Netra™ j 2.0 Administrator's Guide

THE NETWORK IS THE COMPUTER™

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Contents

Preface xix

1. Netra j Product Description and Navigation 1

Netra j Software 1

Netra j Administrative Software 2

JavaStation Software 2

Solaris 2.5.1 Add-ons 3

OCS Software 3

Hardware and Software Requirements 3

Network Topology 4

Netra j and Solaris Administration 5

Netra j Administration Interface 5

Solaris Command Line 6

Java Computing 6

Java Computing Model 6

JavaStation Network Environment 8

The Netra j Administration Interface 8

Page Types 10

Information Icons 15

Navigation Icons 16

Accessing the Netra Administration Interface 16

▼ To Use a Netra Server With a Monitor 17

▼ To Use a Client on the Network 17

Accessing Netra j Documents From the Netra Administration Interface 17

▼ To Access Netra j Documents 18

2. Booting the JavaStation Using Netra j 19

Overview 19

Starting the Netra j Administration Interface 20

▼ To Prepare For Configuration 20

▼ To Start the Netra j Administration Interface 21

Setting Up Name Services 21

Setting the Web Server Document Root 21

Defining Boot Server Global Parameters 22

Setting Up JavaStation Clients 25

3. Using Netra j Network Services Administration 29

Anonymous FTP Administration 29

▼ To Configure Anonymous FTP 30

Mail Administration 30

Mail Directories 31

Alias Administration 34

Configuring Aliases 34

Name Service Administration 36

Name Services on the Netra Server 36

Configuration Options 37

Local Name Service 37

NIS 38

DNS 39

Configuring the DNS Server 41

Configuring the DNS Client 47

Network Computer Server Administration 48

Configuring Global Parameters 48

Web Server Document Root Administration 51

Network Computers – Quick Setup 52

Network Computer Administration 55

Network Computers – Local Printer Setup 57

Client Application Administration 58

Updating Network Computer Operating System 60

HotJava Views Administration 60

4. Using Netra j Network Connection Administration 65

Local Area Network Administration 65

▼ To Add a Network Interface 66

▼ To Modify a Network Interface 67

▼ To Delete a Network Interface 67

Modem Administration 67

Connecting to a Remote Host Using a Modem 68

Remote Host Connections 68

Modem Definitions 70

Modem Port Assignments 71

Modem Log Files 71

Routing Administration 72

Dynamic Router 73

Static Router 74

Setting a Default Route Over a PPP Link 75

Not a Router 76

5. Using Netra j Security Administration 77

Administration Web Server 77

▼ To Change the Administration Password 77

▼ To Modify Host Access Control 78

Network Service Access Administration 79

▼ To Control Access to Network Services 80

Root Password Administration 81

▼ To Set the Root Password 81

6. Using Netra j System Administration 83

Audio Volume 83

▼ To Adjust the Audio Volume 83

External Disks 84

▼ To Mount an External Disk 85

▼ To Unmount an External Disk 85

▼ To Erase an External Disk 86

Default Web Server Administration 86

▼ To Set the Default Web Server 86

▼ To Access Sun WebServer Administration 87

File System Backup and Restore 87

Backup Options 87

Restore Options 88

Host Name 91

▼ To Change the Host Name 91

Log Files 92

▼ To View or Clear Log Files 92

Restart and Shutdown 92

▼ To Restart or Shut Down the System 93

Save and Restore Configuration 93

Save and Restore Options 93

Software Management 95

Install and Remove Options 96

System Administrator Alias 98

▼ To Set Up a System Administrator Alias 98

System Defaults 99

▼ To Set System Defaults 99

User Accounts 100

▼ To Add a User Account 100

▼ To Add Users From a File 101

▼ To Modify or Delete a User Account 103

7. Using Netra j Connectivity Software 105

WinFrame From Citrix Systems 105

GO-Joe With RapidX 106

System Requirements 106

Components and Session Overview 108

Configuration 109

The GlobalHost Loadable ddx Module 110

The `go-login` Authentication Program 111

Adding the GO-Joe Icon to the HotJava Views Selector 111

Running GO-Joe 112

Advanced Configuration Options 113

Diagnostics and Troubleshooting 116

Remote Windowing Procedures 116

▼ To Reference Remote Windowing Servers 116

OC:/ /WebConnect Pro 117

OC:/ /WebConnect 117

OpenVista 118

8. Booting the JavaStation Using Solaris 121

JavaStation Boot Sequence 121

Power-On 122

Task 1: Lease an IP Address 122

Task 2: Deliver and Boot JavaOS 124

Task 3: Deliver Main Application 124

Task 4: Update Flash Memory with New JavaOS 125

Setting Up Boot Services 126

DHCP 126

TFTP 134

NFS 135

HTTP 135

9. Setting JavaOS Properties 137

JavaOS and System Properties 137

General Properties 138

Application Loading Properties 141

User Properties 142

Printing Properties 143

Localization Properties 145

Setting Properties 147

Syntax 147

▼ To Reference a Properties File in the DHCP Vendor Options 149

10. Dynamically Loading Applications 153

Overview 153

Setting Up Applications for Dynamic Loading 154

▼ To Create an Archive 154

▼ To Launch a Single Application at Login 155

▼ To Provide a Dialog Window With a Pick List of Applications 155

11. Setting Locales and Adding Fonts 159

What You Will Need to Configure 159

Setting the Locale 160

▼ To Change the Locale Setting 160

Modifying the Languages Displayed at Login 161

Adding Fonts 161

▼ To Install and Configure Fonts 162

Making Fonts Available to JavaStation Computers 165

▼ To Make Fonts Available to JavaStation Computers 165

Adding a Keyboard 165

▼ To Add a Localized Keyboard 166

Enabling Special Characters on the U.S. Keyboard 167

▼ To Enable Special Characters on the U.S. Keyboard 167

Setting the Input Method 168

▼ To Set the Input Method 168

Changing the Character Set Setting 170

A. Network Computer Configuration Form 171

B. Netra j Package Information 173

Netra j 2.0 Administration Interface 173

JavaStation Software 174

Solaris 2.5.1 Add-ons 175

OpenConnect System Software 175

Additional Software 176

C. JavaStation User Setup Forms 177

Welcome to Your JavaStation Computer 178

D. Troubleshooting 183

Viewing Network Activity 183

▼ Using the JavaOS Console 183

Boot Problems 184

Name Services 186

HotJava Views 187

General 187

CalendarView 187

MailView 187

HotJava Views Administration 188

Tips 188

Enabling Error Message Logging 191

Troubleshooting 193

GO-Joe 194

JavaOS Console Output 195

Applet `diagfile` Parameter 195

The `/tmp/Xerr:n` File 195

Common Problems 195

Additional Error Messages and Known Problems 197

Glossary 199

Index 205

Tables

TABLE 1-1 Special Requirements for Netra j 4

TABLE 1-2 User Input Elements 11

TABLE 1-3 Netra Information Icons 15

TABLE 1-4 Netra Navigation Icons 16

TABLE 2-1 Network Computer Global Parameters 22

TABLE 2-2 Local Parameters 24

TABLE 2-3 Comparison of Methods to Add JavaStation Clients to the Network 26

TABLE 3-1 Anonymous FTP Information 30

TABLE 3-2 Mail Administration 33

TABLE 3-3 Information for Mail Alias Administration 35

TABLE 3-4 Local Name Server Administration 38

TABLE 3-5 NIS Configuration 38

TABLE 3-6 DNS Server Administration 43

TABLE 3-7 DNS Primary Server Administration 44

TABLE 3-8 DNS Secondary Server Administration 46

TABLE 3-9 DNS Client Administration 47

TABLE 3-10 Network Computer Global Parameters 48

TABLE 3-11 Web Server Parameters 52

TABLE 3-12 Quick Setup Administration 53

TABLE 3-13 Local Parameters Administration 55
TABLE 3-14 Local Printer Setup Options 57
TABLE 3-15 Client Application Administration 59
TABLE 3-16 Update NC Operating System Administration 60
TABLE 4-1 Network Interface Administration: TCP/IP 66
TABLE 4-2 Modem Remote Host Administration 69
TABLE 4-3 Adding/Modifying a Modem Definition 70
TABLE 4-4 Modem Assignments 71
TABLE 4-5 Modem Log File Detail Levels 72
TABLE 4-6 Dynamic Router Administration 73
TABLE 4-7 Static Router Administration 75
TABLE 5-1 Web Server Password Administration 78
TABLE 5-2 Host Access Control Administration 78
TABLE 5-3 Security Levels for Network Services 80
TABLE 5-4 Root Password Administration 81
TABLE 6-1 Audio Administration 84
TABLE 6-2 External Disk State Color Code 84
TABLE 6-3 External Disk Mountpoint Information 85
TABLE 6-4 Default Web Server Information 87
TABLE 6-5 Backup Options 89
TABLE 6-6 Restore Device Administration 90
TABLE 6-7 Easy Restore Administration 90
TABLE 6-8 Selective Restore Administration 91
TABLE 6-9 System Restart/Shutdown Administration 93
TABLE 6-10 Options Displayed 94
TABLE 6-11 Save/Restore Configuration 95
TABLE 6-12 Installing Packages or Patches 97
TABLE 6-13 Removing Packages or Patches 97

TABLE 6-14 System Administrator Alias Administration 98
TABLE 6-15 System Defaults 99
TABLE 6-16 User Accounts 101
TABLE 6-17 Users From a File Administration 102
TABLE 7-1 Solaris Dependancies for Go-Joe 107
TABLE 7-2 Applet Parameters 109
TABLE 7-3 Remote Windowing Information 116
TABLE 8-1 DHCP Information for Booting JavaOS 124
TABLE 8-2 Conditions for Updating JavaStation Flash Memory 125
TABLE 8-3 DHCP Options Required to Boot JavaStation computers 128
TABLE 8-4 Optional DHCP Options for Booting JavaStation computers 129
TABLE 8-5 JavaStation Client Class Identifiers 131
TABLE 8-6 DHCP Option Settings for TFTP 134
TABLE 9-1 JavaOS General Properties 138
TABLE 9-2 JavaOS Application Loading Properties 141
TABLE 9-3 JavaOS User Properties 142
TABLE 9-4 JavaOS Printing Properties 143
TABLE 9-5 JavaOS Localization Properties 145
TABLE 9-6 Property Flags 147
TABLE 10-1 JavaOS Properties Required to Load a Single Application 155
TABLE 10-2 Application Tag Attributes 156
TABLE 10-3 Application Tag Parameters 156
TABLE 11-1 Description of Settings to be Changed for Localization 159
TABLE 11-2 JavaStation Locale Settings 160
TABLE 11-3 JavaStation Country Settings 160
TABLE 11-4 Input Methods by Language 168
TABLE 11-5 JavaStation Character Set Encoding Settings 170
TABLE B-1 Netra j 2.0 Software 173
TABLE B-2 JavaStation Software 174

TABLE B-3 Solaris 2.5.1 Add-ons 175
TABLE B-4 OpenConnect System Software 175
TABLE B-5 Sun WebServer 176
TABLE B-6 GO-Joe 176
TABLE B-7 Netra j AnswerBook for Solaris 2.6 176
TABLE D-1 Tips 184
TABLE D-2 Boot Problems and Suggested Actions 185
TABLE D-3 Name Service Error Messages 186
TABLE D-4 HotJava Views Error Messages and Suggested Actions 193
TABLE D-5 Miscellaneous Error Messages and Suggested Actions 197

Figures

FIGURE 1-1 Sample Configuration of a JavaStation Network Environment 4

FIGURE 1-2 Integrating a Sun Server Into an Existing Enterprise Network 5

FIGURE 1-3 Navigation Page 10

FIGURE 1-4 Task Page (regular form) 12

FIGURE 1-5 Error Form 13

FIGURE 1-6 Verify Form 13

FIGURE 1-7 Help Page 14

FIGURE 1-8 Success Status Page 15

FIGURE 3-1 LAN That Uses the Netra Server as a Router 32

FIGURE 3-2 Example of DNS Domains 40

FIGURE 7-1 GO-Joe Architecture 106

FIGURE 8-1 JavaStation Client – DHCP Server Handshake 123

Preface

The *Netra j 2.0 Administrator's Guide* is written for system administrators using the Netra™ j 2.0 software to set up and configure network computing infrastructures. It describes the Netra j administration interface and the procedures to set up and configure JavaStation clients in a network environment. It includes instructions on how to administer the system using the Netra j administration interface, a graphical user interface, as well as using the Solaris command line.

This preface includes the following topics:

- Before You Read This Book—page xix
- How This Book Is Organized—page xx
- Using UNIX Commands—page xxi
- Typographic Conventions—page xxi
- Shell Prompts—page xxii
- Related Documentation—page xxii
- Recommended Reading—page xxiii
- Sun Documentation on the Web—page xxiv
- Sun Welcomes Your Comments—page xxv

Before You Read This Book

You should install the Netra j 2.0 software before using this guide. If you are installing from a
CD-ROM, refer to the *Netra j 2.0 Installation Guide* for installation and initial configuration instructions. For instructions on how to install Netra j from the Electronic Commerce web site, refer to the Netra j `README` included with this product.

After completing the installation, complete the Network Computer Configuration Form in Appendix A to prepare for configuring your network environment with network computers.

How This Book Is Organized

The information in this manual is organized as follows:

Chapter 1, “Netra j Product Description and Navigation," introduces the Netra j 2.0 software and Java™ computing concepts.

Chapter 2, “Booting the JavaStation Using Netra j," describes the minimal configuration to set up and configure a JavaStation™ network environment.

Chapter 3, “Using Netra j Network Services Administration," describes the Network Services Administration modules.

Chapter 4, “Using Netra j Network Connection Administration," describes the Network Connection Administration modules.

Chapter 5, “Using Netra j Security Administration," describes the Security Administration modules.

Chapter 6, “Using Netra j System Administration," describes the System Administration modules.

Chapter 7, “Using Netra j Connectivity Software," describes the additional software that is available for remote windowing and legacy connectivity.

Chapter 8, “Booting the JavaStation Using Solaris," describes DHCP and explains how to use DHCP options to set JavaOS properties.

Chapter 9, “Setting JavaOS Properties," describes the JavaOS™ syntax and properties.

Chapter 10, “Dynamically Loading Applications," describes how to set up your applications to be dynamically loaded.

Chapter 11, “Setting Locales and Adding Fonts," explains how to provide localized resources and fonts to the JavaStation clients in your network.

Appendix A, “Network Computer Configuration Form" provides a form to help you prepare for setup and configuration.

Appendix B, “Netra j Package Information" describes the packages included in Netra j and their respective package names.

Appendix C, “JavaStation User Setup Forms" provides booting instructions to JavaStation users.

Appendix D, “Troubleshooting" describes common and known troubleshooting instructions.

Using UNIX Commands

Netra j 2.0 can be used in conjunction with any Solaris administration tools or UNIX® commands and procedures. However, this document may not contain information on basic UNIX commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- AnswerBook™ online documentation for the Solaris™ 2.5.1 or 2.6 software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

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

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

TABLE P-3 Related Documentation

Application	Title or Product	Part Number/Location
Product Information	*Netra j 2.0 Product Notes*	805-3078-10, `http://docs.sun.com`
	Netra j 2.0 Documentation Roadmap	805-3079-10, `http://docs.sun.com`
Installation	`README`	Included with Netra j software
	Netra j 2.0 Installation Guide	805-3080-10, `http://docs.sun.com`, Netra j Main Administration page
	Sun Binary Code License Agreement	804-6056-10
Administration	Netra j 2.0 online help	Included with Netra j software
	HotJava™ Views™ Administration online help	Included with Netra j software

TABLE P-3 Related Documentation *(Continued)*

Application	Title or Product	Part Number/Location
	Solaris 2.6 System Administrator Collection Volume 1 • *Solaris Naming Administration Guide* • *Solaris Naming and Setup and Configuration Guide*	`http://docs.sun.com`
	Solaris 2.6 System Administrator AnswerBook Volume 2	`http://docs.sun.com`
Other Included Software	HotJava™ Browser	Refer to the online help.
	HotJava Views	Refer to the online help.
	OpenConnect Systems' OpenVista and OC:/ /WebConnect Pro	OC:/ /WebConnect Pro online help; *Netra j 2.0 Administrator's Guide*
	Sun™ WebServer™	Included with Sun WebServer software
	Sun™ Internet Mail Server™	`http://www.sun.com/sims/tech-stuff`
	GO-Joe With RapidX	`README` file included with the GO-Joe software; *Netra j 2.0 Administrator's Guide*; `http:/www.graphon.com`
	Citrix Systems' WinFrame	`http://www.sun.com/desktop/products/PCCP/remotewindowing/citrix`

Recommended Reading

Some of the chapters in this guide address how to set up and manage a JavaStation network using services in the Solaris operating environment. Solaris command line services enable you to handle scenarios not supported by the Netra j Administration Interface. The Solaris approach is suitable if you are deploying more than 100 JavaStation clients or if you are deploying them across more than one subnet.

