Netra™ Internet Server 3.1 User's Manual

The Network Is the Computer™

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Preface

This manual, the *Netra Internet Server 3.1 User's Manual*, is written for the Netra™ system administrator.

Some knowledge of networking concepts and terminology is assumed.

Using the Netra Internet Server Manuals

The Netra Internet server comes with two types of manuals: a Netra hardware manual (or manual set) and the *Netra Internet Server 3.1 User's Manual*.

The Netra hardware manual contains the following information:

- How to add hardware to the Netra Internet server
- How to connect the Netra Internet server to the network
- System specifications for the Netra Internet server

This manual, the *Netra Internet Server 3.1 User's Manual*, contains the following information:

- How the Netra Internet server fits in to a network topology
- What software is required for client systems
- How to configure the Netra server
- How to use the HTML-based user interface and administration modules
- How to perform a system recovery in case of a disk failure

How This Book Is Organized

The information in this manual is organized in six parts:

Part 1 —Setting Up the Netra Server—introduces the Netra server and its user interface and describes how to configure it.

Part 2 —Network Services Administration—describes the Netra server's Network Services Administration modules.

Part 3 —Network Connection Administration—describes the Netra server's Network Connection Administration modules.

Part 4 —Security Administration—describes the Netra server's Security Administration modules.

Part 5 —System Administration—describes the Netra server's System Administration modules.

Part 6 —Crash Recovery—describes how to recover the Netra server in case of a system disk failure.

Related Books

A number of helpful books describe how to access and use the Internet:

- Albitz and Liu, *DNS and BIND*, O'Reilly & Associates, Inc. 1992
- Gilsten, Paul, *Finding It on the Internet*, John Wiley & Sons, Inc., 1994
- Krol, Ed, *The Whole Internet User's Guide and Catalog*, O'Reilly & Associates, Inc., 1992, 1994
- Morris, Mary E.S., *HTML for Fun and Profit*, Prentice Hall, 1995
- Wiggins, Richard W., *The Internet for Everyone*, McGraw Hill, Inc., 1995

Typographic Conventions

The following table describes the typographic conventions used in this book.

Table P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% You have mail.`
`AaBbCc123`	What you type, contrasted with on-screen computer output	`machine_name% su` `Password:`
AaBbCc123	Command-line placeholder: replace with a real name or value	To delete a file, type `rm` *filename*.
AaBbCc123	Book titles, new words or terms, or words to be emphasized	Read Chapter 6 in *User's Guide*. These are called *class* options. You *must* be root to do this.

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Belgium	02-720-09-09	02-725-88-50
Luxembourg	32-2-720-09-09	32-2-725-88-50
Germany	01-30-81-61-91	01-30-81-61-92
The Netherlands	06-022-34-45	06-022-34-46
Sweden	020-79-57-26	020-79-57-27
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Part 1 — Setting Up the Netra Server

The four chapters in Part 1 introduce the Netra server and its user interface and describe how to configure it.

- Chapter 1, “Overview,” describes the Netra server’s capabilities.
- Chapter 2, “Client System Requirements,” describes the software requirements for client systems. It also describes how to install the Solstice™ IPX Gateway software.
- Chapter 3, “Understanding the Netra User Interface,” introduces you to the design conventions of the HTML-based user interface. It describes how to navigate through the various types of “pages” and “forms”.
- Chapter 4, “Performing the Initial Configuration,” describes options for configuring your Netra server for the first time.

Overview 1

The Sun™ Netra Internet Server is an Internet and gateway server that connects small or large organizations of heterogeneous clients directly to the Internet.

PC, Macintosh, and UNIX® workstation clients on TCP/IP or Novell NetWare®-based local area networks (LANs) can use the Netra Internet Server to send and receive global electronic mail, access the World Wide Web (WWW), and use other services available over the Internet. The Netra server can also be used in an intranet configuration to provide services for a local LAN. The Netra server's graphical user interface-based tools make installation, configuration, and administration simple, even for a user who does not have UNIX expertise.

Connecting the Netra server to the Internet requires three hardware components:

- A communications line
- An interface from the communications line to the Netra server
- The Netra server

All the necessary software components are included in the Netra server.

1

The Internet Service Provider

An Internet Service Provider (ISP) is the organization that provides your connection to the Internet. The Netra Internet server is the gateway from your local network to the Internet via the ISP's communications server. The Netra server on your LAN provides one end of a data communications link, such as a direct line or modem connection. The other end of the communications link is at the ISP's server. (The ISP may also have other connections to other large regional networks that make up the Internet.)

The ISP may also be responsible for providing:

- A registered network number, if your site does not have one
- An host addressing scheme
- A domain name
- Name server support
- Security for your Internet connection
- Route management to and from your network
- Names of news servers and mail servers

The Netra Server Administrator

The Netra server administrator's responsibility is to configure and administer the Netra server and the local network. After the server is configured, the server administrator can set up the Internet services provided by the Netra server. Examples of such tasks are: configuring local routing, assigning host addresses, and selecting the appropriate services and security for your site.

Using the Netra Server In a Network Topology

The Netra server supports the two basic network scenarios described below.

Figure 1-1 shows a typical Internet scenario. Note that there are two Netra servers in this scenario. The server `stimpy` acts as an Internet gateway server for all the systems in the domain called `tv.net`. The server `ren` serves the domain called `comedy.tv.net` and uses `stimpy` for Internet access.

Clients on the LAN use the Netra server to access the Internet. The Netra server is the router, and this enables it to pass information from the Internet to the clients on the LAN. If only one network port exists on the Netra server, the scenario in Figure 1-1 is supported by adding virtual network interfaces.

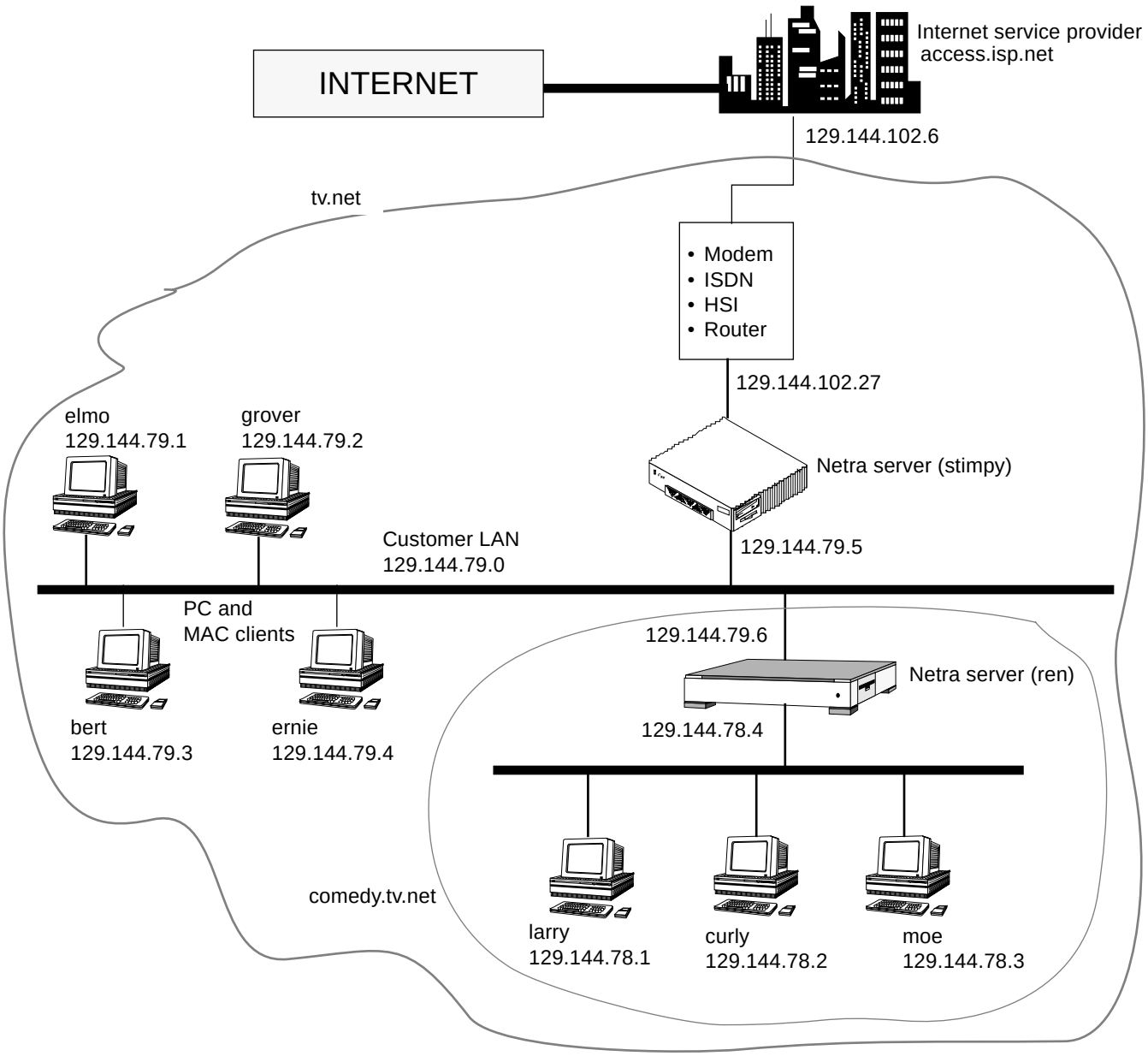

Figure 1-1 LAN that Uses the Netra Server as a Router

Figure 1-2 shows an example intranet configuration. Here, two departmental Netra servers share global information provided by a third Netra server.

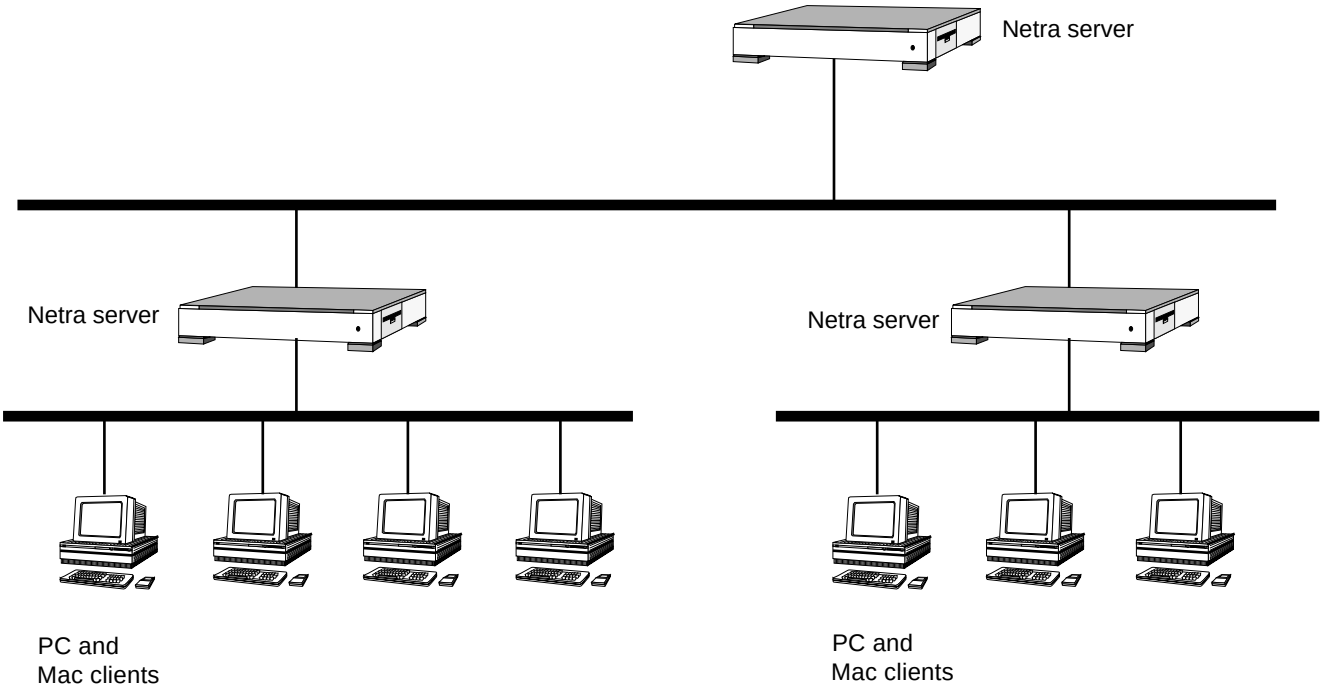

Figure 1-2 Intranet Configuration for Netra Servers

1

Client System Requirements 2

This chapter discusses the requirements for client systems on your LAN. Make sure these systems are set up before you configure and use the Netra server.

Basic Software Requirements

Each client system (PC, Macintosh, or other) must have the following types of software to communicate with the Internet through the Netra server.

- **Network protocol stack:** A network protocol stack is the basic network-to-network communications software package. If you have already set up your LAN, then you have a network protocol stack.

  If your LAN is running the Transmission Control Protocol/Internet Protocol (TCP/IP) network protocol, it is ready to communicate with the Internet because Internet applications such as Web browsers, electronic mail, and File Transfer Protocol (FTP) use TCP/IP.

  If your LAN is running the Sequenced Packet Exchange/Internetwork Packet Exchange (SPX/IPX) network protocol, you must use the IPX Gateway software to translate SPX/IPX to TCP/IP. The IPX Gateway software is shipped with your Netra server; you must install it on client systems on your LAN.

- **Web browsers**: Mosaic and Netscape™ are two popular examples.
- **Utilities**: FTP client software, telnet, and mail packages.

2

Before configuring the Netra server, configure your LAN with a network protocol and the IPX Gateway software. Then configure the Netra server. Next, install and configure a mail package (it must support the SMTP, POP2, POP3, or IMAP protocol); set up a Name Service; and add the browser software and utilities.

Note – If your browser supports caching, make sure this feature is either disabled or configured to verify documents every time. In addition, do not use proxy servers to access the Netra administration modules.

Installing the IPX Gateway on a Client System

The IPX Gateway is a client-server application that provides transparent TCP/IP connectivity to SPX/IPX clients. The IPX Gateway enables any NetWare® client to access Internet services such as Web browsers, mail, news groups, and file transfer capabilities through the built-in IPX-to-IP gateway.

The IPX network number that is used on the existing NetWare server must also be used in the IPX Gateway's configuration in the Netra server on that LAN. For example, assume you have the setup shown in Figure 2-1.

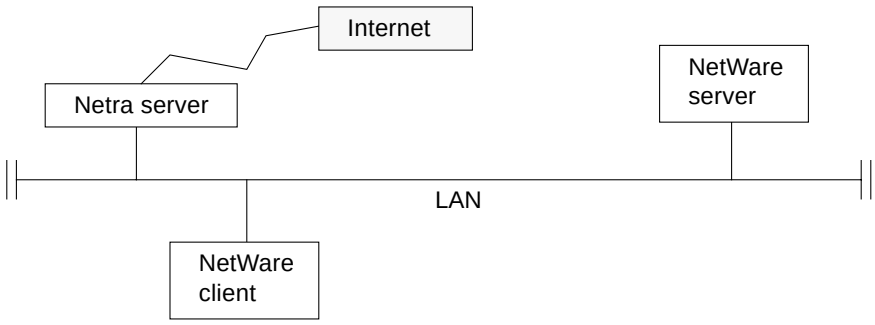

Figure 2-1 Sample IPX Gateway Setup

If the NetWare server has the following SPX/IPX configuration:

- Frame type: Ethernet_802.3
- IPX network number: 12345678

then the network interface for the Netra server on that LAN should also have the same SPX/IPX configuration: a frame type of Ethernet_802.3 and an IPX network number of 12345678.

If you have two frame types on the NetWare server, you can choose either one or both frame types (you must use at least one of them). If you choose both frame types, the same rule applies: the IPX network numbers that are used on the NetWare server must also be used on the Netra server.

Use the IPX Gateway diskette that was shipped with your Netra server to install the IPX Gateway software on each client system. The program used to install the software is called `setup.exe`. It should be run on each client PC or installed on a file server.

▼ To Install IPX Gateway on the Client PC

1. **Insert the IPX Gateway diskette into drive A on the client PC.**
2. **Start File Manager on the client PC and access drive A.**
3. **Double click on the `setup.exe` file name (or icon) to start the installation program.**
   An "Initializing Setup" screen is displayed, followed by a client setup screen.
4. **Select Express Setup.**
   A setup window is displayed, showing the status of the installation.

   Once the IPX Gateway is installed, a screen showing that the installation is complete is displayed. Then icons labeled `Internet Junction Client` and `Release Notes` are displayed on the client system.

2

Understanding the Netra User Interface 3

The Netra server uses an HTML-based user interface for its administration. Each screen is a hypertext document. A browser running on a client or on the Netra system accesses these documents from an administration Web server running on the Netra system.

Netra Administration Modules

An administration function in the Netra user interface is called a *module* and is made up of a set of related tasks. For example, the User Accounts module contains tasks to add user accounts as well as to modify or delete them. These modules are grouped into four categories:

- Network Services Administration
- Network Connection Administration
- Security Administration
- System Administration

The modules are displayed as hypertext links on the main administration page of the user interface. Selecting a link takes you to the module associated with the task.

Types of Pages

The Netra user interface has five types of pages, as described below.

Navigation Page

A navigation page is used to select tasks. You select a task by clicking on the link (displayed as an underlined word or term). When you follow a link, you never change the state of the system.

Some navigation pages are dynamic: they display only the options that are available on your particular Netra system. If you enter information that changes the available options, these navigation pages will reflect the changes.

Figure 3-1 shows a navigation page for the User Accounts module.

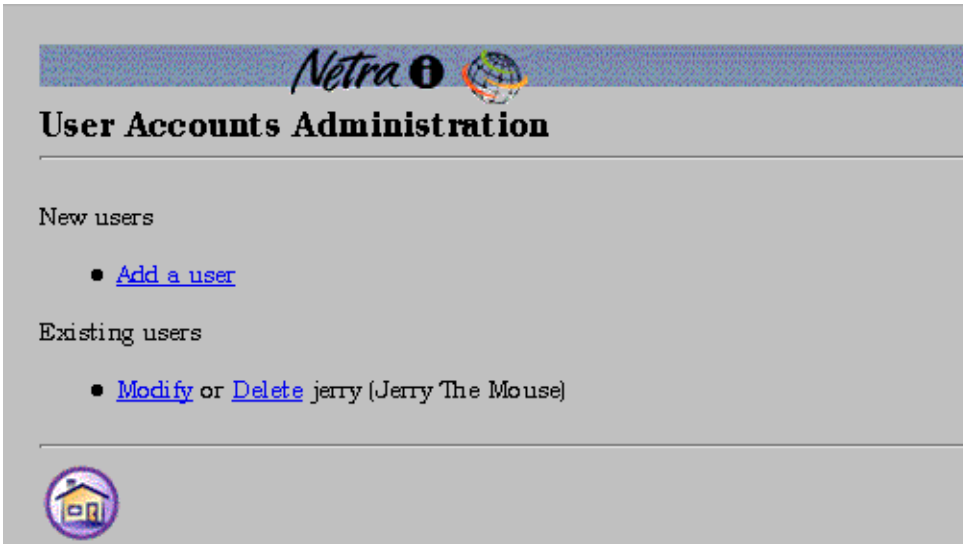

Figure 3-1 Navigation Page

The example in Figure 3-1 shows that there is one account on the Netra server: `Jerry The Mouse`. You can change or remove this account by selecting the `Modify` or `Delete` links, or you can add a new account. Note that if no accounts were defined, only the `Add a user` link would be displayed.

