Support CD addresses this problem by creating a pointer to the 32-bit version of Internet Explorer 6.0 and loading the Java Virtual Machine snap-in to be used in conjunction with it. Once the snap-in is loaded, all Web-based management tools must be executed from the 32-bit browser, referenced on the desktop by the Compaq Web Based Management icon.

Support Limitations for Microsoft Windows Advanced Server, Limited Edition on ProLiant DL590/64 Servers

This section details the known issues with running Microsoft Windows Advanced Server, Limited Edition on ProLiant DL590/64 servers and provides information about resolving them.

GPT Formatted Partitions Are Not Available As Cluster Storage

By default, all partitions created under Windows Advanced Server, Limited Edition are formatted using the GUID Partition Table (GPT) on-disk structure. Storage configured for use in cluster configurations must be formatted using Master Boot Record (MBR) structure.

Solution:

Reformat the partitions to be used as cluster storage using the MBR structure.

Storage Arrays Formatted On 32-Bit Systems Do Not Function Properly As Boot Device For Windows Advanced Server, Limited Edition

Boot devices for Windows Advanced Server, Limited Edition are significantly different from boot devices formatted for use with 32-bit operating systems (such as Windows XP, Windows 2000, or Windows NT 4.0). Differences between the boot devices for these environments include:

- System Partition and Microsoft reserved partition are required to support the EFI boot environment of the 64-bit platforms. These partitions are not required or available on any of the 32-bit operating system environment boot devices.

- Boot devices for Windows Advanced Server, Limited Edition must ensure that the logical drive used to boot the OS utilizes a GUID partition table (GPT). All 32-bit operating environments utilize Master Boot Record (MBR) partition tables.

Solution:

Reformat or rebuild the partitions under Windows Advanced Server, Limited Edition using GPT.

Memory Taken From Another System Does Not Work In The ProLiant DL590/64

Itanium-based systems have very strict memory timing requirements that exceed the applicable industry standard specifications (C100 v1.2 CL2). As a result, memory that complies with that specification may not be adequate for use in ProLiant DL590/64 systems. Likewise, memory modules that do not comply with the standard are not supported, including memory modules that conform to higher speed standards (for example, 133-MHz modules).

Solution:

Remove all modules that are rejected by the system, and use only memory modules that have been approved for use with Itanium processors.

Java Applets and Applications Do Not Work With Windows Advanced Server, Limited Edition

Windows Advanced Server, Limited Edition includes a 64-bit version of Internet Explorer 6.0 as the default browser. Unlike previous versions of Internet Explorer, Version 6.0 does not include the Java Virtual Machine snap-in. Moreover, Microsoft does not produce and distribute a 64-bit version of the Java snap-in.

At the time of this writing, there is no Java Virtual Machine snap-in that will operate successfully with the 64-bit version of Internet Explorer 6.0.

Solution:

Windows Advanced Server, Limited Edition includes both the default 64-bit version of Internet Explorer and the 32-bit version of Internet Explorer. In addition, Microsoft has made the 32-bit version of the Java Virtual Machine snap-in available, both as a download from their website (<http://www.microsoft.com>) and from Compaq media.

Compaq has provided this snap-in on the ProLiant DL590/64 Server Support CD, along with a script that installs the snap-in and changes the default browser from the 64-bit version to the 32-bit version. Please note that the 64-bit browser does not recognize or use the 32-bit version of the snap-in.

To install the Java snap-in, insert the ProLiant DL590/64 Server Support CD into the CD-ROM drive and follow the instructions (specifically, Step 1) shown on that screen.

Cluster Devices Show Up As “Ghost” Devices On Other Cluster Members

Under certain circumstances when both controllers in the Compaq StorageWorks RA/MA8000 are reset (effectively removing all shared storage), one or more servers may present “ghost” volume images after the controllers come back up and the cluster stabilizes. These “ghost” images have the following characteristics:

- Drive letter exists
- Directory structure can be navigated in Explorer or at command line
- Some files can be accessed for reading, but not for writing
- Drive is physically offline, cannot be opened physically, and is not present in Disk Management scans

This condition will persist until the server is rebooted. The actual data is not in danger (write attempts will return with a delayed write failure), but any application that queries for logical drives or file systems will be able to view the directory structure and possibly some of the data. The drives on which we have seen this happen are those that are temporarily acquired and lost by a server during the arbitration melee while the controllers are booting. Even the Quorum drive has been susceptible.