To set up a JavaStation network using Solaris services, you must have experience with the Solaris operating environment and with the following network services:

- Dynamic Host Configuration Protocol (DHCP)
- Name Information Service (NIS)
- Domain Name Service (DNS)
- NFS™
- Trivial File Transfer Protocol (TFTP)

For more information, refer to the following documents:

TABLE P-4 Recommended Reading

Topic	Document	Location
DHCP	• *TCP/IP Data Communication Administration Guide* • *man pages on* `dhcp(4)`, `dhcptab(4)`, `dhcpconfig(1M)`, `dhtadm(1M)`, *and* `pntadm(1M)`	*Solaris 2.6 System Administrator Collection Volume 1,* located at `http://docs.sun.com`. Man pages can be obtained via the Solaris 2.6 command line.
DNS	• *DNS and BIND, 2nd Edition, by Albitz and Liu, O'Reilly* • *Solaris Naming Administration Guide* • *Solaris Naming Setup and Configuration Guide*	Sun Solaris books are available in the *Solaris 2.6 System Administrator Collection Volume 1* located at `http://docs.sun.com`
NFS	• *NFS Administration Guide* • *Managing NFS and NIS, Stern, OReilly*	*Solaris 2.6 System Administrator Collection Volume 1* located at `http://docs.sun.com`
NIS	• *Naming Services Transition Kit 1.2 Administrator's Guide* • *Solaris Naming Administration Guide* • *Solaris Naming Setup and Configuration Guide*	*NISKit 1.2 AnswerBook,* located at `http://docs.sun.com`

Sun Documentation on the Web

The `docs.sun.com` web site enables you to access Sun technical documentation on the Web. You can browse the `docs.sun.com` archive or search for a specific book title or subject at `http://docs.sun.com`.

Sun Welcomes Your Comments

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at `smcc-docs@sun.com`. Please include the part number of your document in the subject line of your email.

CHAPTER 1

Netra j Product Description and Navigation

This chapter describes the following basic topics on Netra j 2.0:

- Netra j Software—page 1
- Network Topology—page 4
- Netra j and Solaris Administration—page 5
- Java Computing—page 6
- JavaStation Network Environment—page 8
- The Netra j Administration Interface—page 8
- Accessing the Netra Administration Interface—page 16
- Accessing Netra j Documents From the Netra Administration Interface—page 17

Netra j Software

Netra j is a software-only Solaris application that provides all the components required to boot and administer JavaStation clients and their users. Netra j software includes JavaStation™ client software, secure 3270/5250 web-to-host connectivity for any Java-enabled client, and browser-based management of complex network services such as DNS, NIS, and DHCP, as well as JavaStation clients and users.

Netra j software can be added to new or existing SPARC™ systems running Solaris 2.5.1 or later. For Solaris 2.5.1 systems, all the components required to support JavaStation systems and internet/intranet connectivity are included, such as Sun Internet Mail Server™ and Sun WebServer™.

Unlike prior Netra j products, Netra j 2.0 software enables experienced Solaris system administrators to use the command line for administration, while administrators with little or no UNIX® expertise can use the Netra browser interface to accomplish adds, moves, and changes for departments and remote sites. Both

administration methods are supported. And since Netra j is a Solaris application, it can coexist with other Solaris-compatible applications, and it can be installed on any SPARC-based Sun system running Solaris 2.5.1 or 2.6.

Servers running the Netra j software can be set up as NIS clients or slaves in an existing Sun network, or as NIS masters for standalone and Java pilot deployment.

The Netra j software includes several software packages that are required to set up and configure the network computing environment to deploy JavaStation clients and applications for any Java-enabled client. The software packages include:

- Netra j administrative software
- JavaStation software
- Solaris 2.5.1 add-ons
- Open Connect Systems (OCS) software

Netra j Administrative Software

The Netra j administrative software enables you to set up and configure the servers and clients needed in your network environment. It also contains the following additional software:

Sun™ Internet Mail Server™ – Enables companies to setup an Internet mail server supporting IMAP4, POP3 and UNIX mail clients.

Sun™ WebServer™ – Enables companies to publish and distribute information and deploy web-based applications across any network environment.

GO-Joe – A thin client Java X server that provides access to all UNIX and X Window applications, including browsers such as HotJava Browser.

JavaStation Software

These software packages provide the operating system, boot images, and client applications for the JavaStation network computer:

- JavaOS 1.1
- HotJava Views 1.1
- HotJava Views Demo Support
- HotJava Views Documentation
- HotJava Browser 1.1

Solaris 2.5.1 Add-ons

Netra j also includes Solaris 2.5.1 add-on software. The following software packages are required to support JavaStation clients on systems running the Solaris 2.5.1 operating environment:

- Sun Internet Mail Server
- PPP/IP asynchronous PPP daemon
- Networking UUCP utilities
- System localization
- PPP/IP and IP dialup
- X Windows optional fonts
- NIS Kit 1.2
- Dynamic host configuration protocol (DHCP)

OCS Software

Open Connect Software (OCS) provides a development tool to develop applets for SNA/AS400 legacy systems and software enabling legacy connectivity to mainframes, AS400, and VT220 hosts. The following OCS software is included with Netra j:

- Netra j OpenVista
- OC://WebConnect
- OC://WebConnect Netra Integration

Hardware and Software Requirements

You can install Netra j 2.0 on any SPARC system running the Solaris operating environment, version 2.5.1 or later. Solaris 2.6 systems should have the full Solaris 2.6 distribution installed, as opposed to subsets such as the end-user cluster.

You will need an HTML-based web browser to administer Netra j 2.0. HotJava Browser is provided as part of this software.

Netra j also requires a web server on port 80. If no other web server is running on port 80, Netra j automatically configures and starts Sun WebServer on that port.

Note – Netra j uses Sun WebServer as the administration web server on port 81. This must not be replaced by any other server.

Some systems have additional requirements, as shown in TABLE 1-1.

TABLE 1-1 Special Requirements for Netra j

If you are installing Netra j ...	Make sure your system has the following:
As an upgrade to Netra i 3.1 or 3.1.1	Sun packages `SUNWadmap` and `SUNWscpu` These packages can be installed from the Netra Recovery CD-ROM, which accompanies the Netra i product CD-ROM.
On a 2.5.1 system and you plan to administer the HotJava Views Calendar	The Common Desktop Environment (CDE) CDE is available on the Solaris Update CD-ROM.

Network Topology

The Netra j software supports two network scenarios, as illustrated in FIGURE 1-1 and FIGURE 1-2.

FIGURE 1-1 shows a configuration that includes a single Sun server and several network computers. The Sun server provides all the network services for the NCs in this network.

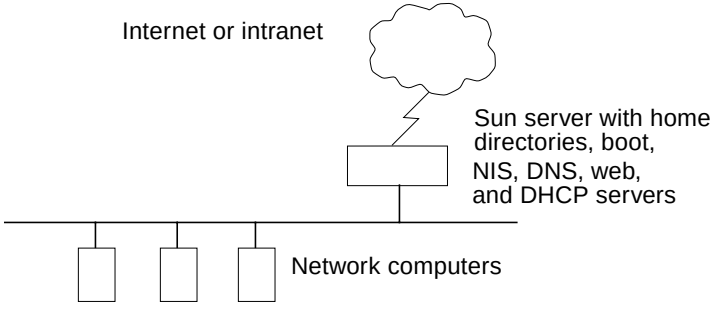

FIGURE 1-1 Sample Configuration of a JavaStation Network Environment

FIGURE 1-2 shows a configuration in which the Sun server is integrated into an existing enterprise network that already incorporates a number of servers.

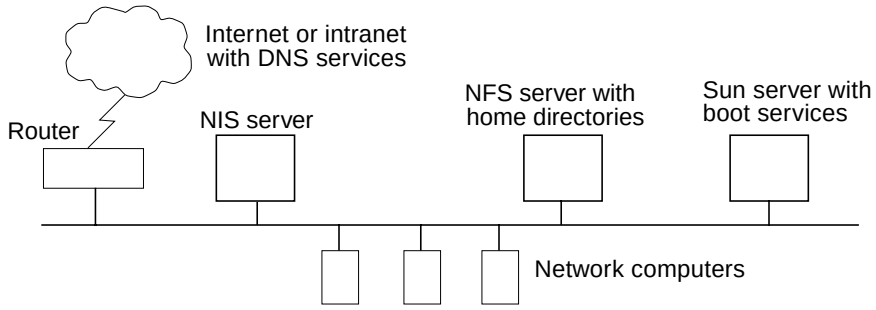

FIGURE 1-2 Integrating a Sun Server Into an Existing Enterprise Network

Netra j and Solaris Administration

This book provides system administration information for both the Netra j dministration interface (web-based administration) and the Solaris operating environment (command-line administration).

Netra j Administration Interface

The Netra j administration interface is a web-based user interface for performing administration tasks. This document describes the GUI and how to use it to perform administration tasks. The following chapters detail the GUI method:

- Booting the JavaStation Using Netra j—page 19
- Using Netra j Network Services Administration—page 29
- Using Netra j Network Connection Administration—page 65
- Using Netra j Security Administration—page 77
- Using Netra j System Administration—page 83
- Using Netra j Connectivity Software—page 105

Solaris Command Line

The Solaris operating environment can be used to manipulate files and directories. You can type in the file and directory names in conjunction with Solaris commands to carry out specific operations. References to Solaris procedures are intended for system administrators who are familiar with basic system administration and with the tasks described in the *Solaris 2.x System Administrator's Guide.*

If you use use Solaris command line for administration, you should have experience administering systems running the Solaris operating environment (2.5.1 or later). This document does not provide a complete description of the Solaris operating environment or a complete description of administration tasks to set up systems (server, client, network services, etc.). It does however, focus on advanced tasks to set up and configure JavaStation clients in a network environment using Solaris commands. The following chapters detail the command-line method:

- Booting the JavaStation Using Solaris—page 121
- Setting JavaOS Properties—page 137
- Dynamically Loading Applications—page 153
- Setting Locales and Adding Fonts—page 159

Java Computing

The JavaStation is part of a new thin-client paradigm that is enabling organizations with outdated networks to upgrade their system architectures without discarding existing investments in software and hardware. This paradigm is called *Java computing*.

Java Computing Model

Early in business computing, users accessed business applications running on mainframe computers through 3270-type terminals and other similar devices. Applications running on the mainframe communicated with these *stateless* terminals by way of a specialized byte-stream. This approach offered a centralized control mechanism for data and applications on the mainframe, but because all application processing was done on the host, it was not particularly scalable.

The introduction of the personal computer (PC) into corporate computing solved some of the issues with the mainframe model but introduced new problems, in particular:

- *Decentralized administration*. Because of their modular nature, each PC tended to be configured differently depending on its hardware composition and its user's needs. The resulting large support matrix has helped drive PC cost-per-seat to $11,900 (Gartner group estimate).
- *Corporate data migration*. Since most PCs have local data storage, important corporate data can migrate onto PC desktops, making the local data inconsistent with central coporate data and inaccessible to the data center. Since users are often responsible for backing up their own systems, the data itself is often at risk.
- *Lack of built-in networking.* Though more and more corporate PCs are now being attached to networks, networking is not a fundamental assumption of the PC architecture. Without built-in networking being part of the basic model, most PC applications use networks only for file sharing, printing, or licensing.
- *Lack of security.* PC operating systems are fundamentally insecure with no way to tell one user from another or one system from another. This inherent insecurity leaves avenues open for viruses to proliferate.

Today the Java programming language, along with the wide adoption of Internet technology and standards such as TCP/IP and HTTP, is enabling a move to the powerful but simple Java computing model. This new way of deploying applications causes a significant change in the way distributed client/server network-based applications are designed and developed.

The Java computing model includes some or all of the following components:

- *JavaStation*. The JavaStation thin client provides local application processing and highly interactive, graphical applications. JavaStation clients enable the Java Virtual Machine (Java VM) and allow Java applications to be downloaded and run from anywhere on the network.
- *Application server.* The graphical portion of an application running on the JavaStation uses standard networking protocols to communicate with applications running on mid-tier application servers.
- *Data warehouse*. Data warehouse systems centralize the management and control of data and applications. Data and applications remain in the centralized domain of the data warehouse, while desktop users receive the benefits of local application processing and dynamic user interfaces.

Customers who require an immediate solution for supporting JavaStation clients are encouraged to use the Netra j administration interface. The Netra j administration interface performs a seamless JavaStation installation and features sophisticated tools that simplify the setup of the network services required by the JavaStation.

JavaStation Network Environment

Unlike traditional workstations and PCs, network computers download all their software from a server. To run properly, these clients require a boot server, a domain name service (DNS) server, a network information service (NIS) server, a NFS server, a web server, a DHCP server, a router and a home directory for each user.

The JavaStation can be integrated into an existing network; however, the JavaStation does require a dedicated boot server.

The boot server “listens” on the network for a JavaStation booting up and supplies the JavaStation with its boot image: JavaOS and either the HotJava Browser, HotJava Views, or an alternate main application. You decide in advance which application a particular JavaStation will run.

If HotJava Views is used as the main application, the web server provides the HotJava Views applets to JavaStation clients that are running HotJava Views. You can configure the HotJava Views environment by using a tool from the Netra j software called HotJava Views Administration. (See “To Access HotJava Views Administration” on page 63.)

The boot server and web server can be the same physical machine, but it is not a requirement. The JavaStation network environment also depends on the DHCP, DNS, NIS, and NFS services. NFS must be provided by the boot server; DNS and NIS can be provided by other machines in the nework. JavaStation home directories (accessed by NFS) can also reside on other machines in the network.

Once you’ve completed server installation and configuration, you can add clients and complete HotJava Views administration through Netra j.

The Netra j Administration Interface

The Netra j server uses a web-based 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.

Each administration function in the Netra user interface is called a *module.* Each module 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 in 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.

Page Types

The Netra user interface has five types of pages:

- Navigation
- Task
- Help
- Glossary
- Status

Navigation Page

A Navigation page is used to select tasks. You select a task by clicking on the link, which displays a Task page or another Navigation page. 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 on a Task page that changes the available options, these Navigation pages will reflect the changes.

FIGURE 1-3 shows a Navigation page for the User Accounts module. From this page you can add a new user or modify or delete an existing user by selecting the apropriate links.

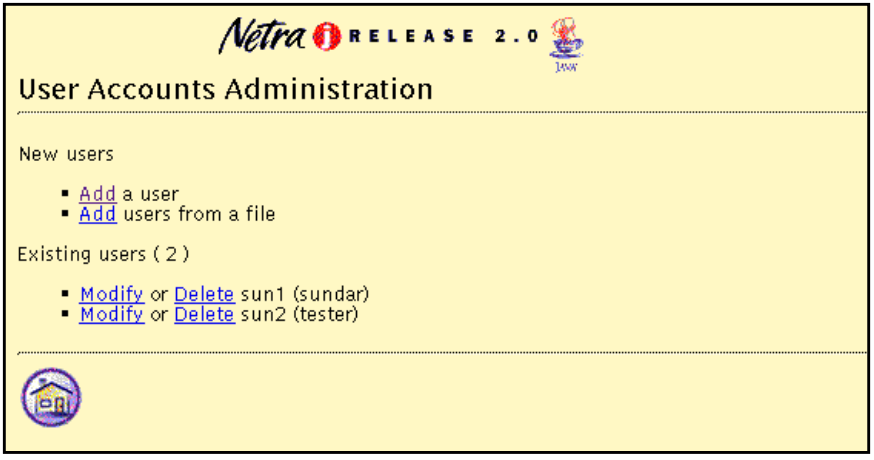

FIGURE 1-3 Navigation Page

Task Page

A Task page is also called a *form*. There are two types of forms: Regular and Special.

Regular Form

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 that you must click to activate any changes or new information that you entered and to change the system state.

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

The user input elements in a form are described in TABLE 1-2.

TABLE 1-2 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. Press the mouse button 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 1-4 shows a Task page (Regular form) for the File Backup Options module.