Task Page

A task page is also called a *form*. There are two types of forms: regular and special.

Regular forms provide the only way to change the system state. When a form is displayed, the values in the fields are either current or default values. You can enter information in a regular form by typing it into the text boxes or by choosing the radio button options.

Regular forms have an OK button. If you enter or change information in such a form, you must click the OK button to activate the changes and change the system state.

Some forms also have a Reset button. If you want to discard your changes, use the Reset button to return fields to their previous values.

The user-input elements in a form are described in Table 3-1.

Table 3-1 User Input Elements

Element	**Description**
Text Box	Accepts one line of text input.
Text Area	Accepts multiple lines of text input.
Radio Buttons	A group of one or more buttons, only one of which can be selected. Click on a radio button to select it. This will de-select any other selected radio button in its group. The only way to de-select a radio button is to select another one.
Check Box	Selects an option. Click on the button to change its state.
Pop-up Menu	A list of options displayed in a menu. Only one option can be selected. The selected item is shown. Click and hold on the menu to display the list of options. Release over a new option to select it.
Scrolling List	A list of options displayed in a window. Click on an option to select it. Scrolling lists can allow multiple selections.

Figure 3-2 shows a form for the User Accounts module.

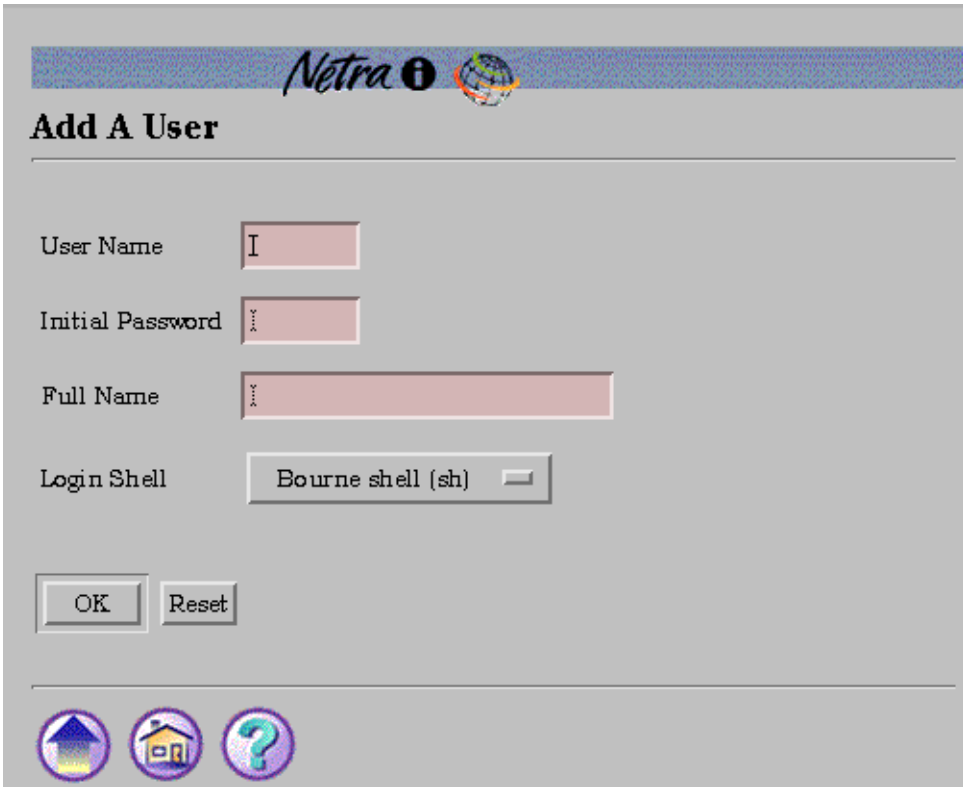

Figure 3-2 Task Page (form)

Special forms are based on regular forms. There are two types of special forms: an Error form and a Verify form.

- An error form does not change the system state. It displays an error icon, and allows you to correct the error and re-enter information in a form. Errors are marked on the form, alongside the relevant field.

  Figure 3-3 shows an Error form for the User Accounts module.

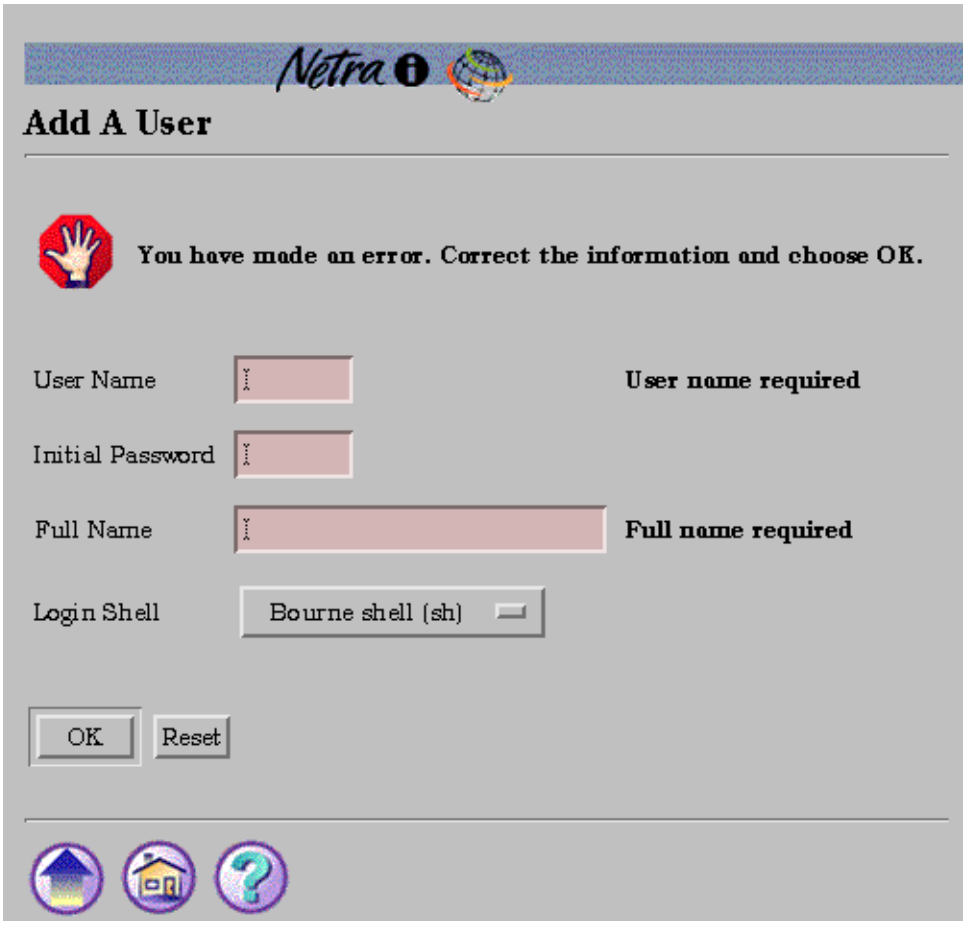

Figure 3-3 Error Form

Note – If the information you enter in a form produces an error, the system state is not changed. The form is re-displayed with the erroneous data. You must correct the data.

- In a Verify form, you only confirm a previous choice.

  Figure 3-4 shows a Verify form for the User Accounts module.

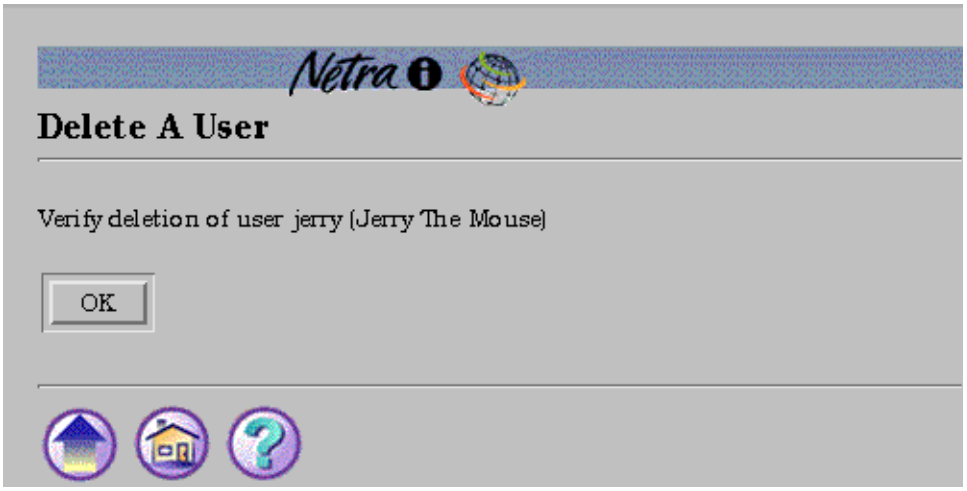

Figure 3-4 Verify Form

Help Page

The Netra user interface also provides Help pages that contain the information you need to fill out a form. All forms have a help icon. Some Help pages use terms that are linked to the glossary. To return to the related form from a Help page, use the back arrow icon described in Table 3-2.

Figure 3-5 shows a Help page for the User Accounts module.

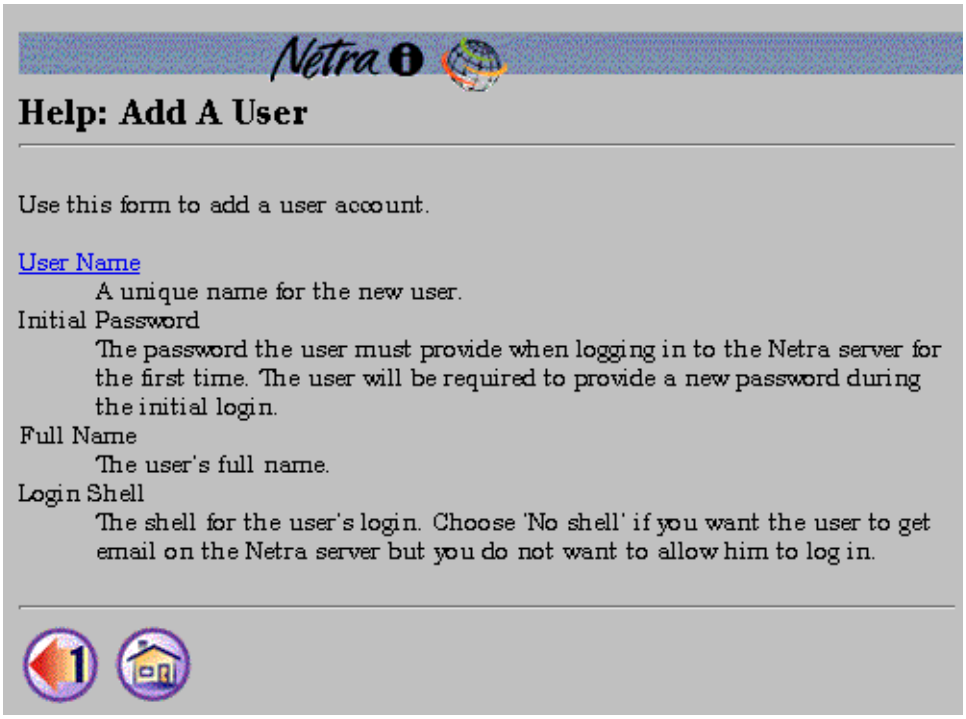

Figure 3-5 Help Page

Note – If you enter information in a form and go to the corresponding Help page before submitting the form, you will lose all the information you entered. The form will display current or default values. If your browser supports it, use a second browser window to view Help pages.

Glossary Page

The Glossary page is accessed using links in the Help pages of a module. When you select a term that is a link, the term and its explanation are displayed at the top of the Glossary page. The Glossary page is displayed in a scrolling window. To return to the Help page, use the back arrow icon.

Status Page

A Status page is displayed once you have filled out all the forms for a task. It can contain either a success icon or an information icon. A Status page confirms that the system state has changed.

Figure 3-6 shows a Success page for the User Accounts module.

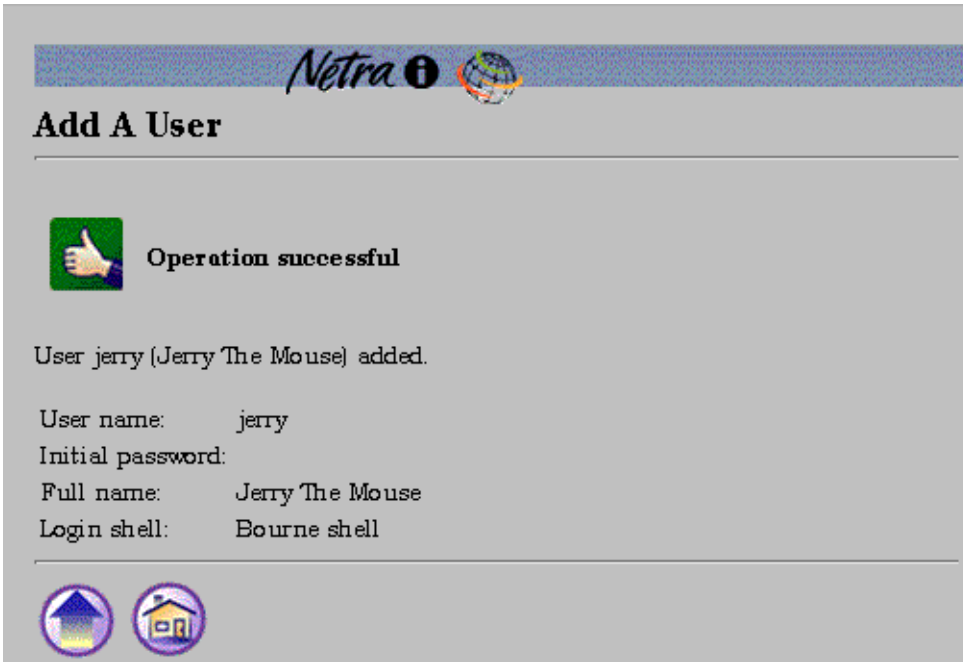

Figure 3-6 Success Page

Navigation Icons

Every administration page has some or all of the following icons:

Table 3-2 Netra Navigation Icons

Icon	Description
	Home icon. Returns to the Netra Main Administration page. (Selecting the banner will also do this.)
	The Help icon. Contains explanations of fields in the related form.
	Back Arrow icon. Goes back 1 navigation page. (Forms are skipped.)
	Back Arrow icon. Goes back 2 navigation pages. (Forms are skipped.)
	Top of Module icon. Returns to a module's top-level page.
	Forward Arrow icon. Continues to the next configuration task.

Information Icons

The following icons may be displayed while a task is being completed.

Table 3-3 Netra Information Icons

Icon	Description
	Information icon. Calls attention to important messages in response to submitting a form. The message indicates the status of the operation.
	Error icon. Calls attention to errors in form entries.
	Success icon. Shows that a task has been completed successfully.

Accessing the Netra Administration Framework

The HTML-based Netra administration framework is accessed through a dedicated administration Web server. To access this framework, you must use a Web browser and provide a user name and password. Two methods are described below.

▼ Using a Netra Server with a Monitor

1. **Power on the Netra server.**
2. **At the console prompt, log in as the user** `setup`**.**
3. **Enter** `setup` **for the password.**
   A window system and a browser are started. The browser is configured to access the Netra administration framework.

   You are now required to authenticate the browser connection.
4. **Enter** `setup` **for the User ID and** `setup` **for the Password.**
   The Netra Welcome page is displayed.
5. **In the Netra Welcome page, select Administration.**
   The Main Administration page is displayed.

▼ Using a Client on the Network

1. **Start a browser on the client system.**
2. **Open the following URL:**

```
http://netra:81
```

   where *netra* is the host name or host address for your Netra server. The Netra password screen is displayed.

3. **Enter `setup` for the User ID and `setup` for the Password.**
   The Netra Welcome page is displayed.
4. **In the Netra Welcome page, select Administration.**
   The Main Administration page is displayed.

Performing the Initial Configuration 4

Before you can use the Netra server for any administration tasks, you must configure it with information that is specific to your site. This chapter describes the options for performing the initial configuration.

Options for Initial Configuration

You have two choices when performing the initial configuration:

- If you have a monitor for the Netra server, you can perform the initial configuration using the monitor. (See page 4-2.)
- If you do not have a monitor, you must perform the initial configuration using a PC on the LAN. (See page 4-6.)

Note – Another, less-used configuration option is described in Appendix C, “Initial Configuration Using TTY.” If you do not have a monitor for the Netra server, you can also connect a TTY terminal to it and complete the initial configuration using a browser on a client system.

4

Using a Monitor for Initial Configuration

▼ To Prepare for Configuration

1. **Physically connect the Netra server to the LAN, and attach the monitor and keyboard. (Refer to your Netra hardware installation manual for instructions.)**
2. **Obtain the following configuration information for your site:**

- System Defaults (See Chapter 19, “Netra System Administration.”)
- Host name for your Netra server (See Chapter 19, “Netra System Administration.”)
- System administrator alias members (See Chapter 19, “Netra System Administration.”)
- Root password (See Chapter 18, “Root Password Administration.”)
- Administration Web Server password (See Chapter 15, “Administration Web Server.”)
- LAN interface information: host address and netmask for a TCP/IP network, or network number and frame type for an SPX/IPX network. (See Chapter 12, “Local Area Network Administration.”)

▼ To Log In to the Netra Server

1. **Power on the Netra server.**
2. **At the** `NewNetra console login` **prompt, enter** `setup`**.**
   Note that an unconfigured Netra server uses the name `NewNetra`.
3. **At the** `Password` **prompt, enter** `setup` **again.**
   The Netscape browser is automatically started on your system, and a Netscape Password window is displayed.
4. **Enter** `setup` **for the** `User ID`**; then enter** `setup` **for the** `Password`**.**
   The Netra Welcome page is displayed.

