IBM Network Station

IBM

Installing IBM Network Station Manager for RS/6000 V2R1, September 1999

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> **Note**
>
> Before using this information and the product it supports, be sure to read the information in "Appendix. Notices" on page 55.

Contents

About Installing IBM Network Station Manager for RS/6000 (SC41-0685)

Who should read this book

This information is intended for the person who is installing and administering the IBM Network Station Manager.

Information available on the World Wide Web

You can obtain the latest version of this book on the World Wide Web from the following URL: `http://www.ibm.com/nc/pubs` This is the same URL that is printed on the cover of this book.

Related information

The following information is available for the IBM Network Station Manager product:

	Information name	Information description
	Installing IBM Network Station Manager for AS/400, SC41-0684	Describes the installation and simple configuration of an AS/400 Network Station environment. It is shipped with the IBM Network Station Manager licensed program. Updates to this information are at http://www.ibm.com/nc/pubs.
	Installing IBM Network Station Manager for RS/6000, SC41-0685	Describes the installation and simple configuration of an RS/6000 Network Station environment. It is shipped with the IBM Network Station Manager licensed program. Updates to this information are at http://www.ibm.com/nc/pubs.
	Installing IBM Network Station Manager for Windows NT, SC41-0688	Describes the installation and simple configuration of a Windows NT Network Station environment. It is shipped with the IBM Network Station Manager licensed program. Updates to this information are at http://www.ibm.com/nc/pubs.
	Using IBM Network Station Manager, SC41-0690	Describes the basic tasks for managing user desktops through the IBM Network Station Manager program. It is shipped with the IBM Network Station Manager licensed program. Updates to this information are at http://www.ibm.com/nc/pubs.

Information name	Information description
IBM Network Station Advanced Information	Describes tasks and information beyond a basic installation and configuration of your Network Station environment. This information is only available at http://www.ibm.com/nc/pubs.
IBM Network Station Manager help text	Describes the basic how-to tasks for configuring your Network Station desktop appearance. This information is availble by clicking the help icon in the IBM Network Station Manager program.
Desktop help	Describes how to use and operate the Network Station desktop. This information is available by clicking the help icon in the lower right of the Network Station desktop.

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Chapter 1. Understanding the IBM Network Station

IBM Network Station overview

The IBM Network Station Manager licenced program code is made up of several programs that are installed on a server. One of these programs is the IBM Network Station Manager program. The IBM Network Station Manager program allows you to set and change configurations for IBM Network Station thin clients (hereafter referred to as Network Stations) and Network Station users through a Web browser. See the *Using IBM Network Station Manager* book for more information about the IBM Network Station Manager program.

Since the Network Station does not contain a hard drive, the Network Station accesses the server to download the client operating system, client programs, and data. After the Network Station loads the client operating system, the Network Station displays a graphical user interface (GUI). The GUI can provide the user access to the following kinds of resources:

- 5250 emulator application
- 3270 emulator application
- Telnet application
- Web browser application (Netscape Communicator)
- Java applets or applications
- Windows-based applications
- Local and remote printers

The Network Station communicates using Transmission Control Protocol/Internet Protocol (TCP/IP) over a token-ring or Ethernet connection to the server. Each Network Station runs the client operating system and communicates to a server that runs the IBM Network Station Manager program and other application programs.

Figure 1 shows what happens when you power on an IBM Network Station.
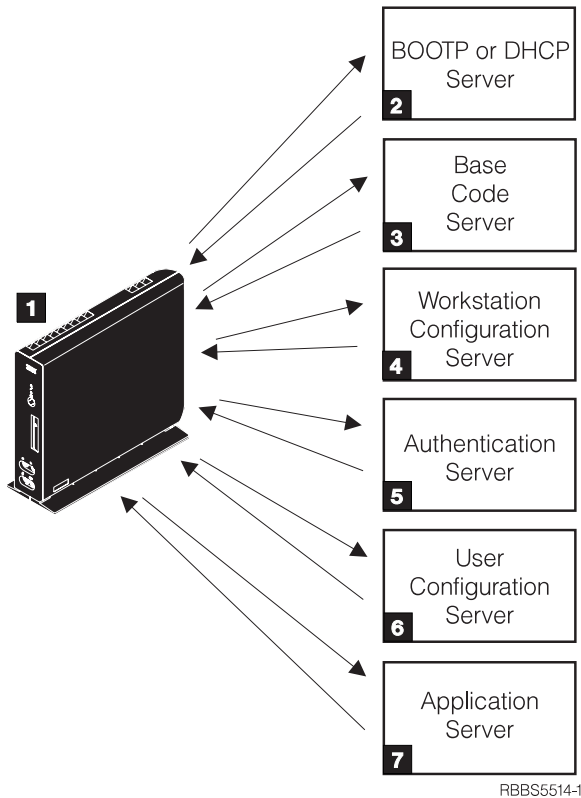
Figure 1. Network Station power-on sequence

1 A non-volatile random access memory (NVRAM) resident program starts. The Network Station automatically runs a series of power-on self tests (POST).

2 The Network Station contacts a BOOTP or DHCP boot server. The Network Station exchanges its media access control (MAC) address for the IP address that is provided by the server. The boot server also provides the address or path of the base code server. The Network Station may alternatively retrieve this information from values that are stored in its NVRAM.

3 The Network Station downloads the base code from the base code server using trivial file transfer protocol (TFTP) or network file system (NFS).

4 The Network Station downloads the workstation-based configuration information from the workstation configuration server.

5 The Network Station presents a logon screen. When the user enters a user id and password, the authentication server verifies the user's identification.

6 The user's configuration server downloads and initiates the personalized environment preferences of the user.

7 The Network Station displays the personalized desktop of the user. The user is able to access application programs that reside on the application server (or host computer).

Each Network Station contains a simple network management protocol (SNMP) agent as part of its operating system. An SNMP manager at a central location can communicate and exchange information with the agent on a Network Station. You can use this information to manage your network environment. SNMP is an industry-standard protocol for network management. See *IBM Network Station Advanced Information* for more information about SNMP. You can find this document at http://www.ibm.com/nc/pubs.

Each Network Station can display the IBM Network Station Setup Utility or IBM Network Station NS Boot utility. The Setup Utility or NS Boot utility allows you to **View** or **Set** (change) configuration settings on a particular Network Station. For example, you can view the MAC address or you can set the monitor resolution of the Network Station. See *Using IBM Network Station Manager* for more information about the Setup Utility and NS Boot Utility.

TCP/IP overview

In order for the Network Station to communicate with your servers, you need a TCP/IP network. If you understand your TCP/IP network, installing and configuring your Network Station and IBM Network Station Manager program is much easier. To help understand your network, draw a diagram of your network.

Refer to the network examples in this section to help you understand how to configure your network. Choose the network example that most closely resembles your network diagram. Refer to these examples as you go about configuring and installing Network Stations on your network.

Note: You do not need to be an expert in order to set up a TCP/IP network. However, you should have an understanding of basic TCP/IP. A detailed introduction to TCP/IP is beyond the scope of this book. If you need to improve your understanding of TCP/IP, you can contact

your IBM sales representative, who has information about classes in your area. You may also want to refer to the redbook, *TCP/IP Tutorial and Technical Overview*, GG24-3376.

LAN network examples

LAN network example 1

Figure 2 shows an example of a network diagram in which two Network Stations are connected over a simple local area network (LAN).
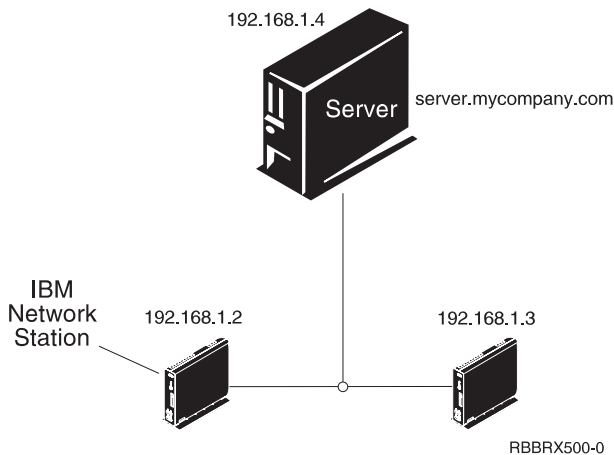
Figure 2. Two Network Stations connected to the server over a simple LAN

LAN network example 2

Figure 3 on page 5 shows an example of a network diagram in which two Network Stations are connected to the server over a local LAN. Two more Network Stations connect to the server through a router over a remote LAN.

192.168.1.4

Server   server.mycompany.com

IBM
Network   192.168.1.2
Station   192.168.1.3

ns1.mycompany.com   ns2.mycompany.com

192.168.1.1

Router

10.1.1.1

10.1.1.2   10.1.1.3

ns3.mycompany.com   ns4.mycompany.com

RBBRX501-0
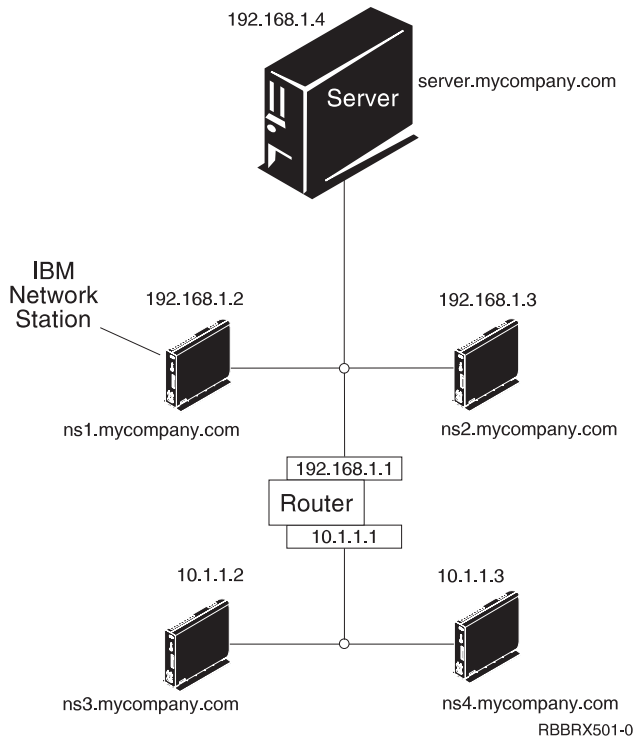
Figure 3. Two Network Stations connected to the server over a local LAN and two Network Stations connected to the server through a router over a remote LAN

LAN network example 3

In Figure 4 on page 6, additional Network Stations connect to the server by using Ethernet connections and token-ring connections. Two token-ring LANs connect via a router. A Domain Name Server also connects to the network.