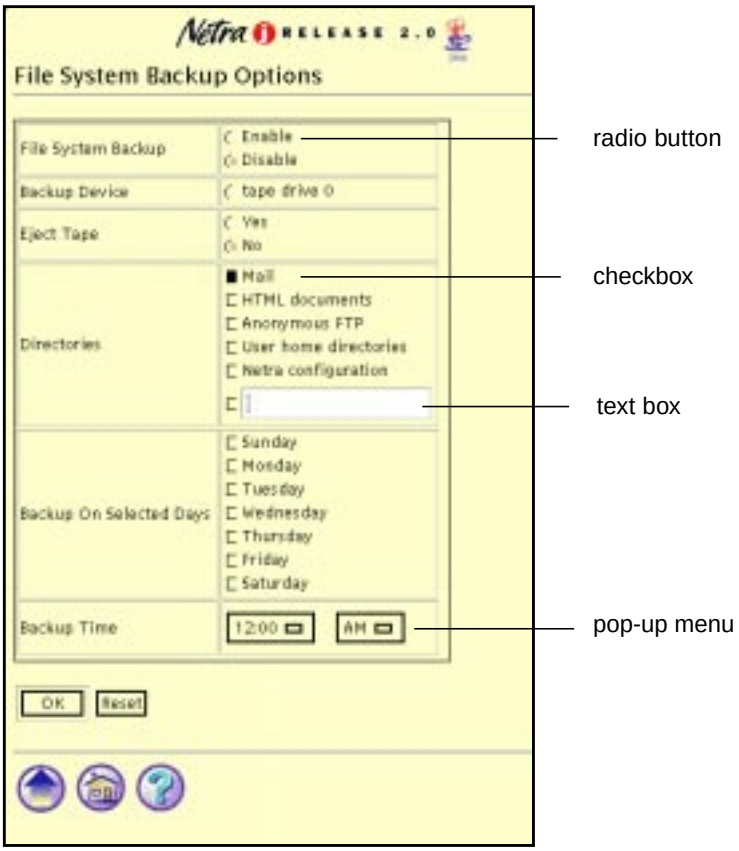

FIGURE 1-4 Task Page (regular form)

Special Form

Special forms are based on Regular forms. Special forms are automatically displayed. There are two types of special forms: Error forms and Verify forms.

- An error form does not change the system state. It displays an error icon, and enables you to correct the error and re-enter information in a Regular form. Errors are marked on the form next to the relevant field. FIGURE 1-5 shows an Error form for the User Accounts module.

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 1-6)

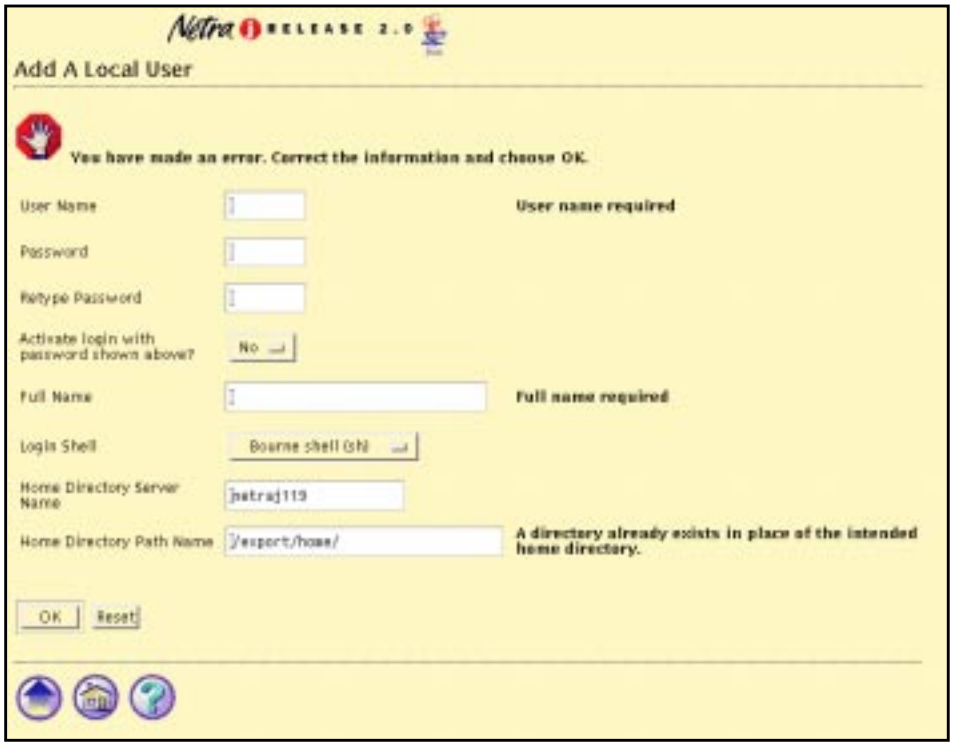

FIGURE 1-5 Error Form

FIGURE 1-6 shows a Verify form for the User Accounts module.

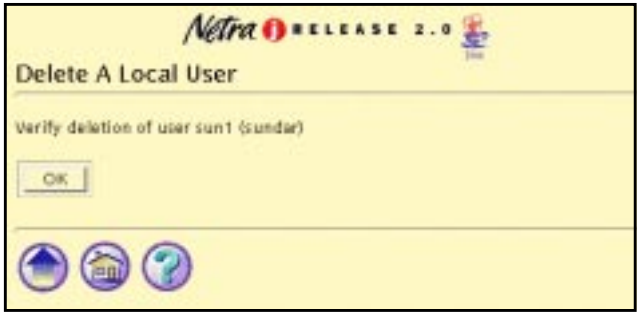

FIGURE 1-6 Verify Form

Help Page

The Netra user interface opens a separate browser to display Help pages that contain the information you need to fill out a form. All forms have a help icon in the form of a question mark. Some Help pages use terms that are linked to the glossary.

FIGURE 1-7 shows a Help page for the User Accounts module.

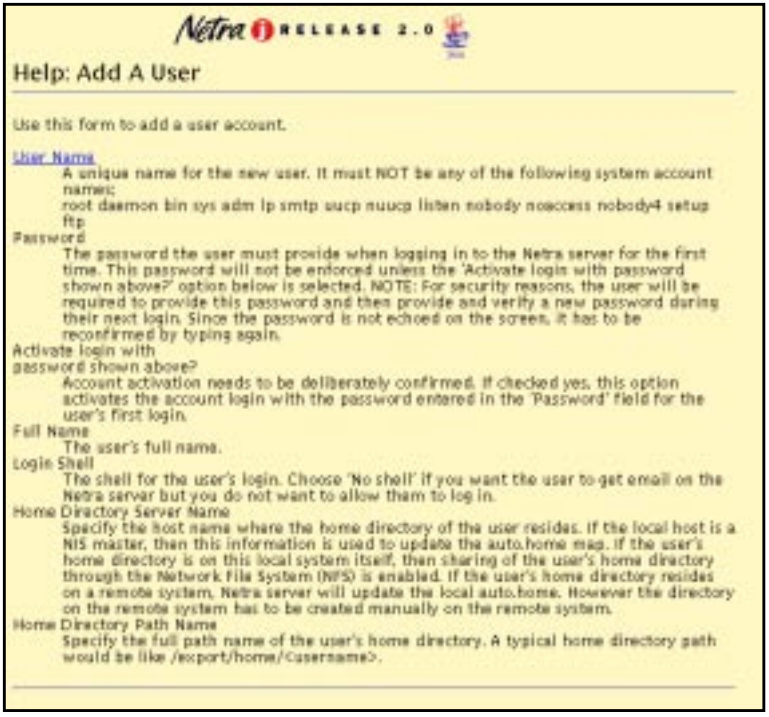

FIGURE 1-7 Help Page

Glossary Page

You can access the Glossary page 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 located at the bottom of the glossary.

Status Page

A Status page is displayed once you have completed 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 1-8 shows a success Status page for the Save Configuration module.

FIGURE 1-8 Success Status Page

Information Icons

The icons shown in TABLE 1-3 may be displayed while a task is being completed.

TABLE 1-3 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.

Navigation Icons

Every administration page has some of the icons shown in TABLE 1-4.

TABLE 1-4 Netra Navigation Icons

Icon	Description
	Home icon. Returns to the Netra Main Administration page. (Selecting the banner will also do this.)
	Help icon. Contains explanations of fields in the related form.
	Top of Module icon. Returns to a module's top-level page.
	Forward Arrow icon. Continues to the next configuration task.

Accessing the Netra Administration Interface

The web-based Netra administration interface is accessed through a dedicated administration web server. To access Netra j, you must use a web browser and provide a user name and password. You can use either of the following two methods.

▼ To Use a Netra Server With a Monitor

1. **Power on the server.**
2. **At the console prompt, log in as the user** `setup`**.**
3. **Type** `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. **Type** `setup` **for the user ID and** `setup` **for the password.**

   The Netra Welcome page is displayed.
5. **In the Netra Welcome page, click Administration.**

   If this is the first time you are accessing Netra j, the Initial Configuration page is displayed. Otherwise, the Main Administration page is displayed.

▼ To Use a Client on the Network

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

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

   The Netra password screen is displayed.
3. **Type** `setup` **for the user ID and** `setup` **for the password.**

   The Netra Welcome page is displayed.
4. **In the Netra Welcome page, click Administration.**

   The Main Administration page is displayed.

Accessing Netra j Documents From the Netra Administration Interface

You can access Netra j documents from the administration interface.

▼ To Access Netra j Documents

1. **From the Main Administration page, under “Documentation,” click Online Documentation.**

   The Documetation page is displayed listing the Netra j documents.

2. **Click on the desired book to view the document.**

   The document is displayed.

CHAPTER 2

Booting the JavaStation Using Netra j

This chapter describes the tasks to set up the minimum configuration to support JavaStation clients on a network using Netra j. Throughout this discussion, references are provided to the chapters in this manual that contain the relevant instructions.

This chapter is organized as follows:

- Setting Up Name Services—page 21
- Setting the Web Server Document Root—page 21
- Defining Boot Server Global Parameters—page 22
- Setting Up JavaStation Clients—page 25

Overview

The minimal services required on a network to support JavaStation clients includes:

- boot server (with TFTP)
- HTTP server (with JavaOS)
- NIS and DNS services

Setting up the minimal configuration for the JavaStation network environment involves the following tasks. these tasks are describes in detail in the sections that follow:

1. Preparing for configuration
   a. Completing the Network Computer Configuration Checklist (see Appendix A)
   b. Verifying that the web server is running
2. Starting the Netra j administration interface

3. Setting up name services
4. Setting the web server document root
5. Defining boot server global parameters
6. Setting up the JavaStation clients
   a. Administering HotJava Views
   b. Updating JavaOS (JavaStation systems with flash memory only)

Starting the Netra j Administration Interface

▼ To Prepare For Configuration

1. **Make sure the Netra j software is installed according to procedures. Refer to both the the** *Netra j 2.0 Installation Guide* **and** `README` **file for instructions.**
2. **Complete the Network Computer Configuration Checklist (Appendix A).**
3. **Make sure the administrative web server daemon is running**:

```
% ps -ef | grep httpd
```

The output should contain the following line:

```
root pid 1 0 date 0:03 /usr/lib/httpd -config /etc/opt/netra/
SUNWnetra/conf/httpd.conf
```

4. **Find the path name of the web server document root. This is the root directory of the web server running on** `port 80` **on your system.**

   For a description of web server document root, see "Setting the Web Server Document Root" on page 21.

▼ To Start the Netra j Administration Interface

As part of installation, Netra j creates a Solaris user account called `setup` that automatically launches HotJava Browser, the browser required to operate HotJava Views Administration pages in the Netra j administration interface. HotJava Views Administration pages use features of the JDK™ developer's kit that are not currently supported by industry-standard browsers.

All other Netra j Administration pages can be operated from any industry-standard browser.

1. **Using your default web browser, open the URL** `http://hostname:81`
2. **Log in as** `setup` **and type the password** `setup`
3. **If you are opening the Netra j administration interface for the first time, follow the system links to set up system defaults, the administration password, and other parameters.**

   Follow the arrow buttons until you have set up all the required parameters.
4. **Click Administration to go to the Netra j 2.0 Main Administration page.**

Setting Up Name Services

If your network already provides network information service (NIS) and domain name service (DNS), Netra j will automatically obtain the information it needs from the system files. You can verify this information by clicking Name Service on the Netra j Main Administration page and following the relevant links.

If your system does not have name services, you need to set them up now. See "Name Service Administration" on page 36 for instructions.

Setting the Web Server Document Root

The web server document root is the means by which the JavaStation client accesses applications such as HotJava Browser and HotJava Views. Once configured, the JavaStation client can access these applications by mounting the application directory or by specifying a URL.

When a user selects an application from a JavaStation, the request is sent to the Netra web server, which contacts the web server where the application actually resides. The Netra web server then loads the application onto the JavaStation.

The web server document root is the root directory of the default web server running on port 80. The documents under this root are accessible to any system connected to the web server (provided the user has permissions). If a file is not under this root directory, it cannot be accessed through the web server.

For example, if you are running Sun WebServer on port 80, the document root is located in `/var/http/demo/public.` If you copy the file `specs.html` under the root directory, then any user can access this file using the URL `http://hostname.domain/specs.html.`

For instructions on setting up the web server document root, see "Web Server Document Root Administration" on page 51.

If you write an alternate main application to be deployed to JavaStation clients instead of HotJava Browser or HotJava Views, you can add them to the list of default applications through the Netra j Network Computer Server module. See "Client Application Administration" on page 58.

Defining Boot Server Global Parameters

During the boot sequence, the boot server provide the JavaStation clients with information they need to operate properly. This information is divided into two categories: global parameters and local parameters. Global parameters are the parameters that are used by all JavaStation clients on the network (TABLE 2-1). Local parameters are defined for each JavaStation individually (TABLE 2-2).

TABLE 2-1 Network Computer Global Parameters

Parameters	Description
NIS Domain Name (optional)	The NIS or NIS+ domain name in which the network computers reside.
NIS Server Address(es) (optional)	The list of host address(es) of NIS or NIS+ servers for the network computers. List of NIS or NIS+ server addresses configured in the network computer server database is displayed.
DNS Domain Name	The DNS domain name in which the network computers reside.
DNS Server Address(es)	The host address of the DNS server for the network computers.
Boot Server Address	The host address of the network computer boot server on the local network.
Time Server Address	The IP address of a server supporting the network time protocol (NTP).

TABLE 2-1 Network Computer Global Parameters *(Continued)*

Parameters	Description
Router Address(es) (optional)	A list of host address(es) of the routers to be used by the network computers. If not given, JavaOS broadcasts looking for a router. List of router addresses configured in the network computer server database is displayed.
Lease Time (in days)	The duration (in days) of the IP address lease to the network computer client. A value of -1 specifies an infinite lease. By default, this field is set to 3 days. After this period of time has expired with no DHCP server sending a DHCPACK packet, JavaOS shuts down the networking port.
Lease Negotiation	A “Yes” or “No” flag indicating whether lease negotiation is to be performed. If the lease time is set to the value “infinite” (-1), "Yes" has no meaning.
Network Interfaces	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.
Input Method Server (optional)	A server with a language engine to interpret the keyboard input method (for Korean, Chinese, and Japanese languages only). This server must be running a localized version of Solaris.
Input Method Port (optional)	The port number of the IIIMP server for the network computer. The IIIMP port number configured in the network computer server database is displayed.
Time Zone	Specify the timezone in which the JavaStation clients are locate d. This is a 3-letter field. For example, GMT. If an invalid timezone is specified, the timezone on the JavaStation clients default to GMT. By default the timezone specified in the network computer server database is displayed.
Fonts Server (optional)	The host address or host name of the fonts server for the network computers. Font server configured in the network computer server database is displayed. Server address is required if the fonts directory is specified.
Fonts Directory (optional)	The directory location of the fonts for the network computers. If a fonts server is specified, a fonts directory is required.
Localized Resources Server (optional)	The host address or host name of the localized resources server for the network computers. The server address is required if the localized resources directory is specified.

TABLE 2-1 Network Computer Global Parameters *(Continued)*

Parameters	Description
Localized Resources Directory (optional)	The directory location of the localized resources for the network computers. If a localized resources server is specified, this directory is required.
Login Locales List (optional)	The list of locales to be presented as choices to the user loging on to a network computer. By default the locales specified in the network computer server database are selected
JavaOS Command Line (optional)	A list of definitions of either JavaOS or system properties. A formatted text string that can be delivered by DHCP or other methods. There are no spaces between the option and the value. Different command line options are separated by a space. Exact syntax must be used to specify the command line options. By default, all JavaOS and system properties configured in the network computer server database (using `JOScmd1`) are displayed.

TABLE 2-2 Local Parameters

Option	Description
Host Name Prefix	The host name of any network computer will be generated using the `name_prefix`. If the IP address of the network computer is aa.bb.cc.dd, then the generated host name for this computer will be `name_prefix-dd`.
Starting IP Address	The initial host address you want to assign to the network computers being set up. If a host address is already used by some other system in the network, that address will be bypassed.
Number of NCs	The number of network computers you want to set up. Note that if an IP address is already used in the network, that address will not be used, resulting in one less client that will be set up.
Enter Lease Time (days)	The duration (in days) of the IP address lease to the network computer client. A value of -1 specifies an infinite lease. By default, this field is set to 3 days. After this period of time has expired with no DHCP server sending a DHCPACK packet, JavaOS shuts down the networking port.
Default Application	The application that will be run on this computer. *Views* specifies HotJava Views, and *browser* specifies HotJava Browser. You can add other applications as options to the Default Application list by using the Client Application Administration menu.
Select NC Locale	The language the user will be using with this network computer. For Asian languages, the input method should also be selected. See Chapter 11 for a detailed description on this topic.

