

Net/One PC System's Network Boot Facility

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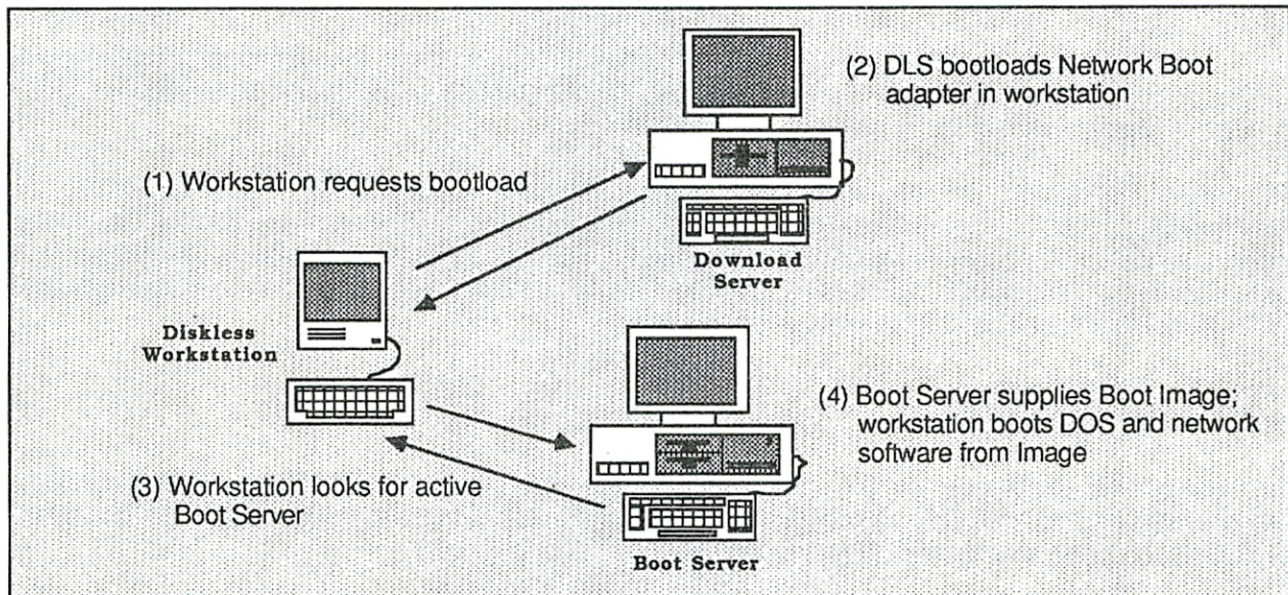
The Network Boot Facility is a new feature of Net/One PC System Version 2.0 that lets a Network Manager provide centralized booting, system access, and storage to any workstation that is equipped with a NIUpc or 3270 NIUpc card. These network boot workstations may be either personal computers with local storage capability, or true "diskless workstations" with no local storage of their own.

WHAT IS NETWORK BOOT?

There are two separate servers involved in the Network Boot process: the Download Server and the Boot Server. Both are accessed whenever a user powers on or resets the Network Boot workstation.

Once the workstation's network adapter completes its diagnostics, it accesses *download server* software at the Network Management Console (NMC) or Network Control Console (NCC). The Download Server transmits required software and configuration information into the workstation's network adapter, loading basically the same software and configuration information as the **LOADNIU** command line does on a non-Network Boot (or *local boot*) workstation.

After the Download Server loads the files needed to initialize the card at the PC, the workstation access *boot server* software at the Net/One PC System server. The Boot Server offers one or more *boot images*--single files that replicate the contents of an entire bootable diskette. When the workstation "loads" a boot image, the image serves the same function as a diskette loaded in the workstation's A: drive; the workstation boots directly from that image.



COMPONENTS OF A NETWORK BOOT SYSTEM

The following subsections describe the components of a typical Network Boot system.

Network Boot Workstation

The Network Boot facility eliminates the need to use local PC storage for network resources. As shown in our illustration, the network downloads the network adapter drivers, downloads DOS and the chosen workstation software, and even stores the user's work files. Unless the user needs to operate extensive local applications, local PC storage or memory is really not required to operate a network boot workstation.

Thus, a network boot workstation can be either a conventional PC or a true "diskless workstation"--basically, a PC with no local storage or memory.

True Diskless Workstations

A diskless workstation is an inexpensive variation on a conventional PC. Like a conventional PC it's a DOS-based machine, and its internal architecture allows you to add optional emulation or network hardware (generally, up to four expansion slots are available). But unlike a conventional PC, a diskless workstation has no local storage (floppy or hard disk drives) and little local memory.

This makes it unsuitable for local PC operations such as data transfer and backup, but well-suited for operations over a DOS-based *network*, where there is no need to operate in local mode.

