COMPAQ
Integration Note

November 2000
13SD-1100A-WWEN

Prepared by OS Integration Engineering

Compaq Computer Corporation

Contents

Setting up a Pre-execution Environment (PXE) on Compaq ProLiant Servers

Abstract: This white paper provides details on configuring your server for a Pre-Execution Environment (PXE). The primary focus will be on the ProLiant DL320 and ProLiant DL360 servers.

The following topics are covered in detail throughout this paper.

- Introduction to the Pre-Execution Environment
- Configuring a target server for PXE support

The Appendix contains a listing of helpful Compaq web resources.

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Setting up a Pre-execution Environment (PXE) on Compaq ProLiant Servers
Integration Note prepared by OS Integration Engineering

First Edition (November 2000)
Document Number 13SD-1100A-WWEN

Introduction

Pre-Execution Environment (PXE) is a component of the Intel Wired For Management (WfM) specification. The PXE model provides servers with the ability to load and execute a network bootstrap program (NBP) from a PXE server and execute a pre-configured image. The image can be an operating system image created by software utilities, or a boot floppy image. This allows a user to configure and install an operating system remotely.

When a PXE enabled client boots, it obtains an IP address from a DHCP server. The client obtains the name of the network bootstrap program (NBP) from the appropriate Boot Server. Then the client uses Trivial File Transfer Protocol (TFTP) to download the NBP from the Boot Server and executes the image. This white paper details how to configure the target server to be PXE capable.

Configuring the Target Server for PXE Support

ProLiant DL320 configuration method

The Compaq ProLiant DL320 allows a connection to a PXE server via an embedded NIC. The server defaults to disabling PXE support on the embedded NIC. To configure the ProLiant DL320 as the client machine for PXE support, follow these steps.

1. Use the ROM Based Setup Utility (RBSU) to enable PXE support for NIC Port 1 as described in the following steps. PXE support cannot be enabled for NIC Port 2.
2. Connect NIC Port 1 to the network containing the PXE server. To enable PXE support for NIC Port 1, press **F9** during POST to enter RBSU.
3. Select Advanced Options when RBSU launches. Select PXE Options in the Advanced Options menu.

   The following menu appears:

   ```
   Embedded PXE Support

   User Interface
   ```

4. Select Embedded PXE Support and change the option to Enabled (default is Disabled) to enable PXE support for NIC Port 1.

Note: By selecting User Interface, you can control if the system automatically attempts a network boot during POST or if the user must hit **F12** during POST to attempt a network boot. If User Interface is disabled, the system always attempts to boot from the network. This selection defaults to enabled.

ProLiant DL320 F12 Prompt

As mentioned previously, the ProLiant DL320 may require pressing **F12** before attempting to boot from the network. The **User Interface** selection in RBSU controls this action. If User Interface is enabled the following message is displayed in the lower right corner of the screen during POST:

```
F12 = Network Service Boot
```

When this prompt displays, pressing **F12** causes the system to search for a PXE server and attempt a network boot. If you do not press **F12**, the system will never attempt to boot from the network. This functionality can be disabled in RBSU by setting User Interface to disabled.

IMPORTANT: PXE support cannot be enabled for an embedded NIC previously disabled via RBSU.

ProLiant DL360 configuration method

The ProLiant DL360 requires an upgrade of the system BIOS (P21) and the System Configuration Utility to support PXE on the embedded NICs. ROM and System Configuration support for the ProLiant DL360 will be included in the SmartStart and Support Software CD-ROM Release 5.0.

A ROM dated later than 09/01/2000 is required for this support. PXE support can either be enabled or disabled for the embedded NICs through the System Configuration Utility (must be later than Version 2.53). The system will default to PXE being disabled for both embedded NICs.

1. To enable PXE support, run the System Configuration Utility then View and Edit Details.
2. The following items will be part of the main configuration menu:

   Embedded PXE Support:

   ```
   NIC Port 1:      Disabled
   NIC Port 2:      Disabled
   ```

3. PXE support can be enabled for either of the embedded NICs. However, PXE support cannot be enabled for both NICs at the same time. Enable PXE support for the NIC connected to the network containing the PXE server.

Note: Unlike the ProLiant DL320, the ProLiant DL360 always attempts to boot from the network subject to the "Boot Order Selection" configured in the "PXE Option ROM Setup Menu" described below.

The DL360 PXE Option ROM Setup Menu

Note: The **Option ROM Setup Menu** is only is available only for the ProLiant DL360. On the ProLiant DL320, this choice is locked at the **Use BIOS Setup Boot Order**. The ProLiant DL320 always attempts to boot the network first, and then attempts to boot off any local media.