TABLE 2-2 Local Parameters *(Continued)*

Option	Description
Select Keyboard	Select the keyboard for use with this network computer. Currently, only PS2 keyboards are supported
Dead Keys Support	This property controls the behavior of the accent keys ' " ~ and ^ for ISO Latin locales. If this property is enabled, these keys are dead keys. When a dead key is pressed, no value is generated until the NEXT key is pressed. To get a single quote character, press this key twice. If this property is disabled, these keys will generate their expected value.
Vendor Specific Options	The DHCP specification enables hardware and software vendors to create their own DHCP options. These options are delivered through the use of the Client Class Identifier option and the Vendor Options option. This field enables you to specify the vendor specific options. Be careful when you use this feature; the Netra j administration interface software does not validate the value you enter in this field. If you do not want the `login` prompt for an application to be run on the network computer, type `-djavaos.login=false`. See Chapter 9 for additional information.

Before you can set up the JavaStation clients, you must define the global parameters for the boot server. (You will define the local parameters when you set up the JavaStation clients.) If your server is already on the network and is properly configured, Netra j obtains most of the global parameters automatically. To verify this information or to make any changes, refer to the appropriate modules for instructions.

For instructions on defining boot server global parameters, see “Configuring Global Parameters” on page 48.

Setting Up JavaStation Clients

You can add JavaStation clients to the network in two ways:

There are two ways to add JavaStation clients to the network: using the Network Computer Administration module or using the Network Computer - Quick Setup module. The Network Computer Administration module has an Add function that

enables you to set up one JavaStation. Quick Setup enables you to set up many JavaStation clients at one time with identical configurations.TABLE 2-3 compares each method.

TABLE 2-3 Comparison of Methods to Add JavaStation Clients to the Network

Network Computer Administration	Network Computer - Quick Setup
For adding individual JavaStation clients;you add one JavaStation at a time	For adding groups of JavaStation clients (with the same configurations) at a time
You assign IP address	IP addresses are assigned automatically
IP addresses can be permanent or leased	IP addresses are leased

The two methods handle IP addressing differently. When you use Quick Setup, the assumption is that you are dealing with a large number of JavaStation clients. You are asked to specify a starting IP address and the number of JavaStation clients you want to be configured. Netra j then assigns IP addresses to JavaStationclients in the order it chooses. Also, addresses are leased rather than being assigned permanently.

On the other hand, if you use the Network Computer Administration Add function to configure a single JavaStation, you assign a unique IP address to the JavaStation, and you decide whether that IP address will belong to the JavaStation permanently or for a certain lease time.

After you set up IP addressing, the remaining fields (in both Quick Setup and Network Computer Administration Add) are for setting local parameters.

Once you have set up a JavaStation, either individually or as part of a Quick Setup group, you can go back and modify its original parameters with the Network Computer Administration Modify function.

See “Network Computer Server Administration” on page 48 and “Network Computers – Quick Setup” on page 52 for procedures.

HotJava Views Administration

Netra j provides a link to the HotJava Views Administration tool that enables you to configure the HotJava Views application that will be deployed to JavaStation clients. For instructions on accessing HotJava Views Administration, see the procedure “To Access HotJava Views Administration” on page 63.

Network Computer Operating System Administration

Use this form to update the operating system if you have a new version of the `javaos` binary. If your network computer has flash memory, the new binary will be stored in flash memory, and will be available for use when the network computer is rebooted or powered on.

Flash memory enables the JavaStation to store the latest version of JavaOS locally in non-volatile memory. Flash memory enables the JavaStation to boot faster. Use the Update Computer Operating System module to reconfigure the existing network environment to the new `javaos` binary. See “Updating Network Computer Operating System” on page 60 for procedures.

CHAPTER 3

Using Netra j Network Services Administration

This chapter describes the Network Services Administration modules:

- Anonymous FTP Administration—page 29
- Mail Administration—page 30
- Name Service Administration—page 36
- Network Computer Server Administration—page 48

Anonymous FTP Administration

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 enables 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 file access or read and write file access.

Use the Anonymous FTP module to configure your 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 download 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.

▼ To Configure Anonymous FTP

1. **From the Main Administration page, under "Network Services Administration," click Anonymous FTP.**

   The Anonymous FTP Administration page is displayed with the current state of the server.

2. **Complete the form using the information in** TABLE 3-1 **for reference.**

TABLE 3-1 Anonymous FTP Information

Option	Description
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 download 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.

3. **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`.

Mail Administration

The Mail Administration module enables you to do the following:

- To Configure a Server to Provide Mail Services—page 30
- To Modify Mail Services—page 33
- To Disable Mail Services—page 33
- To Create a Mail Alias—page 35
- To Modify or Delete a Mail Alias—page 35

If the Netra server is configured to provide mail services, it becomes a mail server (a mail gateway between clients on the LAN and the Internet) and a mail host (incoming mail to users are available in the directory `/var/mail`).

To activate mail services, you need the following information:

- The directory where the users' mailboxes will be
- Whether this will be a shared directory
- The format of the return address on outgoing mail

Mail Directories

The first choice concerns where users' incoming mail is kept. To users, the mailboxes appear to be in the directory `/var/mail`, but if space on the relevant disk partition is limited, it may be preferred for `/var/mail` to be a link to another directory. Previous versions of Netra linked `/var/mail` to `/export/mail`. Now the form asks whether mailboxes should be kept under `/var/mail` or whether `/var/mail` should be linked to another directory. If `/var/mail` is currently linked to another directory on the server, the user is informed of this, and there is a third option to keep this setup.

If the location of the mailboxes is changed, the mailboxes are moved to the new location from the current mail directory unless the `/var/mail` directory was mounted onto the Netra server from another server. In this case, the remote directory is simply unmounted, and the form displays a message indicating this action.

Directory Sharing

The second choice concerns whether the mailbox directory should be shared so that it can be mounted onto other computers. If the directory is to be shared, other computers can mount the Netra server's `/var/mail` directory so that it appears to be part of their own file system. The directory `/var/mail` can be mounted even if it is actually linked to another directory.

Mail Return Address Path Format

The third choice determines the format of the return address on outgoing mail, which can be either *user@host.domain* or *user@domain*. For example, suppose the Netra server's host name is `stimpy` and that the domain name is `tv.net` (as in FIGURE 3-1). With the `user@host.domain` format, mail from the user `setup` goes out as from the sender `setup@stimpy.tv.net`, while with the *user@domain* format it is `stimpy@tv.net`.

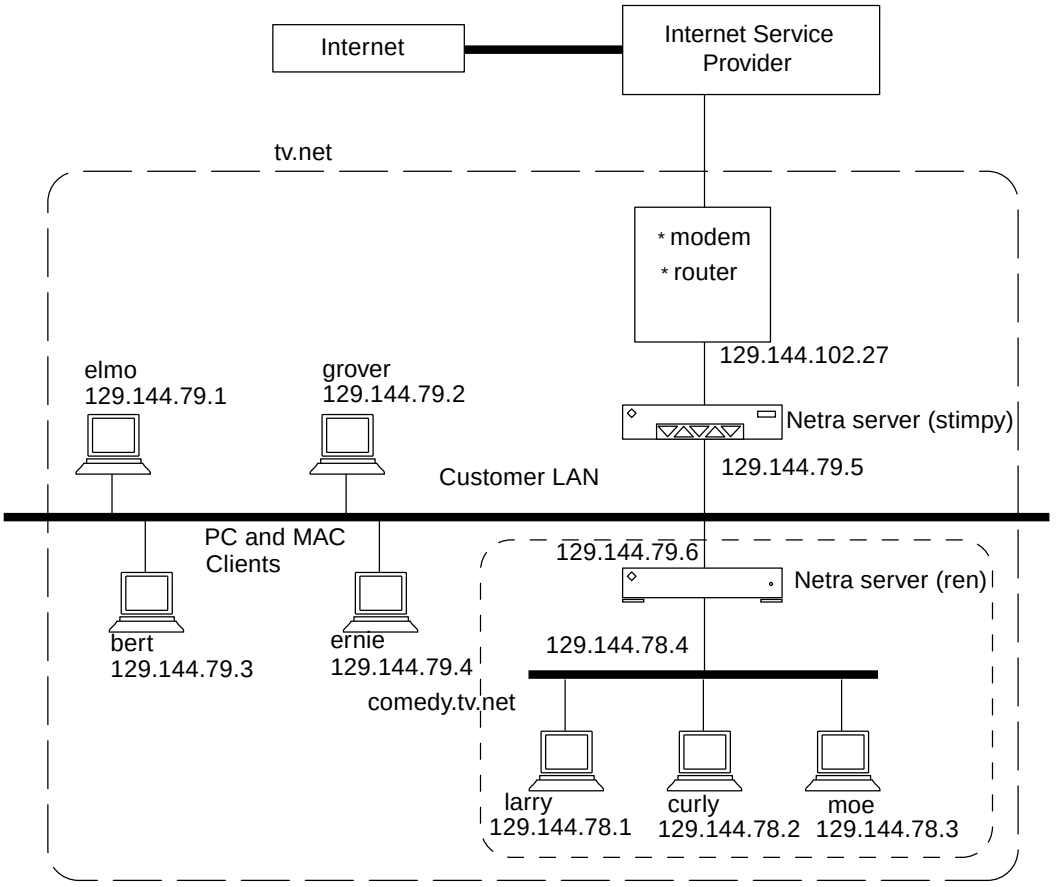

FIGURE 3-1 LAN That Uses the Netra Server as a Router

The return address is used when people reply to messages sent out by the Netra server. For mail using the *user@domain* format to find its way back, the domain name server needs to know that the Netra server deals with mail, so that it can be passed on. This is accomplished by adding an MX record to the DNS database. If the Netra server is acting as the primary domain name server, the MX record can be added through the Name Service module (See "Name Service Administration" on page 36). To add an MX record for `stimpy`, modify the primary domain by adding a line to the Mail Servers box, with Mail Addresses set to `tv.net.` (note the trailing dot), Preference set to 1 and Mail Server set to `stimpy`.

The Netra server supports both the imap4 and the pop3 mail protocols, and for mail services to work correctly, the name service must have an entry for each network interface on the server.

The choices made when activating the mail services can be changed at a later time. If the Mail Administration page is loaded when Netra mail services are active, the following links: "Modify the mail services" and "Disable the Netra mail services configuration" are displayed. The first link shows the same form as for the initial configuration, while the latter link restores the mail services to the state they were in before Netra mail services were activated.

▼ To Configure a Server to Provide Mail Services

1. **From the Main Administration page, under “Network Services Administration,” click Mail, then click Configure this server as mailhost and a mailserver.**

   The Mail Services Administration page is displayed.

2. **Complete the form using the information in** TABLE 3-2**.**

TABLE 3-2 Mail Administration

• Store mail in `/var/mail` • Link `/var/mail` to the directory: *newdirectory*	The users’ mailboxes are kept in either *olddirectory*, `/var/mail`, or *newdirectory*, yet appear to be `/var/mail`
Do you want the mail directory to be shared?	Determine whether other computers can mount to the mailbox directory. Select yes or no.
Mail return address path format is: *user@host.domain*	The return address on mail includes the host name of the Netra server.
Mail return address path format is: *user@domain*	The return address on mail does not include the host name of the Netra server. For the mail format of *user@domain* to be used, the DNS primary server must have a mail server record (MX record) added to its database.

▼ To Modify Mail Services

1. **From the Main Administration page, under “Network Services Administration,” click Mail, then click Modify the mail services.**

   The Mail Services Administration page is displayed.

2. **Complete the form using the information in** TABLE 3-2**.**

▼ To Disable Mail Services

1. **From the Main Administration page, under “Network Services Administration,” click Mail, then click Disable the Netra mail services configuration.**

   The Mail Services Administration page is displayed.

2. **Click OK to confirm the operation.**

Alias Administration

Mail aliases redirect mail sent to a name or to a list of recipients. The Netra alias administration enables you to add and modify aliases, which mail a copy of a message sent to the name, to one or more users. Typically, such aliases are used to distribute messages to an interest group or to redirect single users' mail, either because their mail should go to another server, or because they receive mail under an alternative name. Mail aliases that map names to a group of recipients are called as *mailing lists*, while mail aliases that map a name to a single user are called *alias names*.

Mailing Lists

An example of how you might use a mailing list is to send messages to you volleyball team members. You could create an alias with the name "vball" that has the email addresses of all the team members as the recipients. This way, mail sent to "vball" reaches the whole team without the sender needing to know the members' individual addresses (or even exactly who is on the team at any given point). When a member leaves or a new member joins, you update the alias.

Alias Names

Alias names redirect mail to single users. For instance, the user Tom Jones with user name "tom" may want to receive mail as "tjones". In this case, you would add an alias with the name "tjones" and the single recipient "tom." If John Smith, with user name "john," has left and wants to receive mail at his new address at "otherdomain," add an alias that maps "john" to "jsmith@otherdomain."

Configuring Aliases

Note – If no aliases are defined, only the Add a mail alias option is available. The Modify or Delete options are displayed only after at least one mail alias has been added.

▼ To Create a Mail Alias

1. **From the Main Administration page, under "Network Services Administration," click Mail, then click Add a mail alias.**

   The Add A Mail Alias page is displayed.

2. **Type the information in the form using** TABLE 3-3**.**

TABLE 3-3 Information for Mail Alias Administration

Alias Name	The name of the 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 • 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 receive mail sent to the alias. •Each listed user must be a valid mail address.

▼ To Modify or Delete a Mail Alias

1. **From the Main Administration page, under "Network Services Administration," click Mail.**

   The Mail Administration page is displayed.

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

   - To modify an existing alias, click Modify for the required alias and make the changes in the form using TABLE 3-3.
   - To delete an alias, select an alias, click Delete to remove the alias then confirm the operation.

Name Service Administration

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*. This is also referred to as the IP 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 difficult 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.comedy.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*.

The Name Services module enables you to do the following:

- To Configure the Netra Server as a Local Server—page 37
- To Configure NIS for the Netra Server—page 38
- To Modify or Unconfigure NIS Configuration—page 39
- To Configure the Netra Server as a DNS Server—page 42
- To Modify or Delete a DNS Server—page 43
- To Configure the Netra Server as a DNS Primary Server—page 43
- To Modify or Delete a DNS Primary Domain—page 45
- To Modify or Delete a DNS Secondary Domain—page 46
- To Configure the Netra Server as a DNS Secondary Server—page 46
- To Modify or Delete DNS Client Setup—page 47
- To Configure the Netra Server as a DNS Client—page 47

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 either on the Netra server or 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 queried in the order specified in the `/etc/nsswitch.conf` file.

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 the message “not found.”

Configuration Options

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

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, master or slave server.
- 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.)

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.

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.

▼ To Configure the Netra Server as a Local Server

1. **From the Main Administration page, under “Network Services Administration,” click Name Service, then click Local Name Service.**

   The Local Name Server Administration page is displayed.

2. **Complete the form using the information in** TABLE 3-4**.**

TABLE 3-4 Local Name Server Administration

Host Information	Description
Host Addresses / Host Names / Aliases	The host addresses and corresponding host names and aliases.The host names may be partially or fully qualified to be compatible with other name services. However, this database resolves only host names that have an exact match in the database. Maximum 2000 records.

NIS

The network information service (NIS) provides name services and other information, such as users on the network, for a local network. If there is a NIS server on the network, use the Netra Name Service module to configure the Netra server as a NIS client. This means that it uses NIS to resolve host names, host addresses and host aliases.

The Netra j software provides NIS client / master capability, but only for the `passwd.byname`, `passwd.byuid`, and `auto.home` maps that are required by the JavaStation. If you want to configure the Netra j server as a NIS slave server, you must configure it as a NIS client machine first.

▼ To Configure NIS for the Netra Server

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click NIS (Network Information Name Service).**

   The NIS Configuration page is displayed.

2. **Complete the form using the information in** TABLE 3-5**.**

TABLE 3-5 NIS Configuration

NIS Domain	Description
NIS Domain Name	The NIS domain in which the Netra server resides.
NIS Client	Select this option to be a NIS client only. A NIS server for this domain must exist on the same subnet as the Netra server.

TABLE 3-5 NIS Configuration

NIS Domain	Description
NIS Master Server	Select this option to provide NIS information to other NIS clients. The Netra administration provides only the following maps: `auto.home`, `passwd.byname`, `passwd.byuid`, and `ypservers`.
NIS Slave Server	Select this option to provide NIS information to other NIS clients when there is no other NIS server on your subnet. The NIS maps must exist on a different server (the NIS master server) and must be tranferred to the Netra server. If this option is selected, all maps are transfered from the master server immediately.
Map Master	The host name or host address of the NIS master server. This field is relevant only for slave servers.