192.168.1.4

Server server.mycompany.com

192.168.1.5

Domain
Name
Server

IBM
Network
Station

192.168.1.2

192.168.1.3

ns1.mycompany.com

ns2.mycompany.com

192.168.1.1

Router

10.1.1.1

10.1.1.2

10.1.1.3

ns3.mycompany.com

ns4.mycompany.com

RBBRX503-0
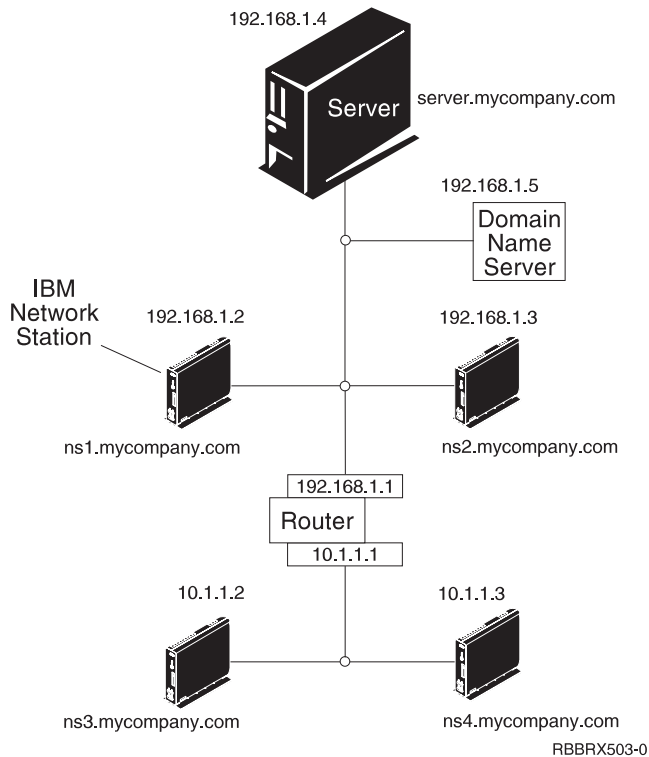
Figure 4. Four Network Stations connected to a network using a router and a domain name server

MAC addresses

Every Network Station comes with a unique identifying number that can be
used to keep track of which IP address has been assigned to it. Media access
control (MAC) addresses of each Network Station are assigned by
manufacturing and hard-coded into the machine. The MAC address of a
Network Station is on the side panel of the small box in which the logic unit
is packaged. If you no longer have the box, see the *Using IBM Network Station
Manager* book for instructions on how to find the MAC address.

You can override the hard-coded MAC address with a customer-assigned
MAC address. See *Using IBM Network Station Manager* for instructions on how
to override the hard-coded MAC address.

IP addresses

Internet Protocol (IP) addresses are numbers that are assigned to devices on a
network (or on the Internet). IP addresses allow computers to communicate
through TCP/IP. IP addresses consist of four numbers (from 0 to 255) that are
separated by periods, for example 192.168.1.1. The numbers that are separated

by periods indicate the network to which a computer belongs and the specific location of the host computer within that network.

IP addresses are not just for computers such as Network Stations, but also for routers, servers, and even subnets and networks themselves. For example, the IP address of a network might be 192.168.1.0. A router on that network might use the IP address 192.168.1.1. A Network Station on the same network might have the address 192.168.1.145.

Each Network Station must have a unique IP address. If you are using the DHCP boot method, you must specify a range of IP addresses so that the server can assign an address to each Network Station. For intranets (networks within your own organization), you can assign your own addresses. However, if you want to connect to the Internet, a central authority must officially assign the network addresses and domain names. At the time of this writing, the authority is as follows:

```
Network Solutions, Inc.
InterNIC Registration Services
505 Huntmar Park Drive
Herndon, VA 22070
1-703-742-4811
E-mail: hostmaster@internic.net
WWW: http://rs.internic.net
```

Boot methods

Since a Network Station has no disk from which to start, it must request information either from its own non-volatile random access memory (NVRAM) or from a server. The Network Station needs to find an IP address for itself. The IP address allows the Network Station to communicate with other hosts. The Network Station can use one of the following methods to request and receive this information:

- Dynamic Host Control Protocol (DHCP)
- Bootstrap Protocol (BOOTP)
- Non-Volatile Random Access Memory (NVRAM)

BOOTP servers can only respond to BOOTP clients, but DHCP servers can respond to both BOOTP and DHCP clients.

Note: If you use the BOOTP or DHCP boot methods, you must configure all routers and gateways in your network to send and receive BOOTP or DHCP packets. If you cannot configure your routers to be BOOTP or DHCP relay agents, you could do either of the following:

- Use a system that has the necessary configuration support to receive limited BOOTP or DHCP broadcasts. Then forward those broadcasts to the appropriate server.
- Use the NVRAM boot method for those Network Stations that are behind a router that cannot forward BOOTP or DHCP broadcasts.

DHCP

Dynamic Host Configuration Protocol (DHCP) is a TCP/IP protocol. DHCP provides a way for a server to automatically allocate IP addresses and configuration information without forcing the administrator to record and track the MAC addresses of the networked computers. DHCP is capable of assigning either a permanent IP address or a temporary IP address for every host or Network Station within a predetermined range of IP addresses. You can also use DHCP to assign IP addresses either statically or dynamically.

In static IP address assignment, you define the MAC address of every Network Station in the DHCP server configuration along with an IP address, which is reserved for the Network Station with this MAC address. A Network Station, identifying itself by its MAC address, sends a request to the DHCP server. The server then returns the IP address that it has reserved for that client.

In dynamic IP address assignment, the server still identifies a Network Station by its MAC address. However, instead of using a fixed IP address, the server allocates any address out of the available pool. The server leases the address to the Network Station for a specified period of time. The address returns to the pool either when the client releases it or when the lease runs out.

DHCP can allow for unlisted clients. Any client, even one with an undefined MAC address in the DHCP configuration, may request an IP address from the pool of available addresses. The use of unlisted clients might be appropriate in an environment in which it is not necessary or preferable to keep track of MAC addresses.

While BOOTP servers can handle requests only from BOOTP clients, DHCP can handle requests from both DHCP and BOOTP clients.

DHCP servers (unlike BOOTP servers) can reuse IP addresses that are not currently being used.

Finally, DHCP provides a large set of configuration options that may include user-defined options. These options are useful in configuring advanced network environments. See *IBM Network Station Advanced Information* for a more in-depth discussion of advanced network environments. You can find this document at http://www.ibm.com/nc/pubs.

BOOTP

Bootstrap protocol (BOOTP) is a TCP/IP protocol that allows the Network Station to request an IP address and the location of the base code file from a server.

To use the BOOTP boot method, the network administrator must record the MAC addresses of all the Network Stations on the network. Then the network administrator assigns each of them an IP address. The administrator then enters those assignments on a BOOTP table. When you need to change IP addresses, you can do so centrally on the table in the boot server rather than individually on each Network Station.

When a Network Station powers on, it broadcasts its MAC address to the BOOTP server. The server looks up the IP address of the Network Station according to its MAC address. BOOTP then returns a reply that assigns the IP address for the Network Station and the name and location of the base code file.

Because BOOTP assigns IP addresses statically (fixing an IP address according to a computer's MAC address and then recording this assignment), it is less versatile than DHCP.

NVRAM

Non-Volatile Random-Access Memory (NVRAM) refers to local Network Station memory. When you use the NVRAM boot method, you code the IP addresses of the Network Station and its server into the memory of the individual Network Station. The Network Station powers on and requests the download of the base code file from the server.

The NVRAM boot method is most practical in small, stable networks. You may also choose to use the NVRAM boot method for one of the following reasons:

- As a method to avoid routers that block BOOTP and DHCP broadcast requests. BOOTP and DHCP broadcast requests for IP addresses can create unnecessary traffic on the network. Many network routers are configured not to pass these broadcast requests. Since NVRAM does not need to request its IP address (because it has been entered in the NVRAM of the Network Station), it does not make broadcasts.
- As an aid in finding and correcting problems with network connections.
- As an aid in finding and correcting problems with BOOTP or DHCP configurations.

This method may not work well for larger networks for the following reasons:

- You must enter setup data into each Network Station manually.
- DHCP and BOOTP can configure many more parameters that may not be easily configured with this method.

For information about how to configure NVRAM in the Setup Utility or NS Boot utility, see the *Using IBM Network Station Manager* book.

Boot file service

The Network Station uses either TFTP or NFS to receive the base code file from the base code server. Trivial file transfer protocol (TFTP) is a simple protocol that is used to transfer files. The network file system (NFS) makes files and directories available to clients. NFS is generally more reliable than TFTP.

Java on the Network Station

Java is a programming language that is designed to bridge the gap between different platforms. Java's imperative, "Write once, run anywhere," refers to its portability and to the ability of a single Java program to run on different platforms. To view Java applications, you need a bundle of Java-enabling programs called Java Virtual Machine (JVM). Using JVM on diskless clients such as the Network Station allows the user to access applications without using permanent disk space either on the Network Station or on the server.

There are two kinds of Java programs:
- Applets — require a browser or applet viewer
- Applications — display directly

The first variety, applets, rely on a browser or applet viewer to provide windows and graphical layout. In general, the browser does not "trust" applets because they are downloaded across the Internet. In other words, the browser can restrict applets from reading or writing to local files and from connecting to machines other than those from which they are downloaded. These restrictions protect users from virus-contaminated programs and provide a safe environment for examining programs on the Internet.

See *IBM Network Station Advanced Information* for a more information about Java. You can find this document at at http://www.ibm.com/nc/pubs.