▼ To Perform the Initial Configuration

1. **Select the Administration option.**
   The Initial Configuration page is displayed. The required administration modules are displayed in the order in which they should be configured. Two optional tasks are also displayed.

2. **If you want to install a localized version of your Netra software, perform the following tasks; if not, proceed to Step 3.**

   a. **Select the Install localized Netra software option.**
      The Software Management Administration page is displayed.

   b. **Insert the localization CD-ROM in the Netra CD-ROM drive.**

   c. **Select the Select new installation medium option.**

   d. **Select CD-ROM as the installation medium.**

   e. **Select Install: Clusters.**
      The Installing Clusters page is displayed with a pair of clusters (required and optional) for each locale. For example, the localized software for Japan is contained in the `Required Japanese Netra Software` and `Optional Japanese Netra Software` clusters.

   f. **Select the two clusters for your locale.**
      You must install the `Required` cluster. The `Optional` cluster is necessary only if you want to install additional Solaris software.

   g. **Once you install the locale-specific clusters, return to the Initial Configuration page.**

3. **Select the highlighted System Defaults option.**
   The System Defaults Administration page is displayed with the current time, date, time zone, and default locale.

4. **If necessary, enter a new time and date using the displayed format.**

5. **If necessary, select a new default system time zone from the scrolling list.**

6. **If you have installed localized Netra software, select a new default system locale from the scrolling list; if not, proceed to Step 7.**

7. **Use the Forward Arrow icon to go directly to the next configuration task.**

8. **Select the highlighted Host Name option.**
   The Host Name Administration page is displayed.

9. **Enter the name for the Netra server.**
   A message saying the Netra server needs to be restarted is displayed. You can restart the Netra server once you finish configuring it.

Note – If you choose to restart the Netra server immediately, you must repeat the initial login sequence (notice that the new host name is used) to bring you to the Initial Configuration page. At this point, the Host Name option will not be shown as one of the remaining configuration tasks. Proceed to the next administration module.

---

10. **Use the Forward Arrow icon to go to the next configuration task.**

11. **Complete the System Administrator Alias, Root Password, Administration Web Server, and Local Area Network configuration tasks.**

Note – If you change the Administration Web Server password, you must reauthenticate the browser connection.

---

12. **Use the Forward Arrow icon to go to the Main Administration page.**
    The Main Administration page is displayed.

▼ To Complete the Configuration

1. **Use the displayed modules to perform any further system configuration tasks (such as setting up mail aliases, configuring a name service, or setting routing options).**
   Refer to the relevant chapters in this manual for more information on each administration module.

2. **Once the Netra server is completely configured, save the configuration information as follows:**

   a. **Insert a blank diskette into the Netra disk drive.**
      If you do not have a diskette drive on your Netra server, proceed to Step b.

   b. **Select System Administration: Save and Restore Configuration.**

c. If you are saving your configuration to diskette, select Save configuration to diskette; if not, select Save configuration to file system.

3. If you did not restart the Netra server after entering the host name, do the following:

a. Select System Administration: Restart and Shutdown.
The Restart snd Shutdown Administration page is displayed:

b. Select the Restart option.
Your Netra server will be restarted with the new configuration.

4

Using a PC for Initial Configuration

Using a PC on the LAN for the initial configuration requires the following general tasks:

- Creating a partial configuration diskette using the Utilities diskette that was shipped with your Netra system.
- Connecting the Netra server to the LAN, insert the partial configuration diskette, and power on the Netra server.
- Using a client on the LAN to complete the initial configuration.

These processes are described in detail in the following sections.

▼ To Prepare for Configuration

1. **If you have a Novell network, install the IPX Gateway software on each PC on the LAN (see Chapter 2, "Client System Requirements").**
2. **Obtain the following configuration information for your site:**

- System Defaults (see Chapter 19, "Netra System Administration.")
- Host name for your Netra server (See Chapter 19, "Netra System Administration.")
- Type of network interface card, Ethernet port, and network protocol
- LAN interface information: host address and netmask for a TCP/IP network, or network number and frame type for an SPX/IPX network (See Chapter 12, "Local Area Network Administration.")
- System administrator alias members (See Chapter 19, "Netra System Administration.")
- Root password (See Chapter 18, "Root Password Administration.")
- Administration Web Server password (See Chapter 15, "Administration Web Server.")

▼ To Create a Partial Configuration Diskette

1. **Insert the Utilities diskette into the PC diskette drive.**

2. **Access drive A:**

```
c:\ a:
```

3. **Run the following program:**

```
a:\ config
```

The following is displayed:

```
This program generates a configuration file
for the local area network interface.
Values shown in square brackets are the default values.
```

4. **Enter the name of the Netra server.**

```
Enter the Host Name for the Netra Server:
```

5. **Enter the number that corresponds to the network interface in your server:**

```
The following interfaces may be available on your Netra server:
1) Lance Ethernet
2) Quad Ethernet
3) Fast Ethernet
4) Token Ring
5) Fast Ethernet 100baseT
Enter the number corresponding to the interface
to be configured [1]:
```

6. **Enter the Ethernet port that you are using to connect the Netra server to the local area network:**

```
Which port are you using on the Netra to connect to the local area
network? [0]:
```

7. **Enter the number corresponding to the type of network you have:**

```
The following types of networks are available:
1) TCP/IP
2) Novell (SPX/IPX)
Enter the number corresponding to the network type [1]:
```

8. **Now enter information for your network type as follows:**

- If you typed 1 for a TCP/IP network:

   a. **Enter the Netra server's local area network host address:**

```
Enter the local area network host address for the
Netra server:
```

   b. **Enter the netmask:**

```
Enter the local area network netmask for the
Netra server [255.255.255.0]:
```

   The information you entered is saved on the diskette. This diskette now contains partial configuration information for your Netra server.

   c. **Go to Step 9.**

- If you typed 2, for a Novell (SPX/IPX) network:

   a. **Enter the IPX network number:**
   See Chapter 11 for more information on SPX/IPX network numbers and frame types.

```
Enter the IPX network number in hexadecimal format:
```

b. Enter the number for the frame type you are using:

```
The following frame types are available:
1) Ethernet_802.2
2) Ethernet_802.3
3) Ethernet_II
4) Ethernet_snap
Enter the number corresponding to the frame type being used [1]:
```

The information you entered is saved on the diskette. This diskette now contains partial configuration information for your Netra server.

9. **Eject the diskette from the drive.**
10. **Make sure your Netra server is connected to the LAN.**
    Refer to your Netra hardware installation manual for this procedure.
11. **Insert the diskette with partial configuration information in the Netra diskette drive.**
12. **Power on the Netra server.**

▼ To Complete the Initial Configuration

1. **Start a browser on a client PC on the LAN.**
2. **Open the following URL in the browser:**

- If you have a TCP/IP network, open:

```
http://netra_host_address:81
```

- If you have an SPX/IPX network, open:

```
http://hostname:81
```

A password window is displayed.

3. **Enter** `setup` **for the** `User ID`**; then enter** `setup` **for the** `Password`**.**
   The Netra Welcome page is displayed.

4. **Select the Administration option.**
   The Initial Configuration page is displayed with the remaining configuration tasks.

5. **If you want to install a localized version of your Netra software, perform the following tasks; if not, proceed to Step 6.**

   a. **Select the Install localized Netra software option.**
      The Software Management Administration page is displayed.

   b. **Insert the localization CD-ROM in the Netra CD-ROM drive.**

   c. **Select the Select new installation medium option.**

   d. **Select CD-ROM as the installation medium.**

   e. **Select Install: Clusters.**
      The Installing Clusters page is displayed with a pair of clusters (required and optional) for each locale. For example, the localized software for Japan is contained in the `Required Japanese Netra Software` and `Optional Japanese Netra Software` clusters.

   f. **Select the two clusters for your locale.**
      You must install the `Required` cluster. The `Optional` cluster is necessary only if you want to install additional Solaris software.

   g. **Once you install the locale-specific clusters, return to the Initial Configuration page.**

6. **Select the highlighted System Defaults option.**
   The System Defaults Administration page is displayed with the current time, date, time zone, and default locale.

7. **If necessary, enter a new time and date using the displayed format.**

8. **If necessary, select a new default system time zone from the scrolling list.**

9. **If you have installed localized Netra software, select a new default system locale from the scrolling list; if not, proceed to Step 10.**

10. **Use the Forward Arrow icon to go directly to the next configuration task.**

11. **Select the System Administrator Alias option.**
12. **Enter the mail addresses of the alias members.**
13. **Complete the Root Password and Administration Web Server configuration tasks.**

Note – If you change the Administration Web Server password, you must reauthenticate the browser connection.

---

14. **Use the Forward Arrow icon to go to the Main Administration page.**
    The Main Administration page is displayed.

▼ To Complete Other Configuration Tasks

1. **Use the displayed modules to perform any further system configuration tasks (such as setting up mail aliases, configuring a name service, or setting routing options).**
   Refer to the relevant chapters in this manual for more information on each administration module.
2. **Once the Netra server is completely configured, save the configuration information as follows:**
   a. **Insert a blank diskette into the Netra disk drive.**
      If you do not have a diskette drive on your Netra server, proceed to Step b.
   b. **Select System Administration: Save and Restore Configuration.**
   c. **If you are saving your configuration to diskette, select Save configuration to diskette.**
      If not, select Save configuration to file system.

4

Part 2 — Network Services Administration

The chapters in Part 2 describe the Netra server's Network Services Administration modules.

- Chapter 5, "Anonymous FTP Administration," describes how to configure the Netra server as an anonymous FTP server.
- Chapter 6, "Mail Administration," describes how to set up mail aliases and return addresses.
- Chapter 7, "Name Service Administration," describes how to use the Local name service, Network Information Service, and Domain Name Service for name resolution.
- Chapter 8, "Netscape Enterprise Server Administration," describes how to configure a Netscape Web Server.

Anonymous FTP Administration 5

File Transfer Protocol (FTP) enables a user to copy files from one computer to another over a network. The user runs an FTP client program on one computer and connects to the FTP server running on the other computer. To use FTP, a user must have a valid `login` account on the server.

Anonymous FTP allows users who do not have accounts on a server to access files on that server. The server can be configured to allow either read-only access or read and write access.

Use the Anonymous FTP module to configure your Netra server as an anonymous FTP server. This module allocates disk space for files that can be accessed by anonymous users. The anonymous FTP server can be in one of three configuration states:

- **Enable anonymous FTP with upload and download capability**: Anonymous users can connect to the Netra server and copy files both *to* and *from* the server.
- **Enable anonymous FTP with upload capability only**: Anonymous users can connect to the Netra server and copy files *from* the server but *not to* the server.
- **Disable anonymous FTP**: Anonymous users cannot connect to the Netra server.

Place all files that can be accessed from the server in the `/export/ftp/pub` directory. Anonymous FTP users will see this directory as `/pub`. If the server is configured with upload capability, anonymous users will be able to copy files to the `/export/ftp/incoming` directory. FTP users will see this directory as `/incoming`.

The Anonymous FTP administration module displays the current configuration state of your Netra server. If you want to change this state, use the radio buttons to select one of the other two configuration options.

▼ To Configure Anonymous FTP

1. **Select Network Services Administration: Anonymous FTP.**
   The Anonymous FTP Administration page, with the current state of the server, is displayed.

2. **Enter the information in the form using Table 5-1.**

Table 5-1 Information for Anonymous FTP

Enable anonymous FTP with upload and download capability	Anyone can connect to the Netra server using FTP. A user can copy files from the `/export/ftp/pub` directory on the Netra server to the user machine and from the user machine to the `/export/ftp/incoming` directory on the Netra server. •Files for download should be placed in the `/export/ftp/pub` directory by the root user.
Enable anonymous FTP with upload capability only	Anyone can connect to the Netra server using FTP. A user can only copy files from the `/export/ftp/pub` directory on the Netra server to the user machine. •Files for download should be placed in the `/export/ftp/pub` directory by the root user.
Disable anonymous FTP	Only users with valid user accounts on the Netra server can connect to it using FTP.

Mail Administration 6

The Netra server is configured to be a mail gateway between clients on your LAN and the Internet. The Mail module is used to set the return address on outgoing mail and to administer mail aliases.

Note – For mail services to work correctly, your name service must have an entry for each network interface on the Netra server.

Mail Return Address

The mail return address is set for all mail originating on the Netra server. You have the option of including the Netra server host name in the return address. For example, suppose your Netra server's host name is `stimpy`, and your domain (set by the Name Service module) is `tv.net` (see Figure 1-1 in Chapter 1, "Overview"). The possible return addresses for mail sent by the user `setup` on `stimpy.tv.net` are:

- `setup@stimpy.tv.net`
- `setup@tv.net`

If the second return address (`stimpy@tv.net`) is used, then the DNS database must have a mail address record. If the Netra server is acting as your primary DNS server, this record can be added in the `Mail Servers` field, as follows: `Mail Address`: **`tv.net`**; `Preference`: **`1`**; `Mail Servers`: **`stimpy`**. (See Chapter 7, Name Service Administration, for more information on DNS databases and servers.)

6

Mail Aliases

Mail aliases are used to redirect mail that is sent to one or more mail addresses. Aliases are used for any mail that is sent to the Netra server, including mail sent from local clients and mail sent from the Internet. Two useful ways to use aliases are: (i) to send mail to a group of users (group aliases) and (ii) to redirect mail for single users (personal aliases).

Group Aliases

Group aliases generally have more than one member. For example, suppose the members of a volleyball team are on an alias called `vball`. If mail is sent to the `vball` alias, each member of the team will receive a copy of that mail. The sender does not have to know each team member's mail address or even who is on the team.

Personal Aliases

Personal aliases usually have only a single member. Such aliases redirect mail to either a different user or to the same user on a different machine. For example, if user Tom wants his mail sent to his personal machine, `grover`, add a personal alias for Tom (with the user name `tom`) to the Netra server. The alias will contain one member: `tom@grover`. The name of the alias will be the same as Tom's user name (that is, `tom`).

To send mail to an alias, address the mail as if it were going to any user on the Netra server. Thus, if you send mail to `vball@stimpy.tv.net`, it will reach the members of the volleyball team. If you send mail to `tom@stimpy.tv.net`, it will go to `tom@grover.tv.net`.

Alias members must be valid mail addresses on the Netra server. If a user receives mail on the Netra server, then only the user name is required. If this user receives mail on another host, then the user name and the host name (*username@hostname*) must be used when specifying this user as an alias member. You can also use a fully qualified host name.

An alias member list can also contain other aliases as members. This is helpful if you want to circumvent the 1000-character limit on the alias member list.

Mail Procedures

Return Address

▼ To Modify the Mail Return Address

1. **Select Network Services Administration: Mail ➤ Modify mail return address.**
   The Mail Return Address Administration page, showing the return address on mail sent from the Netra server, is displayed.
2. **Make the changes in the form using Table 6-1.**

Table 6-1 Information for Mail Administration

user@domain	The return address on mail does not include the host name of the Netra server.
user@host.domain	The return address on mail includes the host name of the Netra server.

Aliases

Note – If no aliases are defined, you will only see the **Add a mail alias** option. The **Modify** or **Delete** options are only displayed after you add at least one mail alias.

▼ To Create a Mail Alias

1. **Select Network Services Administration: Mail ➤ Add a mail alias.**
   The Add A Mail Alias page is displayed.
2. **Enter the information in the form using Table 6-2.**

Table 6-2 Information for Mail Alias Administration

Alias Name	The name of a mail alias. A copy of all mail sent to the alias is sent to each member of the alias. Alias names: •Must be at least one character and no more than 20 characters in length •Must begin with a letter, and may include letters, digits, hyphens, underscores, and periods •Are case insensitive •Must be unique
Alias Members	A list of users, one per line, who will receive mail sent to the alias. •Each listed user must be a valid mail address. Valid alias members who cannot be reached at configuration time are added to the alias, but mail sent to that alias is returned to the sender. •The maximum length of the alias member list is 1000 characters, including implicit commas that are added between successive alias members.

▼ To Modify or Delete a Mail Alias

1. **Select Network Services Administration: Mail.**
   The Mail Administration page is displayed with a list of aliases.

2. **Select one of the following options:**

- To modify an existing alias, select Modify for the required alias, and make the changes in the form using Table 6-2.
- To delete an alias, select Delete for the alias you want to remove; then confirm your operation.

Name Service Administration 7

Every machine on a network must have a unique identifier to distinguish itself from other machines on the network. This is also true for all machines on the Internet. Thus, every machine is given a *host address*. A host address has the form 129.144.79.5, where each of the four numbers separated by periods can be in the range of 0 to 255. Such addresses are hard to memorize, so each machine is also given a *host name* that is associated with its host address. Users generally use a host name, such as `stimpy@tv.net`, to access a specific machine on a given network.

The process by which a host name is associated with or translated to its host address is called *name resolution*. It is usually performed by a *name service*.

Name Services on the Netra Server

The Netra server provides three types of name services:

- Local name service: Translation is done locally (by looking up the name in a file)
- Network Information Service (NIS): Translation is done by an NIS server (running on another host)
- Domain Name Service (DNS): Translation is provided by a DNS server (running either on the Netra server or on another host)

The Netra server can use any or all of the name services at the same time. If you decide to use more than one name service, they are tried in the following order: local name service, NIS, DNS. For example, suppose your Netra server is configured to use the local name service and DNS. When a name service query is made, the server attempts name resolution by looking up the host name in the local database first. If the host name is found, the server returns the host address. If not, the query is passed to the DNS server. If the DNS server resolves the query, it returns the information, otherwise it returns “not found”.

Local Name Service

The local name service provides a local database that associates the names of hosts with their host addresses. This name service is only available to programs running on the Netra server.

Network Information Service

The NIS name service provides information about the local network. This information can include more than host names and addresses (such as users and passwords). However, the Netra server can only use NIS for host names, host aliases, and host addresses.

Domain Name Service

DNS gives different groups responsibility for subsets of names. Each subset or level is called a domain. At the top level of the DNS hierarchy are a small number of large domains, such as `com` (for commercial organizations). Individual organizations set up their own domains within these domains (`sun.com`, `oracle.com`, `stanford.edu`). Domains, in turn, can have subdomains. Domain names are requested from and registered by the Network Information Center (NIC) for an annual fee.

The host name of a system, together with its full domain specification, makes up a complete DNS name. For example, Figure 7-1 shows such a DNS name: `ren.comedy.tv.net`. The machine `ren` is a node residing in the subdomain `comedy` within in the domain `tv`, which is the domain `net`.