From the Network Manager's standpoint, diskless workstations have two significant advantages over conventional personal computers:

- **They are more cost-effective.** In many cases, the most expensive components of a personal computer are its disk storage and memory hardware. If local storage and memory is not needed, why pay for it?
- **They are more secure.** Since it is impossible to copy files from an unattended diskless workstation onto a floppy disk, a diskless workstation provides a high degree of network security.

Diskless workstations will mix and match easily with conventional PCs in your Network Boot system. You can purchase one or more diskless workstations to expand an existing system, or use diskless workstations exclusively: as long as all workstations have Network Boot adapters (NIUpcs or 3270 NIUpcs with the appropriate PROMs), they will operate the same way on a Network Boot system.

Conventional PC Workstations

With a personal computer for a network workstation, the user has the best of two worlds: he gains access to "publicly-owned" network utilities and devices, while retaining "private" PC storage space and computing power.

However, the price of this privacy is usually a lot of duplicated effort on the network. If there are 24 PC workstations with virtual circuits to a particular server, each of those 24 workstations has to boot with its own copy of DOS, initialize its own network card, and make its own connection to the network. And since each user can configure her PC to suit her own taste, each of those 24 workstations may contact the network through a unique sequence of events.

From the Network Manager's standpoint, this creates two potential administrative problems. For one thing, if there are 24 different ways to contact the network, there are at least 24 different ways the network connection process can go wrong. For another, whenever new equipment or software is added to the system, the Network Manager must perform 24 customized PC installations.

One way to streamline network maintenance and backup procedures while maintaining the "privacy" of local PC storage is to use Net/One PC System's *Network Boot* facility. Since all network software is loaded from a single source, network maintenance and backups become more manageable. And PC users can still maintain the "privacy" of their own local storage and computing power, switching between network boot workstation and local PC mode via the **LOCAL** and **REMOTE** commands.

Once the workstation user chooses a boot image, he operates his workstation the same way he would in a non-Network Boot (or *local boot*) environment. The redirection of the PC's A: drive to the Network Boot system doesn't affect any of the PC's other drives, so work can be stored either *remotely* (on the network) or *locally* (on, say, the PC's C: drive).

All Net/One PC System user commands work the same way they would in a Local Boot environment.

Download Server

The Download Server is a network management utility that is included with Net/One BASE services. Its purpose is to transmit network configuration information to each adapter or NIU on the network, *downloading* the appropriate code so it can connect with the network hardware. The Download Server database thus serves as a centralized source for all network adapter or NIU basic operating software.

The download server draws upon two basic types of files: *Load Specification* files and *Load Characteristics* files.

- **Load Specification files** specify which Net/One software module to load for each NIU in the network. The name of the Load Specification file is always keyed to the serial number on the side of the network adapter card; depending on the network protocol, the file will end in either *.LS* (for Ethernet baseband or broadband networks) or *.TR* (for Token Ring networks).

For instance, an Ethernet 3270 NIUpc whose node ID is 1612 should have a Load Specification file named *1612.LS*. A Token Ring NIU with the same node ID would have an analogous file named *1612A.TR*.

2. Workstation performs poweron diagnostics
3. Workstation's Network Boot adapter:
 - runs its own diagnostics
 - redirects workstation drive A to Network Boot software located on one of its chips (PC workstations only)
 - asks the user if she wants to boot locally or across the network (adapters with QUERY Network Boot enable chips only; see Appendix B or the booklet *Upgrading Your Network Adapter for Network Boot*)
 - requests bootload from system **before the workstation has time to load its own copy of DOS**
4. Workstation's Network Boot adapter is bootloaded from the Download Server
5. Workstation "looks" for the Boot Server in the network; if possible, Boot Server responds, presenting all possible *boot images* for that workstation (each boot image presents a different combination of options for workstation startup).

If the Boot Server is either inactive or cannot offer the workstation any boot images(s), one of the following will happen:

- **If the requesting workstation is diskless**, the load request fails.
 - **If the requesting workstation is a conventional PC**, the workstation boots in LOCAL (non-workstation) mode, loading its own DOS.
6. Workstation user chooses a boot image; Boot Server downloads boot image software (including *CONFIG.SYS*, workstation DOS, and workstation *AUTOEXEC.BAT*); network executes appropriate command sequence to initiate NETBIOS session
 7. Workstation software is activated; user can now enter Net/One PC System commands.

The Boot Server offers boot options to the workstation user by giving him a choice of *boot images*--files that are created as virtual "images" of bootable workstation diskettes. As a rule, each boot image will contain:

- DOS system files
- *CONFIG.SYS* file with support for *ANSI.SYS* and other desired device drivers (i.e., Connection Manager)
- *AUTOEXEC.BAT* file with support for Network Boot and startup command for desired workstation option (but without **LOADNIU** command line, since Download Server has already loaded and initialized the Network Boot adapter)