Windows applications on the Network Station

Network Stations can run Windows-based applications through the use of a multi-user Windows server. There are several products that can provide a multi-user Windows server:

- Citrix WinFrame is a multi-user Windows application server that is based on Windows NT 3.51. Citrix WinFrame communicates to the Network Station by using the independent computer architecture (ICA) protocol.
- NCD WinCenter is a multi-user Windows application product that requires Citrix WinFrame or Microsoft Windows NT Server 4.0, Terminal Server Edition. NCD WinCenter communicates to the Network Station by using the X11 protocol.
- Citrix MetaFrame is a multi-user Windows application product that requires Microsoft Windows NT Server 4.0, Terminal Server Edition. Citrix MetaFrame communicates to the Network Station by using the ICA protocol.

Network Stations that start from a V1R3 or V2R1 IBM Network Station Manager licensed program server can communicate to a multi-user Windows server using the X11 protocol or the ICA protocol.

For more information, see the following Web sites:

- WinFrame and MetaFrame - http://www.citrix.com
- WinCenter - http://www.ncd.com
- Windows NT Server 4.0, Terminal Server Edition - http://www.microsoft.com

Network Station memory requirements

Network Stations download each of their applications into memory. You should verify that your Network Stations have enough memory to run their applications. For more information on memory, do the following:

1. Go to this Web site: http://www.ibm.com/nc
2. In the left pane, click on **Support**.
3. In the **Search** field, enter memory requirements.

Taking advantage of multiple server environments

You can install the IBM Network Station Manager licensed program on multiple computer systems. For a more in-depth discussion of this topic, see the *IBM Network Station Advanced Information*. You can find this document at http://www.ibm.com/nc/pubs.

New features in Version 2 Release 1

Version 2 Release 1 (V2R1) of the IBM Network Station Manager licensed program introduces many new features. These features include:

Client desktop

The client desktop has a new look and includes the following:

- 16 bit color support
- Scalable fonts
- Desktop help
- Kiosk mode

For more information see the *Using IBM Network Station Manager* book.

Netscape Communicator 4.5

Netscape Comunicator 4.5 includes the Navigator browser, and Messenger (e-mail and news). The browser is fully compatible with other Unix versions of Netscape Navigator. Key features that are new in this version include:

- Netscape JVM
- Runtime Plug-in for the Network Station, Java Edition
- PDF helper application
- Real Player helper application
- Audio player helper application
- Video player helper application

For more information, see the *Using IBM Network Station Manager* book.

Windows application support

Enhanced ICA support. For more information, see the *Using IBM Network Station Manager* book.

VT emulator

Enhanced VT emulator. For more information, see the *Using IBM Network Station Manager* book.

Productivity applications

- File manager
- Text editor
- Calendar
- Calculator
- Paint

For more information, see the *Using IBM Network Station Manager* book.

Java   The IBM Network Station Manager licensed program provides two JVMs:

- Netscape 4.5 JVM
- IBM JVM (JDK 1.1.8)

Flash memory support

Flash memory support provides the ability to local boot from a flash memory card and a flash memory management utility. For more information, see *IBM Network Station Advanced Information*. You can find this document at http://www.ibm.com/nc/pubs.

Hardware support

Table 1 shows the IBM Network Station hardware by machine type, model number, and series. It also shows which version and release of the IBM Network Station Manager licensed program is required to support a particular hardware machine type and model.

For example:

- Machine type 8364 model Exx requires V2R1
- Machine type 8362 model A22 is supported by either V2R1 or V1R3

Table 1. IBM Network Station hardware types, models, and series

Compatible release	Machine type - model				
	Series 100	Series 300	Series 1000	Series 2200	Series 2800
V2R1 only				8363-Exx 8363-Txx	8364-Exx 8364-Txx
both V2R1 and V1R3		8361-110 8361-210	8362-A22 8362-A23 8362-A52 8362-A53		
V1R3 only	8361-100 8361-200	8361-341*			
* Twinaxial model supported only on AS/400 servers.					

Coexistence with V1R3

When you install V2R1 on a system that already has V1R3 installed on it, the V1R3 environment is preserved. Both V2R1 and V1R3 can coexist and operate on the same server. The ability to have two software versions that coexist on the same server allows support for

all Network Station hardware models. A migration utility can migrate the V1R3 preference files to V2R1. You can uninstall the V1R3 environment after you migrate the V1R3 preference files. For more information, see "Chapter 4. Migrating to IBM Network Station Manager V2R1" on page 45.

Chapter 2. Installing and configuring IBM Network Station Manager for AIX

About this chapter

This chapter contains instructions for planning and installing the IBM Network Station environment for RS/6000 servers that run the AIX operating system.

Installing and configuring the AIX server software

These instructions should only be used for the IBM Network Station Manager V2R1 licensed program.

Note: References to V2R1 indicate an **eNetstation 2.1.0.x** installation, while V1R3 indicates a **netstation 1.3.0.x** installation.

Depending on what options you select and whether your server has the proper requirements, the installation process may take from 15 minutes to 30 minutes.

If you plan to migrate your configuration data from an older version of the IBM Network Station Manager licensed program, read the information in "Chapter 4. Migrating to IBM Network Station Manager V2R1" on page 45 before you start the IBM Network Station Manager V2R1 program installation.

Note: You *must* install the IBM Network Station Manager V2R1 licensed program, before performing the migration process. If you currently have V1R3 installed on your system, it is recommended that you do not uninstall it at this time. If you proceed with this installation and then need to reinstall V1R3, you *must* install **netstation 1.3.0.7** or above.

To install and configure the IBM Network Station Manager licensed program, complete the following checklist and mark off each item as you complete it:

___ 1. Draw a diagram of your network. See "TCP/IP overview" on page 3.

__ 2. Bookmark or copy the pages which contain the LAN network example diagrams that you will use as you install and configure your network. These diagrams are Figure 2 on page 4, Figure 3 on page 5, and Figure 4 on page 6.

__ 3. Examine the README file on the IBM Network Station Manager V2R1 licensed program CD. This file contains information about prerequisites, installation, and late-breaking code changes.

__ 4. The Series 2800 (Type 8364) Network Station supports multiple software releases. For information on the best way to setup Series 2800 (Type 8364) Network Stations for V2R1 IBM Network Station software, you must see "Running V2R1 on Series 2800" in the README file.

__ 5. Network Stations download each application, including their base systems, into memory. It is important that you verify that each Network Station has enough memory to perform the desired functions. Use the following procedure to determine your IBM Network Station memory requirements:

   a. Go tohttp://www.ibm.com/nc/.

   b. In the left pane, click on **Support**.

   c. In the **Search** field, type Memory Requirements.

__ 6. Verify the following server memory requirements and network settings.

   __ a. RS/6000 server with the AIX Version 4.2.1 or later operating system installed.

   __ b. Typically, all server functions will reside on a single server. Therefore, the hard disk space requirements are cumulative. Also, if the install images are acquired from a Web site, additional space is required for the images themselves.

   Depending on the type of function the server will perform, the following hard-disk space requirements must be met:

   • BootP/DHCP Server — These functions are provided with the AIX operating system and do not require any additional hard-disk space.

   • Base-Code Server — This server provides the client operating system with any desired local client applications. Depending on the applications that are selected, the Network Station models to be supported, and the selected international languages, the server will require from 200 MB to 500 MB of available hard-disk space.

   • Configuration-Server — This server provides space for storing terminal and user configuration data and requires at least 15 MB of available hard-disk space.

- Authentication-Server — This server provides the user login functions. This server requires at least 50 MB of available hard-disk space.

___ 7. Make sure that your server's AIX operating system has all the proper prerequisites.

Consult Table 2 to make sure that your system is ready for the installation. If all of the prerequisites are in place, go to step 8.

Note: The recommended Web browser for use with the IBM Network Station Manager licensed program is **Netscape.nav-[us].rte 4.0.4**

Table 2. AIX operating system prerequisites

Prerequisite	How do I know if the prerequisite fileset is installed?
bos.rte Version 4.2.1 or later	Type the following command at the prompt: `lslpp -h bos.rte`
bos.net.tcp.server Version 4.2.1 or later	Type the following command at the prompt: `lslpp -h bos.net.tcp.server`
bos.iconv (If using the configuration-server installation with the IBM Network Station Manager program.)	Type the following command at the prompt: `lslpp -h bos.iconv`
bos.net.nfs.client Version 4.2.1 or later	Type the following command at the prompt: `lslpp -h bos.net.nfs.client`

Lotus Domino Go Webserver
 	
Version 4.6.2.2 or later
 	
Included on the IBM Network Station Manager V2 licensed program CD.
 	
(If using the configuration-server installation with the IBM Network Station Manager program.)
	Type the following commands at the prompt:
	
	`lslpp -h internet_server.base.admin.httpd`
	
	`lslpp -h internet_server.base.admin.doc`

___ 8. Insert the IBM Network Station Manager V2 CD into the CD-ROM drive.

___ 9. Log in as the root user on your server.

___ 10. Use the fast path below to open the System Management Interface Tool (SMIT) **Install/Update from All Available Software** menu.

`smitty install_selectable_all`

___ 11. Use the List function (F4) to select an input device or directory from the list that is displayed.

For example, the CD-ROM drive is normally indicated as `cd0`.

___ 12. Depending on the server functionality that is desired, install the filesets according to the guidelines that are listed in the following tables:

Notes:

a. If you want to perform an installation other than the typical single-server installation, and you do not have a full understanding of separation of servers, review the information in the *IBM Network Station Advanced Information* book before attempting these types of installations.

b. In Tables 3 and 4, Sxxx below signifies S2x00 or S300_1000 series, depending on the hardware models of Network Station that are in your system environment.

Single-Server installation

The single-server installation places all elements of the IBM Network Station Manager licensed program onto a single server. This installation is the preferred method of installing the software. Other methods should be used only after reviewing the information in the *IBM Network Station Advanced Information* book.

Table 3. Single-Server installation

Required Filesets	Optional Filesets
eNetstation.base	**eNetstation.Sxxx.emul**
eNetstation.S2x00.base*	Provides telnet, 3270, and 5250 emulation capability
eNetstation.S300_1000.base*	
eNetstation.msg.en_US**	**eNetstation.Sxxx.ica**
	Provides ICA protocol capability.
eNetstation.nsm	**eNetstation.Sxxx.java**
eNetstation.nsm.en_US**	Provides Java support.
eNetstation.login	**eNetstation.Sxxx.netscape**
* The filesets used for installation are determined by the IBM Network Station Manager hardware models in your environment. These filesets may be installed separately or together.	Installs Netscape browser.
	eNetstation.Sxxx.fonts_typ
	Installs only the most commonly used fonts.
	eNetstation.Sxxx.fonts_all
	Installs all available fonts.
** Other languages optional.	**eNetstation.Sxxx.*lang***
	Provides non-English language support for local Network Station applications.
	eNetstation.tools

Base-Code server

This server provides the operating system and local application files that are exported or downloaded to the Network Station clients. This server is not used to configure the Network Stations.