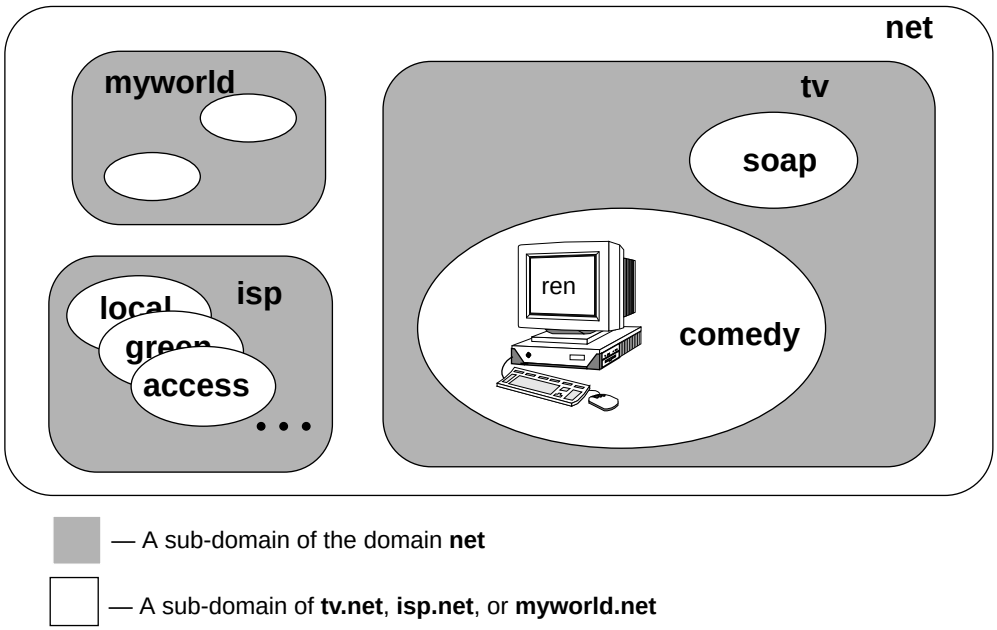

Figure 7-1 Example of DNS Domains

Every domain has two or more systems that keep a database of DNS names for that domain. These systems also contain the DNS names of the subdomains, unless this responsibility is delegated to systems in the subdomain. Thus, there are several systems that contain the database for the domain `net`. In that database, there is a delegation entry pointing to a system that keeps the database for `tv`. The DNS database for `tv` contains entries for delegating the domains `soap` and `comedy`. The database for `comedy` contains the host address for `ren`.

The DNS system of resolving names is strictly hierarchical. Using the previous example, the system that acts as the DNS server for the domain `tv` translates a host name to a host address only if that host name exists directly within the domain. All other host names are forwarded to the appropriate sub-domain for resolution. (Thus, the name `ren.comedy.tv.net` is forwarded from `tv`'s DNS server to the DNS server for the subdomain `tv` for resolution.

7

Configuration Options

When configuring each name service, you must take into account both the client side and the server side.

Local Name Service

For the Local name service, the Netra server is both client and server. As a local name server, your Netra server will contain a list of host-name-to-host-address mappings for its own use. These mappings are only available to applications running on the Netra server. Information entered in the local database is automatically available to programs running locally.

NIS

For the NIS name service, you can only configure the client side. You cannot configure an NIS server to run on the Netra server. This means that an NIS server should already be running on another host.

DNS

For the DNS name service, you can configure a client *and* a server.

- When a Netra server functions as a *DNS client*, it does not perform any name service functions. If you want the Netra server to be a DNS client, you should already have name servers for your DNS domain. You can choose a DNS server that is running either on another machine or on the Netra server. You can also configure alternate servers that will be used when the first server is unavailable.
- The Netra server can be configured as a *DNS server.* All DNS servers cache the results of name service queries. This means that repeat queries are answered by the local name server rather than the original name server (until the information is out of date). When a DNS server is not configured with any primary or secondary domains, it is called a *cache-only server.*

  As a *primary domain server*, the Netra server maintains a master database for its own domain. (You must make all updates to the DNS database.) The primary name server regularly propagates information to the other name servers in its domain. It should have a secondary name server to back it up, either on your LAN or at your ISP.

As a *secondary domain server*, the Netra server is subordinate to another DNS server maintained by your ISP or in your network. It periodically compares its database to the current database on the master name server. When it detects a difference, it requests a zone transfer (in which the master name server sends the latest copy of the database to the secondary name server).

- For intranet configurations (configurations without connections to the Internet), you can configure the Netra server as a *root name server*. In this case, the Netra server is responsible for all domain information although it may delegate domains to other DNS name servers.

How to Set Up Name Services

The three name service options (Local, NIS, and DNS) work independently of each other.

- Local name service enables you to add or delete hosts and their respective addresses.
- NIS enables you to add or delete the Netra server as an NIS client.
- DNS requires you to configure two independent pieces: a client and a server. If you configure the Netra server as a DNS server, it is usually best to also be a client of this DNS server. (Note that you must configure the DNS server first and then configure it as a client.)

Configuring the DNS server is a two-step process:

1. Start a name server. Unless you are running a root name server, you must specify a list of other name servers that will be queried when the local DNS server cannot resolve a query. The default list of name servers should be sufficient for all sites connected directly to the Internet. For sites that do not have direct access (for example, because they are behind a firewall), list other DNS servers that can be contacted.
2. Once the DNS server is running, add primary and secondary domains as needed.

   When you add a primary domain, you are specifying a domain of hosts for which this DNS server contains authoritative data. Other DNS servers contact this server to resolve queries about hosts in this domain. Host

names, host addresses, host aliases (CNAME records), mail servers (MX records), and other name servers can all be entered as information that is part of a primary domain.

When you add a secondary domain, you specify that this DNS server should cache all the information about that domain from another name server. Standard caching only stores the results from previous queries: a secondary domain actively retrieves all the domain information in anticipation of future requests. A secondary domain reduces the load on the primary server and serves as a backup in case other servers cannot be contacted by clients.

Name Service Procedures

NIS Client Administration

▼ To Configure the Netra Server as an NIS Client

1. **Select Network Services Administration: Name Service ➤ Administer NIS.**
   The NIS Client Administration page is displayed.
2. **Enter the information in the form using Table 7-1.**

Table 7-1 NIS Client Administration Information

NIS Client Domain Name	The NIS domain in which the Netra server resides.

▼ To Modify or Unconfigure an NIS Client Domain

Note – The Modify and Unconfigure options are only displayed when the Netra server is configured as an NIS client.

- To modify an NIS client domain, select Network Service Administration: Name Service ➤ Administer NIS ➤ Modify.
- To unconfigure an NIS client domain, select Network Service Administration: Name Service ➤ Administer NIS ➤ Unconfigure.
  The Netra server will no longer use NIS to resolve host names, and the NIS client domain name is ignored.

Local Name Server Administration

▼ To Configure the Netra Server as a Local Server

1. **Select Network Services Administration: Name Service ➤ Administer Local.**
   The Local Name Server Administration page is displayed.
2. **Enter the information in the form using Table 7-2.**

Table 7-2 Local Server Information

Host Names / Host Addresses	The host names and corresponding host addresses. The host names may be partially or fully qualified to be compatible with other name services. However, this database only resolves host names that have an exact match in the database.

DNS Client Administration

▼ To Configure the Netra Server as a DNS Client

1. **Select Network Services Administration: Name Service ➤ Administer DNS ➤ Configure DNS Client.**
   The DNS Client Administration page is displayed.
2. **Enter the information in the form using Table 7-3.**

Table 7-3 DNS Client Administration Information

DNS Domain Name	The DNS domain that will be used to resolve partially-qualified host names. Usually, this is the local domain name. Example: comedy.tv.net
Name Server 1	The host address of the DNS server that will be tried first for all DNS queries. Example: 129.144.79.5
Name Server 2	The host address of the DNS server to use, if the first name server is unreachable. Example: 129.144.79.6
Name Server 3	The host address of the DNS server to use, if the first two name servers are unreachable. Example: 129.144.102.6

▼ To Modify DNS Client Setup

1. **Select Network Services Administration: Name Service ➤ Administer DNS ➤ Modify DNS client.**
   The DNS Client Administration page is displayed.
2. **Make the changes in the form using Table 7-3.**

DNS Server Administration

▼ To Configure the Netra Server as a DNS Server

1. **Select Network Services Administration: Name Service ➤ Administer DNS ➤ Configure DNS Server.**
   The DNS Server Administration page is displayed.
2. **Enter the information in the form using Table 7-4.**

Table 7-4 DNS Server Information

DNS Domain Name	The DNS domain in which the Netra server resides. The domain name is assumed to be fully-qualified (do not use a trailing period). Example: comedy.tv.net
Root Name Servers / Host Addresses	The fully-qualified host names and host addresses of DNS name servers to contact to resolve name service queries. If the Netra server is behind a firewall, use the names and addresses of name servers on the firewall. If the Netra server is a root name server, this field can remain empty. Example: access.isp.net 129.144.102.6

▼ To Configure the Netra Server as a DNS Primary Server

1. **Select Network Services Administration: Name Service ➤ Administer DNS ➤ Add a primary domain.**
   The Add DNS Primary Domain page is displayed.

2. **Enter the information in the form using Table 7-5.**

Table 7-5 DNS Primary Server Information

Primary Domain Name	The name of the primary domain. If the Netra server is a root name server, use the domain name `root`. The domain name is assumed to be fully qualified (do not use a trailing period). Example: elmo 129.144.79.1
Host Names	The host names and corresponding host addresses of the hosts within the specified domain.
Host Aliases	The host aliases within this domain and their corresponding host names. A host name must be within the domain, unless it is a fully-qualified host name.
Mail Servers	The mail address, the corresponding mail server, and its preference value. •The mail address is a host name or an alias and must be within the domain. •The mail server is the machine that will accept mail for this address. If there is more than one mail server, the preference value determines which mail server is used. •The preference value is an integer: the lower the value, the higher the priority of that mail server.
DNS Servers	The domains served by the corresponding DNS name servers. The domain must be a subdomain of the primary domain, unless it is a fully-qualified domain name. The host name of the name server must be within this domain, unless it is a fully qualified host name. All DNS servers will be treated as authoritative for the listed domain. If a subdomain is entered, authority for that domain is delegated to the listed server. Do not enter the Netra server or primary domain.

The Internet community uses some standard aliases and mail addresses that you may also want to use. For example you can add the following entries to the `Host Aliases` and `Mail Servers` fields:

- The host aliases: www, ftp, ns. For example:

```
www                     stimpy
ftp                     stimpy
ns                      stimpy
```

- The mail server corresponding to your domain. For example:

```
tv.net.                 10 stimpy
```

▼ To Modify or Delete a DNS Primary Domain

1. **Select Network Services Administration: Name Service ➤ Administer DNS.**
2. **Select one of the following:**
   - To modify a DNS primary domain, select Modify, and make the changes in the form using Table 7-5.
   - To delete a DNS primary domain, select Delete; then confirm the operation.

▼ To Configure the Netra Server as a DNS Secondary Server

1. **Select Network Services Administration: Name Service ➤ Administer DNS ➤ Add a secondary domain.**
   The Add DNS Secondary Domain page is displayed.

2. **Enter the necessary information in the form using Table 7-6.**

Table 7-6 DNS Secondary Server Information

Secondary Domain Name	The name of the secondary domain. Use the domain name `root` if the Netra system is a secondary server for the root domain. The domain name is assumed to be fully-qualified (do not use a trailing period). Example: tv.net
Master DNS Servers' Host Addresses	The host addresses of the master DNS name servers in the order in which they should be queried. A master DNS server can be either an existing primary or secondary DNS server. Example: 129.144.102.6

▼ To Modify or Delete a DNS Secondary Domain

1. **Select Network Services Administration: Name Service ➤ Administer DNS.**

2. **Select one of the following:**
   - To modify a DNS secondary domain, select **Modify**, and make the changes in the form using Table 7-6.
   - To delete a DNS secondary domain, select **Delete**; then confirm the operation.

7

Netscape Enterprise Server Administration 8

The Netscape Enterprise Server is a Hypertext Transfer Protocol (HTTP) server. It is also known as a *Web server*. Anyone connected to your network can access the information provided by such a server. It can be accessed using the URL `http://`*hostname.domainname*.

You can administer the Netscape Enterprise Server using the Netscape Administration Server. You can initially access the Netscape Administration Server using the Netscape Enterprise Server option on the Netra Main Administration page. Thereafter, you can access this administration server using the URL `http://`*hostname*`:82`.

To access the Netscape Administration Server you must provide a user name (`setup`) and password. The password is the same as the current Netra administration password. It can only be changed using the Netscape Administration Server. Changing the password enables people other than the Netra server administrator to administer the Web servers.

8

Configuring Web Servers

You can use the Netscape Administration Server to set up and administer one or more Web servers. For further details refer to the Netscape documentation that was shipped with your Netra system.

Note – If you are setting up multiple Web servers on your Netra server, each host address must be unique.

The default document root directory for a Web server must be `/export/htdocs`. The Netra File System Backup and Restore module and future Netra upgrades assume that all HTML documents are stored in this directory. If you have multiple Web servers and want to provide different content on each server, you must create different document root directories. Add multiple document root directories within the `/export/htdocs` directory (for example, `/export/htdocs/server1/`, `/export/htdocs/server2/`, and so on).

Part 3 — Network Connection Administration

The chapters in Part 3 describe the Netra server's Network Connection Administration modules.

- Chapter 9, "ATM Administration," describes how to set up a connection to an Asynchronous Transfer Mode (ATM) network.
- Chapter 10, "High-Speed Serial Interface Administration," describes how to connect the Netra server to a remote host using an HSI interface and PPP.
- Chapter 11, "ISDN Administration," describes how to connect the Netra server to a remote host using ISDN and PPP.
- Chapter 12, "Local Area Network Administration," describes how to configure the LAN interfaces on a Netra server.
- Chapter 13, "Modem Administration," describes how to connect the Netra server to a remote host using a modem and PPP.
- Chapter 14, "Routing Administration," describes how to configure the Netra server as a router.

Note – The Netra software does not display information on high-speed serial, ISDN or Token Ring interfaces if the necessary interface hardware and software are not installed in the Netra server. (Refer to your Netra hardware installation manual for instructions on adding network interface hardware. Refer to the Software Management module for software installation instructions. Then configure the interface using the following chapters.)

ATM Administration 9

This chapter describes how to set up a connection to an Asynchronous Transfer Mode (ATM) network.

ATM is a connection-oriented network protocol. To use this protocol, two communicating entities must establish a connection before data transfer can begin. TCP/IP, on the other hand, is inherently connectionless.

The SunATM™ 2.0 software supports two protocols which reconcile the differences between the ATM and TCP/IP paradigms:

- Classical Internet Protocol (IP) interface
- LAN Emulation interface

Both these protocols allow TCP/IP to run transparently over an ATM interface by resolving an IP address to an ATM address and establishing the connection to the host to which a message is addressed.

The Netra ATM administration module supports SunATM version 2.0 software and SunATM-155 version 2.0 hardware. (The SunATM-155/Mfiber SBus Adapter 2.0 and SunATM-155/UTP5 SBus Adapter 2.0 are single-wide SBus adapters that conform to the specifications of the ATM Forum.)

9

Classical Internet Protocol Interface

Classical IP supports the TCP/IP and UDP/IP protocols in an ATM environment. An ATM address resolution protocol (ATM ARP) server replaces the traditional ARP protocol by resolving IP addresses to ATM addresses. It is accessible to all hosts on a subnet. Each host must register with the ARP server when the ATM interface is brought up.

Classical IP has the following limitations because it does not support broadcast and multicast messaging.

- Running NIS or NIS+ over Classical IP requires configuration beyond the scope of the ATM module and is not supported.
- The Routing Information Protocol (RIP) and the router discovery protocol are not supported. Thus, to route over an ATM network using a Classical IP interface, the Netra server must be configured as a static router. Routes to the routers in the ATM subnet must be explicitly added.

Each ATM port (SBus card) on the Netra server supports only one Classical IP interface.

LAN Emulation Interface

LAN Emulation, which provides mechanisms to send broadcast messages, is another way of supporting the TCP/IP and UDP/IP protocols over an ATM network. A series of LAN Emulation services (such as the LAN Emulation Configuration Server (LECS), the LAN Emulation Server (LES), and the Broadcast and Unknown Server (BUS)) provide address resolution information. When a LAN Emulation interface is brought up, it joins the LAN by registering with these services. The LAN Emulation protocol provides a broadcast service to the upper layer protocols. Therefore, a LAN Emulation interface is not affected by the multicast and RIP limitations of Classical IP.

Each ATM port on the Netra server currently supports only one LAN Emulation interface.

Configuring ATM Interfaces

To configure ATM interfaces on the Netra server, you must perform the following general tasks:

1. **Set the type of framing interface.**
   ATM switches use either the SDH or the SONET framing interface. (The framing interface used by your ATM switch should be in the switch product information.) Set the framing interface type using the `Change Framing Interface` option, as described on page 9-4.

2. **Set the User Network Interface (UNI) version for each ATM port.**
   Each ATM port must be configured with a User Network Interface version. This version will apply to all Classical IP and LAN Emulation interfaces configured on that port. Each port can be configured with a different version. Set the UNI version using the `Change User Network Interface Version` option, as described on page 9-4.

3. **Configure a Classical IP and/or a LAN Emulation interface for each ATM port.**
   Use the `Configure a Classical IP Interface` and `Configure a LAN Emulation Interface` options described on page 9-5 and page 9-6.

9

ATM Procedures

Framing Interface

▼ To Change the Framing Interface

1. **Select Network Connection Administration: ATM.**
   The ATM Administration page is displayed with the current switch and port configuration information.
2. **Select Change Framing Interface.**
3. **Select the type of framing interface (see Table 9-1).**

Table 9-1 Information for ATM Framing Interface

Framing Interface	The supported ATM switch framing interface. The Netra default framing interface type is SONET. Choices: SONET, SDH

4. **Restart the Netra server using System Administration: Restart and Shutdown.**

User Network Interface

▼ To Change the User Network Interface Version

1. **Select Network Connection Administration: ATM.**
   The ATM Administration page is displayed with configuration information for each port.
2. **Select Change User Network Interface for the required ATM port.**
3. **Select the version number (see Table 9-2).**

Table 9-2 Information for ATM User Network Interface

User Network Interface (UNI)	The version of the UNI specification used for signalling. The default version is 3.0. Choices: 3.0, 3.1

4. **Restart the Netra server using System Administration: Restart and Shutdown.**

Classical IP Interface

▼ To Configure a Classical IP Interface

1. **Select Network Connection Administration: ATM.**
   The ATM Administration page is displayed with configuration information for each port.

2. **Select Configure a Classical IP interface for the required ATM port.**
   An administration page for the selected interface is displayed.

