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Contents

Deployment of SuSE Linux Enterprise Server 7 for Itanium Processor Family (IPF) on Compaq ProLiant DL590/64 Servers

Abstract: Compaq introduced a new server based on the Intel® Itanium™ 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, SuSE released the SuSE Linux Enterprise Server 7 for Itanium Processor Family (IPF) operating system for Itanium-based servers. This document describes the level of support available for the SuSE Linux Enterprise Server for IPF operating system on the ProLiant DL590/64 including:

- Recommended system configurations

- Supported software, storage options, and network adapters

- Recommended installation procedures

This document is intended to augment the documentation provided with the ProLiant DL590/64 server and the documentation provided with SuSE Linux Enterprise Server 7 for IPF. It is offered with the intent of enhancing the user's experience of SuSE Linux Enterprise Server 7 for IPF on the Itanium-based platform.

For the latest information, visit the following website:

- ProLiant DL590/64 Product Marketing Site:
  http://www.compaq.com/products/servers/proliantdl590

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Notice

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Introduction to the Architecture

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

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, CD-ROMs 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
- Master Boot Record (MBR) boot devices have been replaced with GUID Partition Table (GPT) devices

Requirements

Compaq worked with SuSE during the development phase of SuSE Linux Enterprise Server 7 for IPF to test daily software builds, to tune the OS, to build support for hardware features, and to provide continuous feedback and fixes.

Designed to support 64-bit operating systems, the ProLiant DL590/64 server is the ideal platform to support SuSE Linux Enterprise Server 7 for IPF. Default hardware configurations of the ProLiant DL590/64 server models and information about software supporting the SuSE Linux Enterprise Server 7 for IPF operating system are detailed in the following sections.

Default Hardware 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) (64 DIMM socket capable with optional second memory board)	2 memory boards (64 DIMM sockets)
SDRAM	1 GB (4 x 256 MB)	4 GB (8 x 512 MB)
Memory Expansion[1]	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)
System Power Module	1 (support for 3)	2 (support for 3)
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

All Compaq support software and drivers that are supported for use on the ProLiant DL590/64 server are included on the SuSE Linux Enterprise Server 7 for IPF CD-ROM set (Compaq part number 267140-001).

Future updates to Compaq support software will be provided for download at http://www.compaq.com/support/files/server/us/locOsCat/72.html.

Device Support for SuSE Linux Enterprise Server 7 for IPF

SuSE Linux Enterprise Server 7 for IPF is a 64-bit operating system with a true 64-bit kernel. Any code that executes in kernel mode, such as drivers, must be developed specifically to interface correctly with the 64-bit kernel. Therefore, drivers that were developed for any 32-bit versions of SuSE Linux will not function properly under SuSE Linux Enterprise Server 7 for IPF.

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 2 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 2 lists supported Compaq storage options and drivers needed to interface with SuSE Linux Enterprise Server 7 for IPF.

Table 2. Supported Compaq storage options

Option	Driver	Location
Compaq 64-bit/66MHz Dual Channel Wide Ultra 3 SCSI Adapter	aic7xxx	SuSE CD-ROM
Compaq 64-bit/66MHz Single Channel Wide Ultra 3 SCSI Adapter	aic7xxx	SuSE CD-ROM
Compaq Integrated Smart Array Controller	cpqarray	SuSE CD-ROM
Compaq Smart Array 5300 Controller	cciss	SuSE CD-ROM
Compaq Smart Array 532 Controller	cciss	SuSE CD-ROM
Compaq StorageWorks 64-bit/33 MHz PCI-to-Fibre Channel Host Bus Adapter	cpqfc	SuSE CD-ROM
IDE CD-ROM		SuSE CD-ROM
IDE LS-120 Removable Media Drive		SuSE CD-ROM

Supported Network Interface Controllers

Table 3 lists Compaq network interface controllers supported for use with the ProLiant DL590/64 running SuSE Linux Enterprise Server 7 for IPF.

Table 3. Supported Compaq network interface controllers

Compaq NIC	Driver	Location
Compaq NC3123 Fast Ethernet NIC PCI 10/100 WOL	e100	SuSE CD-ROM
Compaq NC3134 Fast Ethernet NIC 64 PCI Dual Port 10/100	e100	SuSE CD-ROM