Table 4. Base-Code server

Required Filesets	Optional Filesets
eNetstation.base	**eNetstation.Sxxx.emul**
eNetstation.S2x00.base*	Provides telnet, 3270, and 5250 emulation capability
eNetstation.S300_1000.base*	**eNetstation.Sxxx.ica**
eNetstation.msg.en_US**	Provides ICA protocol capability.
* The filesets used for installation are determined by the IBM Network Station Manager hardware models in your environment. These filesets may be installed separately or together.	**eNetstation.Sxxx.java**
	Provides Java support.
** Other languages optional.	**eNetstation.Sxxx.netscape**
	Installs Netscape browser.
	eNetstation.Sxxx.fonts_typ
	Installs only the most commonly used fonts.
	eNetstation.Sxxx.fonts_all
	Installs all available fonts.
	eNetstation.Sxxx.*lang*
	Provides non-English language support.

Terminal-Configuration server

This server provides the terminal configuration profiles
(**userbase/profiles/ncs**) required to configure the network stations
themselves. These profiles can be generated in the following ways:

- on the same server (you must install the optional filesets for the
  IBM Network Station Manager program listed below).
- on another server (with the IBM Network Station Manager licensed
  program installed) and copied to this server.

Table 5. Terminal-Configuration server

Required Filesets	Optional Filesets
eNetstation.base	**eNetstation.nsm**
eNetstation.msg.en_US****	**eNetstation.nsm.en_US******
** Other languages optional.	Allows the user to configure the terminal configuration profiles using the Network Station Manager licensed program on this server.
	eNetstation.tools
	Allows the user to use the Network Station Manager Command Line Utility for configuration. This will require Java to be installed on your server. See the *IBM Network Station Advanced Information* book for information on using tools.
	** Other languages optional.

User-Configuration server

This server provides the user configuration profiles (**userbase/profiles/users [groups]**) required to configure the network station users. These profiles can be generated in the following ways:

- on the same server (you must install the optional filesets for the IBM Network Station Manager program below).
- on another server (with IBM Network Station Manager program) and copied to this server.

Table 6. User-Configuration server

Required Filesets	Optional Filesets
eNetstation.base	**eNetstation.nsm**
eNetstation.msg.en_US**	**eNetstation.nsm.en_US****
** Other languages optional.	Allows the user to configure the terminal configuration profiles using the Network Station Manager program on this server.
	eNetstation.tools
	Allows the user to use the Network Station Manager Command Line Utility for configuration. This will require Java to be installed on your server. See the *IBM Network Station Advanced Information* book for information on using tools.
	** Other languages optional.

Authentication server

This server provides the mechanism by which all Network Station users must authenticate (log in) before use.

Table 7. Authentication server

Required Filesets	Optional Filesets
eNetstation.base	N/A
eNetstation.msg.en_US**	
eNetstation.login	
** Other languages optional.	

> **Note:** The Authentication and User-Configuration servers *must* be used in combination, unless the AIX Network Information System (NIS) is being used. NIS provides a way to share **uid/gid** and other system information across servers.

__ 13. After you have selected the filesets you will be installing, press Enter to proceed with the installation process. You do not have to restart the system if you only installed the eNetstation filesets. The software installation process will run the **/usr/NetworkStationV2/bin/v2nsconf** script. This script will set up and enable the following elements on the AIX server:

- RS/6000 host-specific configuration
- BootP

- Trivial File Transfer Protocol (TFTP)

For more information about the **/usr/NetworkStationV2/bin/v2nsconf** script, see "Understanding the v2nsconf script" on page 40.

__ 14. Gather information on your RS/6000 system configuration. Table 8 on page 24 lists the information you need to configure your RS/6000 server and Network Stations. Print out this table and record the configuration information for your system. This will provide you with a quick reference when you need to complete the steps for configuring your RS/6000 system.

Table 8. RS/6000 configuration information

Field	Description	Write Value Here
1 RS/6000 server IP Address	The RS/6000 server IP address is the address that uniquely identifies this RS/6000 to Transmission Control Protocol/Internet Protocol (TCP/IP). This address is associated with the local host name to create a name entry in the Host Names table.	
2 Media Access Control (MAC) address (hardware address) of each Network Station	The Media Access Control (MAC) address for BOOTP and DHCP is a unique hardware-specific identifier for each Network Station. The address is located on the Network Station's box. To find the MAC address without the box, follow this procedure: a. Power on the Network Station. b. After the keyboard controller test, press the Escape key. c. In the Setup Utility, press F2. d. Record the MAC address.	
3 IP address of each Network Station or IP address range needed for a DHCP environment where IP addresses are being assigned dynamically.	Ensure all IP addresses and IP address ranges are valid and unique for your network.	
4 Host name of each Network Station	The host name identifies the Network Station as a unique destination within a TCP/IP network.	
5 Subnet mask	The subnet mask is a value that enables network devices to direct packets of information accurately in a subnetted environment.	
6 IP address for the Gateway (if one exists in your network)	If the local area network (LAN) that you are attaching Network Stations to is not directly attached to the RS/6000, you need to specify the IP address of the IP Router/Gateway that the Network Stations use to access the server.	
7 IP address for the Domain Name server (if one exists for your network and you are using the BOOTP or DHCP)	The Domain Name server IP address is the address of the system (if any) that will act as primary name server in this domain.	

__ 15.   You must now configure each Network Station so that the server recognizes it when it attempts to connect during the boot process. You

can configure the Network Stations using Dynamic Host Configuration Protocol (DHCP), BootP from the server, or locally using NVRAM on each unit.

Each Network Station must be set using the **NS Boot Main** menu. From this menu, select **Configure network settings** and set the **Network priority** according to the server configuration you have selected to use.

> **Note:** The recommended boot method is DHCP for this release of the IBM Network Station Manager licensed program. The other methods of booting the server should only be used if there is a problem in configuring your server for DHCP.

Choose the boot method you are using to configure your Network Stations:

- If you choose to use DHCP, go to step 16.
- If you choose to use BootP, go to step 17 on page 26.
- If you choose to use NVRAM, go to step 18 on page 29.

__ 16.   The DHCP and BootP daemons cannot run on the same machine at the same time because both daemons use the same protocol and the same UDP port. DHCP replaces BootP and supports all features of BootP. There is no need to run both daemons on the same machine.

It is also possible to set up a relay DHCP daemon. This server forwards DHCP requests to another DHCP server. Use this relay feature if you want to use a DHCP server in another network because the broadcast requests from a Network Station will not cross subnets.

DHCP configuration is more advanced than BootP. If you already have a running BootP configuration, convert the entries in the **/etc/bootptab** file into the **/etc/dhcpsd.cnf** file automatically by using the **/usr/sbin/bootptodhcp** command. This command appends the proper client entries to the DHCP configuration file. You can find more information within the **/etc/dhcpsd.cnf** file and in the *AIX Version 4 System Management Guide: Communications and Networks*. You can also see *AIX Version 4.3 System Management Guide: Communications and Networks*.

Use the following procedure to set up the **/etc/dhcpsd.cnf** file for your network and start DHCP:

__ a.   Edit the **/etc/dhcpsd.cnf** file by using the example in "DHCP configuration file and description" on page 36 as a guide.

__ b.   After you set up the configuration file, use the following procedure to start the DHCP server:

__ 1)   Disable the start of BootP.

To disable the start of BootP, edit the **/etc/inetd.conf** file and place a **#** in the first column of the 'bootps' line. Then enter the following command to restart the **inetd** subsystem:

```
refresh -s inetd
```

___ 2) Enter the following command to check for any active BootP daemons:

```
ps -eaf | grep bootp
```

___ 3) If any BootP processes are running, enter the following command to stop them:

```
kill -9 PID
```

where *PID* is the process ID of the BootP process that is listed by the **ps** command.

___ 4) Enter the following command to start DHCP:

```
startsrc -s dhcpsd
```

When you start DHCP for the first time, be sure to check the log files for errors in your server or client configuration. It is a good idea to enable all events for logging.

This completes the DHCP configuration. Go to step 19 on page 29.

___ 17. Each Network Station must have an entry in the BootP table on the server. Use the procedure that is described below to add a line to the server **/etc/bootptab** file for each Network Station:

___ a. Use the following fast path to open the SMIT BootP Device menu:

```
smitty bootp
```

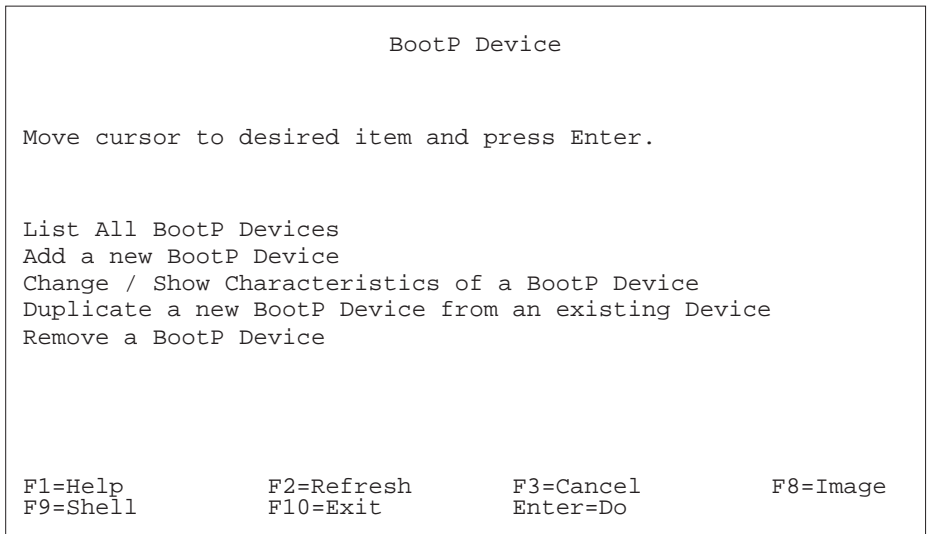An example of the **BootP Device** menu is shown in Figure 5 on page 27:

```
                        BootP Device


Move cursor to desired item and press Enter.



List All BootP Devices
Add a new BootP Device
Change / Show Characteristics of a BootP Device
Duplicate a new BootP Device from an existing Device
Remove a BootP Device




F1=Help           F2=Refresh        F3=Cancel          F8=Image
F9=Shell          F10=Exit          Enter=Do
```