3. **Enter the information in the form using Table 9-3.**

Table 9-3 Information for ATM Classical IP Interface

ARP Configuration	The server or client ARP configuration. Standalone allows a back-to-back configuration. Choices: Server, Client, Standalone
ARP Server Prefix	The 13-byte prefix of the ARP server switch. If the ARP server is on the same switch as the Netra server, no entry is required. If there is no entry in this field, the local switch prefix is used. •This field is required only when the ARP Configuration field is set to Client.
ARP Server Address	The 7-byte local portion of the ATM address of the ARP server. If there is no entry in this field, the default local server is assumed. (There are also 256 addresses reserved by Sun: SUNMACSEL0-255.) •This field must remain blank if the ARP Configuration field is set to Standalone.
Remote Host Address	The remote host address for the machine to which the Netra server is connected. The remote host address and the host address must be on the same subnet. •This field is required only when the ARP Configuration field is set to Standalone.
Host Address	The host address for the network interface. This address should be unique on the system.
Netmask	The netmask address that determines the network with which the host address is associated. Example: 255.255.255.0

4. **Restart the Netra server using System Administration: Restart and Shutdown.**

▼ To Modify or Unconfigure a Classical IP Interface

1. **Select Network Connection Administration: ATM.**
   The ATM Administration page is displayed with configuration information for each port.
2. **Select one of the following.**

- To modify a Classical IP interface, select Modify for the required interface, and make the changes in the form using Table 9-3.
- To unconfigure a Classical IP interface, select Unconfigure for the interface you want to remove; then confirm the operation.

3. **Restart the Netra server using System Administration: Restart and Shutdown.**

LAN Emulation Interface

▼ To Configure a LAN Emulation Interface

1. **Select Network Connection Administration: ATM.**
   The ATM Administration page is displayed with configuration information for each port.
2. **Select Configure a LAN Emulation interface**
   An administration page for the selected interface is displayed.
3. **Enter the information in the form using Table 9-4.**

Table 9-4 Information for ATM LAN Emulation Interface

LAN Name	The name of an emulation LAN to join.
Host Address	The host address for the network interface. This address should be unique on the system.
Netmask	The netmask address that determines the network with which the host address is associated. Example: 255.255.255.0

4. **Restart the Netra server using System Administration: Restart and Shutdown.**

▼ To Modify or Unconfigure a LAN Emulation Interface

1. **Select Network Connection Administration: ATM.**
   The ATM Administration page, with configuration information for each port is displayed.

2. **Select one of the following.**

- To modify a LAN emulation interface, select Modify for the required interface, and make the changes in the form using Table 9-4.
- To unconfigure a LAN emulation interface, select Unconfigure for the interface you want to remove; then confirm the operation.

3. **Restart the Netra server using System Administration: Restart and Shutdown.**

9

High-Speed Serial Interface Administration

10

This chapter describes how to set up a connection to a remote host over a high-speed serial interface (HSI) using point-to-point protocol (PPP).

The SunLink™ High-speed Serial Interface (HSI) controller card is a four-port serial communications SBus card. When used with Data Service Unit or Channel Service Unit (DSU/CSU) equipment (available from third parties) the HSI controller card can be used to communicate over 1.544 Mbps T1 or 2.148 Mbps E1 telephone lines. While DSU and CSU are two separate entities, they are often combined in one physical unit. The CSU is the point of contact for the T1 line, and provides termination and signal regeneration for the T1 line. The DSU converts signals from the router into the bipolar digital signals used by the digital line.

Note – The Netra software only displays information about network interface hardware that is currently attached to the Netra server. (Refer to your Netra hardware installation manual for instructions on adding network interface hardware. See the “Software Management” module in Chapter 19 for software installation instructions.)

The High-Speed Serial Interface module only supports the SunLink PPP 2.0 software. SunLink PPP 3.0 and SunLink PPP 3.0.1 are not supported.

▼ To Configure an HSI Interface

1. **Select Network Connection Administration: High-Speed Serial Interface**
   The High-Speed Serial Interface Administration page is displayed with the status for each port.
2. **Select the Configure for PPP option for the port you want to configure.**
3. **Enter the information in the form using Table 10-1.**

Table 10-1 Information for High-Speed Serial Interface

Local Host Address	The host address of the HSI interface (that is, the Netra end of the HSI connection). It is provided by the ISP. Example: 129.144.102.27
Local Netmask	The netmask of the local area network. Example: 255.255.255.0
Remote Host Address	The host address of the system at the other end of the HSI connection (for example, your ISP). Example: 129.144.102.6
Line Speed	The line speed of the serial link (modem or CSU/DSU). This value must match the speed of the modem or CSU/DSU.
Clocking	The origin of the clocking for transmitted data. •`External` means that the incoming transmit clock is used. •`Internal` means that the Netra server's internal clock is used.

4. **Restart the Netra server so that the new values take effect.**

▼ To Modify or Delete an HSI Interface

1. **Select Network Connection Administration: High-Speed Serial Interface**
   The High-Speed Serial Interface Administration page is displayed.
2. **Select one of the following options:**

- To modify an interface, select Modify for the appropriate interface, and make the changes in the form using Table 10-1.
- To remove an interface, select Delete for the interface you want to remove; then confirm the operation.

ISDN Administration 11

This chapter describes how to set up a connection to a remote host over Integrated Services Digital Network (ISDN) using PPP.

ISDN is a set of services provided by telephone companies over public telecommunication lines. Voice and data services are supported at speeds greater than normal telephone line speeds, using multi-channel digital telephone lines through specially-configured switches. The channel used for voice and data is referred to as the *B channel*.

As a data service, ISDN can be used as the medium for a Wide Area Network (WAN) or for a dedicated connection to the ISP. In either case, PPP should be used to provide connectivity between systems.

The ISDN module supports only the SunISDN™ version 1.0.3 software, which is available with the SunISDN hardware. Most of the configurations that are possible using ISDN and PPP are supported. The compression and multi-point links configurations are not supported. (If you need advanced configurations for your site, you can unconfigure the Netra ISDN module and use the tools provided by the SunISDN software instead.)

11

Connecting to a Remote Host Using ISDN

To connect to a remote host over ISDN using PPP requires the following tasks:

1. **Configuring all ISDN ports.**
   All ports must be configured correctly before connections can be made to remote hosts. Configure each port using the appropriate **Configure Port x** option, as described on page 11-5.

2. **Adding a remote host connection.**
   After configuring all the ports, set up a connection to a remote host using the **Add a remote host connection** option, as described on page 11-3. Most of the information you need should be available from the ISP or the WAN administrator.

   If you are connecting to Ascend, Cisco, or Network Express routers, configure your connection with the following information:
   - Ascend: Use CHAP as the security protocol and MP-Ascend as the encapsulation protocol.
   - Cisco: Use CHAP as the security protocol and MP-Other as the encapsulation protocol for Multilink.
   - Network Express: Use MP-Other as the encapsulation protocol for Multilink.

ISDN Procedures

Remote Host Connections

▼ To Add a Remote Host Connection

1. **Select Network Connection Administration: ISDN Administration ➤ Add a remote host connection.**
   The ISDN Remote Host Connection page is displayed.

2. **Enter the information in the form using Table 11-1.**

Table 11-1 Information for ISDN Remote Host Connection

Connection	
Remote Host Address	The host address of the peer side of the ISDN point-to-point link (for example, the ISP's ISDN server). Example: 129.144.102.6
Local Host Address	The host address of the local side of the ISDN point-to-point link. Example: 129.144.102.27
Netmask	The number that masks the host component of a host address and thus shows how to divide the network component of the host address into sub-networks.
Inactivity Timeout	The number of minutes an ISDN connection is allowed to idle before it is disconnected.
Host Setup Timeout	The number of minutes allowed before a connection request ceases its attempt to connect to the remote system.
Default Route	The route entry that allows connections to unspecified hosts to go through this connection. The default route is created when the connection is made with the remote system; it is deleted when that connection is terminated or timed out. Choices: On, Off
Bandwidth Controller	The side of the connection that is controlling the number of ISDN links used on the connection. Only one side can be "on" at a time. Choices: On, Off

Table 11-1 Information for ISDN Remote Host Connection *(Continued)*

Encapsulation	The encapsulation protocol used in data transfers. For multilink PPP (MP), the control protocol may or may not be encapsulated. Ascend boxes require control encapsulation; others typically do not. Choices: PPP, MP-Ascend, MP-Other.
Security	
Local Authentication	The authentication process (if any) that will be used to validate incoming calls. •CHallenge Authentication Protocol (CHAP) uses encryption-based password control. •Password Authentication Protocol (PAP) is similar to CHAP. Choices: chap, pap, off
ID String (Local)	The login string used by the authentication protocol.
Password (Local)	The password string used by the authentication protocol.
Remote Authentication	The authentication protocol that will be used with remote systems. Choices: chap, pap, both
ID String (Remote)	The login string used by the authentication protocol.
Password (Remote)	The password string used by the authentication protocol.
Phone	
Caller ID	Choices: On, Off
Channel Baud Rate	The B-channel baud rate. Choices: data56, data64
Phone Number 1	The phone number to dial to reach the system at the other end of the ISDN connection. Example: 17005554141
Phone Number 2	(Optional) The phone number to dial to reach the system at the other end of the ISDN connection. This number need only be entered if it is supplied by the remote system. Example: 17005554141

▼ To Modify or Delete Remote Host Connections

1. **Select Network Connection Administration: ISDN Administration.**
   The ISDN Administration page is displayed.
2. **Select one of the following:**

- To modify an existing interface, select Modify, and make the changes in the form using Table 11-1.
- To delete the existing interface, select Delete; then confirm the operation.

Local Port Assignments

Note – Profile B and SPID numbers should only be used in the U.S.A.

▼ To Configure a Port

1. **Select Network Connection Administration: ISDN Administration ➤ Configure Port *x*.**
2. **Enter the information in the form using Table 11-2.**

Table 11-2 Information for Configuring a Port (ISDN)

Switch Type	Specifies the type of switch to which your ISDN line is connected. This information is available from your phone company or ISP. Choices: au1 (Australia); vn3, vn6 (France); 1tr6 (Germany); ntt (Japan); bt2 (United Kingdom); dms, 5ess, ni2 (North America); etsi (Europe); swd-etsi (Sweden); hkt (Hong Kong)
Profile A	
Force 56Kb	Forces the ISDN line to a 56Kb transfer rate, regardless of how the incoming call identifies itself. This is mainly used to solve incompatibility problems between switches. Choices: On, Off
Calling Line Identify	Enables or disables exchange service (if available) where the exchange verifies that the local calling number is the phone number of the calling system.

Table 11-2 Information for Configuring a Port (ISDN) *(Continued)*

ISDN Number	Your ISDN phone number. This information is used for outgoing calls and specifies the calling number to the remote host.
ISDN Subaddress	(Optional) If more than one ISDN device is using the same ISDN line, sub-addressing can be used to address each device. This is an advanced feature; consult the ISDN documentation for details.
SPID	(Optional) The service profile identifier. It is used in North America as an additional identifier and in conjunction with the calling number, to identify the local number to the local switch.
Local Number	(Optional) Used to "filter" incoming calls. If the calling number of an incoming call does not match this number, the call will be rejected. When used, this number should be your ISDN number.
Local Subaddress	(Optional) This is an advanced feature and is normally not needed. Consult the ISDN documentation for details.
Profile B	
Force 56Kb	Forces the ISDN line to a 56Kb transfer rate, regardless of how the incoming call identifies itself. This is mainly used to solve incompatibility problems between switches. Choices: On, Off
Calling Line Identify	Enables or disables exchange service (if available) where the exchange verifies that the local calling number is the phone number of the calling system.
ISDN Number	If more than two phone numbers were provided by your phone company, this field represents the second number.
ISDN Subaddress	(Optional) If more than one ISDN device is using the same ISDN line, sub-addressing can be used to address each device. This is an advanced feature; consult the ISDN documentation for details.

Table 11-2 Information for Configuring a Port (ISDN) *(Continued)*

SPID	(Optional) The service profile identifier. It is used in North America as an additional identifier and in conjunction with the calling number, to identify the local number to the local switch.
Local Number	(Optional) Used to "filter" incoming calls. If the calling number of an incoming call does not match the number you specify, the call will be rejected. When used, this number should be your ISDN number.
Local Subaddress	(Optional) This is an advanced feature and is normally not needed. Consult the ISDN documentation for details.

Remote Host Connection Log

▼ To View or Clear Log Files

1. **Select Network Connection Administration: ISDN Administration.**
   The ISDN Administration page is displayed.
2. **Select one of the following options:**

- To look at the log file, select View log file.
- To clear the log file, select Clear log file; then confirm the operation.

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Local Area Network Administration 12

This chapter describes how to configure the local area network (LAN) interfaces on your Netra server using the Local Area Network module.

Note – The Netra software will only display information about network interface hardware that is currently attached to the Netra server. (Refer to your Netra hardware installation manual for instructions on adding network interface hardware. See the “Software Management” module in Chapter 19 for any software installation instructions.)

What is a Network Interface

A network interface consists of three elements:

- Network Port
  The network port provides the physical link between machines that comprise a network. Ports can be built into the Netra server, or they can be provided by SBus cards in the server. The Netra server supports the following types of network hardware:
  - Lance Ethernet
  - Fast Ethernet
  - Fast Ethernet 100 Base-T
  - Quad Ethernet
  - Token Ring

- Network Protocol
  The network protocol defines the communication that travels over the network. The Netra server supports the following network protocols:
  - TCP/IP: This protocol supports the definition of multiple interfaces for a network hardware port and network protocol.
  - SPX/IPX: This protocol is used for communicating with NetWare clients. It does not support multiple interfaces per port.

Note – Both network protocols can be associated with the same port.

- Interface Definition
  The interface definition is the configuration information that is specific to the Netra server. For example, the Netra server requires host addresses for TCP/IP interfaces, and network numbers and frame types for SPX/IPX interfaces. (See “Installing the IPX Gateway on a Client System” on page 2-2” for information about SPX/IPX network numbers and frame types.)

LAN Procedures

Note – You cannot administer the Netra server from a remote client without defining the network interface.

▼ To Configure a Network Interface

1. **Select Network Connection Administration: Local Area Network.**
   The Local Area Network Administration page is displayed with a list of network interface hardware to configure.
2. **Select either Add a TCP/IP Interface or Add an SPX/IPX Interface for the required network interface.**
   An administration page for the selected interface and protocol is displayed.

3. Enter the information in the form using one of the following tables.

- If you selected TCP/IP, use Table 12-1:

Table 12-1 Network Interface Administration: TCP/IP

Host Address	The host address for the network interface. This address should not be on the same network as any other configured interface. Example: 129.144.79.5
Netmask	The netmask address that determines the network with which the host address is associated. Example: 255.255.255.0

- If you selected SPX/IPX, use Table 12-2:

Table 12-2 Network Interface Administration: SPX/IPX

Ethernet II	The network number*, if your SPX/IPX LAN uses Ethernet II frame types.
Ethernet 802.2	The network number*, if your SPX/IPX LAN uses Ethernet 802.2 frame types.
Ethernet 802.3	The network number*, if your SPX/IPX LAN uses Ethernet 802.3 frame types.
Ethernet Snap	The network number*, if your SPX/IPX LAN uses Ethernet Snap frame types.

*The number must be the same as the one used in the Novell network.

▼ To Modify a Network Interface

1. **Select Network Connection Administration: Local Area Network.**
   The Local Area Network Administration page is displayed with a list of network interfaces to configure.
2. **Select either Modify a TCP/IP Interface or Modify an SPX/IPX Interface for the required network interface.**
   An administration page is displayed with existing configuration information for the selected interface and protocol.
3. **Make the changes in the form using Table 12-1 or Table 12-2.**

▼ To Delete a Network Interface

1. **Select Network Connection Administration: Local Area Network.**
   The Local Area Network Administration page is displayed with a list of network interfaces to delete.
2. **Select Delete for the interface you want to remove; then confirm the operation.**

Modem Administration 13

This chapter describes how to set up a point-to-point protocol (PPP) link between the Netra server and a remote host using a modem.

PPP allows two computers to be connected over a two-way communications link. The connection is established as needed. The Modem Administration module enables you to administer connections to a remote host system (for example, your ISP) using PPP. The following PPP protocol options are supported:

- Dynamic assignment of your Netra system's host address
- Addition of the remote system's host address to your routing table

Connecting to a Remote Host Using a Modem

Connecting to a remote host using a modem and PPP requires the following tasks:

1. Defining a modem.
   Examine the existing modem definitions in the Netra server using the **View modem definitions** option described on page 13-4. If an initialization definition for your modem has already been created, skip this task. If not, add an initialization definition and a unique name for your modem using the **Add a modem definition** option described on page 13-4.

2. Assigning a modem to a port.
   Your modem must be physically connected to the Netra server on one of the serial ports. Assign your modem to a specific port by using the appropriate **Assign a modem to Port *x*** option, as described on page 13-5.

3. Adding a remote host connection.
   After you assign a modem to a serial port, set up a connection to a remote host using the **Add a remote host connection** option described on page 13-2. (Note that this option will not appear until at least one modem is assigned to a port.)

Modem Procedures

Remote Host Connections

Note – You must assign a modem to a port before you can see the **Add a remote host connection** option.

▼ To Add a Modem Remote Host Connection

1. **Select Network Connection Administration: Modem ➤ Add a remote host connection.**
   The Add A Remote Host Connection page is displayed.

2. **Enter the information in the form using Table 13-1.**

Table 13-1 Information for Modem Remote Host Connection

Remote Host Address	The host address of the system at the other end of the PPP connection (presumably the ISP). Example: 129.144.102.6
Local Host Address	The host address of the Netra server. Example: 129.144.102.27 •If the remote host assigns the host address dynamically, enter `dynamic` in this field.
Phone Number	The phone number for the remote host. Example: 17005554141

Table 13-1 Information for Modem Remote Host Connection *(Continued)*

Login String	The UUCP-style chat script to log in to the remote PPP server once the modem connection is established. Example: \" in: LOGIN\r\c word: PASSWORD\r\c\"
Timeout (minutes)	The time, in minutes, after which an idle connection is terminated. Example: 5
Use Remote Host As Default Route	Select this option if you want the remote host address to be added to the route table as the default destination. This default route is removed when the connection is terminated.
Serial Port Name	The name of the serial port on the Netra server through which to connect to the remote host. Choices: ports with connected modems.
Connection Speed	The bits-per-second speed at which the serial port on the Netra server should communicate with the modem. (Use 38400 for maximum throughput.) Choices: 38400, 19200, and 9600

▼ To Modify or Delete A Remote Host Connection

1. **Select Network Connection Administration: Modem.**
   The Modem Administration page is displayed.

2. **Select one of the following:**

- To modify an existing remote host connection, select Modify, and make the changes in the form using Table 13-1.
- To delete a remote host connection, select Delete; then confirm the delete operation.