▼ To Modify or Unconfigure NIS Configuration

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

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click NIS (Network Information Name Service).**

   The NIS Administration page is displayed.

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

   - To modify NIS configuration, click Modify, update the form using the information in TABLE 3-5, and confirm the operation.
   - To unconfigure an NIS configuration, click Delete NIS, and confirm the operation. The Netra server no longer uses NIS to resolve host names, and the NIS domain name is ignored.

DNS

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. Contact your ISP for a domain name, which they can register for a fee.

The host name of a system, together with its full domain specification, makes up a complete DNS name. For example, FIGURE 3-2 shows the DNS name comprise `ren.comedy.tv.net`. The machine `ren` is a node residing in the subdomain `comedy` within in the subdomain `tv`, which is in the domain `net`.

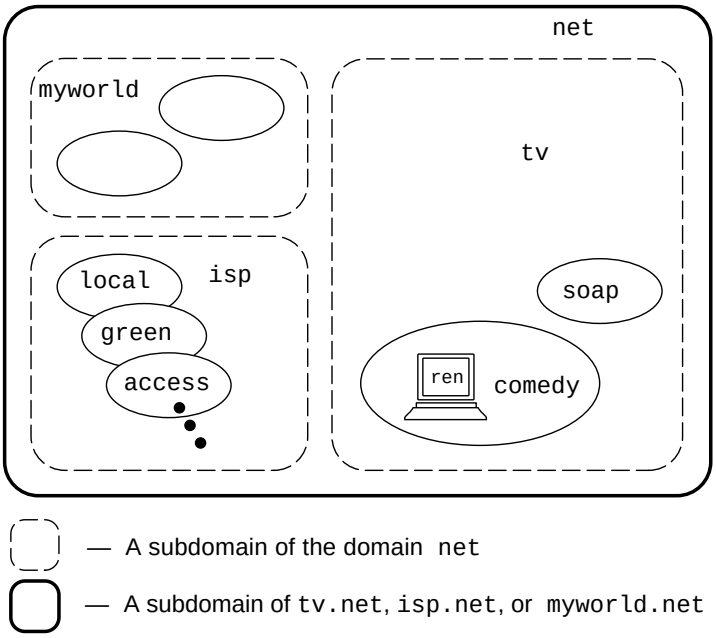

FIGURE 3-2 Example of DNS Domains

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, in this example 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 subdomain for resolution. (Thus, the name `ren.comedy.tv.net` is forwarded from `tv`'s DNS server to the DNS server for the subdomain `comedy` for resolution.)

DNS Configuration Options

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

DNS Client

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.

DNS Server

As a DNS server, the Netra server can cache the result of name service queries. This means that repeat queries can be answered locally rather than through contacting the source name server again. That is, until the information becomes out of date. This is called a *cache-only server.*

A *primary domain server* maintains an authoritative master database with information about a domain which it propagates to other name servers. It should have a secondary name server, either on the LAN or with the ISP, as a backup.

A *secondary domain server* keeps a local copy of a master database for a domain which it retrieves from the primary DNS server for the domain. It periodically compares its database to that on the primary DNS server and requests a new copy if a difference is detected. While standard caching only stores the results from previous queries, a secondary domain server actively retrieves all the domain information in anticipation of future requests. This reduces the load on the primary server and also makes it a backup in case the primary server cannot be contacted.

On an intranet without an Internet connection, or on a large network with several subdomains served by separate DNS primary domain servers, an internal *root name server* is needed. The root name server keeps a database of the primary domain servers for the subdomains, and delegates queries to these servers.

Configuring the DNS Server

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 a primary domain is added, enter the name of the domain and host name/host address pairs for the machines on the domain. In addition, host aliases (CNAME records), information about mail servers (MX records), and/or other name servers may be entered. To configure the Netra server as a root server, enter the domain name `root` and add the names of the DNS primary domain servers in the name servers field.

When adding a secondary domain, specify the name of a domain and the IP address of a DNS server for that domain. The Netra server copies and cache all the information about this domain in anticipation to queries.

▼ To Configure the Netra Server as a DNS Server

If you configure the Netra server as a DNS server, it is usually best to also configure the Netra server to be a client of this DNS server. You must configure the DNS server first and then configure it as a client.

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**
2. **Under "DNS Administration," click Configure DNS Server.**

   The DNS Server Administration page is displayed.

3. **Complete the form using the information in** TABLE 3-6**.**

TABLE 3-6 DNS Server Administration

DNS Server Information	Description
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`
Generate Reverse Maps	When this box is checked, Netra automatically generates the reverse maps (address to name records) for every host address / host name pair entered when configuring a primary domain. This assumes that the IN-ADDR.ARPA authority has been delegated to your site. Consult with your Internet Service Provider before changing the default checked state.

▼ To Modify or Delete a DNS Server

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**

   The DNS Administration page is displayed.

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

   - To modify a DNS server, click Modify, and make the changes in the form using TABLE 3-6 as a reference.
   - To delete a DNS server, click Delete; then confirm the operation.

▼ To Configure the Netra Server as a DNS Primary Server

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**

2. **Under "DNS Administation," click Add a primary domain.**

   The Add DNS Primary Domain page is displayed.

3. **Complete the form using information in** TABLE 3-7**.**

TABLE 3-7 DNS Primary Server Administration

DNS Primary Server Information	Description
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 / Host Addresses	The host names and corresponding host addresses of the hosts within the specified domain.
Host Aliases / Host Names	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 Addresses / Mail Server / Preferences	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.
Domains / 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.

For example, assume that a master database for the domain `comedy.tv.net` is to be set up. In the Primary Domain Name field, specify:

```
comedy.tv.net
```

In the Host Names / Host Addresses field, type a list of those hosts whose presence are to be broadcast to any machine which can connect to this DNS server. For this example, type `ren`, `stimpy`, and `homer`, a host that resides on the subnet `black.comedy.tv.net`.

```
ren                     129.1.1.2
stimpy                  129.1.1.3
homer.black             129.2.1.2
```

The Internet community uses conventional names for hosts that provide certain types of services, in order to make them easy to locate. For instance, the WWW server for a domain is usually known as `www.domain` and an anonymous FTP server is typically called `ftp.domain`. On `comedy.tv.net`, `ren` is an FTP and WWW server, while `stimpy` is a name server. Standard aliases for these machines are added into the Host Aliases / Host Names field:

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

`stimpy` is going to handle mail sent to `comedy.tv.net` so an MX record needs to be created:

```
comedy.tv.net         5       stimpy
```

If a domain contains subdomains, the DNS primary domain server for the domain must know a DNS server for the subdomain. `comedy.tv.net` has a subdomain called `black`, whose DNS primary domain server is called `homer`. `homer` resides on that domain, so in order for the Netra DNS server to reach `homer` when it needs to request name services for that domain, it has to know `homer`'s IP address. That is why `homer.black` was added to the list of known hosts.

▼ To Modify or Delete a DNS Primary Domain

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**

   The DNS Primary Domain page is displayed.

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

   - To modify a DNS primary domain, click Modify, and make the changes in the form using TABLE 3-7 as a reference.
   - To delete a DNS primary domain, click Delete; then confirm the operation.

▼ To Configure the Netra Server as a DNS Secondary Server

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**
2. **Under "DNS Administration," click Add a secondary domain.**

   The Add DNS Secondary Domain page is displayed.
3. **Complete the form using the information in** TABLE 3-8**.**

TABLE 3-8 DNS Secondary Server Administration

DNS Secondary Server Information	Description
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. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**

   The DNS Secondary Domain page is displayed.
2. **Choose one of the following:**
   - To modify a DNS secondary domain, click Modify, and make the changes in the form using the information in TABLE 3-8.
   - To delete a DNS secondary domain, click Delete then confirm the operation.

Note – If a Netra server configured as a DNS server is installed on top of an operational system that is configured as a NIS server, the NIS server prevents the DNS server from running correctly unless it is configured to co-exist with DNS. To ensure that it is, edit the `/var/yp/Makefile` file (which makes the NIS server), replacing the line `B=` with `B=-b` and then run `make`.

Configuring the DNS Client

If you configure the Netra server as a DNS server, you should also configure the Netra server to be a client of this DNS server. You must configure the DNS server first and then configure it as a client.

▼ To Configure the Netra Server as a DNS Client

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**
2. **Under "DNS Administration," click Configure DNS Client.**

   The DNS Client Administration page is displayed.
3. **Complete the form using the information in** TABLE 3-9**.**

TABLE 3-9 DNS Client Administration

Option	Description
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 (optional)	The host address of the DNS server to use, if the first name server is unreachable. Example: `129.144.79.6`
Name Server 3 (optional)	The host address of the DNS server to use, if the first two name servers are unreachable. Example: `129.144.102.6`

If the Netra server is configured to be a DNS server as well as a DNS client, type the same domain name as for the DNS server, and then set Name Server 1 to be `127.0.0.1` (the loopback address).

▼ To Modify or Delete DNS Client Setup

1. **From the Main Administration page, under "Network Services Administration," click Name Service, then click DNS (Domain Name Service).**

   The DNS Administration page is displayed.
2. **Choose one of the following**:
   - To modify a DNS client setup, click Modify, and make the changes in the form using TABLE 3-9 as a reference.
   - To delete a DNS client setup, click Delete then confirm the operation.

Network Computer Server Administration

This section is divided into topics that enable you to set up servers for your network environment and to set up and configure HotJava Views for JavaStation clients:

- Configuring Global Parameters—page 48
- Web Server Document Root Administration—page 51
- Network Computers – Quick Setup—page 52
- Network Computer Administration—page 55
- Network Computers – Local Printer Setup—page 57
- Client Application Administration—page 58
- Updating Network Computer Operating System—page 60
- HotJava Views Administration—page 60

Configuring Global Parameters

You can modify the global parameters that will be used by the boot server for all network computers. The global parameters are described in TABLE 3-10.

TABLE 3-10 Network Computer Global Parameters

Parameters	Description
NIS Domain Name (optional)	The NIS or NIS+ domain name in which the network computers reside.
NIS Server Address(es) (optional)	The list of host address(es) of NIS or NIS+ servers for the network computers. List of NIS or NIS+ server addresses configured in the network computer server database is displayed.
DNS Domain Name	The DNS domain name in which the network computers reside.
DNS Server Address(es)	The host address of the DNS server for the network computers.
Boot Server Address	The host address of the network computer boot server on the local network.
Time Server Address	The IP address of a server supporting the network time protocol (NTP).
Router Address(es) (optional)	The list of host address(es) of the routers to be used by the network computers. If not given, JavaOS will broadcast looking for a router. List of router addresses configured in the network computer server database is displayed.

TABLE 3-10 Network Computer Global Parameters

Parameters	Description
Lease Time (in days)	The duration (in days) of the IP address lease to the network computer client. A value of -1 specifies an infinate lease. By default, this field is set to 3 days. After this period of time has expired with no DHCP server sending a DHCPACK packet, JavaOS shuts down the networking port.
Lease Negotiation	A “Yes” or “No” flag indicating whether lease negotiation is to be performed. If the lease time is set to the value “infinite” (-1), indicating "Yes" has no meaning.
Network Interfaces	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.
Input Method Server (optional)	A server with a language engine to interpret the keyboard input method (for Korean, Chinese, and Japanese languages only). This server must be running a localized version of Solaris.
Input Method Port (optional)	The port number of the IIIMP server for the network computer. The IIIMP port number configured in the network computer server database is displayed.
Time Zone	Specify the timezone in which the JavaStation clients are located. This is a 3-letter field. For example, GMT. If an invalid time zone is specified, the time zone on the JavaStation clients default to GMT. By default the time zone specified in the network computer server database is displayed.
Fonts Server (optional)	The host address or host name of the fonts server for the network computers. Font server configured in the network computer server database is displayed. Server address is required if the fonts directory is specified.
Fonts Directory (optional)	The directory location of the fonts for the network computers. If a fonts server is specified, a fonts directory is required.
Localized Resources Server (optional)	The host address or host name of the localized resources server for the network computers. The server address is required if the localized resources directory is specified.

TABLE 3-10 Network Computer Global Parameters

Parameters	Description
Localized Resources Directory (optional)	The directory location of the localized resources for the network computers. If a localized resources server is specified, this directory is required.
Login Locales List (optional)	The list of locales to be presented as choices to the user loging on to a network computer. By default the locales specified in the network computer server database are selected
JavaOS Command Line (optional)	A list of definitions of either JavaOS or system properties. A formatted text string that can be delivered by DHCP or other methods. There are no spaces between the option and the value. Different command line options are separated by a space. Exact syntax must be used to specify the command line options. By default, all JavaOS and system properties configured in the network computer server database (using `JOScmd1`) are displayed.

▼ To Configure Global Parameters

1. **From the Main Administration page, under "Network Services Administration" click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under "Basic NC Server Administration," click Configure Global Parameters.**

   The Global Parameters Administration page is displayed.

3. **Complete the form using the information in** TABLE 3-10**.**

▼ To Modify or Unconfigure Global Parameters

1. **From the Main Administration page, under "Network Services Administration" click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

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

   - To modify global parameters, click Modify Global Parameters, and make the changes in the form using TABLE 3-10 as a reference.
   - To unconfigure global parameters, click Unconfigure Global Parameters.

▼ To Specify the Fonts Server

JavaOS mounts the Fonts directory at startup. Add the property setting to specify the location of the Fonts directory by defining it in global parameters.

1. **From the Main Administration page, under “Network Services Administration” click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under “Basic NC Server Administration,” click Configure Global Parameters.**

   The Global Parameters Administration page is displayed.

3. **From the JavaOS Command Line field, type:**

```
-djavaos.mountlist=server:font_directory/FONTS
```

Web Server Document Root Administration

The web server document root is the root directory of the web server running on your system. The documents under this root are accessible to any system connected to the web server (provided the user has permissions). If a file is not under this root directory, then it cannot be accessed through the web server. Netra j requires the document root information to set up the default application of the client.

By default, Netra j sets up HotJava Views and HotJava Browser as main application options available through the Network Computer Server Administration module. Network computers can access these applications by either mounting to the respective application directory or by specifying a URL. Through `document root`, Netra j creates a link to Hotjava Views or Hotjava Browser. Netra j also sets up the `dhcptab` entries in `document root` so that the file names can be used in `dhcptab`.

Note – Netra j will not allow you to add a new main application or a network computer without setting up `document root`.

▼ To Configure a Web Server

You will need to know the document root of the default web server. If you installed Sun WebServer during installation, you can start Sun WebServer on `port 80`. The default `document root` for SunWebServer on `port 80` is `/var/http/demo/public`.

1. **From the Main Administration page, under “Network Services Administration” click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

1. **Under “Basic NC Server Administration,” click Web Server Documentation Root Administration.**

   The Web Server Document Root Administration page is displayed.

2. **Complete the form using the information in** TABLE 3-11**.**

TABLE 3-11 Web Server Parameters

Options	Description
Select Web Server	Select the default web server that will be running from the boot server at `port 80`.
Full Path Name of the Document Root	Enter the absolute path of the `document root` for the default web server. For example, if Sun WebServer is running on `port 80`, then refer to the file `/etc/http/httpd.conf` and find the keyword `doc-root`. The default `document root` for Sun WebServer is `/var/http/demo/public`. If Netscape web server is running on port 80, then refer the file `/usr/local/netscape/nse-home/https-ServerName/config/obj.conf` and find the keyword `document root`.

Network Computers – Quick Setup

You can use the quick setup administration to set up many network computers with the same parameters. This module enables you to identify the starting IP address, the number of NCs, the lease time, the NC locale, keyboard, dead keys, vendor-specific options and the default application for these clients.

Quick Setup works for network computers that only use DHCP for initial configuration. If your network computer uses reverse address resolution protocol (RARP) for initial configuration, you need to assign the Ethernet address of the network computer using the Modify option of the Network Computer Administration menu.

▼ To Use Quick Setup for Network Computers

1. **From the Main Administration page, under “Network Services Administration” click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

1. **Under “Basic NC Server Administration,” click Network Computer – Quick Setup.**

   The Network Computers - Quick Setup Administration page is displayed.

2. Complete the form using the information in TABLE 3-12**.**

TABLE 3-12 Quick Setup Administration

Option	Description
Host Name Prefix	The host name of any network computer will be generated using the name_prefix. If the IP address of the network computer is aa.bb.cc.dd, then the generated host name for this computer will be `name_prefix-dd`.
Starting IP Address	The initial host address you want to assign to the network computers being set up. If a host address is already used by some other system in the network, that address will be bypassed.
Number of NCs	The number of network computers you want to set up. Note that if an IP address is already used in the network, that address will not be used, resulting in one less client that will be set up.
Enter Lease Time (days)	All network computers have a temporary lease. The lease time is the duration (in days) of the IP address lease to the network computer client. A value of -1 specifies an infinate lease. By default, this field is set to 3 days. After this period of time has expired with no DHCP server sending a DHCPACK packet, JavaOS shuts down the networking port.
Default Application	The application that will be run on this computer. *Views* specifies HotJava Views, and *browser* specifies HotJava Browser. You can add other applications as options to the Default Application list by using the Client Application Administration menu.
Select NC Locale	The language the user will be using with this network computer. For Asian languages, the input method should also be selected. See Chapter 11 for a detailed description.