Figure 5. RS/6000 BootP Device menu

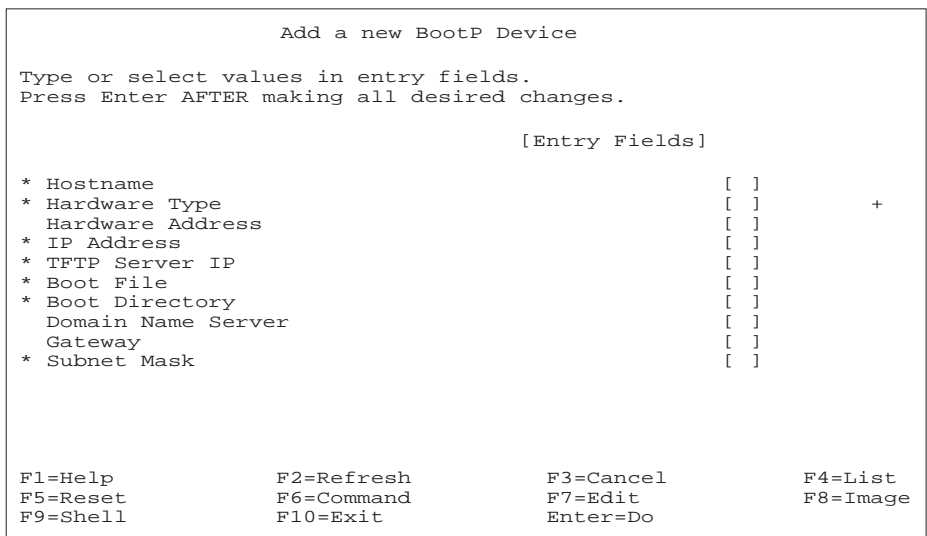__ b. Select **Add a new BootP Device**. The **Add a new BootP Device** dialog box displays as shown in Figure 6:

```
                   Add a new BootP Device

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                    [Entry Fields]

* Hostname                                     [ ]
* Hardware Type                                [ ]            +
  Hardware Address                             [ ]
* IP Address                                   [ ]
* TFTP Server IP                               [ ]
* Boot File                                    [ ]
* Boot Directory                               [ ]
  Domain Name Server                           [ ]
  Gateway                                      [ ]
* Subnet Mask                                  [ ]




F1=Help           F2=Refresh        F3=Cancel          F4=List
F5=Reset          F6=Command        F7=Edit            F8=Image
F9=Shell          F10=Exit          Enter=Do
```

Figure 6. RS/6000 Add a new BootP Device dialog box

__ c. In the Add a new BootP Device dialog box, type or select the following information:

__ 1) Host name of the Network Station

Type the value that is recorded on line ◢4◣ in Table 8 on page 24.

__ 2) Hardware Type of the Network Station (Choose from the list)

__ 3) Hardware Address (the MAC address for the Network Station that you are configuring)

Use the value that is recorded on line ◢2◣ in Table 8 on page 24. Type the value without the **:** colon separators. Type the string either with no separators or with period separators.

__ 4) IP Address of the Network Station

Type the value that is recorded on line ◢3◣ in Table 8 on page 24.

__ 5) TFTP Server IP address

This is typically the IP address of the RS/6000 that is being configured. Type the value that is recorded on line ◢1◣ in Table 8 on page 24.

__ 6) Boot file

Type kernel in this field.

> **Note:** Depending on the specific hardware series you are configuring DHCP for, use **kernel.2200**, **kernel.2800**, **kernel.300**, or **kernel.1000**.

__ 7) Boot directory

Type /usr/NetworkStationV2/prodbase/[x86 or ppc]/ in this field. Type the directory path as shown including the trailing /.

> **Note:** Use x86 in this field if you are configuring a new Series 2x00 machine. If you are configuring an old Series 300 or 1000 machine, use ppc in this field

__ 8) IP Address for the Domain Name Server

Type the value that is recorded on line ◢7◣ in Table 8 on page 24.

> **Note:** This field is optional. If your environment does not require this address, leave the field blank.

__ 9) IP Address for the Gateway

Type the value that is recorded on line ◢6◣ in Table 8 on page 24.

> **Note:** This field is optional. If your environment does not require this address, leave the field blank.

    __ 10) Subnet mask

        Type the value that is recorded on line **5** in Table 8 on page 24.

    __ 11) If all fields and selections are correct, press the Enter key to add this Network Station to the BootP table.

Repeat these steps for each Network Station.

Notes:

1) If you are configuring more than one Network Station, select **Duplicate a new BootP Device from an Existing Device** in the BootP Device Menu as a starting point to configure the next network station. Many fields contain the same information for all Network Stations.

2) You can also configure Network Stations by using the **chbootptab** script (see "Using the chbootptab script to automatically configure Network Stations for BootP" on page 34) or by manually editing the **/etc/bootptab** file (see "Manually configuring Network Stations for BootP" on page 33).

This completes the BootP configuration procedure. Go to step 19.

__ 18. Configuring the server for the NVRAM boot method is only practical if you are configuring a very small number of IBM Network Stations.

If you still want to configure the Network Stations for NVRAM, use the procedure in the *Using IBM Network Station Manager* book to configure Network Stations locally.

> **Note:** Reverse Address Resolution Protocol (RARP) is a choice in the Network Station NVRAM boot choices. However, the RS/6000 platform does not support RARP for booting Network Stations.

__ 19. This step is only applicable if you have IBM Network Station Manager V1R3 installed and intend to migrate your current Series 300 or Series 1000 machines to V2R1.

You *must* update the boot code on your current Series 300 or 1000 Network Stations. Each of your Network Stations must have a minimum boot code version of 3.0.8.7. You must access the IBM Network Station Manager program at:

http://*Server Name*/networkstationv2/admin

Next, review the section on updating the boot code in the *Using IBM Network Station Manager* book.

__ 20. After you have completed the installation procedure, it is important that you verify the following:

> **Note**
>
> To ensure correct operation and to take advantage of new functionality, you must update the Network Station boot code to the latest level. Even if you have purchased new Network Stations, you must verify and update the boot code of your Network Stations. For information about updating boot code, see the *Using IBM Network Station Manager* book.

- Verify that your HTTP and DHCP (if used) servers have been started, and whether or not the BootP, TFTP, and NFS daemons are running (**biod**, **nfsd**, **rpc.mountd**, **rpc.statd**, and **rpc.lockd**).

  Note: TFTP and BootP daemons are transient daemons. Unless you run the **ps -ef** command while they are actually running, you cannot verify that they have run successfully. Also, the TFTP daemon is used only with AIX Version 4.3.1 and later.

- If you are using DHCP, and you have a router between your IBM Network Stations and your boot server, verify that the router is configured to handle DHCP requests.

- Use a Web browser to access the IBM Network Station Manager at URL http://*ServerName*/networkstation/admin to administer system or group level local-client applications, including the Netscape Communicator Web browser and terminal emulators. You need root user authority to perform this task on the server. See the *Using IBM Network Station Manager* and *IBM Network Station Advanced Information* books for more information.

- Verify that the network parameters that are configured in the Setup Utility of each Network Station agree with your boot method. For example, if you want an IBM Network Station to obtain its IP address through a DHCP or BootP server, ensure that the **IP Address From** field in the Setup Utility is set to Network. IBM Network Stations are set to Network when they are shipped from the factory. For more information about setting up Network Stations, see the *Using IBM Network Station Manager* book.

Installing IBM Network Station Manager components after the initial installation

You may want to install certain software components after you have installed the IBM Network Station Manager software.

Strong Encryption Support

If you are in Canada or the United States, you may choose to install the 128-bit Strong Encryption Support software.

Note: If you are installing the secure Netscape Communicator software or the secure ICA option, make sure that you have installed the following prerequisite software. Select the prerequisite fileset according to the Network Station hardware series you are installing the software on.

Table 9. Prerequisite software for Strong Encryption Support software

Strong Encryption Support Software	Prerequisite Software
Netscape Communicator (128 bit encryption)	**eNetstation.S2x00.netscape** OR **eNetstation.S300_1000.netscape**
ICA	**eNetstation.S2x00.ica** OR **eNetstation.S300_1000.ica**

To install the Strong Encryption Support software, perform the following steps:

__ 1. Use the fast path shortcut to open the SMIT Install/Update From All Available Software menu:

```
smitty install_selectable_all
```

__ 2. Use the List function (F4) to select an input device or directory from the list that is displayed.

For example, the CD-ROM drive is normally indicated as cd0.

__ 3. Use the List function to display a list of all available software on the selected input device or directory.

__ 4. To install the Netscape Communicator software, use the Find function to search on eNetstation. Next, select the following fileset to install:

eNetstation.Sxxx.sec128.netscape-us

__ 5. To install the ICA option, use the Find function to search on eNetstation. Next, select the following fileset to install:

eNetstation.Sxxx.sec128.ica

___ 6. To install the SSL option, use the Find function to search on
eNetstation. Next, select the following fileset to install:

eNetstation.Sxxx.sec128.ssl

You have now completed your installation of the IBM Network Station
Manager licensed program. If you are currently running with **netstation.base**
1.3.0.x (referred to as Version 1 Release 3), it is highly recommended that you
go to "Chapter 4. Migrating to IBM Network Station Manager V2R1" on
page 45 and read the information on migrating your system configurations
from V1R3 to V2R1.

Chapter 3. Optional configuration information for IBM Network Station Manager

About this chapter

This chapter contains instructions for configuring the IBM Network Station environment for RS/6000 servers that run the AIX operating system.