Modem Definitions

Note – The Netra server defines 33 modems. You cannot change these definitions or use any of them as your modem name.

▼ To Add a Modem Definition

1. **Select Network Connection Administration: Modem ➤ Add a modem definition.**
   The Add a Modem Definition page is displayed.
2. **Enter the information in the form using Table 13-2.**

Table 13-2 Information for Adding/Modifying a Modem Definition

Modem Name	The name associated with the modem. The name must be unique. It must start with a letter, and can include letters, digits, hyphens, and underscores. A modem name must not exceed 12 characters. Example: *myhayes*
Initialization String	The string passed to the modem when the connection to it is first established. Example: \" AT\r\c\ OK ATM1L)\r\c OK ATDT\D\r\c CONNECT\"

▼ To View Modem Definitions

- **Select Network Connection Administration: Modem ➤ View modem definitions.**
  A list of definitions is displayed in a scrolling window. The modems you defined are shown under `Your Modems`; the system-defined modems are listed next.

▼ To Modify or Delete a Modem Definition

1. **Select Network Connection Administration: Modem.**
   The Modem Administration page is displayed.

2. **Select one of the following.**

- To modify an existing modem definition, select Modify, and make the changes in the form using Table 13-2.
- To delete a modem definition, select Delete; then confirm the operation.

Modem Port Assignments

▼ To Assign a Modem to a Serial Port

1. **Select Network Connection Administration: Modem ➤ Assign a modem to Port *x*.**
   Choose the port to which your modem is connected.

   The Modem Port Assignment page is displayed with current port assignments.

2. **From the scroll list, select the name of the modem connected to the port (see Table 13-3).**

Table 13-3 Modem Assignments

Modem assigned to port x	All modems are listed, including those defined by the system. "No modem" is not a valid selection if the port is in use by a remote host. If you do not assign modems to any ports, you cannot make a remote connection.

Modem Log Files

▼ To Change the Log File Detail Level

1. **Select Network Connection Administration: Modem ➤ Change log file detail level.**
   The Modem Log File Detail Level page is displayed.
2. **Select a level of detail (see Table 13-4):**

Table 13-4 Modem Log File Detail Levels

Log File Detail Level	• errors only • minimal information • some uucp chat script information • all uucp chat script information • maximum uucp information • PPP message traces • everything, including IP packets

▼ To View or Clear the Log File

1. **Select Network Connection Administration: Modem.**
2. **Select one of the following options:**

- To view information in the log file, select View log file.
- To clear information in the log file, select Clear log file; then confirm the operation.

Routing Administration 14

This chapter describes how to configure the Netra server as a router.

Routing is the mechanism by which systems on different networks can communicate with each other. Each network usually has at least one system called a router. A *router* is a system that is connected to multiple networks; it maintains information that defines routes between host systems and networks.

Netra System Routers

The Netra system can be configured as one of the following:

- A dynamic router
- A static router
- Not a router

Dynamic Router

A *dynamic router* relies on information broadcast from other routers to update its routes and reflect changes in the network topology. It also broadcasts this information to other dynamic routers.

Dynamic routers are typically required when systems act as gateways between networks or within large networks where route information is constantly changing. The Netra server supports the following dynamic routing protocols:

- The Xerox NS Routing Information Protocol (RIP)
- The ICMP router discovery protocol

If client host systems are required to use the dynamic router, they must either run programs that can communicate using these protocols or they must specify the dynamic router as a default router.

When the Netra server is configured as a dynamic router, broadcasting RIP information over point-to-point (PPP) links can be enabled or disabled. If additional PPP links are defined after the dynamic router is configured, you must reconfigure the dynamic router to ensure that it is aware of the new links.

Static Router

A *static router* relies on the manual addition of routes. Routing information is not exchanged with other routers.

Static routers are typically used in very stable, simple networks. An example of such a network would be a single LAN connected to the Internet or to another network over a PPP link.

If machines on the LAN require a static router, it must be specified as a default router.

Setting a Default Route Over a PPP Link

If you require a default route over a PPP link, choose one of the following options.

- If both local and remote host addresses are statically assigned, you can use either of them as the default route.
- If the remote host address is dynamically assigned, use the local host address as the default route.
- If the local host address is dynamically assigned, use the remote host address as the default route.

If both the local and the remote host addresses are dynamically assigned, you cannot use a default route over a PPP link.

Not a Router

A non-gateway system need not be a router in networks that already have dynamic routers. The Netra server will listen for dynamic routers to broadcast route information using the RIP and the ICMP router discovery protocols.

Routing Procedures

Static Router

▼ To Configure the Netra system as a Static Router

Note – Before using static routing over PPP links, do the following:
- Configure a PPP connection to the remote host using the HSI, ISDN or Modem Administration modules.
- Add a static route to the remote host's Host Address.

1. **Select Network Connection Administration: Routing ➤ Configure static router.**
   The Static Router Administration page is displayed.
2. **Enter the information in form using Table 14-1.**

Table 14-1 Information for Static Router

Default Router Host Address	Host address of the default router for the network.
Destination Network/ Host Address	Network/Host address to which information is routed.
Router Host Address	Host address of the router used for accessing the destination address.
Hop Count	A value of 0 or greater. 0 means the Netra server is the router; a value greater than 0 means that another system is the router.

▼ To Modify a Static Router

1. **Select Network Connection Administration: Routing ➤ Modify static router.**
2. **Make the changes in the form using Table 14-1.**

Dynamic Router

▼ To Configure the Netra System as a Dynamic Router

1. **Select Network Connection Administration: Routing ➤ Configure dynamic router.**
   The Dynamic Router Administration page is displayed.

2. **Enter the information in the form using Table 14-2.**

Table 14-2 Information for Dynamic Router

Destination Network/ Host Address	Network/Host address to which information is routed.
Gateway Host Address	Host address of the gateway used for accessing the destination address. If the router is unreachable when this form is configured then it will not be used for routing until dynamic routing is reconfigured or the Netra system is restarted.
Hop Count	A value of 0 or greater. 0 means the Netra server is the router; a value greater than 0 means that another system is the router.
Status	Active or Passive. Gateways marked active are removed from the routing information if they become inaccessible. Gateways marked passive are part of the routing information until explicitly removed. Routes to passive gateways are also not broadcast to the other systems on the network.
Dynamic Routing Information over Point-to-Point Links?	Enables or disables RIP over PPP links. Choices: Yes or No.

▼ To Modify a Dynamic Router

1. **Select Network Connection Administration: Routing ➤ Modify dynamic router.**

2. **Make the changes in the form using Table 14-2.**

Not a Router

▼ To Configure the Netra System as Not a Router

Note – Once the Netra server is already configured as “not a router,” this option is not displayed.

- **Select Network Connection Administration: Routing ➤ Turn off routing; then confirm the operation.**

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Part 4 — Security Administration

The chapters in Part 4 describe the Netra server's Security Administration modules.

- Chapter 15, "Administration Web Server," describes how to set the administration password and control host access to the administration modules.
- Chapter 16, "Solstice FireWall-First! Administration," describes the Solstice Firewall-First! network security software.
- Chapter 17, "Network Service Access Administration," describes the network services available on the Netra server and how to control access to them.
- Chapter 18, "Root Password Administration," describes how to set the root password.

Administration Web Server 15

The Netra server provides an Administration Web Server, which you can use to administer of all the modules. To protect against unauthorized access, there are two security features: only selected machines are allowed to access the Administration Web Server and a password must be used from those machines. The Administration Web Server module allows you to configure these features.

▼ To Set the Administration Password

1. **Select Security Administration: Administration Web Server ➤ Administration Password.**
   The Administration Password page is displayed.

2. Enter the information in the form using Table 15-1.

Table 15-1 Administration Web Server Password Information

Current Administration Password	The existing administration password. The administration password for an unconfigured Netra system is `setup`. A password can be a combination of any characters.
New Administration Password	A new password that will be used to access your Netra server. The password is not echoed as you type it. •If you change the existing password, you have to re-authenticate the browser connection using the new password you provide.
Reenter New Administration Password	A repetition of the new administration password. Because the password is not echoed as you type it the first time, you are required to verify it by typing it a second time.

Host Access Control

▼ To Control Host Access

1. **Select Security Administration: Administration Web Server ➤ Host Access Control.**
   The Host Access Administration page is displayed.

2. **Enter the address of the hosts or networks (one per line) that will be allowed access to the administration modules.**
   If you do not specify any hosts, all hosts will be allowed access.

Solstice FireWall-First! Administration

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Solstice™ FireWall-First! is a network security system that gives you comprehensive, flexible and distributed control over access to each service and computer on your network. It is completely transparent to all users and applications, and all services remain fully available.

Solstice FireWall-First! examines all packets sent and received through all network interfaces by applying a set of security rules, then deciding whether to pass the communication to the packet or block. It captures packets between the network protocol layer and the hardware interface. It is installed on gateway computers to provide perimeter defense, and on servers and workstations to allow in-depth defense. Solstice FireWall-First! is managed from a browser that is running either on the Netra server or on another machine on the network. In the latter case, Solstice FireWall-First! must be configured to allow remote administration.

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Configuring the Initial Security Policy

Note – Refer to the Solstice FireWall-First! online documentation when deciding on thesecurity policy for your site.

Your network is not secure until a security policy is installed. You can choose to install the default security policy or you can specify your own. The default security policy is:

- **Telnet**: Disallow incoming connections; allow and log outgoing connections.
- **Ftp**: Disallow incoming and outgoing connections.
- **Mail**: Allow and log incoming connections; allow outgoing connections.
- **Web**: Disallow incoming connections; allow and log outgoing connections.
- **Internet Phone**: Disallow incoming or outgoing connections.
- **Any Other**: Disallow incoming or outgoing connections.

Note – For Netra systems that do not have a monitor, remote administration is allowed as part of the default security policy.

Solstice FireWall-First! Licensing

The Solstice FireWall-First! software comes with a pre-installed basic license. The basic license allows you to have five concurrent internal Internet users and six different services in your security policy. Upgrade licenses can be purchased separately from your authorized Solstice FireWall-First! reseller.

The full version of the Solstice FireWall-1™ Light Security Center is also installed on your system. To unlock this version, you must purchase the appropriate license from your reseller.

Installing Solstice FireWall-First! on a New Network Interface

Every time a new networking interface is installed and you want the firewall software to monitor that interface, you must restart the Netra server. (See Chapter 19 for instructions on restarting the server.)

Using the Solstice FireWall-First! Software

▼ To Use the Solstice FireWall-First! Product

1. **Select Security Administration: FireWall-First!.**
   This takes you to the main administration page for the Solstice FireWall-First! product.

2. **Display other Solstice FireWall-First! administration pages as follows:**

- Select Policy and Status to display the security policy and system status pages, or to modify the security policy.
- Select Log Viewer to display the FireWall-First! log.
- Select License Manager to display the License Manager page, where you can see your current license or add licenses.
- Select Help to display the Solstice FireWall-First! on-line documentation.

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Network Service Access Administration 17

The Netra server provides a number of generic network services that do not have administration modules associated with them. These services allow users to access information and facilities on the server. You can restrict access to any or all of these services using the Network Service Access module. (Restricting access to all services helps ensure the security of your network.)

The following network services are available on your Netra server:

- **File Transfer Protocol (FTP)**: Allows an authorized user to transfer files between a remote machine and the Netra server.
- **TELNET Protocol (telnet)**: Allows an authorized remote user to log into the Netra server and interact as a normal user.
- **Remote User Information (finger)**: Allows network users to display information about users logged in to the Netra server.
- **Remote Shell (rsh)**: Allows an authorized remote user to open a command-line interpreter (shell) on the Netra server and execute commands there.
- **Remote Login (rlogin)**: Allows an authorized remote user to log in to the Netra server and interact as a normal user.
- **Remote Execution (rexec)**: Allows a library routine to be run on a remote machine and return streams to the local machine.
- **Remote System Statistics (rstat)**: Allows a remote user to get performance data from the Netra server.

- **Mail Notification (comsat)**: Allows the Netra server to detect incoming mail and notify local users logged into the Netra server.
- **Talk Program (talk)**: Allows users on remote systems to enter lines of text on one machine and have them appear on the terminal of someone logged into the Netra server. (Remote users can thus “chat” with users on the Netra server.)
- **Distributed System Admin (sadmind)**: Allows remote users to perform distributed system administration operations on the Netra server.
- **Network File System Quota (quotad)**: Allows for notification if users use more than an allocated amount of disk space on the Netra server.
- **User Info (rusers)**: Allows a remote user to check which users are logged into the Netra server.
- **Diagnostic Packet Tester (spray)**: Allows a remote user to send a one-way stream of packets to the Netra server to see how many are received and at what rate.
- **Broadcast Messages (rwall)**: Allows a single message from a remote user to be sent to all users logged into the Netra server.
- **UNIX-to-UNIX Copy (uucp)**: Allows remote copy exchanges between a remote machine and the Netra server.
- **Trivial Name Server (tnamed)**: A server that supports the DARPA trivial name server protocol.
- **Calendar Manager (cmsd)**: Allows remote users to check the Calendar Manager entries of a user with an account on the Netra server.

You can decide which hosts will have access to the various network services offered by the Netra server using either the Network Service Access module or the FireWall-First!™ module. Note that the FireWall-First! settings take precedence over those in the Network Service Access module.

▼ To Control Access to Network Services

1. **Select Security Administration: Network Service Access.**
   The Network Service Access Administration page is displayed with a list of the server's network services and corresponding access levels.

2. **Select the access mode for each network service using Table 17-1.**

Table 17-1 Security Levels for Network Services

Access Modes	
None	Denies access to all hosts for this service.
Control List	Permits access by hosts and networks specified in the `Control List Host and Network Addresses` field.
All	Allows access to all hosts.
Control List Host and Network Addresses	The host or network addresses of the hosts and networks of hosts that are allowed access to the services. This field is required for services using the Control List access mode.

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Root Password Administration 18

In addition to regular user accounts, which are created with the User Accounts module, there is a superuser account that has special privileges when it accesses the Netra server. This account is called `root`. When the Netra server is accessed by the root user, many of the restrictions that apply to regular user accounts are removed. For example, the root user can read, write, or delete any file, or change the system configuration. To protect these privileges, the root account also has a password.

A password can be composed of any combination of characters.

▼ To Set the Root Password

1. **Select Security Administration: Root Password.**
   The Root Password Administration page is displayed.

2. **Enter the information in the form using Table 18-1.**

Table 18-1 Information for Root Password Administration

Current Root Password	The existing root password for your Netra server. When the Netra server is unconfigured, there is no root password, so leave this field empty. The password can be composed of any combination of characters.
New Root Password	The new password that will be used to access your Netra server.
Reenter New Root Password	A repetition of the password used to access your Netra server. Because the password is not echoed as you type it the first time, you are required to verify it by typing it a second time.

Part 5 — System Administration

Part 5 contains one chapter that describes the Netra server's System Administration modules.

- Chapter 19, "Netra System Administration," describes system administration tasks, such as backing up the file system, installing packages / patches, administering user accounts, and so on.

Netra System Administration 19

This chapter describes the following system administration modules:

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Audio Volume

Use the Audio module to adjust the volume for configuration messages and audio files that are played through the Netra system speaker.

You can test the volume level by playing a sample sound when you set the level.

▼ To Adjust the Audio Volume

1. **Select System Administration: Audio.**
   The Audio Administration page, showing the current volume, is displayed.
2. **Set the volume using Table 19-1.**

Table 19-1 Information for Audio Administration

Audio Volume	An integer between 0 and 99, inclusive, where 0 = no sound 99 = maximum volume
Output Port	The destination of the audio output. Select built-in speaker, headphone jack, or line out.
Play Sample Sound	Plays a sound at the selected volume on the Netra system speaker. Choices: Yes, No

External Disks

Note – The Netra software does not display the External Disks module if you do not have external disks attached to the Netra server. If you add a new external disk to an already-configured Netra server, restart the server with the **Check for new devices during restart** option so that it recognizes the new disk drive.

Use the External Disks module to create mount points for external disks or to erase any unmounted disks. You must provide the mount point for a disk drive.

Warning – When you erase a disk, you lose all the data on it.

▼ To Mount or Erase an External Disk

1. **Select System Administration: External Disks.**
   The External Disk Administration page is displayed.
2. **Select one of the following options:**

- To mount a disk, select Mount and enter the mount point for this disk. The mount point is the directory on which to mount the disk. If the directory does not exist, it will be created before the disk is mounted.
- To unmount a disk, select Unmount and confirm the operation.
- To erase a disk, select Erase and confirm the operation.

Note – If an external disk is attached to the Netra server but is not in the expected Netra format, you will not see the mount option. Erase the disk first. The mount option will then be displayed.

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File System Backup and Restore

Note – The Netra software does not display the File System Backup and Restore module if a tape drive is not attached to the Netra server. If you add a new tape drive to an already-configured Netra server, restart the server with the **Check for new devices during restart** option so that it recognizes the new drive.

Use the File System Backup and Restore module to make a copy of the user data file system and save it to tape. You can also use it to restore directories from the tape backup copy if a disk fails or if a file is accidentally deleted.

Backup Options

You can back up any or all of the following directories in the user data file system: `Mail`, `HTML documents`, `Anonymous FTP`, and `Users' homes`. (The setup user's home directory is not backed up when you choose the `Users' homes` directory.)

The following backup options are available:

- **Set backup options**: Allows you to schedule days of the week and times for regular backups.
- **Immediate backup**: Allows you to back up the file system at any time. This does not affect the scheduled backup.

Note – Only a single-tape backup is supported, and the tape is rewound after the backup process is completed.

Restore Options

When a directory is restored, all files and directories in that directory are copied from the backup tape to the Netra file system. For example, if you restore the `Users' homes` directory, all files in all users' directories are copied to the file system.

The following restore options are available:

- **Change restore device**: A default tape drive is displayed as the device that contains the backup tape from which a file system is restored. This option allows you to specify a different tape drive, if necessary.
- **Easy restore**: Allows you to restore selected directories from the backup tape that is in the current restore device. You can restore any of the following directories: `Mail`, `HTML documents`, `Anonymous FTP`, and `Users' homes`.
- **Selective restore**: Allows you to restore only the directories you need from a backup tape.

Backup and Restore Procedures

▼ To Set Backup Options

1. **Select System Administration: File System Backup and Restore.**
   The File System Backup and Restore Administration page is displayed.
2. **Select Backup: Set Backup Options.**
   The File System Backup Options page is displayed.
3. **Enter the information in the form using Table 19-2.**

Table 19-2 Information for Backup Options

File System Backup	Backs up the file system as specified in the following fields in this table. Choices: Enable, Disable.
Backup Device	The tape drive that will be used for the backup procedure. If an attached tape drive does not appear on the displayed list, restart the server with the Check for new devices during restart option in the Restart and Shutdown module.
Eject Tape	Ejects the tape from the drive after the backup is completed. Choices: Yes or No.