TABLE 3-12 Quick Setup Administration *(Continued)*

Option	Description
Select Keyboard	The keyboard that will be used with this network computer. Currently, only PS2 keyboards are supported
Dead Keys Support	This property controls the behavior of the accent keys ' " ~ and ^ for ISO Latin locales. If this property is enabled, these keys are dead keys. When a dead key is pressed, no value is generated until the NEXT key is pressed. To get a single quote character, press this key twice. If this property is disabled, these keys will generate their expected value.
Vendor Specific Options	The DHCP specification enables hardware and software vendors to create their own DHCP options. These options are delivered through the use of the Client Class Identifier option and the Vendor Options option. This field enables you to specify the vendor specific options. Be careful when you use this feature; the Netra j administration interface software does not validate the value you enter in this field. If you do not want the `login` prompt for an application to be run on the network computer, type `-djavaos.login=false`. See Chapter 9 for additional information.

Network Computer Administration

You can add, modify or delete network computers from a specific boot server. You should complete server administration prior to completing client administration. This module enables you to specify the information listed in TABLE 3-13.

TABLE 3-13 Local Parameters Administration

Options	Description
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. The first character must be alphabetic.
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).
Ethernet Address	This address is a number that uniquely identifies each computer. It is built into the hardware of each computer and is displayed at boot time. The Ethernet address is composed of six hexadecimal numbers separated by colons; each number is in the range 0 - ff. Upper- or lower- case letters can be used to specify non-decimal digits.
Host Address Assigned by	The value of this field defines whether the IP address lease is turned on. If the host address is managed by the administrator, then the lease is turned off and the IP address is assigned to this network permanently and the value of next field `lease_time` is ignored. If the host address is managed by a server, then the IP address will be leased for the time is specified in the `lease_time` field.
Enter Lease Time	All network computers have a temporary lease. The lease time is the duration (in days) of the IP address lease to the network computer client. A value of -1 specifies an infinate lease. By default, this field is set to 3 days. After this period of time has expired with no DHCP server sending a DHCPACK packet, JavaOS shuts down the networking port.
Select NC Locale	The language the user will be using with this network computer. For Asian languages, the input method should also be selected.
Default Application	The application that will be run on this computer. *Views* specifies HotJava Views, and *browser* specifies HotJava Browser. You can add other applications as options to the Default Application list by using the Client Application Administration menu.

TABLE 3-13 Local Parameters Administration *(Continued)*

Options	Description
Select Keyboard	Select the keyboard for use with this network computer. Currently, only PS2 keyboards are supported
Dead Keys Support	This property controls the behavior of the accent keys ' " ~ and ^ for ISO Latin locales. If this property is enabled, then these keys are dead keys. When a dead key is pressed, no value is generated until the NEXT key is pressed. In order to get a single quote character, this key must be pressed twice consecutively. If this property is disabled, then these keys will generate their expected value.
Vendor Specific Options	The DHCP specification allows for hardware and software vendors to create their own DHCP options. These options are delivered through the use of the Client Class Identifier option and the Vendor Options option. This field enables you to specify the vendor specific options. Be careful when you use this feature. The Netra j administration interface software does not validate the value you enter in this field. If you do not want the `login` prompt for an application to be run on the network computer, enter `-djavaos.login=false`. See Chapter 9 for additional information.

▼ To Add a Network Computer

1. **From the Main Administration page, under "Network Services Administration" click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under "Network Computers Administration, " click Network Computer Administration.**

   The Network Computer Administration page is displayed.

3. **Under "New Network Computers," click Add a network computer.**

   The Add a Network Computer Administration page is displayed.

4. **Complete the form using the information in** TABLE 3-13**.**

▼ To Modify or Delete a Network Computer

1. **From the Main Administration page, under "Network Services Administration" click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under “Network Computers Administration, “ click Network Computer Administration.**

   The Network Computer Administration page is displayed.

3. **Choose one of the following:**

   - To modify a network computer, click Modify, and make the changes in the form using TABLE 3-13 as a reference.
   - To delete a network computer, click Delete then confirm the operation.

Network Computers – Local Printer Setup

You can enable a local printer and connect it to a specific network computer. You will need to setup the network computer prior to setting up the local printer.

▼ To Set Up a Local Printer

1. **From the Main Administration page, under “Network Services Administration” click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

1. **Under “Network Computers Administration, “ click Network Computers – Local Printer Setup.**

   The Network Computer – Local Printer Setup window is displayed.

   Complete the form using the information in TABLE 3-14**.**

TABLE 3-14 Local Printer Setup Options

Option	Description
Select Network Computer	Choose the network computer for this local printer setup.
Select Bit Rate	The bit rate of the serial port. The bit rate is the rate at which data is sent over a communication line. The default bit rate is 4800.
Number of Data Bits	The number of data bits. The default is 7.

TABLE 3-14 Local Printer Setup Options

Option	Description
Number of Stop Bits	The number of stop bits. Stop bits are extra "1" bits which follow the data and any parity bit. They mark the end of a unit of transmission (normally a byte or character). The default is 1.
Select Parity	The parity. An extra bit added to a byte or word to reveal errors in transmission. Even (odd) parity means that the parity bit is set so that there are an even (odd) number of one bits in the word, including the parity bit. The default is “no parity.”
Enter Handshake	The handshake identifier. A handshake is the exchange of predetermined signals between the network computer and local printer to assure each that it is connected to the other (and not to an imposter). The default is hh.

Client Application Administration

The client application will be the user’s desktop environment on the JavaStation. In the Netra j administration interface, the current list of client applications includes HotJava Views and HotJava Browser. You can add additional applications to the list by using the Client Administration module.

The application must be a Java application. You cannot use applets as a main application on a JavaStation computer.

To add a client application, you must know the main class for the application, the home property file, and the `.zip` file that contains all the classes.

▼ To Add a Client Application

1. **From the Main Administration page, under “Network Services Administration” click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under “Advanced NC Server Administration, “ click Client Application Administration.**

   The Client Application Administration page is displayed.

3. **Under “New Application,” click Add an Application.**

   The Add a Client Application window is displayed.

4. **Complete the form using the information in** TABLE 3-15**.**

TABLE 3-15 Client Application Administration

Option	Description
Application Name	The name of the application. This name will be used in other places within the Netra administrative interface to refer to this application.
Main Class of the Application	The name of the main class where the Java application is defined. The client loads the main class to start the application.
Application Archive (Zip) URL	The archive (zip) file that contains all the classes. The client downloads the application before starting it. If you need to create a archive, see Appendix .
Home Property of the Application	The value of this field depends on the application. Applications use different property names for the path to use for their home directory. This needs careful attention. The application needs this attribute to find its configuration files. For example, HotJava Browser uses `hotjava.home` and Marimba Tuner uses `tuner.home`.
Application Startup Options	The value of this field depends on the application. If the application has an option that can be provided while starting up, that option can be specified here. If the URL of the default web page is provided, HotJava Browser can come up with that URL.

▼ To Modify or Delete a Client Application

1. **From the Main Administration page, under "Network Services Administration" click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under "Advanced NC Server Administration, " click Client Application Administration.**

   The Client Application Administration page is displayed.

3. **Choose one of the following**:

   - To modify a client application designation, click Modify, and make the changes in the form using TABLE 3-15 as a reference.
   - To delete a client application, click Delete then confirm the operation.

Updating Network Computer Operating System

Use this form to update the operating system if you have a new version of the `javaos` binary. If your network computer has flash memory, the new binary will be stored in flash memory, and will be available for use when the network computer is rebooted or powered on.

Flash memory enables the JavaStation to store the latest version of JavaOS locally in non-volatile memory. Flash memory enables the JavaStation to boot faster. Use the Update Computer Operating System module to reconfigure the existing network environment to the new `javaos` binary.

▼ To Update New `javaos` Binary

1. **From the Main Administration page, under "Network Services Administration" click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under "Advanced NC Server Administration, " click Update Network Computer Operating System.**

   The Update Network Computer Operating System window is displayed.

3. **Complete the form using the information in** TABLE 3-16**.**

TABLE 3-16 Update NC Operating System Administration

Options	Description
Full path name of the new binary	The absolute path of the new JavaOS binary file.
Select client architecture	The selected architecture for this binary.

Note – You can only update flash memory in JavaStation client tower models.

HotJava Views Administration

You can specify HotJava Views as the main application for JavaStation clients. This section briefly describes HotJava Views administration. See HotJava Views Administration online help for complete information.

HotJava Views offers the following integrated components:

- *Selector* - An environment manager with a push-button interface for switching between applications.
- *MailView* - An IMAP4 mail client for composing, sending, and saving messages and handling a variety of attachments.
- *CalendarView* - A calendar client for managing personal and group calendars
- *NameView* - An enterprise name directory service client that retrieves and displays a configurable set of fields and enables contact via email, URLs, and calendar data
- *WebView* - An HTML 3.2-capable web browser (URL access can be restricted by the system administrator)

HotJava Views Model

HotJava Views enables the zero client-administration network computer and also attempts to minimize server-side administration. Users are organized into groups in HotJava Views, and each group has its own profile, or set of properties.

Through HotJava Views Administration, you can define groups of users that share client properties, specify applications to appear in the Selector, specify any sliding panels that appear from the edges of the screen, administer other properties that affect the user's experience, and specify properties for particular network computers.

Selector refers to the vertical bar on the left side of the HotJava Views window where the applications buttons are located. It is easiest to think of Selector as being synonymous with HotJava Views itself. MailView, CalendarView and NameView are all applets that run within Selector, and their icons appear on the Selector bar.

When the JavaStation client boots, a URL is passed to Selector, which is a pointer to the initial configuration file. Once Selector locates the web server, it loads its set of properties files.

Properties

HotJava Views is controlled by a set of eight properties files. There are property files at the group, user, and client levels.

- *Group properties* - Each user is normally a member of a group and inherits the group properties. Group properties are usually the main source of the final properties. Users who are not members of a group inherit the group properties of the group currently designated as the “default”group. There are both initial and final group property files.
- *User properties* - Stored in the user’s home directory. Initial group properties are overridden by the user’s individual property file. Note that user properties cannot be administered by this Web-based interface.

- *Client properties* - Client properties are specific to a given network computer. They typically control a few items, such as the default printer, that are specific to the physical location of the JavaStation.

Administering Views

The HotJava Views administration is conducted from within a web browser. There is a link from the Netra J 2.0 software to this set of web pages. The link points to a web page that offers the choice of configuring the HotJava Views client applications or configuring the back-end services (for example, NameView database).

See "To Access HotJava Views Administration" on page 63 for instructions on accessing the link to this administration tool.

Note – To access the HotJavaViews Administration module, you should run Netra j on HotJava Browser 1.1. All other Netra j administrative modules are supported by any industry-standard browser.

Client-Side Administration

Upon selecting the HotJava Views client-side administration, a web page with an embedded applet is displayed. The applet contains the major tasks needed to configure HotJava Views client applications:

- *Overview* – Explanatory text that describes the overall flow of the administration applet. When first entering this applet, this button is highlighted and the overview text is displayed. This page will also have some pointers to task-based help (how to configure a selector, how to configure drawers, and other tasks).
- *Application Palette* – To add and configure the global properties of the applications that can be used in the selector and drawers.
- *Groups & Configuration* – Configuring what users are in what groups and defining the selector applications, sliding panels, and application properties specific to each group.
- *Network Computer Props* – Properties that are specific to a network computer hardware client, overriding properties set by the user or group. For example, you may have a public-use JavaStation that uses the printers nearest to it, rather than the printers assigned by the group or user.

Note – At this time, HotJava Views does not support locales other than English. If you configure a JavaStation client to a locale other than English, HotJava Views will not display on the JavaStation.

Server-Side Administration

Configuring the server-side application services includes properties associated with the back-end server that the client applications connect to. These applications include Welcome, WebView, MailView, CalendarView and NameView.

▼ To Access HotJava Views Administration

HotJava Views Administration can be run only from HotJava Browser supplied with Netra j 2.0. Make sure that HotJava Browser is installed before proceeding with this procedure. If you've installed HotJava Browser to the, you can run HotJava Browser by issuing the command `/opt/SUNWnhjb/bin/hotjava`.

1. **From the Main Administration page, under "Network Services Administration" click Network Computer Server.**

   The Network Computer Server Administration page is displayed.

2. **Under "NC Webtop Applications Administration, " click HotJava Views Administration.**

   The HotJava Views Administration window is displayed.

3. **From the Main HotJava Views Administration page, click Edit ➤ Preferences ➤ Applet Security.**

4. **Set preferences to LOW for signed applets and MEDIUM for unsigned applets.**

   - Signed applets contain a signature (a sequence of data embedded in the applet's code) and protects the applet against tampering. It is placed in the code by the originator of the applet.
   - Unsigned applets do not have protection against tampering.

5. **Refer to the HotJava Views Administration online help for information on how to use HotJavaViews Administration.**

CHAPTER 4

Using Netra j Network Connection Administration

This chapter describes the Network Connection Administration modules:

- Local Area Network Administration—page 65
- Modem Administration—page 67
- Routing Administration—page 72

Local Area Network Administration

This section 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.)

A network interface consists of three elements: the network port, the network protocol, and the interface definition.

- 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 or PCI cards in the server. The Netra server supports the following types of network hardware:

- Lance Ethernet
- Fast Ethernet
- Fast Ethernet 100 BASE-T

- Quad Fast Ethernet
- Token Ring
- Fiber Channel (FDDI)

- Network protocol

The *network protocol* defines the communication that travels over the network. The Netra server supports TCP/IP network protocols. The TCP/IP network protocol suite supports the definition of multiple interfaces for a network hardware port and network protocol.

- 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.

Note – If no network interface is configured, or if the network interface is improperly configured, the Netra server will have difficulty rebooting.

▼ To Add a Network Interface

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

1. **From the Main Administration page, under "Network Connection Administration," click Local Area Network.**

   The Local Area Network Administration page is displayed with a list of network interface hardware to configure.

2. **Click Add a TCP/IP Interface for the required network interface.**

   An administration page for the selected interface and protocol is displayed.

3. **Complete the form using the information in** TABLE 4-1**.**

TABLE 4-1 Network Interface Administration: TCP/IP

Option	Description
Host Name/Address	The host name and 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

▼ To Modify a Network Interface

1. **From the Main Administration page, under “Network Connection Administration,” click Local Area Network.**

   The Local Area Network Administration page is displayed with a list of network interface hardware to configure.

2. **Click Modify a TCP/IP Interface for the required network interface.**

   An administration page is displayed with existing configuration information for the selected interface and protocol.

3. **Complete the form using the information in** TABLE 4-1**.**

▼ To Delete a Network Interface

1. **From the Main Administration page, under “Network Connection Administration,” click Local Area Network.**

   The Local Area Network Administration page is displayed with a list of network interfaces to delete.

2. **Click Delete for the interface you want to remove, then confirm the operation.**

Modem Administration

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

PPP enables 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 70. 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 70.

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 71.

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 68. (Note that this option will not be displayed until at least one modem is assigned to a port.)

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. **Choose Modem ➤ Add a remote host connection.**

   The Add A Remote Host Connection page is displayed.

2. **Complete the form using the information in** TABLE 4-2**.**

TABLE 4-2 Modem Remote Host Administration

Option	Description
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
Login String	The UUCP-style chat script used 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.
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. **From the Main Administration page, under "Network Connection Administration," click Modem.**

   The Modem Administration page is displayed.

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

   - To modify an existing remote host connection, click Modify, and complete the form using the information in TABLE 4-2 as a reference.
   - To delete a remote host connection, click 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. **From the Main Administration page, under "Network Connection Administration," click Modem.**

   The Modem Administration page is displayed.

1. **Under "Modem Definitions," Add a modem definition.**

   The Add a Modem Definition page is displayed.

2. **Complete the form using the information in** TABLE 4-3**.**

TABLE 4-3 Adding/Modifying a Modem Definition

Option	Description
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

1. **From the Main Administration page, under "Network Connection Administration," click Modem.**

   The Modem Administration page is displayed.

2. **Under "Modem Definitions," click 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. **From the Main Administration page, under "Network Connection Administration," click Modem.**

   The Modem Administration page is displayed.

2. **Choose one of the following.**
   - To modify an existing modem definition, click Modify, and complete the form using the information in TABLE 4-3 as a reference.
   - To delete a modem definition, click Delete, then confirm the operation.

Modem Port Assignments

You can assign a modem to a serial port using the Network Connection Administration page.