Manually configuring Network Stations for BootP

Use the following procedure to configure Network Stations manually by editing the **/etc/bootptab** file. For each Network Station that you want your server to start, copy the template below and replace the field names (labels in uppercase) with the appropriate values. Enter the following information on *one line only*:

```
NC_HOST_NAME:ht=NETWORK_TYPE:ha=MAC_ADDRESS:ip=IP_ADDRESS:bf=kernel
hd=/usr/NetworkStationV2/prodbase/[x86 or ppc]/:sm=SUBNET_MASK:
gw=GATEWAY_IP:ds=NAMESERVER_IP:
```

Notes:

1. When you edit the **/etc/bootptab** file manually, each entry is longer than one line of text can display in your editor. Do *not* insert a manual return (line feed) in the entry by pressing the Enter key. If you do this, the entry will fail. Some editors wrap lines automatically; however, this does not cause problems with the entry.

2. Depending on the specific hardware series you are configuring DHCP for, use **kernel.2200**, **kernel.2800**, **kernel.300**, or **kernel.1000**.

Fieldname	Replace with ...
NC_HOST_NAME	network name of the Network Station (such as, hostname)
NETWORK_TYPE	Ethernet, ieee802, or token-ring
MAC_ADDRESS	hardware address of the Network Station
IP_ADDRESS	IP address of the Network Station

The following fields are optional. If the item does not exist in your network setup, you do not need to make an entry in the field.

Fieldname	Replace with ...
SUBNET_MASK	subnet mask of the network

Fieldname	Replace with ...
GATEWAY	gateway IP of the network
NAMESERVER_IP	domain name server IP of the network

Note: Each Network Station that you want your AIX system to start using BootP must have an entry in the **/etc/bootptab** file.

Using the chbootptab script to automatically configure Network Stations for BootP

If you want to configure Network Stations centrally using the **chbootptab** script, enter the following instructions at the command line:

```
/usr/NetworkStationV2/bin/chbootptab -A -h hostname -t hardware_type
-s tftp_server_ip -a hardware_address -b boot_file -i ip_address
-d boot_directory
```

Note: You *must* enter this information on a single line.

You can also use these optional flags:

```
-n domain_name_server
-g gateway_ip
-m subnet_mask
```

Where:

- *hostname* is the value that is recorded on line **4** in Table 8 on page 24.
- *hardware_type* is the Hardware Type of the Network Station.
- *tftp_server_ip* is the TFTP Server IP address.

  This is typically the IP address of the RS/6000 that you are configuring. See the value that is recorded on line **1** in Table 8 on page 24.
- *hardware_address* is the hardware address (the MAC address for the Network Station that you are configuring).

  Use the value that is recorded on line **2** in Table 8 on page 24. Enter the value without the colon separators. Either enter the string with no separators or with period separators.
- *boot_file* is kernel.

  Note: Depending on the specific hardware series you are configuring DHCP for, use **kernel.2200**, **kernel.2800**, **kernel.300**, or **kernel.1000**.
- *ip_address* is the IP address of the Network Station.

  Enter the value that is recorded on line **3** in Table 8 on page 24.
- *boot_directory* is /usr/NetworkStationV2/prodbase/[x86 or ppc]/.

  Note: Type the path as shown including the trailing **/**.

- *domain_name_server* is the IP address for the Domain Name Server.

  Enter the value that is recorded on line **7** in Table 8 on page 24.
- *gateway_ip* is the IP address for the gateway.

  Enter the value that is recorded on line **6** in Table 8 on page 24.
- *subnet_mask* is the subnet mask.

  Enter the value that is recorded on line **5** in Table 8 on page 24.

Run the script again for each Network Station that you are configuring.

For information about additional flags that are available with the **chbootptab** script, enter the following at the command line:

```
/usr/NetworkStationV2/bin/chbootptab -?
```

Setting up BootP relay configuration

If you set up your RS/6000 server to be a gateway between your Network Stations and the Network Station boot server and you wish to use BootP or DHCP, you must configure the **/etc/dhcprd.cnf** file to do direct broadcast forwarding. Once configured, the RS/6000 will forward the Network Station BootP or DHCP broadcast message to a specific boot server on another network.

The RS/6000 can function as only one of the following:
- BootP server (**bootpd** should be enabled)
- DHCP server (**dhcpsd** should be enabled)
- BootP/DHCP Relay (**dhcprd** should be enabled)

Configure you boot server for BootP relay by using the following steps:

__ 1. Disable **bootp** in the **/etc/inetd.conf** file by placing a # in the first column of the bootps line. Save the file and refresh the inetd subsystem by entering the following command:

```
refresh -s inetd
```
__ 2. Check for any active BootP daemons by entering:

```
ps -ef | grep bootp
```

If any **bootp** processes are running, stop them by entering:

```
kill -9 PID
```

The PID is the process ID of the **bootpd** command listed in the previous **ps** command output.

___ 3. Make sure that **dhcpsd** is not running by entering:

```
ps -ef | grep dhcpsd
```

If it is running, disable it by entering:

```
smit spdhcpsd
```

and select either **NOW** or **BOTH**. This will disable **dhcpsd**.

___ 4. Edit the **/etc/dhcprd.cnf** file to specify the IP address of each server to which the Network Station BootP or DHCP broadcast should be forwarded. Entries are in this form:

```
server IP_address
```

where *IP_address* is the IP address of the destination server. To have the Network Station BootP or DHCP broadcast forwarded to multiple BootP or DHCP servers, add additional 'server' lines.

___ 5. Start the **dhcprd** daemon by entering the following command:

```
smit stdhcprd
```

and select **NOW** or **BOTH** to start **dhcprd**.

DHCP configuration file and description

The **/etc/dhcpsd.cnf** file example and description show configuration file entries for a variety of DHCP configurations. These configurations are:

- Variable IP address, variable host name
- Variable IP address, static host name
- Static IP address inside managed IP range
- Static IP address outside managed IP range
- BootP address records

It is likely that your configuration file is less complex. This is because the example below contains all possibilities of how DHCP can assign IP addresses or host names. For more information on DHCP configuration settings, see the *IBM Network Station Advanced Information* book.

Note: The following example spans more than one page. There should be no breaks in your **/etc/dhcpsd.cnf** file. A description of each entry follows this example.

```
#global declaration of the log files
1  numLogFiles 4
logFileSize 100
logFileName /tmp/dhcp.log
2  logItem SYSERR
logItem OBJERR
logItem PROTERR
logItem WARNING
logItem EVENT
logItem ACTION
logItem INFO
logItem ACNTING
logItem TRACE
#how long is IP address valid
3  leaseTimeDefault    30 minutes
leaseExpireInterval 10 minutes
#BootP should be supported
4  supportBOOTP yes
#All clients will be served
5  supportUnlistedClients yes
#declare global options
6  option 28 9.3.1.255   #broadcast address
option 3  9.3.1.74 #default gateway
option 6  9.3.1.74 #domain name server
option 15 austin.ibm.com #Domain name
option 12 "bootserv.austin.ibm.com"
#special BootP options
7  option sa 9.3.1.116    #bootserver
option hd "/usr/netstation/"    #boot directory
option bf "kernel"    #kernel file
#our network with subnetmask
#this must be the first statement
8  network 9.0.0.0 255.255.255.0
{
#BootP clients
9  client 6 0000E568D75E 9.3.1.199
client 6 0000E5E8EC76 9.3.1.202
#DHCP clients outside managed subnet
10   client 6 0000E568D739 9.3.1.201
{
option 51 0xffffffff #infinite address lease time
}
#subnet with variable IP addresses
11  subnet 9.3.1.0    9.3.1.135-9.3.1.139
{
#hosts with variable IP addresses
#need not to be mentioned explicitly, since
#supportUnlistedClients=yes
#hosts with fixed IP addresses within managed subnet
12  client 6 0000e568f5f0 9.3.1.135
#hosts with variable IP address, but fixed host name
#this needs DDNS enabled (last two lines)
13  client 6 0000e568f5ee "any"
{
option 12 "sv2040b" #hostname
}
#To support multi-server environments the following is suggested
#hosts with class identifier for Network Station Model 8361-200
14  class "IBMNSM 1.0.0" 9.3.1.138-9.3.1.139
{
option sa 9.3.1.116 #bootserver
option hd "/usr/netstation/" #boot directory
```

```
option bf "kernel" #kernel file
option 66 "9.3.1.116" #Network Station Class Boot
#Server IP address
option 67 "/usr/netstation/kernel" #Boot Image file
option 211 "nfs" #Boot Server TCPIP access protocol
option 212 "9.3.1.117"  #Terminal Configuration Server(s)
#IP address(es) (two may be defined)
option 213 "/usr/netstation/configs"  #Configuration file
                                      #(two may be defined)
option 214  "nfs"  #Terminal Server TCPIP  access protocol
                   #(two may be defined)
} #end class definition
{
#hosts with class identifier for
#Network Station Model 8364 Token Ring
#class "IBM 8364-TXX" 9.3.1.40-9.3.1.42
option 66 "9.3.21.55" # Boot-Server IP address
option 67 "/usr/NetworkStationV2/prodbase/x86/kernel.2800"  #Boot-Server Boot file
option 211  "nfs" #Boot-Server file protocol
option 212 "9.3.21.55"  #Terminal-Configuration Server IP address
option 213 "/usr/NetworkStationV2/userbase/profiles"  #Terminal-Configuration Server
                                                      #data path
option 214  "nfs" #Terminal-Configuration Server file protocol
option  98  "9.3.21.55" #Authentication-Server IP address
option sa 9.3.21.55 #bootp suff
option hd "/usr/NetworkStationV2/prodbase/x86" #boot directory
option bf "kernel.2800" #kernel file
} #end class definition
} #end subnet
} #end network
 16  #Actions for updating DNS
updateDNS
"/usr/sbin/dhcpaction '%s' '%s' '%s' '%s' PTR NONIM >>/tmp/rmdns.out 2>&1"
removeDNS
"/usr/sbin/dhcpremove '%s' PTR NONIM >>/tmp/rmdns.out 2>&1"
```

The following list describes the entries in the example configuration file in
"DHCP configuration file and description" on page 36:

 1 Declaration of the log files.

DHCP uses four log files with a maximum file size of 100KB and the base
name **/tmp/dhcp.log**. These log files are important and are the only source
of information for error messages and debugging.

 2 Events to be logged by DHCP.

During setup, enable all events. Once DHCP is running, you can decrease
the amount of logging.

 3 Declaration of the lease-time interval

After 30 minutes, the client must renew the lease interval. In the case
where the client cannot renew its IP address because the DHCP server is
not accessible, the IP will expire in 10 minutes.