Table 19-2 Information for Backup Options *(Continued)*

Directories	The directories that will be backed up. You must choose at least one of the following directories: Mail (`/export/mail`), HTML documents (`/export/htdocs`), Anonymous FTP (`/export/ftp`), or Users' homes (`/export/home`). • Maximum length for a path name prefix is 155 characters. • Maximum length for a file name is 100 characters. • Maximum length for a full path name is 255 characters. Any file names exceeding these limits are not backed up.
Backup On Selected Days	The days on which the backup will be performed. You must choose at least one day.
Backup Time	The time at which the backup will be performed. It is safest to back up the file system when it is in a quiescent state.

▼ To Back Up the File System Immediately

1. **Select System Administration: File System Backup and Restore.**
   The File System Backup and Restore Administration page is displayed.
2. **Select Backup: Immediate backup.**
   The Immediate File System Backup page is displayed.
3. **Enter the information in the form using the `Backup Device`, `Eject Tape`, and `Directories` fields in Table 19-2.**
   The directories you specified are backed up immediately.

▼ To Change the Restore Device

1. **Select System Administration: File System Backup and Restore.**
   The File System Backup and Restore Administration page is displayed.
2. **Select Restore: Change Restore Device.**
   The Change Restore Device page is displayed.
3. **Select the tape drive you want to use to restore the file system (see Table 19-3).**

Table 19-3 Information for Restore Device

Restore Device	The tape drive that contains the backup tape that will be used to restore the file system. If an attached tape drive does not appear on the displayed list, restart the server with the Check for new devices during restart option in the Restart and Shutdown module.

▼ To Restore Groups of Directories

Note – Before you begin, make sure the tape is in the drive.

1. **Select System Administration: File System Backup and Restore.**
2. **Select Restore: Easy Restore.**
   The Easy File System Restore page is displayed.
3. **Make the selections in the form using Table 19-4.**

Table 19-4 Information for Easy Restore

Directories	The directories that will be restored from the backup tape to the Netra server. You must select at least one directory. Choices: `Mail` (`/export/mail`), `HTML documents` (`/export/htdocs`), `Anonymous FTP` (`/export/ftp`), `Users' homes` (`/export/home`).
Eject Tape	Ejects the tape from the drive after the restore operation is completed. Choices: Yes, No.

▼ To Restore Selected Directories

Note – Before you begin, make sure the tape is in the drive.

1. **Select System Administration: File System Backup and Restore.**
2. **Select Restore: Selective Restore.**
   The Selective File System Restore page is displayed. (Note that it may take several minutes for the form to be displayed because the table of contents on the tape must be read first.)
3. **Enter the information in the form using Table 19-5.**

Table 19-5 Information for Selective Restore

Directories	The directories that will be restored from the backup tape to the Netra server. You must select at least one directory. Directories are restored recursively. (For example, if you select `/export/ftp`, all the files in all the directories in `/export/ftp` will be restored.)
Eject Tape	Ejects the tape from the drive after the restore operation is completed. Choices: Yes, No.

Host Name

Use the Host Name module to change the name of your Netra server.

▼ To Change the Host Name

1. **Select System Administration: Host Name.**
   The Host Name Administration page is displayed.
2. **Enter the Netra server name (see Table 19-6).**

Table 19-6 Information for Host Name

Host Name	The name by which the Netra server will be known.

3. **Restart the Netra server so that the new name is used.**

Log Files

Log files should be viewed and cleared periodically. Use the Log Files module to administer the following types of log files:

- **Mail log**: Contains mail debug information
- **Message log**: Contains status on generic Solaris modules
- **Netra log**: Contains information posted by Netra administration modules (such as error conditions)
- **Super User Login log**: Records who logs in to the server as root
- **Administration Web Server Error log**: Records the times that the Administration Web Server was unable to deliver a page
- **Administration Web Server Access log**: Records all requests to the Administration Web Server

▼ To View or Clear Log Files

1. **Select System Administration: Log Files.**
   The Log Administration page is displayed.
2. **Select one of the following options:**

- To look at a log file, select View.
- To remove a log file, select Clear; then confirm the operation.

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Restart and Shutdown

Use the Restart and Shutdown module to restart or shutdown the Netra server. You may need to restart the Netra server when you add new devices.

All users who are logged in to the Netra server receive a message before these operations are performed.

▼ To Restart or Shut Down the System

1. **Select System Administration: Restart and Shutdown.**
   The Restart and Shutdown Administration page is displayed.
2. **Enter the information in the form using Table 19-7.**

Table 19-7 Information for System Restart/Shutdown

Shut Down	Shuts down and powers off the Netra server.
Restart	Restarts the Netra server.
Check for new devices during restart?	If this option is selected, the operating system regenerates the list of devices attached to the Netra server. Use this option if you add a tape drive, CD-ROM drive, external hard disk, or network interface hardware to your server.
Delay (in minutes)	The time, in minutes, after which the Netra server will shut down or restart.

Save and Restore Configuration

If you make any changes to your system configuration, you should always save the new configuration to a diskette or to a system hard disk. Use the Save and Restore Configuration module to save your Netra system configuration to a diskette or system disk, or to restore a previously-stored configuration from such media.

Save and Restore Options

The following options are available:

- **Eject diskette***: This option ejects a diskette from the drive. If you save or restore your system configuration to or from a diskette, the diskette is ejected at the end of the operation.
- **Save configuration to diskette***: This option saves your current system configuration to the diskette in the drive. If you use an unformatted diskette, it is formatted as part of the save process.
- **Save configuration to file system**: This option saves your current system configuration to a system hard disk.
- **Restore configuration from diskette***: Either all or selected configurations on the diskette are restored to the Netra system. This option is displayed only if there is a valid Netra 3.1 system configuration on the diskette.
- **Restore configuration from file system**: Either all or selected configurations on the hard disk are restored to the Netra system. This option is displayed only if there is a valid Netra 3.1 system configuration on the hard disk.

Note – *To use these options, first make sure you have inserted a diskette in the drive. If there is no diskette in the drive, the module will not display these options, but will prompt you to insert a diskette and check the drive again.

Save and Restore Procedures

▼ To Eject a Diskette

♦ **Select System Administration: Save and Restore Configuration ➤ Eject diskette.**
The Eject Diskette page is displayed, telling you that the diskette has been ejected.

▼ To Save the System Configuration

1. **If you are saving to diskette, insert the diskette into the drive; otherwise proceed to Step 2.**
Make sure the diskette is not write protected.
2. **Select System Administration: Save and Restore Configuration.**
The Save And Restore Configuration Administration page is displayed.
3. **Select either Save configuration to diskette or Save configuration to file system; then confirm the operation.**

▼ To Restore the System Configuration

1. **If you are restoring the configuration from a diskette, insert a diskette into the drive; otherwise proceed to Step 2.**
2. **Select System Administration: Save and Restore Configuration.**
The Save And Restore Configuration Administration page is displayed.
3. **Select either Restore configuration from diskette or Restore configuration from file system.**
4. **Make the entries in the form using Table 19-8.**

Table 19-8 Information for Save/Restore Configuration

Restore entire configuration	Restores all configurations from the diskette/disk.
Restore selected configurations	Restores only the selected configurations from the diskette/disk. If you select this option, you must also select at least one configuration; if you select any configurations, you must also select this option.

Software Management

Use the Software Management module to administer software on the Netra server. You do not need to use Solaris commands for Netra software administration. This module recognizes all software that is put together as Solaris packages or patches. (Thus, you can administer all Sun software and most third-party software using this module.)

A software package is a collection of required files and directories that forms part of a software product. A complete software product may consist of several packages grouped into a cluster.

A software cluster is a collection of software packages associated with a specific software product.

A software patch consists of files and directories. It is used to fix a set of problems associated with a software product. A patch can be installed on a system only if the software product being fixed is also installed.

Note – When installing or removing software associated with specific hardware, ensure that the hardware is already installed and is part of the system device list. For example, before you install the Token Ring Interface software, make sure that the Token Ring Interface card is installed in the Netra server and that the server has regenerated its list of attached devices (see the section titled “Restart and Shutdown” on page 19-10).

Install and Remove Options

The Software Management module offers the following options:

- **Select new installation medium**: Use this option to set the installation medium from which to do future installs. Clusters, packages or patches to be installed on the Netra can be on installation media such as CD-ROM, diskette, or mounted directories. The CD-ROM is the default installation medium.
- **Install clusters, packages, or patches**: Use this option to install clusters, packages, or patches from the selected installation medium. Once the installation is complete, you should restart the Netra server.

- **Remove packages, or patches**: Use this option to remove packages, or patches that are installed on the Netra server. Once these clusters, packages, or patches are removed, you should restart the Netra server.
- **View packages, or patches**: Use this option to see what packages, or patches (if any) are installed on the Netra server.

Install/Remove Procedures

▼ To Specify the Installation Medium

1. **Select System Administration: Software Management ➤ Select new installation medium.**
   The Select Installation Medium page is displayed.
2. **Select the medium from which you will install packages or patches.**
   If you select **CD-ROM** or **Diskette**, the medium is automatically mounted onto the system as part of the installation. If you select **Mounted Directory**, enter the path to the directory from which the software will be installed.

▼ To Install Clusters, Packages, or Patches

1. **Select System Administration: Software Management.**
   The Software Management Administration page is displayed.
2. **Select Install: Clusters, Install: Packages, or Install: Patches.**
3. **Enter the information in the form using Table 19-9.**

Table 19-9 Information for Installing Packages / Patches

Install All Clusters / Packages / Patches	Installs all clusters, packages, or patches from the selected installation medium.
Install Selected Clusters / Packages / Patches	Installs only the clusters, packages, or patches you select from the list. If you select this option, you must also select at least one cluster / package / patch; if you select any clusters / packages / patches, you must also select this option.

4. **Restart the Netra server using System Administration: Restart and Shutdown.**

▼ To Remove Packages, or Patches

Note – Sometimes packages may not be removed in the correct order. If this happens, re-select the packages that failed, and remove them.

1. **Select System Administration: Software Management.**
   The Software Management Administration page is displayed.
2. **Select Remove: Packages or Remove: Patches.**
3. **Enter the information in the form using Table 19-10.**

Table 19-10 Information for Removing Packages / Patches

Remove All Patches	Removes all patches on the Netra server.
Remove Selected Packages / Patches	Removes only the packages or patches you specify from the list. If you select this option, you must also select at least one package / patch; if you select any packages / patches, you must also select this option. • You cannot remove all installed packages.

4. **Restart the Netra server using System Administration: Restart and Shutdown.**

▼ To View Installed Packages, or Patches

- To view installed packages, select System Administration: Software Management ➤ View: Installed Packages.
- To view installed patches, select System Administration: Software Management ➤ View: Installed Patches.

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System Administrator Alias

Use the System Administrator Alias module to create the list of people who will get mail addressed to the system administrator (who is also known as the UNIX root user).

Each person on the list must be a valid mail address. Valid alias members who cannot be reached at configuration time will be added to the alias, but any mail sent to that alias will not be delivered.

▼ To Set Up an Administrator Alias

1. **Select System Administration: System Administrator Alias.**
   The System Administrator Alias Administration form is displayed.
2. **Enter the mail addresses of the alias members (see Table 19-11).**

Table 19-11 Information for System Administrator Alias

Alias Members	A list of users, one per line, who will receive mail sent to `root`. Each listed user must be a valid mail address. If any valid alias members cannot be reached at the time of configuration, they are added to the alias, but mail sent to the alias is returned to the sender. •The maximum length of the alias is 1000 characters, including implicit commas that are added between successive alias members.

System Defaults

Use the System Defaults module to change the date, time, time zone, and locale for your Netra server.

Note – If you change the time zone or locale, restart the Netra server so that the new value takes effect.

▼ To Set System Defaults

1. **Select System Administration: System Defaults.**
   The System Default Administration page, showing the time, date, time zone, and locale is displayed.

2. **Modify the information in the form using Table 19-12.**

Table 19-12 Information for System Defaults

Time	The current time, in 24-hour format. Displayed as HH:MM, where HH = hours in the range 0 to 23 inclusive MM = minutes in the range 0 to 59 inclusive
Date	The current date. Displayed according to locale. For example, in English it is displayed as MMM DD, YYYY, where MMM = the full name of the month DD = the day of the month in the range 1 to 31, inclusive YYYY = the year in the range 1970 to 2037, inclusive. The comma is optional.
Default System Time Zone	The default time zone used by the Netra server. You can override the default time zone by setting the TZ environment variable.
Default System Locale	The default locale used by the Netra server. You can override this default by setting the LANG or LC* environment variables. Some of the available locales are partial locales. Choosing a partial locale sets up the system to display localized numeric, monetary, and calendar formats, but not localized user interfaces or messaging.

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Unconfigure

Use the Unconfigure module to unconfigure Netra administration modules.

Once you unconfigure a module, you return it to its factory settings. You may have to perform an initial configuration after unconfiguring certain modules. For example, if you unconfigure the Administration Web Server module, the administration password reverts to its factory setting. Browser reauthentication may be necessary.

▼ To Unconfigure Modules

1. **Select System Administration: Unconfigure.**
   The Unconfigure page is displayed.
2. **Enter the information in the form using Table 19-13.**

Table 19-13 Information for Unconfiguring Modules

Unconfigure all modules	Unconfigures all modules that have configuration information.
Unconfigure selected modules	Unconfigures only the modules you select from the list. If you select this option, you must also select at least one module; if you select any modules, you must also select this option.

User Accounts

The User Accounts module allows you to add new user accounts, or change or delete existing accounts.

When you create a user account, you allocate storage space on the Netra server for that user. The user can also receive mail on the Netra server. A user account can be accessed using standard protocols, such as `rsh`, `telnet`, `rlogin`, and FTP.

Note – You cannot use this module to administer the root user or setup user accounts.

If no users are defined, you will only see the **Add A User** option. The **Modify** or **Delete** options are only displayed after you add at least one user account. When you remove a user account, the data in that account is deleted.

User Account Procedures

▼ To Add a User Account

1. **Select System Administration: User Accounts ➤ Add A User.**
   The Add A User page is displayed.
2. **Enter the information in the form using Table 19-14.**

Table 19-14 Information for User Accounts

User Name	The login name of the user you want to add / modify. The name must be unique. Example: Jerry.
Initial Password	(Optional) The password the user will need when logging in to the Netra server for the first time. The user will be required to provide and verify a new password as part of the initial log in. If you do not set an initial password, then the user is not prompted for it during initial log in.

Table 19-14 Information for User Accounts *(Continued)*

Full Name	The full name of the user you want to add/modify. Example: Jerry The Mouse
Login Shell	The default shell for the user. Choices: C shell (csh), Korn shell (ksh), Bourne shell (sh), No shell (mail only). If you choose No shell (email only) the user will get mail on the Netra server, but will not be able to log in.
Reset Password to Initial Password	Changes the user's password to the string in the `Initial Password` field. This field only needs to be set when modifying an existing user account. Choices: Yes or No.

▼ To Modify or Delete a User Account

1. **Select System Administration: User Accounts.**
   The User Administration page is displayed, with a Modify or Delete option for each existing account.

2. **Select one of the following options:**

- To modify an existing account, select Modify and make the changes in the form using Table 19-14.
- To delete a user account, select Delete; then confirm the operation.

Part 6 — Crash Recovery

Part 6 contains one chapter that describes how to recover the Netra server in case of a system disk failure.

- Chapter 20, “Netra System Recovery,” discusses reconfiguration, repair, and reinstallation options.

Netra System Recovery 20

This chapter describes how you can recover data from the Netra server if the system hard drive fails.

The *Netra Internet Server: Recovery* CD-ROM is provided with every Netra server. Use this CD-ROM to recover the data or reinstall the system if your server has one of the following problems:

- The server cannot recover user data because the system hard drive's user data partition (`/export`) has been corrupted.
- The server cannot be restarted due to a serious system failure.
- The system hard drive has failed and needs to be replaced.

Note – If the system hard drive has failed, contact your authorized service representative about obtaining a new hard drive. Refer to the *Netra Internet Server Hardware Installation Manual* for instructions on installing the hard drive.

The *Netra Internet Server: Recovery* CD-ROM is not intended for normal operations such as Netra server reconfiguration. To reconfigure your system, use the Netra server administration modules.

20

Reconfiguration, Repair, and Reinstallation

- Reconfiguration is the changing of settings on a working system. Reconfigure the Netra server using the administration modules.
- Repair is the fixing of a corrupted system hard drive. When you repair a drive, you may lose some data. However, repairing a drive will preserve most of the information without requiring a system reinstallation.
- Reinstallation is the re-loading of the Solaris operating system and Netra server software on to the system hard drive. Such a procedure is necessary if the hard drive has failed or is beyond repair. Depending on the severity of the problem, you may be able to reinstall just the root (/) partition and preserve the user data partition.

Recovery Options

Use the *Netra Internet Server: Recovery* CD-ROM to determine if the system hard drive is in good condition. Depending on the outcome, you can use one of the following recovery options. Note that additional software, which you may have installed separately, is not reinstalled by the *Netra Internet Server: Recovery* CD-ROM. You must install and configure this software separately.

- If the whole system hard drive is corrupt, you can select one of the following:
  - Repair the user data partition and then reinstall just the root partition. The user data partition will be preserved.
  - Reinstall the Netra server.
- If only the user data partition is corrupt, select one of the following:
  - Repair the user data partition. If the user data partition is successfully repaired, no reinstallation will be performed.
  - Reinstall the Netra server.
- If only the root partition is corrupt, select one of the following:
  - Reinstall just the root partition. The user data partition will be preserved.
  - Reinstall the Netra server.
- If the system hard drive is in good condition, select one of the following:
  - Reinstall just the root partition. The user data partition will be preserved.
  - Reinstall the Netra server.

If repairing the user data partition fails, the Netra server may need to be reinstalled.

▼ To Perform a Recovery

1. **Be certain that reinstallation is the correct course of action.**
   Before using the reinstallation procedure, verify that this is the correct action. The problem may be in the hardware and may not require a software reinstallation.

2. **Connect a monitor or TTY terminal to the Netra server, as necessary.**

3. **If the Netra server is still running, halt the system using one of these methods:**

- If you can log into the Netra server, do the following:

```
<systemname> console login: root
Password:
<banner, login message, etc>
# /usr/bin/halt
...
ok
```

- If you cannot log into the Netra server, do the following to get to the OpenBoot PROM prompt:
  - If you have a monitor and keyboard connected directly to the Netra server, press the Stop (L1) and A keys.
  - If you are using a TTY interface, send a Break to the Netra server. For example, for a Wyse terminal, press the Control and Break (or Stop) keys.