▼ To Assign a Modem to a Serial Port

1. **From the Main Administration page, under "Network Connection Administration," click Modem.**

   The Modem Administration page is displayed.

1. **Under "Port Assignments," click 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 4-4**).**

TABLE 4-4 Modem Assignments

Option	Description
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

You can change, view or delete modem log files using the Network Connection Administration.

▼ To Change the Log File Detail Level

1. **From the Main Administration page, under "Network Connection Administration," click Modem.**

   The Modem Administration page is displayed.

1. **Under “Modem Log file,” Change log file detail level.**

   The Modem Log File Detail Level page is displayed.

2. **Choose a level of detail (see** TABLE 4-5**):**

TABLE 4-5 Modem Log File Detail Levels

Option	Description
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. **From the Main Administration page, under “Network Connection Administration,” click Modem.**

   The Modem Administration page is displayed.

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

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

Routing Administration

This section 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.

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.

▼ To Configure the Netra System as a Dynamic Router

1. **From the Main Administration page, under " Network Connection Administration," click Routing.**

   The Routing Administration page is displayed.

1. **Click Configure dynamic router.**

   The Dynamic Router Administration page is displayed.

2. **Complete the form using the information in** TABLE 4-6**.**

TABLE 4-6 Dynamic Router Administration

Option	Desciption
Host / Net	Specify if a destination address is a Network or a Host. If a value of "net" is entered incorrectly, the system attempts to add the routing entry as a "host."
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, it will not be used for routing until dynamic routing is reconfigured or the Netra system is restarted.

TABLE 4-6 Dynamic Router Administration

Option	Desciption
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. **From the Main Administration page, under “ Network Connection Administration,” click Routing.**

   The Routing Administration page is displayed.

1. **Click Modify dynamic router.**
2. **Complete the form using the information in** TABLE 4-6**.**

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.

▼ To Configure the Netra System as a Static Router

Note – Before using static routing over PPP links, configure a PPP connection to the remote host using the Modem Administration module, and add a static route to the remote host’s host address (IP address).

1. **From the Main Administration page, under “ Network Connection Administration,” click Routing.**

   The Routing Administration page is displayed.

1. **Click Configure static router.**

   The Static Router Administration page is displayed.

2. **Complete the form using the information in** TABLE 4-7**.**

TABLE 4-7 Static Router Administration

Option	Description
Default Router Host Address	Host address of the default router for the network.
Host / Net	Net or Host. This field enables you to specify if a destination address is a Network or a Host. If a value of "net" is entered incorrectly, the system attempts to add the routing entry as a "host.”
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. **From the Main Administration page, under “ Network Connection Administration,” click Routing.**

   The Routing Administration page is displayed.

1. **Click Modify static router.**

2. **Complete the form using the information in** TABLE 4-7**.**

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.

▼ 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.

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1. **From the Main Administration page, under “ Network Connection Administration,” click Routing.**

   The Routing Administration page is displayed.

2. **Click Turn off routing, then confirm the operation.**

CHAPTER 5

Using Netra j Security Administration

This chapter describes the Security Administration modules:

- Administration Web Server—page 77
- Network Service Access Administration—page 79
- Root Password Administration—page 81

Administration Web Server

The Administration Web Server serves the administration pages through which the Netra administration modules are configured. To protect access to administration web server from unauthorized users, access to the web server is protected through a password (mandatory), and an access list (optional). If an access list is specified, connections from machines that are not on the list are refused. Connections from machines on the list are permitted access, provided the user knows the password.

▼ To Change the Administration Password

1. **From the Main Administration page, under "Security Administration," click Administration Web Server.**

   The Administration Web Server Administration page is displayed.

2. **Click Change Administration Password.**

   The Administration Password page is displayed.

3. **Complete the form using the information in** TABLE 5-1**.**

TABLE 5-1 Web Server Password Administration

Option	Description
Current Administration Password	Type 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	Type 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 must re-authenticate the browser connection using the new password you provide.
Re-enter New Administration Password	Type the new administration password. Because the password is not echoed as you type it the first time, you must verify it by typing it a second time.

▼ To Modify Host Access Control

The Host Access Control enables you to set the hosts that may access the administration web server. There are two possible access modes. Administration access can be granted to all hosts; or access can be restricted to a specified list of hosts and networks (an access control list). The Netra system is always allowed administration access, even when not specified in the access control list. It is recommended that restrictions be set, particularly when the Netra system is connected to the Internet.

1. **From the Main Administration page, under "Security Administration," click Administration Web Server.**

   The Administration Web Server Administration page is displayed.

1. **Click Modify Host Access Control.**

   The Host Access Administration page is displayed.

2. **Complete the form using** TABLE 5-2 **for reference.**

TABLE 5-2 Host Access Control Administration

Option	Description
All hosts	Access to the administration web server is permitted to all hosts. Any specified host or network addresses are ignored.
Specified host and network addresses	The host and network addresses that are allowed access to the administration modules.

Note – If you do not specify any hosts, all hosts will be allowed access.

UDP-based services which are not connection oriented may linger after the client has disconnected. Reboot the Netra j server after modifying the access control to these services.

Network Service Access Administration

The Netra server provides a number of generic network services that do not have administration modules associated with them. These services enable 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.

For each network service there are three access modes. The service can be denied to all hosts; the service can be made available to a specified list of hosts and networks (using a control list); or the service can be made available to all hosts. All services using the control list access mode share one access control list.

The following network services are available on your Netra server:

- **File Transfer Protocol (**`FTP`**)**. Enables an authorized user to transfer files between a remote machine and the Netra server.
- **TELNET Protocol (**`telnet`**)**. Enables an authorized remote user to log in to the Netra server and interact as a normal user.
- **Remote User Information (**`finger`**)**. Enables network users to display information about users logged in to the Netra server.
- **Remote Shell (**`rsh`**)**. Enables an authorized remote user to open a command-line interpreter (shell) on the Netra server and run commands there.
- **Remote Login (**`rlogin`**)**. Enables an authorized remote user to log in to the Netra server and interact as a normal user.
- **Remote Execution (**`rexec`**)**. Enables a library routine to be run on a remote machine and return streams to the local machine.
- **Remote System Statistics (**`rstat`**)**: Enables a remote user to get performance data from the Netra server.
- **Mail Notification (**`comsat`**)**. Enables the Netra server to detect incoming mail and notify local users logged into the Netra server.
- **Talk Program (**`talk`**)**. Enables users on remote systems to enter lines of text on one machine and display them 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`)**. Enables remote users to perform distributed system administration operations on the Netra server.
- **Network File System Quota (`quotad`)**. Enables for notification if users use more than an allocated amount of disk space on the Netra server.
- **User Info (`rusers`)**. Enables a remote user to check which users are logged into the Netra server.
- **Diagnostic Packet Tester (`spray`)**. Enables 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`)**. Enables a single message from a remote user to be sent to all users logged into the Netra server.
- **UNIX-to-UNIX Copy (`uucp`)**. Enables 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`)**. Enables remote users to check the Calendar Manager entries of a user with an account on the Netra server.

▼ To Control Access to Network Services

1. **From the Main Administration page, under "Security Administration," click 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. **Choose the access mode for each network service using the information in** TABLE 5-3**.**

TABLE 5-3 Security Levels for Network Services

Option	Description
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.

Root Password Administration

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.

▼ To Set the Root Password

1. **From the Main Administration page, under "Security Administration," click Root Password.**

   The Root Password Administration page is displayed.

2. **Complete the form using information in** TABLE 5-4**.**

TABLE 5-4 Root Password Administration

Password option	Description
Current Root Password	Type 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	Type new password that will be used to access your Netra server.
Reenter New Root Password	Type the new password again. Because the password is not echoed as you type it the first time, you must verify it by typing it a second time.

CHAPTER 6

Using Netra j System Administration

This chapter describes the system administration modules:

- Audio Volume—page 83
- External Disks—page 84
- File System Backup and Restore—page 87
- Host Name—page 91
- Log Files—page 92
- Restart and Shutdown—page 92
- Save and Restore Configuration—page 93
- Software Management—page 95
- System Administrator Alias—page 98
- System Defaults—page 99
- User Accounts—page 100

Audio Volume

Use the Audio module to adjust the volume for the 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. **From the Main Administration page, under “System Administration,” click Audio.**

   The Audio Administration page, showing the current volume, is displayed.

2. **Set the volume using the information in** TABLE 6-1**.**

TABLE 6-1 Audio Administration

Option	Description
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.

The External Disk module presents a graphic overview of the external disks attached to the system. Each disk is presented as a colored icon, and the icon color represents its state. The legend correlates the icon color to states described in TABLE 6-2.

TABLE 6-2 External Disk State Color Code

Color	State	Comment
Green	Unused	Disk is available for formatting and mounting.
Red	System	Disk contains the Solaris operating environment.
Yellow	Erased	Disk has been formatted.
Aqua	Mounted	Disk is accessible through the file system hierarchy.
Orange	Non-Netra	Disk is non-Netra, but partially or totally mounted.
Purple	Meta	Disk which all or part is in use by a metadevice.
(blank)	Empty	No disk.

Over each disk icon is the disk name. If this name is a link, then following it will present a list of valid operations for that disk. Only unused or disks that have already been erased / mounted by the Netra system will show up as links.

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

▼ To Mount an External Disk

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.

1. **From the Main Administration page, under "System Administration," click External Disks.**
2. **Under "External Disk Administration," click disk link, then click Mount External Disk.**

   The External Disk Administration page is displayed.
3. **Complete the form using the information in** TABLE 6-3**.**

TABLE 6-3 External Disk Mountpoint Information

Option	Description
Mount point	The directory on which to mount the disk. If the directory does not exist, it is created before the disk is mounted.

Note – A mounted disk cannot be erased through the External Disks Administration module.

▼ To Unmount an External Disk

1. **From the Main Administration page, under "System Administration," click External Disks.**
2. **Under "External Disk Administration," click disk link, then click Unmount External Disk.**

The Unmount External Disk Administration page is displayed.

3. **Click OK to confirm the operation.**

▼ To Erase an External Disk

1. **From the Main Administration page, under "System Administration," click External Disks.**
2. **Under "External Disk Administration," click disk link, then click Erase External Disk.**

   The Erase External Disk Administration page is displayed.

Caution – When a disk is erased, all the data on it is lost forever.

3. **Click OK only if you want to erase the disk, otherwise click on the Home icon.**

Default Web Server Administration

This module enables you to set the default web server. In addition, it provides access to the administration modules for Sun WebServer.

▼ To Set the Default Web Server

1. **From the Main Administration page, under "System Administration," click Default Web Server (Port 80).**

   The Default Web Server Administration page is displayed.

2. **Click Change Web Server Info.**

   The Change Web Server Info Administration page is displayed.

3. **Complete the form using the information in** TABLE 6-4**.**

TABLE 6-4 Default Web Server Information

Option	Description
Web Server Name	Enter the name of the web server. The name will appear on the link.
Web Server URL	The URL of the web server running on port 80.

▼ To Access Sun WebServer Administration

1. **From the Main Administration page, under "System Administration," click Default Web Server (Port 80).**

   The Default Web Server Administration page is displayed.

2. **Click Sun WebServer.**

   The Sun WebServer console is displayed.

3. **See the Sun WebServer online help for administration procedures.**

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 a pre-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`, and Netra configuration files.When the backup is complete, the module reports all the directories and files that have been saved via an E-mailed report to the system administrator (root) user.

Note – The users' home directory option does not back up the system administrator's home directory. For user-specified directories and files, there is an upper limit on the number of characters in the file descriptor: for the path name, the maximum length is 155 characters; for the file name, 100 characters.

The following backup options are available:

- **Set backup options**. Enables you to schedule days of the week and times for regular backups.
- **Immediate backup**. Enables 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 enables you to specify a different tape drive, if necessary.
- **Easy restore.** Enables 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.** Enables you to restore only the directories you need from a backup tape.

▼ To Set Backup Options for a Scheduled Backup

1. **From the Main Administration page, under "System Administration," click File System Backup and Restore.**

   The File System Backup and Restore Administration page is displayed.

2. **Under "Backup," click Set Backup Options.**

   The File System Backup Options page is displayed.

3. **Complete the form using the information in** TABLE 6-5**.**

TABLE 6-5 Backup Options

Option	Description
Backup Device	The tape drive that will be used for the backup procedure. If an attached tape drive is not displayed in the 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.
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`). If the Web server's `document root` is not `/export/htdocs`, specify the full path name of the `document root` in the empty text box. •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.

▼ To Back Up the File System Immediately

1. **From the Main Administration page, under "System Administration," click File System Backup and Restore.**

   The File System Backup and Restore Administration page is displayed.

2. **Under "Back up," click Immediate backup.**

   The Immediate File System Backup page is displayed.

3. **Enter the information in the form using the information described in the Backup Device, Eject Tape, and Directories fields in** TABLE 6-5**.**

   The directories you specified are backed up immediately.

▼ To Change the Restore Device

1. **From the Main Administration page, under "System Administration," click File System Backup and Restore.**

   The File System Backup and Restore Administration page is displayed.

2. **Under, "Restore" click Change Restore Device.**

   The Change Restore Device page is displayed.

3. **Choose the tape drive you want to use to restore the file system (see** TABLE 6-6**).**

TABLE 6-6 Restore Device Administration

Option	Description
Restore Device	The tape drive that contains the backup tape that will be used to restore the file system. If an attached tape drive is not displayed in the 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. **From the Main Administration page, under "System Administration," click File System Backup and Restore.**

   The File System Backup and Restore Administration page is displayed.

2. **Under "Restore," click Easy Restore.**

   The Easy File System Restore page is displayed.

3. **Complete the form using the information in** TABLE 6-7**.**

TABLE 6-7 Easy Restore Administration

Option	Description
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`). If the Web server's document root is not `/export/htdocs`, then replace the string "Other Directories" in the text box with the full path name of the `document root`.
Restore location	The directory that receives the restored directories. If not chosen, the directories restored into their default directories.
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. **From the Main Administration page, under “System Administration,” click File System Backup and Restore.**

   The File System Backup and Restore Administration page is displayed.

2. **Under “Restore,” click 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. **Complete the form using the information in** TABLE 6-8**.**

TABLE 6-8 Selective Restore Administration

Option	Description
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.)
Restore location	The directory that receives the restored directories. If not chosen, the directories restored into their default directories.
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. **From the Main Administration page, under “System Administration,” click Host Name.**

   The Host Name Administration page is displayed.

2. **Enter the Netra server name.**

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. **Choose Log Files.**

   The Log Administration page is displayed.

2. **Choose one of the following options:**
   - To look at a log file, click View.
   - To remove a log file, click Clear; then confirm the operation.

Restart and Shutdown

Use the Restart and Shutdown module to restart or shut down 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. **From the Main Administration page, under “System Administration,” click Restart and Shutdown.**

   The Restart and Shutdown Administration page is displayed.

2. **Complete the form using the information in** TABLE 6-9**.**

TABLE 6-9 System Restart/Shutdown Administration

Option	Description
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	The number of minutes before the Netra will shut down or restart.

Save and Restore Configuration

The Save and Restore Configuration module enables you to:

- Save a record of the current configuration of the Netra server to a diskette or to a file.
- Restore the Netra server to a previous configuration using data that was saved to either media.

You should save the system configuration whenever it is changed so you can return to this configuration state if necessary.

Save and Restore Options

The following options are available to save and restore your system configuration:

- **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 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 system configuration on the hard disk.

TABLE 6-10 describes when file system options are displayed on the Netra j 2.0 Main Administration page.

TABLE 6-10 Options Displayed

Option	When the Option is Displayed on the Main Administration Page
Eject Diskette	The diskette is in the disk drive.
Save Configuration to Diskette	The diskette is in the disk drive.
Restore Configuration from Diskette	The diskette in the disk drive contains valid Netra configuration information.
Restore Configuration from File System	The Netra configuration state has previously been saved to a file on the hard disk.

▼ 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. **From the Main Administration page, under "System Administration," click Save and Restore Configuration**

   The Save and Restore Configuration Administration page is displayed.

3. **Click 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. **From the Main Administration page, under "System Administration," click Save and Restore Configuration**

   The Save And Restore Configuration Administration page is displayed.

3. **Click either Restore configuration from diskette or Restore configuration from file system.**

4. **Complete the form using the information in** TABLE 6-11**.**

TABLE 6-11 Save / Restore Configuration

Option	Description
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.

▼ To Eject a Diskette

1. **From the Main Administration page, under "System Administration," click Save and Restore Configuration**

2. **Click Eject diskette.**

   The Eject Diskette page is displayed, telling you that the diskette has been ejected.

Software Management

The Software Management module is used to install and remove software on the Netra server. This module recognizes software that is supplied in the Solaris package, patch, or cluster formats. All Sun software and most third-party software can be managed using this module.

A *package* is a collection of files and directories required to form a software application.

A *cluster* is a logical grouping of software packages associated with a specific software product.

