

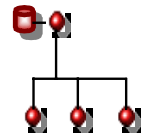
Related Products

November 2003: This Technical Information Note discusses what is required to remote boot an operating system (OS), across the network, onto a diskless single board computer (SBC) using the Preboot Execution Environment (PXE) boot loader. TIN 3111 can be applied to all Concurrent Technologies' boards, including extended temperature, that support PXE. Currently the following Concurrent Technologies board families support PXE:

CompactPCI:	PP 100/x1x, PP 110/01x, PP 120/x1x, PP 121/x1x, PP 200/x1x, PP 220/x1x, PP 221/x1x and PP 310/01x
VMEbus:	VP 100/01x, VP 101/01x, VP 110/01x and VP 305/01x

Overview

In a CompactPCI or VMEbus system, there can often be more than one intelligent processor board that needs to execute its own OS, whether it's, for example, Windows®, Linux® or VxWorks®. Depending on the application, it may not be viable to have local OS storage (e.g. CompactFlash™ disk) on every single processor board – as it may not be economically, technically or environmentally possible.



Specifics

Many Concurrent Technologies CompactPCI and VME processor boards (herein referred to as CTSCB) provide, within the on-board BIOS, the Preboot Execution Environment (PXE) boot loader. The PXE ultimately enables a CTSCB, as a diskless client, to download its OS image from a server across a network. The server could be a CTSCB with local storage. The client's OS image type can be independent from the type of OS running on the server; the client's OS image could be Linux and the server's OS could be Windows 2000.

The PXE boot loader is a key component of the Wired For Management (WFM) specification from Intel. So, as well as executing a remote network boot, it is also possible to use the PXE boot loader to remotely install an OS onto a client's local storage, useful during system commissioning. Or it can even be used if the client fails to boot correctly such that a diagnostic image can be downloaded from the server to identify any problems.

“The client's OS image could be Linux and the server's OS could be Windows 2000”

The principal behind the operation of PXE on a CTSCB client and CTSCB server is as follows. PXE uses the DHCP (Dynamic Host Configuration Protocol) and TFTP (Trivial File Transfer Protocol) in order to download the OS image via the network. The CTSCB server is configured as a DHCP Server and TFTP Server.

The CTSCB client initiates the PXE protocol by broadcasting a DHCPDISCOVER with an extension that identifies the request as coming from a client that implements PXE. The CTSCB server after several intermediate steps sends the client a list of appropriate Boot Servers. The client then discovers the CTSCB Boot Server and receives the name of an executable file on the Boot Server. The client then uses TFTP to download the executable file from the Boot Server. Finally, the client initiates the execution of the downloaded image.

With these capabilities, a CTSCB client machine can enter a heterogeneous network, acquire a network address for itself from a DHCP server, and then download a Network Bootstrap Program (NBP) to set itself up or to use as its native operating environment.

It is worth noting here that not all operating system images can be downloaded directly using the PXE boot loader, they require the boot loader Etherboot. However, PXE can be used to download an Etherboot image that in turn can download the desired client OS image.

To date the following operating systems have been successfully tested on a range of Concurrent Technologies processor boards in a diskless configuration: Windows XP Embedded, Linux, QNX6, VxWorks and DOS.

Please contact us if you wish to discuss your application in more detail.

See Also

Preboot Execution Environment: <http://download.intel.com/labs/manage/wfm/download/pxespec.pdf>

Wired for Management: <http://www.intel.com/labs/manage/wfm/wfmspecs.htm>

Etherboot: <http://etherboot.sourceforge.net/>

Windows XP Embedded: <http://www.microsoft.com/windows/Embedded/xp/evaluation/features/remotboot.asp>

Linux (examples): http://www.ofb.net/~jheiss/netboot_linux/ or <http://www.intel.com/update/departments/initech/it01001.pdf>

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#0	Original document

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