continued

Table 3. Supported Compaq network interface controllers *(continued)*

Compaq NIC	Driver	Location
Compaq NC3135 Fast Ethernet Module Dual (10/100 Upgrade Module for NC3134 and NC3131)	e100	SuSE CD-ROM
Compaq NC6132 Gigabit Upgrade Module (1000 SX Upgrade Module for NC3134 and NC3131)	e1000	SuSE CD-ROM
Compaq NC6133 Gigabit Module (1000 LX Upgrade Module for NC3134 and NC3131)	e1000	SuSE CD-ROM
Compaq NC3133 Fast Ethernet Module (100FX Upgrade Module for NC3134 and NC3131)	e100	SuSE CD-ROM
Compaq NC6136 Gigabit Server Adapter, 64-bit/66MHz, PCI, 1000 SX	e1000	SuSE CD-ROM
Compaq NC7131 Gigabit Server Adapter, 64-bit/66MHz, PCI, 10/100/1000-T	e1000	SuSE CD-ROM
Compaq NC7132 10/100/1000-T Upgrade Module for NC3134 and NC3131	e100	SuSE CD-ROM

Installation Procedures

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

- Pre-Installation Checks

- EFI Boot Manager

- SuSE Graphical User Interface (GUI)

- Post-Installation Updates

- SaX2

Compaq Supported Installation

To install SuSE Linux Enterprise on the ProLiant DL590/64 so that it is fully supported by Compaq and SuSE, 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 2).

   - Confirm that you are using only supported network interface controllers (see Table 3).

   - 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 internal 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).

- Run the Compaq ROM-Based Setup Utility (RBSU) and set the OS type to Linux.

EFI Boot Manager

2. Insert SuSE CD-ROM #1 into the CD-ROM drive during power up.

3. Select **Boot Configuration** in Boot Manager.

4. Select **Add Shell to Boot Entries**. Press **Esc** key.

5. Select **Edit Boot Timeout**. Enter the seconds to auto boot the EFI shell.

6. Make sure the default selection of EFI Shell is selected and press **Enter**.

7. At the Shell prompt, type **fs2:** to change the drive letter.

8. Type **elilo** and press **Enter**.

9. At the ELILO boot prompt, press **Tab**.

10. Type **linux swiotlb=32768**.

> **Note:** This step allocates buffers for use by 32-bit devices such as the Compaq Integrated Array Controller. If a sufficient number of buffers are not allocated, a system panic or system hang may occur. This boot time parameter should be added to /boot/elilo.conf (see Step 33).

SuSE GUI (YaST2)

11. Select your language and click the **Next** button.

12. Select keyboard layout and time zone, then click the **Next** button.

13. On the Preparing Hard Disk screen, select **Boot hard disk** or **Custom Partitioning**.

> **Note:** If you select Custom Partitioning, make the first partition 100 MB or smaller. This partition must be formatted as vfat and mounted as /boot.

14. Click the **Next** button.

15. On the Software Selection screen, select **Default System**, and click the **Detailed selection** button. Check the **Network/Server** and **Install available sources** checkboxes. Click the **Next** button.

> **Note:** Checking the Install available sources checkbox is optional. You also have the option of installing commercial software or selecting single packages.

16. On the System Boot Configuration screen, you will see a message stating that ELILO will be installed on the boot sector of the first hard disk. Click the **Next** button.

17. On the Personalize screen, create a default user account.

18. Click the **Next** button.

19. Enter the password for the root user. Then, click the **Next** button.

20. Confirm installation information and click the **Next** button. At this time, you could save the settings to floppy disk to create a kickstart file.

21. Select **Yes-install** upon receipt of the warning message.

Note: This step may take several minutes since several hundred software packages are being installed on the hard drive. While you are waiting, you might want to use the commands in Table 4.

Table 4. Command List

Command	Description
Ctrl+Alt+F2	Shell Prompt
Ctrl+Alt+F4	Activity Log
Ctrl+Alt+F7	GUI
Ctrl+Alt+F8	Error Log

22. Click **OK** upon receipt of the following message:

    The boot sector has been written to disk. Now booting your system.

23. At the next prompt, press **Enter** to commit the installation. Remove all installation media.

24. While restarting the system, insert SuSE CD-ROM #2 into the CD-ROM drive.

25. Select **EFI Shell** and press **Enter**.

26. At EILO boot prompt, type **linux swiotlb=32768** and press **Enter**.

Note: This step may take several minutes since the remaining software packages are being installed on the hard drive.

27. Configure your monitor.

    • Select **NoXII** for vendor, then click the **Next** button.

    • At the prompt, click the **Continue** button.

28. Click the **No** button when prompted to view the Installation Log File.

29. On the Configuration screen, click the **Configure Hardware** button to configure printers, network, modems, ISDN adapters, and sound.

    • Click the **Network** button on the System Component Configuration screen.

    • Select the first active network interface controller by clicking the first **Active Card** button. Available selections are listed in Table 5.