Solution:

Since “ghost” volumes do not present a specific danger to the data, they can be safely ignored until it is convenient to reboot the server, thereby clearing the “ghost” volumes.

PCI Hot Plug Controller Hardware Naming May Be Inconsistent

After installing Windows Advanced Server, Limited Edition and opening the Device Manager, the System Devices tree includes an incorrect listing for the PCI Hot Plug controller hardware. You may notice that a number of the controllers listed are referred to as “Intel WXB PCI Hot plug Controller.” This incorrect reference is caused by a cosmetic problem in the hardware definition file of Windows Advanced Server, Limited Edition. The Compaq ProLiant DL590/64 Server Support CD contains the drivers and installation tools that correctly set the name for those devices.

Solution:

Install the support software provided on the Compaq ProLiant DL590/64 Server Support CD. If you do not wish to install all of the components provided on the CD, specifically install the Compaq PCI Hot Plug support software.

Insufficient Disk Space For OS Installation When Minimum Partition For FAT Installation Is Used

If you attempt to install Windows Advanced Server, Limited Edition onto a FAT formatted partition sized at the precise minimum specified (1,151 MB), you will run out of disk space before the OS installation can complete. This space shortage occurs because the minimum size specified is incorrectly described in the kit. This issue does not occur if you use the minimum specified partition size in conjunction with the NTFS file system.

Solution:

Compaq recommends using at least 2 GB for the boot partition.

Cannot Flash Firmware Of Storage Devices

The Options ROMPaq Utility does not run properly on ProLiant DL590/64 servers. The Options ROMPaq Utility is a DOS application not supported on this server.

Solution:

Flash the firmware on all storage devices on IA-32 servers (servers that do not contain Itanium processors).

Extended Screen Blackout During OS Install

When installing Windows Advanced Server, Limited Edition, the screen will remain black for up to two minutes while video parameters are loaded and checked. Though it may appear that the system is hung, an issue does not exist.

Solution:

Allow time for the loading and checking of the video parameters.

Windows 32 Time Service Loses One Minute Per Day

On a system that has the Windows 32 Time Service running, the time shown by the system clock loses one minute per day. This time loss is also written to the system clock and will transcend system reboots.

Solution:

Disable the Windows 32 Time Service.

Windows Installs To Incorrect Storage Device

If your ProLiant DL590/64 contains multiple boot device controllers, Windows installation may occur on a device that is not specified as the default boot device controller. If this occurs and is not addressed during installation, the server will not start after OS installation.

Solution:

Ensure that the partition selected for OS installation exists on the default boot device. If Windows creates a partition on any other device, delete that partition and create one on the default boot device.

Inserting NIC Into Unpowered System May Cause the System to Power Up

If you insert network interface controllers (NIC) that use Intel 82259 chips into a system that has been powered down, it is possible that the inserted NIC will trigger a power up event on the system. This probability increases as the number of NICs being inserted increases.

Solution:

Compaq is investigating ways to resolve this issue.

Establishing Connections To Network Shares Takes A Long Time

Once a few connections to network shares have been established, response to subsequent connection requests will be very slow, taking from 30 minutes to several hours to complete. Once a connection is established, however, there are no significant performance problems with the connection. This issue appears to be related to the fact that Windows Advanced Server, Limited Edition turns on Distributed File System (DFS) by default, thereby introducing authentication delays on connection requests for DFS services that are not available.

Solution

Disable the Distributed File Service.

Compaq Support Paq Does Not Install After Disconnecting Network Interface Controller

The Compaq Support Paq for the ProLiant DL590/64 may not complete installation if nothing is plugged into any of the network interfaces attached to the system. This incomplete installation occurs only if you have disconnected the loopback connector that ships with the system and you have not plugged the system into a network.

Solution

Avoid this problem by attaching the server to a network or by installing the loopback connector that ships with the system.