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1. If PXE is enabled for either of the embedded NICs on the ProLiant DL320 the PXE Option ROM is executed during POST. This option ROM provides the support for booting over the network.
2. The PXE option ROM displays the following message during POST:

   ```
   Initializing Intel (R) Boot Agent Version X.X.XX
   PXE X.X Build XXX (WfM X.X), RPL vX.XX
   ```

3. If **CTRL+S** is pressed when this message appears (the user has approximately 2 seconds to make this selection), the system enters the PXE option ROM's Setup Menu. This setup menu allows the user to choose the boot order for network boot.
4. The following menu appears:

```
Network Boot Agent Protocol      PXE
Boot Order                       Try network first, then
                                 local drives
Show Setup Prompt                Disabled
Setup Menu Wait Time             2 seconds
Legacy OS Wakeup Support         Disabled
```

5. To attempt a network boot via PXE, the Network Boot Agent Protocol must be set to PXE. The Boot Order selection allows the user to select the order of the devices that the system attempts to boot.
6. The following choices are available for Boot Order on the ProLiant DL360:
   - **Try network first, then local drives** - The system searches for a PXE server and performs a network boot, if available. If no PXE server is found, the system performs the normal boot order (such as floppy, CD, fixed disk).
   - **Try local drives first, then network boot drive** - The system attempts to boot local media first, even if a PXE server is present. If no local media is bootable, the system attempts to boot from a PXE server.
   - **Try network only** – The system only attempts to boot over the network. Booting to local media is never attempted. The system searches for a PXE server, and if none is found, a message appears indicating to press **CTRL+T** to attempt booting from the network again.
   - **Try local drives only** – The system always attempts to boot local media. Although the PXE option ROM executes, the system never attempts to boot over the network.
7. If the user enables Show Setup Prompt, the option ROM prompts you to enter the PXE option ROM Setup Menu by displaying the following message after the normal PXE option ROM initialization text:
8. Press **CTRL+S** to enter Setup Menu
9. Show Setup Menu Wait Time simply controls the amount of time allotted to press **CTRL+S** to enter the Setup Menu during POST. The default value is 2 seconds, but the timeout can be increased to a value up to 8 seconds.

The Legacy operating system Wakeup Support selection is not related to PXE support.

Summary

A Preboot Execution Environment (PXE) makes it possible to configure or reconfigure a system remotely. The computer system has a universal service agent loaded locally in the BIOS. This agent allows the system to interact with a remote server to dynamically retrieve the requested boot image across the network, making it possible to install the operating

system and user configuration of a new system without a technician present. This type of OS remote installation saves both time and IT resources allowing companies to lower their TCO.

There are many methods of integrating a PXE environment for OS installation. Some operating systems provide utilities that allow the user to create OS images for PXE boot. See www.compaq.com for future white papers with additional information on how to setup and execute OS images via the SmartStart Scripting Toolkit and Red Hat Linux.

Appendix

In addition to hardware and software products, Compaq also provides information enabling you to stay current on the latest developments and assisting you in making deployment decisions.

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.

Compaq ActiveUpdate offers proactive notification and delivery of the latest software updates. Do not waste time searching the web. Subscribe to Compaq ActiveUpdate for automatic delivery of software updates for your Compaq servers, desktops, workstations, and portables.

If you require more timely access to information products, Compaq provides a service called Compaq Info Messenger, which can be accessed through the Compaq website. If you submit a profile to Compaq Info Messenger, telling it what platforms and operating systems you are interested in, the service tracks your areas of interest and will advise you when related information products are released.

Customer Advisories inform you of any known problems and workarounds because of a Service Pack release.

Communiqués and press releases announce the availability of new products and versions.

Service Advisories notify Compaq resellers and retailers of any known service-related issues and provide them with the information they need to effectively support their customers.

Solution Stories describe how Compaq customers have addressed their business needs through the combination of Compaq products and third-party software products.

TechNotes and Tech Briefs update customers on the latest developments in Compaq products.

White papers inform you of ways to optimize your environment and obtain the maximum benefit from software enhancements.

These information products range from those with no specific OS focus to those that address specific OS issues and answers. Information products specific to Linux and Microsoft are collected and distributed as part of the Compaq Resource Paqs produced twice a year.

Table 1 lists Compaq resources on the web.

Table 1. Compaq web resources

Item	Web Location
Linux on Compaq	http://www.compaq.com/linux/
Windows 2000 on Compaq	http://www.compaq.com/partners/Microsoft/Windows2000/index.html
Compaq ActiveAnswers	http://www.compaq.com/activeanswers
Compaq ActiveUpdate	http://www.compaq.com/products/servers/management/activeupdate/index.html
Compaq Info Messenger	http://www.compaq.com/infomessenger
Compaq Insight Manager XE	http://www.compaq.com/manage
SmartStart Scripting Toolkit	http://www.compaq.com/manage/deployment.html
Compaq Management CD	http://www.compaq.com/support/files/server/MGMTSOL/index.html
Compaq Option ROMPaq	http://www.compaq.com/support/files/storage/index.html
Compaq Resource Paq for Microsoft Windows 2000 and Windows NT	http://www.compaq.com/partners/microsoft/resourcepaq.html
Compaq SmartStart Subscription Service	http://www.compaq.com/products/servers/smartstart/index.html
Compaq System ROMPaq	http://www.compaq.com/support/files/server/us/index.html
Customer Advisories	http://www.compaq.com/support/techpubs/Customer_advisories/index.html
Microsoft Frontline Partnership	http://www.compaq.com/partners/Microsoft
Press releases	http://www.compaq.com/newsroom/pr
Support software (complete listing)	http://www.compaq.com/support/files/server/us/index.html
Compaq Support Paq for Microsoft Windows 2000	http://www.compaq.com/partners/Microsoft/Windows2000/support/servers.html
Compaq Survey Utility	http://www.compaq.com/support/files/server/us/index.html
Compaq / InformIT Linux web site	http://compaq.informit.com/linux/content/
White Papers and other technical documents (complete listing)	http://www.compaq.com/support/techpubs/whitepapers/index.html