4. **Insert the *Netra Internet Server:Recovery* CD-ROM into the Netra CD-ROM drawer.**
   If the drawer is currently closed, press the eject button.

5. **Type the following command:**

```
ok boot cdrom
```

   This initiates a system disk check. The state of the system hard drive is displayed.

6. **Select the course of action to take from the displayed options.**

7. **Now select one of the following steps:**

- If only the user data partition required repairs, and you repaired it successfully, or if you decided not to continue with the displayed options, restart your Netra server now.
- If you reinstalled the Netra server and you have a Netra reconfiguration diskette, insert the diskette in the drive and restart the system. Once the Netra server has been configured, proceed to Step 8.
- If you reinstalled the Netra server and you do not have a Netra reconfiguration diskette, restart the system and perform the initial configuration as described in Chapter 4, “Performing the Initial Configuration.”

8. **Reinstall any additional software that was previously installed on the Netra server.**

Administering Localized Software A

This appendix describes how to install a localized version of the Netra software.

The localized version of your Netra software is contained on one of the following CD-ROMs:

- Netra Internet Server: Asian Localization CD-ROM
  This CD-ROM contains the Japanese, Korean, Simplified Chinese, and Traditional Chinese localized software.
- Netra Internet Server: European Localization CD-ROM
  This CD-ROM contains the French, German, Italian, Spanish, and Swedish localized software.

You can install the localized Netra software in one of two ways:

- Perform the installation as part of the initial configuration.
- Install the software on an already-configured Netra server.

For either option, you must perform the following general tasks:

- Use the localization CD-ROM to install the software on the Netra server.
- Install the required localization cluster for your locale.
- Set the default system locale.
- Restart the Netra server.

The installation options are described in the following procedures.

▼ To Install Localized Software During Initial Configuration

♦ **Perform the tasks described in Chapter 4, "Performing the Initial Configuration."**

▼ To Install Localized Software on a Configured Netra Server

1. **Insert the localization CD-ROM in the Netra CD-ROM drive.**
2. **From the Netra Main Administration page, select System Administration: Software Management ➤ Select new installation medium.**
3. **Select CD-ROM as the installation medium.**
4. **Select Install: Clusters.**
   The Installing Clusters page is displayed with a pair of clusters (required and optional) for each locale. For example, the localized software for Japan is contained in the `Required Japanese Netra Software` and `Optional Japanese Netra Software` clusters.
5. **Select the two clusters for your locale.**
   You must install the `Required` cluster. The `Optional` cluster is necessary only if you have installed additional Solaris software.
6. **Once you install the locale-specific clusters, return to the Netra Main Administration page.**
7. **Select System Administration: System Defaults.**
   The System Defaults Administration page is displayed.
8. **Select a new default system locale from the scrolling list.**
9. **Restart the Netra server using System Administration: Restart and Shutdown.**

▼ To Perform a Crash Recovery on a Localized Netra Server

1. **See Chapter 20, "Netra System Recovery," for system recovery options.**
2. **Perform the recovery using the instructions in Chapter 20.**
3. **Reinstall the localized Netra software using the instructions in this chapter.**

Installing Solstice Backup 4.2.2 and Solstice DiskSuite 4.0 Software

B

This appendix describes how to install the Solstice DiskSuite and Solstice Backup software.

The 3.0.1 version of the *Netra Internet Server: Recovery* CD-ROM contains two new network storage management products: Solstice Backup 4.2.2 and Solstice DiskSuite 4.0.

To *install* either product, use the Software Management module of the Netra administration framework. To *use* these products, you must have a monitor for your Netra server and run the software in the OpenWindows environment. (You cannot administer this software using the Netra HTML-based user interface.) User documentation is provided in the online AnswerBook™ for each product.

Installation for both Solstice Backup 4.2.2 and Solstice DiskSuite 4.0 consists of the same overall tasks: install the required software packages; install the required patches; restart the Netra server; access the online documentation for further information. A detailed description follows.

1. **Insert the** *Netra Internet Server: Recovery* **CD-ROM into the Netra CD-ROM drawer.**
2. **Ensure that your installation medium is CD-ROM.**
   Refer to the Software Management section in Chapter 19, "Netra System Administration," for more information.
3. **Continue to use the Software Management module to install the software, as follows.**

- If you are installing the Solstice Backup 4.2.2 software:

   a. Install the packages listed in Table B-1.

Table B-1 Solstice Backup Required Installation Packages

SUNWsbuab	Solstice Backup 4.2 Answerbook
SUNWsbuc	Solstice Backup (Backup / Recover) Client
SUNWsbum	Solstice Backup (Backup / Recover) Man
SUNWsbus1	Solstice Backup (Backup / Recover) Server
SUNWsbus2	Solstice Backup (Backup / Recover) Device Drivers

   b. Install the patch shown in Table B-2.

Table B-2 Solstice Backup Required Installation Patch

103480-01	SPARC: Solstice Backup 4.2.2 Jumbo patch

- If you are installing the Solstice DiskSuite 4.0 software:

   a. Install the packages listed in Table B-3.

Table B-3 Solstice DiskSuite Required Installation Packages

SUNWabmd	DiskSuite 4.0 Answerbook
SUNWmd	Solstice DiskSuite
SUNWmdg	Solstice DiskSuite Tool

   b. Install the patch shown in Table B-4.

Table B-4 Solstice Backup Required Installation Patch

102580-08*	Solstice DiskSuite 4.0: Jumbo patch

*This is an update to the -03 patch, which is also on the Recovery CD-ROM.

4. **Once you have installed the required packages and patches for each product, restart the Netra server using the Restart and Shutdown module.**

5. **Open a Shell Tool or Command Tool, and, as root, access the online AnswerBook documentation as follows:**

```
# /usr/openwin/bin/answerbook
```

This command brings up the AnswerBook Navigator. You can access the required documentation for further information on how to use the Solstice Backup and Solstice DiskSuite software.

Note – If you install the Solstice Backup 4.2 software, do not use the File System Backup and Restore module simultaneously. If you install the Solstice DiskSuite 4.0 software, do not use the External Disks module to administer the same disks.

B

Initial Configuration Using TTY

C

This appendix describes how to configure your Netra Server using a TTY interface or the Sun Web site.

Configuring the Netra Server Using TTY

▼ To Prepare for Configuration

1. Assemble the hardware:

- PC/VT100 terminal
- Serial cable
- Null modem serial cable for the terminal or PC
- RS-232 cable to connect a modem (if necessary) to the server
- Null modem adapter

If you use a PC, it must have terminal emulator software (for example, VT100 emulation). Set the terminal or PC to these line settings (for specific instructions, refer to the terminal or PC) user's manual:

Baud rate	9600
Data bits	8
Parity	none
Stop bits	1

2. **Physically connect the Netra server to the LAN, and attach the TTY terminal.**
   Refer to the *Netra Internet Server Hardware Installation Manual* for instructions.

3. **Obtain the following configuration information for your site:**

- System Defaults (see Chapter 19, "Netra System Administration")
- LAN interface information: host address and netmask for a TCP/IP network, or network number and frame type for an SPX/IPX network (see Chapter 12, "Local Area Network Administration")
- Host name for your Netra server (see Chapter 19, "Netra System Administration")
- System administrator alias members (see Chapter 19, "Netra System Administration")
- Root password (see Chapter 18, "Root Password Administration")
- Administration Web Server password (see Chapter 15, "Administration Web Server")

▼ To Run the Setup Script

1. **Power on the Netra server and the TTY terminal.**

2. **At the** `NewNetra console login` **prompt, enter** `setup`**.**
   Note that an unconfigured Netra server uses the name `NewNetra`.

3. **At the** `Password` **prompt, enter** `setup` **again.**
   The following screen is displayed:

```
This program generates a configuration file
for the local area network interface.
Values shown in square brackets are the default values.
```

4. Enter the number that corresponds to the network interface in your server:

```
The following interfaces are available:
1) Lance Ethernet Port 0
2) Lance Ethernet Port 1
Enter the number corresponding to the interface
to be configured [1]:
```

5. Enter the number corresponding to the type of network you have:

```
The following types of networks are available:
1) TCP/IP
2) Novell (SPX/IPX)
Enter the number corresponding to the network type [1]:
```

6. Enter information for your network type as follows.

- If you typed `1` for a TCP/IP network:

  a. Enter the Netra server's LAN host address:

```
Enter the local area network host address for the
Netra server:
```

  b. Enter the netmask:

```
Enter the local area network netmask for the
Netra server [255.255.255.0]:
```

c. Confirm that the entered information is correct:

```
The following configuration information has been entered:

Interface:      your interface
IP Address:     your host address
IP Netmask:     255.255.255.0

Select from the following options:
1) Configure le0 with these values.
2) Discard these values and input new values.
3) Discard these values and exit.
Enter an option [1]:
```

The following is displayed:

```
Lance Ethernet Port 0 has been configured for TCP/IP operation.
IP address:     your host address
Netmask:        255.255.255.0
```

- If you typed 2 for a Novell (SPX/IPX) network:

  a. Enter the IPX network number:
  See Chapter 12, "Local Area Network Administration" for more information on SPX/IPX network numbers and frame types.

```
Enter the IPX network number in hexadecimal format:
```

b. Enter the number for the frame type you are using:

```
The following frame types are available:
1) Ethernet_802.2
2) Ethernet_802.3
3) Ethernet_II
4) Ethernet_snap
Enter the number corresponding to the frame type being used [1]:
```

c. Confirm that the entered information is correct:

```
The following configuration information has been entered:

Interface:       your interface
Frame type:      your frame type
Network number:  your network number

Select from the following options:
1) Configure le0 with these values.
2) Discard these values and input new values.
3) Discard these values and exit.
Enter an option [1]:
```

The following is displayed:

```
Lance Ethernet Port 0 has been configured SPX/IPX operation.
Frame type:      your frame type
Network number:  your network number
```

▼ To Complete the Initial Configuration from a Client PC

1. **Start a browser on a client PC on the LAN.**
2. **Open the following URL in the browser:**

- If you have a TCP/IP network, open:

```
http://netra_host_address:81
```

- If you have an SPX/IPX network, open:

```
http://NewNetra:81
```

3. **Enter** `setup` **for the** `User ID`**; then enter** `setup` **for the** `Password`**.**
   The Netra Welcome page is displayed.

4. **Select the Administration option.**
   The Initial Configuration page is displayed with the remaining configuration tasks.

5. **If you want to install a localized version of your Netra software, perform the following tasks; if not, proceed to Step 6.**

   a. **Select the Install localized Netra software option.**
      The Software Management Administration page is displayed.

   b. **Insert the localization CD-ROM in the Netra CD-ROM drive.**

   c. **Select the Select new installation medium option.**

   d. **Select CD-ROM as the installation medium.**

   e. **Select Install: Clusters.**
      The Installing Clusters page is displayed with a pair of clusters (required and optional) for each locale. For example, the localized software for Japan is contained in the `Required Japanese Netra Software` and `Optional Japanese Netra Software` clusters.

   f. **Select the two clusters for your locale.**
      You must install the `Required` cluster. The `Optional` cluster is necessary only if you want to install additional Solaris software.

   g. **Once you install the locale-specific clusters, return to the Initial Configuration page.**

6. **Select the highlighted System Defaults option.**
   The System Defaults Administration page is displayed with the current time, date, time zone, and default locale.

7. **If necessary, enter a new time and date using the displayed format.**

8. **If necessary, select a new default system time zone from the scrolling list.**

9. **If you have installed localized Netra software, select a new default system locale from the scrolling list; if not, proceed to Step 10.**

10. **Use the Forward Arrow icon to go directly to the next configuration task.**

11. **Select the highlighted Host Name option.**
    The Host Name Administration page is displayed.

12. **Enter the name for the Netra server.**
    A message saying the Netra server needs to be restarted is displayed. You can restart the Netra server once you finish configuring it.

Note – If you choose to restart the Netra server immediately, you must repeat the initial login sequence (notice that the new host name is used) to bring you to the Initial Configuration page. At this point, the Host Name option is not displayed as one of the remaining configuration tasks. Proceed to the next administration module.

Note – If you are using a browser on an SPX/IPX client and if you choose to restart the Netra server immediately, you must restart the browser after the system has restarted using the new host name.

---

13. **Use the Forward Arrow icon to go directly to the next configuration task.**

14. **Complete the System Administrator Alias, Root Password, and Administration Web Server configuration tasks.**

Note – If you change the Administration Web Server password, you must reauthenticate the browser connection.

---

15. **Use the Forward Arrow icon to go to the Main Administration page.**
    The Main Administration page is displayed.

▼ To Complete Other Configuration Tasks

1. **Use the displayed modules to perform any further system configuration tasks (such as setting up mail aliases, configuring a name service, or setting routing options).**
   Refer to the relevant chapters in this manual for more information on each administration module.

2. **Once the Netra server is completely configured, save the configuration information as follows:**

   a. **Insert a blank diskette into the Netra disk drive.**
      If you do not have a diskette drive on your Netra server, proceed to Step b.

   b. **Select System Administration: Save and Restore Configuration.**

   c. **If you are saving your configuration to diskette, select Save configuration to diskette.**
      If not, select Save configuration to file system.

Glossary

ATM address

A 20-byte (the bytes are often referred to as octets) number that uniquely identifies an ATM endpoint. The first 13 bytes are assigned by the switch and are called the switch prefix; the remaining 7 bytes (made up of a 6-byte end system identifier and a 1-byte selector) are assigned by the local host.

domain name

A name that identifies a logical group of computers. It is a text string composed of letters (a-z and A-Z), digits (0-9) and hyphens (-) (for example, `eng`). A fully-qualified domain name is composed of the local domain and all of its ancestor domains leading to the root domain, separated by periods and ending in a period (for example, `eng.sun.com.`). A partially-qualified domain name is the local domain name and some number of ancestor domains separated by periods (for example, `eng.sun`). When a partial domain name is used, it is assumed to be within the current domain or within one of the ancestor domains of the current domain.

DNS

Domain Name System. A network information service that provides information about hosts within the domain name system. It is mainly used for name resolution, that is, to provide host addresses that correspond to host names. It can also be used to provide other information about hosts such as aliases or mail servers.

dynamic router

A router that relies on information broadcast from other routers to update its routes to reflect changes in the network topology. The router also broadcasts this information to other dynamic routers.

e-mail address

Electronic Mail Address (also referred to as “mail address” in this manual). An e-mail address is composed of three parts: the user name (the name of the person who receives the mail), the host name (the system on which that user has an account) and the domain name (the domain in which the system resides). The user name is separated from the host name by an at sign (@). The host name and domain name are separated by a period (for example, *user@host.domain.com*).

Ethernet

A network protocol that broadcasts information to all the hosts on the network. The information is accepted by the intended recipients and discarded by the other hosts.

firewall

A logical border that protects the local network against intrusion from other networks. A firewall can monitor or prohibit connections to and from specified services or hosts.

FTP

File Transfer Protocol. A protocol that allows files to be copied between systems connected to a TCP/IP network independent of the operating systems or architectures of the hosts involved in the file transfer.

hexadecimal number

A number expressed in base 16. It is composed of the characters 0-9, a-f, and A-F.

host address

An assigned number that uniquely identifies each computer connected to a TCP/IP network. The address consists of two parts: a network number and a host number. The network number identifies the network to which the computer is connected and the host number identifies the computer on that network. The host address is composed of four integers separated by periods. The first integer must be in the range 0-223, the second and third integers in the range 0-255 and the fourth integer in the range 1-254 (for example, 129.144.0.1).

host name

The name of a computer within the local domain. It is a text string of up to 24 characters composed of letters (a-z and A-Z), digits (0-9) and hyphens (-). The last character may not be a hyphen.

HTML

Hypertext Markup Language. It is used to format hypertext documents. Hypertext documents have text that contains links to other documents or to images, sound, graphics, or video files.

HTTP

Hypertext Transport Protocol. It is used to transmit and display hypertext documents. HTTP capitalizes on the fact that navigation information can be embedded directly in the documents. Thus, the protocol itself does not have to support full navigation features like the FTP protocols do. Because HTTP has low overhead, HTTP servers are commonly used for serving hypertext documents.

HTTPD

Hypertext Transport Protocol Daemon. It is the software component of a Web server. Using the HTTPD, the Netra server makes its administration tools available to clients on the LAN.

integer

A natural number. It is composed of the digits 0-9.

Internet

A global collection of networks connecting a wide range of computers using a common protocol to communicate and share services.

ISDN

Integrated Services Digital Network. A set of integrated telecommunications services available over public telecommunication networks.

Internet Service Provider

A company that provides an Internet connection by using its own computer system as a conduit to the Internet. The service provider generally has a direct Internet connection; the client typically connects to the service provider with a dial-up connection.

MAC address

The unique hardware address assigned to a system or interface board when it is manufactured.

multi-homed host

A host that has more than one network interface connected to the same network.

netmask

A mask used to determine the network address from a host address. A netmask is composed of four integers in the range 0-255 separated by periods. When a netmask is expressed in binary notation, it must be a contiguous sequence of “ones” followed by a contiguous sequence of “zeroes” (for example 255.255.128.0).

network address

A number that identifies the network in which a computer resides. A network address is composed of four integers separated by periods. The first integer must be in the range 0-223, the second and third integers in the range 0-255 and the fourth integer in the range 0-254 (for example 129.144.0.0).

network interface

An access point to a system on a network. Each interface is associated with a physical device. However, a physical device can have multiple network interfaces.

PPP

Point-to-Point Protocol. This protocol allows two computers to be connected over a two-way communications link, such as a telephone line. The connection is established as needed.

route

A route specifies the next router on a message's path to its destination. A default route does not contain a specific destination; it has a general destination used for any destinations not specified in other routes.

router

A computer or other dedicated hardware that connects two or more networks and routes data between them.

static router

A router that relies on manual addition of routes. Routing information is not exchanged with other routers.

software package

A collection of files and directories required for a software product. A complete software product can be made up of several packages. A collection of packages required for a software product is called a software cluster.

software patch

A collection of files and directories that fix a set of problems associated with a software product. A patch can be installed on a system only if the software product being fixed is also installed.

URL

Uniform Resource Locator. The addressing system used by clients to request web documents from servers. The format of a URL is [*protocol*:][//*system*[:*port*]]/[*document*] (for example, `http://www.sun.com/`).

user name

The name that the computer uses to identify a particular user. It is a text string of up to eight characters composed of letters (a-z and A-Z), digits (0-9), hyphens (-), and underscores (_). The first character must be a letter.

WWW

This stands for World Wide Web. It is a collection of systems on the Internet that contain hypertext documents that are accessible using HTTP and are displayed as “Web pages” by “Web servers”.

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