 4 This DHCP server should answer BootP requests.

 5 If set to no, you must declare all MAC addresses of your clients in the
configuration file to serve them by DHCP. If set to yes, DHCP serves any
incoming requests.

6 Global options that are transmitted to the client when it requests start-up information.

If available, you should (at a minimum) declare these four options. Refer to the comments in the original AIX **/etc/dhcpsd.cnf** file for additional options.

7 Special options for BootP.

The Network Station uses these options to load the kernel file and configuration files. The Network Station reads these options even when using the DHCP protocol.

8 Declaration of the network.

You must adhere to the TCP/IP network conventions. Be sure to use the correct network address and mask.

9 Declaration of the BootP clients.

As with the BootP setup, you must register every client with its MAC address and the corresponding IP address. If you want to specify different BootP options for a client, you have to put these options into brackets immediately after the client statement.

10 An example for a DHCP client outside of the subnet that is managed by DHCP

This looks similar to the BootP client definition. Because DHCP cannot renew any IP addresses outside its managed range, you must specify an infinite lease time for these clients. This results in the same behavior as BootP clients, with the client that is assigned an IP address. The client does not renew the IP address.

11 Declaration of the subnet that is managed by DHCP and the range of the IP addresses for the address pool of DHCP.

Unless otherwise specified, any client requesting an IP address from DHCP will get an address from this pool, if possible. Because the option `supportUnlistedClients` is `yes`, you do not have to specify any MAC addresses of your clients.

12 With statements similar to this, you can assign fixed IP addresses to special clients, in the case where the software depends on a fixed address.

13 If you use DDNS, the IP address of your host can vary but it will always have the same host name. To specify the host name, you must assign a host name with `option 12` to this client.

14 It is recommended that Release 3 clients be defined/isolated by class instead of MAC address within a DHCP managed network. This is an example of a V1R3 class file.

15 It is recommended that Release 3 clients be defined/isolated by class instead of MAC address within a DHCP managed network. This is an example of a V2R1 class file.

16 These commands update the DNS database if DHCP assigns or releases IP addresses.

Understanding the v2nsconf script

The **nsconf** script enables TFTP access from the IBM Network Stations by performing the following tasks for you during the software installation: *You do not need to perform these tasks!*

- Removing the **#** in the far-left column for the 'tftp' entry in the **/etc/inetd.conf** file.
- Running **/usr/bin/refresh -s inetd**
- If the **/etc/tftpaccess.ctl** file exists, add the following line to it:

  ```
  allow:/usr/NetworkStationV2/prodbase
  ```

  Note: The existence of the **/etc/tftpaccess.ctl** file limits TFTP access to only the directories that are explicitly listed in this file. You may want to add additional 'allow' statements to support other TFTP activity on the server. If you want to allow unlimited TFTP access to the server, you can remove the **/etc/tftpaccess.ctl** file. See the **tftp** man page for additional information.

- Adding the entry '**/usr/NetworkStationV2/prodbase -ro**' to the **/etc/exports** file.
- Running **/usr/sbin/exportfs -a**, which exports all the directories that are listed in the **/etc/exports** file for NFS client access.
- Running **/usr/sbin/mknfs -B**. The **mknfs** command configures the system to run the Network File System (NFS) daemons. The **mknfs** command adds an entry to the **inittab** file so that the **/etc/rc.nfs** file is run on system restart. The **mknfs** command also runs the **/etc/rc.nfs** file immediately to start the NFS daemons.

If at any time you need to disable the server code, enter the following command:

```
/usr/NetworkStationV2/bin/v2nsconf -d
```

Running the **v2nsconf** script with the **-d** flag comments out references to the Network Stations in the **/etc/bootptab** file. This keeps the Network Stations from starting using the BootP protocol. Configuration information is not erased from the system, and the server code can be reactivated by running the **v2nsconf** script again with no flags.

Note: Running **v2nsconf -d** does *not* turn off BootP, TFTP, and NFS. These processes must be shut down manually.

Administrative groups for the IBM Network Station Manager

The IBM Network Station Manager licensed program assigns administrative control and sets directory permissions by using AIX local groups. The IBM Network Station Manager installation program creates the NSMAdmin local group on your server.

To assign full administrative control, add the user to the NSMAdmin group.

You should remember that the root user always has full administrative control.

Setting up AIX server routing

If you set up your server as a gateway between your Network Stations and other networks, you must configure the **/etc/rc.net** file to do IP forwarding. Add the following line to the end of the **/etc/rc.net** file:

```
/usr/sbin/no -o ipforwarding=1
```

Note: If you would like your server to begin forwarding packets immediately, run the same command manually at the command prompt.

Printing from AIX to a printer that is attached to a Network Station

In the RS/6000 environment, printing from an RS/6000 AIX application is done through the AIX print-spooler subsystem. You can use the print-spooler subsystem to print to a printer that is attached to the Network Station. To print, define a remote queue for the printer attached to the Network Station and submit jobs to be printed using standard AIX print commands, such as **qprt** and **enq**. Local Network Station clients do not use a local spooler subsystem for printing.

Refer to *AIX Version 4 Guide to Printers and Printing* for general AIX printer installation and configuration information.

Setting up AIX to print to a printer attached to the Network Station includes these tasks:
- Defining an AIX remote print queue
- Connecting a printer to the Network Station
- Verifying printer operation

Refer to the *IBM Network Station Advanced Information* publication for information on connecting a printer to the Network Station.

Defining the AIX remote print queue

Use the following procedure to define the AIX remote print queue:

__ 1. As the root user, use the SMIT fast path:

smit mkpq

to open the Add a Print Queue menu.

__ 2. From the Add a Print Queue menu, select **remote** and press Enter.

__ 3. From the Type of Remote Printing menu, select **Local filtering before sending to print server** and press Enter.

__ 4. From the Remote Printer Type menu, select your printer type and press Enter.

__ 5. From the Remote Printer Type list, select your printer model and press Enter. If your printer is not listed, select **Other** to use a generic printer definition.

The Add a Remote Print Queue with Local Filtering dialog box displays as shown in Figure 7:

```
                    Add a Remote Print Queue with Local Filtering

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
  Description                                      Hewlett-Packard LaserJ>

* Name of new PRINT QUEUE to add                   []

  Remote server characteristics
*    HOSTNAME of remote server                     []
*    Name of QUEUE on remote server                []
     TYPE of print spooler on remote server         AIX Version 3 or 4     +
     Send PASS-THROUGH FLAG to queue                yes                     +
        on remote server?




F1=Help            F2=Refresh         F3=Cancel            F4=List
F5=Reset           F6=Command         F7=Edit              F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 7. RS/6000 Add a Remote Print Queue with Local Filtering Dialog Box

__ 6. In the Add a Remote Print Queue with Local Filtering dialog box, type or select the following:

__ a. Type the name:

```
SERIAL1
```

or

```
PARALLEL
```

depending on which of the remote print queues you are adding.

__ b. Type the host name of the Network Station in the **HOSTNAME of remote server** field.

__ c. Type the name of the Network Station remote print queue in the **Name of QUEUE on remote server** field.

__ d. Select **BSD** for the **TYPE of print spooler on remote server**.

__ e. Press the Enter key to create the queue.

This completes the setup of the remote print queue.

Verifying printer operation

To verify printer operation, enter the following command to submit a job to a printer queue:

```
enq -Pname_of_print_queue /etc/motd
```

If you need additional printer-support information, see the *AIX Version 4 Guide to Printers and Printing*.

Chapter 4. Migrating to IBM Network Station Manager V2R1

About this Chapter

This chapter provides instructions for upgrading your IBM Network Station Manager licensed program and migrating your IBM Network Station Manager preference files.

These instructions are *only* for migrating IBM Network Station Manager V1R3 to IBM Network Station Manager V2R1. If you are using an earlier release of the IBM Network Station Manager, you can update your current software from http://service.boulder.ibm.com/nc/rs6000/preindx.shtml.

If you manually changed any configuration files instead of using the IBM Network Station Manager V1R3 migration option in the past, refer to the *IBM Network Station Advanced Information* publication.

Read this entire chapter before you take any steps to migrate your files. Migrating preference files and clients is a complex process. *Do not* try to migrate your preference files without reading the sections below.

Note: You may want to perform the migration after business hours or at a time when there are no Network Station users on the network. Active Network Station users will lose their applications if you need to restart your server.

Migration considerations

When you install the IBM Network Station Manager V2R1 licensed program, the installation program checks to see if your server has a previous version of the software installed. The compatible version for migration to V2R1 is V1R3.

If you have different Network Station hardware models on your network, you must decide which Network Stations to support with a particular software release. To find out if V2R1 supports your Network Station hardware model, consult Table 1 on page 13.

Migration is one-way (V1R3 to V2R1). You cannot migrate subsequent changes to the V2R1 environment back to V1R3. Languages and keyboards that were available in V1R3 may not be available in V2R1. Changes made to V1R3 after migration is run can be migrated to V2R1 if the migration utility is run again. This overwrites any changes that are made to V2R1 since the previous migration.

Coexistence option

Both V2R1 and V1R3 can coexist and operate on the same server. If you have both V1R3 and V2R1 environments on your server, then:

- You use the V2R1 login daemon to log in and authenticate your Network Stations.
- You have two IBM Network Station Manager program interfaces. Each interface has its own URL.
- You have two directory structures for IBM Network Station Manager on your server.
- You need to reconfigure DHCP or NVRAM to point to the V2R1 environment. Refer to "Client migration" on page 49.
- You have two sets of configuration files. You may need to configure users in both the V1R3 and the V2R1 environments.
- Refer to V1R3 documentation for information about V1R3 and the V2R1 documentation for V2R1 information.

Migrating IBM Network Station Manager to V2R1

The IBM Network Station Manager licensed program installs V2R1 on your server while preserving your V1R3 environment. Your V1R3 environment is preserved whether or not you choose to migrate to V2R1.

After installing the IBM Network Station Manager licensed program, you can perform a migration. You can migrate individual user preferences or Network Station configurations by using the migration utility. You can run the migration utility from the command line to accomplish migration in stages. The command-line interface allows you to specify an individual user, group, or Network Station for migration.

Migration is one-way (V1R3 to V2R1). You cannot migrate subsequent changes to the V2R1 environment back to V1R3. Languages and keyboards that were available in V1R3 may not be available in V2R1. Changes made to V1R3 after migration is run can be migrated to V2R1 if the migration utility is run again. This overwrites any changes that are made to V2R1 since the previous migration.

Although you can perform migrations several times, it is recommended that you only run migration once. You can perform a migration as many times as you want. Each time migration runs, this process overwrites any settings that are configured in V2R1 prior to rerunning migration.

The migration utility enables you to copy V1R3 configurations and user preferences to the V2R1 environment. The V1R3 operating environment remains unchanged. You can uninstall (delete) the V1R3 environment, after the migration utility migrates the configuration information and user information.

If you have Series 100 hardware and choose to coexist and operate both V2R1 and V1R3 on the same server, you can run migration to specify the Network Stations that run under V2R1 and those that should continue with V1R3. In addition to migrating configurations and users, you must change your DHCP and NVRAM configurations so that your Network Stations use V2R1 software. You can perform this migration on a Network Station-by-Network Station basis.

Migration utility

The migration utility has the following requirements and features:

- Your server must have V1R3 (**netstation** 1.3.0.x). The migration utility does not support migration from a release earlier than V1R3.
- The migration utility can only be run from a server that has V2R1 installed.
- The migration utility does not include an option to delete V1R3. You must manually uninstall (delete) the V1R3 environment after the migration utility migrates the configuration information and user preference files to V2R1.
- After you manually remove the V1R3 environment, the migration utility cannot run.
- Although you can run the migration utility several times, even for the same users, groups, or Network Stations, it is recommended that you migrate preference files for users, groups, or Network Stations only once. Each time the migration utility runs, it overwrites any existing V2R1 preference files.
- The migration utility is not capable of handling client migration. You must manually configure DHCP and NVRAM for each network station. Refer to "Client migration" on page 49 for instructions.
- Only users with administrator authority can run the V2R1 migration utility.

You can run the migration utility from the command-line using several option flags customize the process. The syntax for this command and a table which details the option flags is given below:

```
nsmmigr -P <Path(typically /usr/netstation/nsm)> -C -S -U [(<user1><user2> . . .)
or *ALL] -G [(<group1> <group2> . . .) or *ALL] -T[(<terminal1><terminal2> . . .)
or *ALL]
```

Table 10. Migration command option flags

Flag	Description and Format
-P	Path to the V1R3 USERBASE location. For AIX, this path is: /usr/netstation/nsm
-A	Complete migration for all users, all groups, all terminals, and system preferences.
-C	Client migration for all Series 1000 (8362 - all models) and Series 300 (8361-110 and 8362-210). This flag forces your Series 1000 (8362 - all models) and Series 300 (8361-110 and 8362-210) Network Stations to start from the V2R1 software, if they are configured locally and using NVRAM.
-U	Migrates user preference files. For example: nsmmigr -U *User1 User2* OR nsmmigr -U *ALL
-G	Migrates group preference files. For example: nsmmigr -G *Group1 Group2* OR nsmmigr -G *ALL (This command migrates all groups.)
-T	Migrates Network Station (terminal) configuration files. For example: nsmmigr -T *OriginIPaddress TargetIPaddress* OR nsmmigr -T *ALL
-S	Migrates all system preference files.

Migration procedure

This is the recommended procedure for migrating your IBM Network Station Manager from V1R3 to V2R1.

__ 1. Decide which configuration and preference files to migrate for the users, groups, and specific Network Stations in your environment.

__ 2. Decide whether to migrate your system-preference files.

__ 3. From the command line, use the migration utility to migrate those configuration or preference files you selected to keep.

> **Note:** It is recommended that you migrate all of your configuration and preference files. Use the following command:
>
> ```
> nsmmigr -A
> ```

__ 4. Decide if you want to migrate all of your current NVRAM configured Network Stations (Series 300 and 1000 clients) to IBM Network Station Manager V2R1. Use the following command:

```
nsmmigr -C
```

If you do not have **eNetstation.S300_1000.base** installed, you *must not* perform this step.

Your migration to IBM Network Station Manager V2R1 is now complete.

Client migration

Attention: Only proceed with client migration if you have **eNetstation.S300_1000.base** already installed.

To move your existing Series 300 or 1000 Network Stations to your new version of the IBM Network Station Manager licensed program, use the following instructions:

__ 1. Select one Network Station first to migrate to V2R1. Consult Table 1 on page 13 to determine which of your Network Stations can migrate to V2R1.

__ 2. If you plan to use DHCP with your new IBM Network Station Manager software, you must configure the DHCP server to handle Network Station start-up requests. Refer to step 16 on page 25.

__ 3. If your Network Stations use NVRAM to start from your old server, go to step 4.

If your Network Stations use DHCP to start from your old server, go to step 8 on page 50.

If your Network Stations use BootP to start from your old server, go to step 16 on page 51.

__ 4. Make sure that you have completed step 19 on page 29 and that you have run the `nsmmigr -C` command. After you have completed these items, restart your Network Station. The Network Station will now

start from the new IBM Network Station Manager V2R1 software. The server may also automatically update the Network Station boot PROM so that the Network Station restarts automatically.

Notes:

    a. Do not touch the Network Station during the boot PROM update process. If you interrupt the boot PROM update, you must replace the Network Station.

    b. To reboot your Network Station remotely, use the procedure that is listed in "Remotely restarting IBM Network Stations" on page 51.

__ 5. If your Network Station has a token-ring adapter, it updates again and restarts automatically.

__ 6. Each time you reboot the test Network Station, it will now use the new IBM Network Station Manager software. Test the user-preference files on the test client. Repeat the instructions from step 4 on page 49 for all of the clients that you want to migrate.

__ 7. Once you migrate all of the clients so that they start from the new server, test the preference files. If you are sure that you want to use NVRAM to start your clients, your migration is complete. If you want to use DHCP to start your clients, continue to step 8.

__ 8. If you have not yet done so, install and configure DHCP as instructed in step 16 on page 25.

__ 9. In your current DHCP configuration, you should have already set the following DHCP options so that the following values apply to all of your Network Stations:

- Option 66: The IP address of the boot server.
- Option 67: **/usr/NetworkStationV2/prodbase/[x86 or ppc]/[***your kernel filename***]**

If you have not set the above options, do so now.

__ 10. Configure the following option as a global parameter with the following value:

- Option 211: "nfs" or "tftp"

    Note: If you select "tftp" as your boot protocol, the kernel downloads via the TFTP protocol. The Network Station then switches to the NFS protocol for all other data transfers.

    The server automatically updates the boot PROM of the Network Station and the client restarts automatically.

__ 11. If the test client has a token-ring adapter, it updates again, and restarts automatically.

__ 12. Restart the test client to check the DHCP configuration.

__ 13. Restart all of the remaining Network Stations that you want to move to the new server.

__ 14. Test your Network Stations to see if the user profile information is correct. Your migration for DHCP is now complete. If you want to use BootP to start clients, continue to the next step.

__ 15. You may continue to use BootP, or you can now change your server configuration to DHCP. If you want to continue using BootP as your boot method, go to step 16.

__ 16. Enter the BootP SMIT panels. Change the following fields:
  - TFTP Server IP Address: *IP address of the boot server*
  - Boot file: *your kernel file name*
  - Boot directory: **/usr/NetworkStationV2/prodbase/[x86 or ppc]**

    The server automatically updates the boot PROM of the Network Station and the client restarts automatically.

__ 17. Restart the test client.

    Note: To reboot your Network Station remotely, use the procedure that is listed in "Remotely restarting IBM Network Stations".

__ 18. If the test client has a token-ring adapter, it updates again and restarts automatically.

__ 19. Restart the test client to check the BootP configuration.

__ 20. Restart all of the remaining Network Stations that you wish to move to the new server.

    Your migration for BootP is now complete.

Your client migration to IBM Network Station Manager V2R1 is now complete.

Remotely restarting IBM Network Stations

To perform a remote reboot of your IBM Network Station, follow these steps:

__ 1. Verify that you have the SNMP function installed by running the following command:

    `lspp -h bos.net.tcp.server`

__ 2. Place host names or IP addresses of the clients you wish to restart into the **/usr/NetworkStationV2/reboot_names** file.

__ 3. Create a community name by using the IBM Network Station Manager program

__ 4. Now use the following command to restart your IBM Network Station:

    `/usr/NetworkStationV2/bin/nsreboot <community name>`

Migrating Netscape Communicator bookmarks and address book

The V1R3 **bookmarks.html** and **address-book.html** files in your **NAV** directory will be renamed to **v1r3_bm.htm** and **v1r3_ab.htm**. These files are located in the new V2R1 browser directory:

usr/NetworkStationV2/userbase/home/*username***/.netscape**

This is done because the two default files already exist in the browser directory.

Note: When selecting the files from the directory that is specified above, *username* refers to the user whose files you wish to migrate.

Migrating Netscape Communicator bookmarks file

If you want to use your V1R3 bookmarks file with your IBM Network Station Manager V2R1 licensed product, you must import the information from the browser. Follow these steps:

__ 1. From the Netscape Communicator browser on a Network Station, click on **Bookmarks**.

__ 2. From the drop-down menu, choose **Edit Bookmarks**.

__ 3. Select **File—>Import**.

__ 4. Go to the **usr/NetworkStationV2/userbase/home/***username***/.netscape** directory, and select the **v1r3_bm.htm** file. Click on **OK**.

Your V1R3 bookmarks files should now be available for use with Netscape Communicator and the IBM Network Station Manager V2R1 licensed program.

Migrating Netscape Communicator address book

If you want to use your V1R3 address book file with your IBM Network Station Manager V2R1 licensed program, you must import the information from the browser. Follow these steps:

__ 1. From the Netscape Communicator browser on a Network Station, click on **Communicator**.

__ 2. From the drop-down menu, choose **Address Book**.

__ 3. Select **File->Import**.

__ 4. Go to the **usr/NetworkStationV2/userbase/home/***username***/.netscape** directory, and select the **v1r3_ab.htm** file. Click on **OK**.

Your V1R3 address book should now be available for use with Netscape Communicator and the IBM Network Station Manager V2R1 licensed

program.

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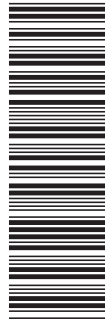
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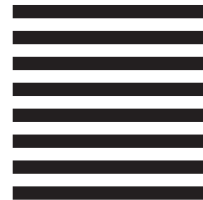
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