    Table 5. Network Selections

Selection	Port	Comments
Active Card	1	
Active Card	2	
Manual Card Setup		Use in case the OS does not recognize a NIC.

    • Configure DHCP or Static.

- Enter Hostname and Nameserver information.

  Note: You can create the name, server list, and domain server list using information provided by your network administrator.

- Click the **Next** button.

30. Click the **Finish** installation button unless you need to configure the second NIC.

31. Click the **Yes** button to save your network configurations. Click the **OK** button.

   Note: On the Configure Hardware screen, you have the option to configure other components, such as printers, modems, ISDN adapters, or sound cards.

32. Click the **Finish** button to complete the installation.

Post-Installation Updates

33. Modify /boot/elilo.conf to include the following line in the global section:

   ```
   append="swiotlb=32768"
   ```

   Note: To boot the system faster, you can change the default timeout from 80 seconds to a lower value.

SaX2

34. At the linux login prompt, type **root** and press **Enter**.

35. Type your password when prompted.

36. At the linux:~# prompt, type **sax2** press **Enter**.

   Note: This step takes a few minutes. It may appear that the system is down, but everything is operational.

37. Click the **Click to select** button and select **Change Configuration**.

38. On the Mouse Settings screen, click the **Next** button.

39. Select keyboard settings and click the **Next** button.

40. Select **Graphics Device** and click the **Next** button.

   Important: Make sure Mach64 XL or XC is listed as the board name.

41. On the Desktop Setup screen, highlight resolution and click the **Properties** button.

   - Select a new resolution. (To select a new resolution, you must first click the current selection to de-select it, and then click the desired selection to change the resolution.)

   Note: Compaq recommends using the default color selection of 65536 [16-bit].

42. Click the **Monitor** tab. Select vendor and name selection, then click the **OK** button.

43. Click the **Finish** button and click the **Save Configuration** button.

44. Click the **Yes** button and installation will complete.

45. After configuring X, modify /etc/inittab to start X automatically on boot. Search for the line containing `id:3:initdefault`. Change 3 to 5 and save the file.

Appendix A–Compaq Web Resources

Table 6 lists the Internet links noted throughout this document as well as additional links that you might find helpful when investigating Compaq solutions for Linux.

Table 6. Compaq Web resources

Description	Web Address
Compaq *ActiveAnswers* gives you the benefit of our experience to help manage your system and reduce the time, risks, and complexity associated with deploying solutions.	http://www.compaq.com/activeanswers
Linux at Compaq offers industry-defining technology, break-through performance, high availability, and easy serviceability.	http://www.compaq.com/linux
ProLiant DL590/64 Product Marketing site provides product information about the ProLiant DL50/64 server.	http://www.compaq.com/products/servers/proliantdl590
ProLiant Linux website provides information regarding Compaq and Linux partnerships and solutions for ProLiant servers.	http://www.compaq.com/products/servers/linux/
Server Software Download Center allows downloading of the latest support software, drivers, utilities, and agents and provides information about software enhancements and fixes.	http://www.compaq.com/support/files/server/us/index.html

Appendix B–SuSE Web Resources

Throughout this paper, we have discussed SuSE Linux Enterprise Server 7 for IPF installation and requirements. For additional tools and information critical to your implementation process, visit the Linux Web resources listed in Table 7.

Table 7. Linux Web resources

Description	Web Address
Linux Knowledge Portal for SuSE allows you to arrange your personal Portal and specifically enhance your knowledge of Linux.	http://www.linux-knowledge-portal.org/en/index.php
Security Announcements keeps you informed with the latest information as it relates to security.	http://www.suse.de/en/support/security/index.html
SuSE Business Products provides a list of business software product links and descriptions.	http://www.suse.com/us/products/suse_business/index.html
SuSE Download Area contains updates, patches, and ftp links to download SuSE software.	http://www.suse.de/en/support/download/
SuSE Linux Enterprise Server 7 for Itanium Processor Family site provides information about this new operating system.	http://www.suse.com/us/products/suse_business/sles/sles_ia64/index.html
SuSE Linux FAQ contains frequently asked questions (FAQs) with answers.	http://www.suse.com/us/company/suse_faq/index.html

continued

Table 7. Linux Web resources *(continued)*

Description	Web Address
SuSE Linux Maintenance website offers registered SuSE Linux Enterprise Server customers tested and documented fixes, patches, and updates for SuSE Linux Enterprise Server 7 for IPF.	http://support.suse.de/psdb For support registration, visit: http://support.suse.de/en/register/index.html
SuSE Linux website provides information about software, services, and related products.	http://www.suse.com
SuSE Support Knowledgebase is a searchable support database available in many languages.	http://sdb.suse.de/sdb/en/html/