A *patch* is a collection of files and directories that replace or update existing files and directories that are preventing proper execution of the software. The existing software is derived from a specified package format, and can be installed only if the package it fixes is already present.

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 “Restart and Shutdown” on page 92).

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 they 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.

▼ To Specify the Installation Medium

1. **From the Main Administration page, under “System Administration,” click Software Management.**

   The Software Management Administration page is displayed.

2. **Under “Select Installation Medium,” Select new installation_medium.**

   The Select Installation Medium page is displayed.

3. **Choose 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. **From the Main Administration page, under “System Administration,” click Software Management.**

   The Software Management Administration page is displayed.

2. **Under “Install,” click Clusters, Packages, or Patches.**

3. **Complete the form using the information in** TABLE 6-12**.**

TABLE 6-12 Installing Packages or Patches

Option	Description
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 – The Software Management module cannot remove a package if there is another package on the system that requires its presence. The module attempts to remove packages in the order which they are displayed, and since this may not reflect the dependency order, the removal of a core package may fail even if the packages that depend upon it are also removed. If this happens, re-select the packages that failed and remove them again.

1. **From the Main Administration page, under “System Administration,” click Software Management.**

   The Software Management Administration page is displayed.

2. **Under “Remove,” click Packages or Patches.**

3. **Complete the form using the information in** TABLE 6-13**.**

TABLE 6-13 Removing Packages or Patches

Option	Description
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 or patch; if you select any packages or 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

1. **From the Main Administration page, under "System Administration," click Software Management.**

   The Software Management Administration page is displayed.

2. **Under "View," click Installed Packages or Installed patches.**

   The Viewed Installed Packages or Viewed Installed Patches page is displayed.

System Administrator Alias

Use the System Administrator Alias module to create the list of people who will receive 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 a System Administrator Alias

1. **From the Main Administration page, under "System Administration," click System Administrator Alias.**

   The System Administrator Alias Administration page is displayed.

2. **Enter the mail addresses of the alias members (see** TABLE 6-14**).**

TABLE 6-14 System Administrator Alias Administration

Option	Description
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.

Note – If the Netra software has been installed onto a server that mounts `/var/mail` from a remote server, mail is handled by the remote server. This situation requires that the members of the administrator alias are valid mail addresses on the remote server.

System Defaults

Use the System Defaults module to change the 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. **Choose System Defaults.**

   The System Default Administration page, showing the time, date, time zone, and locale, is displayed.

2. **Complete the form using the information in** TABLE 6-15**.**

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

TABLE 6-15 System Defaults

Option	Description
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.

User Accounts

The User Accounts module enables you to add new user accounts, or change or delete existing accounts. The User Accounts module enables the addition of new user accounts, and to modify or delete existing ones. Creating an account allocates the new user a home directory on the Netra server and enables the user to access the services that are available on it, which may include mail for example. The account can be accessed through standard protocols such as `telnet`, `rlogin`, `ftp` and `rsh`, provided the server is configured to accept them.

When creating the account, specify an initial password for the user. This enables users to log in to the Netra server the first time. Before they can do anything with their accounts, they are asked to provide and verify a new password.

The form asks to specify a default shell for the user, including an option No shell (email only). If this option is chosen, the user is not able to log in, but receives mail on the server if it is configured as a mail server. This scenario is useful if the Netra server is acting as a mail host whose mailbox directory is mounted onto the clients, but not as a login host.

If no users are defined, only the Add A User option is available. When user accounts have been added, there are also options to Modify or Delete specific users. When a user account is removed, the corresponding home directory is deleted recursively and the users mailbox is removed. The user is no longer be able to log into the server.

The user account module can only be used for ordinary users. System users such as `root` and `ftp` or the Netra setup user cannot be administered from the module.

▼ To Add a User Account

1. **From the Main Administration page, under “System Administration,” click User Accounts.**

   The User Accounts Administration page is displayed.

2. **Under “New Users,” click Add A User.**

   The Add A Local User page is displayed.

3. **Complete the form using the information in** TABLE 6-16**.**

TABLE 6-16 User Accounts

Option	Description
User Name	The login name of the user to add or modify. For example, `jsmith`. The user name must be unique and must not be among the list reserved for systems users. If such a name is chosen, the User Accounts module asks for another. The reserved user name list is displayed on the help page.
Password	The password the user must provide when logging in to the Netra server for the first time. The user is not able to log in unless the Activate login with password shown above? option below is chosen.
Retype Password	As the password is not echoed on the screen, it must be confirmed by re-entering it.
Activate login with password shown above?	Account activation needs to be deliberately confirmed. If checked yes, this option activates the account login with the password entered in the 'Initial password' field for the user's first login.
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.
Home Directory Server Name	Specify the host name and the full path name of the home directory of the user. If the local host is a NIS master, then this information is used to update the `auto.home map`. If the user's home directory is on this local system itself, then sharing of the user's home directory through NFS is enabled. The user's password entry is also added to the NIS password maps. If the user's home directory resides on a remote system, the server will update the local `auto.home`. However the directory on the remote system has to be created manually on the remote system.
Home Directory Path Name	Specify the full path name of the user's home directory. A typical home directory path would be like `/export/home/`*username*`.`

▼ To Add Users From a File

The default password will set to the username.

1. **From the Main Administration page, under “System Administration,” click User Accounts.**

   The User Accounts Administration page is displayed.

2. **Under "New Users," click Add users from a file.**

   The Add users from a file page is displayed.

3. **Complete the form using the information in** TABLE 6-17**.**

TABLE 6-17 Users From a File Administration

Option	Description
Input File	Full path to a UNIX file which must be correctly formatted. No comments or blank lines are allowed. For example, if the field separator specified below is a comma, each line entry must be formatted as follows: `username,<UID>,password`. The username and password must be composed of one to eight alphanumeric characters. Each `username` must be unique and must NOT be any of the following system account names; `root, daemon, bin, sys, adm, lp, smtp, uucp, nuucp, listen, nobody, noaccess, nobody4, setup, ftp.` The `UID` must be between 1000 and 59999. The administrator can optionally leave the uid field blank and one will be assigned. For security reasons, the input file must be owned by root with all group/other permissions removed.
Field Separator	The character used to delimit each field in the input file.
Home base directory	Full path to a directory that will hold the users home directories. For example, if `/export/home` is specified as the home base directory, a valid input file entry for a user called `sample` will create a home directory, `/export/home/sample.` The root directory is not acceptable as a base. Where the base directory does not exist, it will be created if possible.

▼ To Modify or Delete a User Account

1. **From the Main Administration page, under “System Administration,” click User Accounts.**

   The User Administration page is displayed, with a Modify or Delete option for each existing account.

2. **Under “Existing Users,” click one of the following options:**

   - To modify an existing account, click Modify and make the changes in the form using TABLE 6-16.
   - To delete a user account, click Delete, then confirm the operation.

CHAPTER 7

Using Netra j Connectivity Software

Network computers can provide access to UNIX, PC, and Java applications through a variety of connectivity technologies.

Sun's windowing products enable Sun workstation and JavaStation users to run Windows (3.x, 95, and NT) applications on an application server and display them back to their desktops. The remote windowing products include the Citrix Systems', Inc., WinFrame product, and GO-Joe with RapidX.

For legacy connectivity, Sun provides OC:/ /WebConnect software enabling users on Java-capable clients to access data and applications on IBM mainframes and on midrange computers from many vendors.

This chapter introduces these remote windowing and legacy connectivity products and provides instructions on how to reference remote windowing servers:

- WinFrame From Citrix Systems—page 105
- GO-Joe With RapidX—page 105
- Remote Windowing Procedures—page 116
- OC:/ /WebConnect—page 117

WinFrame From Citrix Systems

WinFrame is a thin-client/server software that provides access to virtually any Windows NT 3.5.1 application, across any type of network connection, to the JavaStation. Its features give you centralized management, and improved security for all your business-critical applications and data.

For additional information on Citrix Solutions' WinFrame, refer to `http://www.sun.com/desktop/products/PCCP/remotewindowing/citrix`.

After configuring the WinFrame server, use the Netra j Remote Windowing Tools module to specify the host name or IP address to the Netra server. See “To Reference Remote Windowing Servers” on page 116.

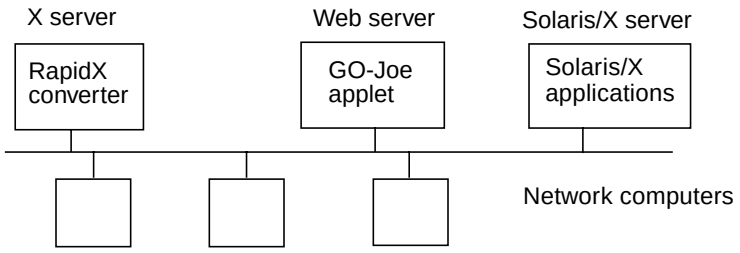
GO-Joe With RapidX

GO-Joe is an X server that provides access to all Solaris and X applications within a JavaStation environment.

After configuring the GO-Joe X server, use the Netra j Remote Windowing Tools module to specify the host name or IP address to the Netra server. See “To Reference Remote Windowing Servers” on page 116.

GO-Joe consists of two modules that work together to provide X connectivity in the JavaStation environment: the X-to-RapidX converter and the GO-Joe applet. The X-to-RapidX convertor (the *GlobalHost ddx loadable* module) is installed on a UNIX host which provides connectivity into the X environment on the network. The Java applet enables the user to access Solaris / X Window applications. FIGURE 7-1 shows the GO-Joe architecture.

FIGURE 7-1 GO-Joe Architecture



System Requirements

You can install and run GO-Joe on SPARC™ systems running the Sun Solaris operating environment, version 2.5.1 or later. The adaptive RapidX protocol and the Java applet total under 500 kilobytes of memory.

Dependancies

GO-Joe requires additional Solaris software to run properly. TABLE 7-1 list the Solaris dependancies.

TABLE 7-1 Solaris Dependancies for Go-Joe

Package ID	Description	Location
SUNWcsr	Core Solaris, (root)	Netra j 2.0 software (Solaris 2.5.1 add-on cluster), and Solaris 2.6 CD-ROM
SUNWcsu	Core Solaris, (usr)	Netra j 2.0 software (Solaris 2.5.1 add-on cluster), and Solaris 2.6 CD-ROM
SUNWcar	Core Architecture, (root)	Solaris 2.5.1 or 2.6 CD-ROM
SUNWkvm	Core Architecture, (usr)	Solaris 2.5.1 or 2.6 CD-ROM
SUNWlibms	Solaris bundled shared libm	Solaris 2.5.1 or 2.6 CD-ROM
SUNWtltk	ToolTalk runtime	Solaris 2.5.1 or 2.6 CD-ROM
SUNWxwplt	X Windows platform software	Solaris 2.5.1 or 2.6 CD-ROM
SUNWolrte	OPEN LOOK toolkits runtime environment	Solaris 2.5.1 or 2.6 CD-ROM
SUNWoldte	OPEN LOOK desktp environment	Solaris 2.5.1 or 2.6 CD-ROM
SUNWxwdv	X Window system kernal drivers	Solaris 2.5.1 or 2.6 CD-ROM
SUNWxwfnt	X Window system fonts	Solaris 2.5.1 or 2.6 CD-ROM
SUNWdtcor	Solaris desktop `/usr/dt` file system anchor	Solaris 2.5.1 or 2.6 CD-ROM
SUNWmfrun	Motif runtime kit	Solaris 2.5.1 or 2.6 CD-ROM

GO-Joe requires a JDK™ 1.1-capable browser. Currently, Netscape Communicator version 4.0 or earlier is unable to support AWT 1.1 and New Event Model features in JDK 1.1. To address this requirement, Netscape provides a JDK 1.1 software patch that provides the following functionality:

- AWT 1.1
- New Event Model
- JavaBeans Support
- Printing Support for Applets

See `http://developer.netscape.com/software/jdk/download.html` for information.

Note – You must install Netscape Communicator 4.0 and Netscape's JDK 1.1 software patch before running GO-Joe.

Components and Session Overview

GO-Joe has many components that work together to bring X Windows to the JavaStation. An example X session is provided with the software. The GO-Joe session process is as follows:

1. When you enter a URL in your browser or Java environment, it initiates a process that loads the HTML page containing the GO-Joe applet and named Solaris/X server with the GO-Joe server package loaded.
2. The browser or Java environment then loads and runs the GO-Joe applet.
3. GO-Joe prompts you for a username and password to authenticate you to the Solaris machine.
4. When you click on the Connect button, GO-Joe connects to the server on the port specified in the HTML page loaded in step 1.
5. The Solaris machine accepts the applet's connection and passes it off to the `go-login` program.
6. The `go-login` program receives the username and password specified in step 3. If the username or password are incorrect, an error is returned by the applet and it returns to step 3.
7. If the `username` and `password` are valid, `go-login` starts `/usr/openwin/bin/openwin` with special arguments initiating the GlobalHost loadable ddx module.
8. The modified initialization scripts check for a GO-Joe token, and if present, modify the session startup behavior to start the clients specified by the token.

After these steps, the session is displayed on the GO-Joe applet and you will be able to run X clients from the UNIX network.

Configuration

The GO-Joe applet ships with several examples of how to use it. One example is the `xsession.html` file. This file contains an example startup that exercises all of the available parameters for the applet, but this file must be customized before it can be used.

TABLE 7-2 Applet Parameters

Parameter	Description
width	This parameter is specified in the `APPLET` tag and determines the width of the GO-Joe frame in the HTML file. Its format is browser specific, but can generally be an absolute number of pixels (for example, “width=800”) or a percentage of the browser window's width (for example, “width=100%”).
height	This parameter is specified in the `APPLET` tag and determines the height of the GO-Joe frame in the HTML file. Its format is browser specific, and can generally be an absolute number of pixels (for example, “height=600”) or a percentage of the browser window's height (for example, “height=90%”).
server	The host machine that will be connected to run the RapidX session. This host must be configured with the go-login program and GlobalHost protocol.
port	The port number that will be contacted by the GO-Joe applet. In general use, this will be `port 491`, but it may be changed if multiple configurations of GlobalHost protocol are available on the host.
token	A value to be passed into the environment of the X session.
diaglevel	If set to a value greater than zero, this parameter will cause the GO-Joe applet to log diagnostic information. This is not generally useful except in rare cases. If this parameter is set, then the `diagfile` parameter should also be set.
diagfile	This parameter directs diagnostic output. The default output of diagnostic information is to the JavaOS system console. In environments where the JavaOS console is not available, this parameter can be used to redirect this output to a different location. Its format can specify a file to be logged into by setting it to an absolute path (for example, `/tmp/gojoe-log`). In environments where local disk storage is not available, it can be set in the form `%<host>:<port>`.

The following is a sample `xsession.html` file that initiates a default session.

```
<HTML><HEAD><TITLE>GO-Joe Example Session</TITLE></HEAD>
<BODY>
<HR>
<APPLET CODEBASE="/example/code/" ARCHIVE="togo.jar"
CODE="togo.class"
    WIDTH=800 HEIGHT=600>
    <PARAM NAME=server VALUE=myhost>
    <PARAM NAME=port VALUE=491>
</APPLET>
```

The GlobalHost Loadable ddx Module

The GO-Joe applet communicates through a dynamically loaded Xsun device driver. This driver appears to the Xsun server to be a standard display driver, but transmits display operations to the GO-Joe applet. This is referred to as the *GlobalHost loadable ddx module*.

To start the Xsun server with the GlobalHost loadable ddx module, you need to reference the device files created in `/devices` similar to the following:

```
openwin -dev /dev/fbs/goglobal0
```

When the Xsun queries this device, it loads the correct module for GO-Joe.

Note that you would never type theis command at the command line. It is started by a script after the `go-login` program has authenticated the user through `inetd` or perhaps started by the `go-login` program itself.

The `go-login` Authentication Program

The `go-login` program is started by `inetd` and receives user authentication information from the applet before starting the session. The `go-login` program is designed to be called directly from `inetd`, but limitations in some `inetd` software limit the number of command line arguments that can be passed to `go-login`, so it is usually called from a *shim* script as follows:

```
#!/bin/sh
# This is /usr/openwin/server/etc/shim
# This gets around inetd implementations that only pass a limited
number of
# command-line arguments onto go-login.
/usr/openwin/bin/go-login /usr/openwin/bin/openwin -dev /dev/fbs/
goglobal0 -I -inetd
```

This script ensures that all of the arguments necessary are passed to `go-login`. The `go-login` program must be installed into `inetd.conf` as shown:

```
go-login stream tcp nowait root /usr/openwin/server/etc/shim shim
```

Adding the GO-Joe Icon to the HotJava Views Selector

At installation, The Go-Joe properties are dumped into the `selector.apps` file located in `/opt/SUNWjdt/lib/props`. There are several `selector.desktop` files corresponding to their group located under `/opt/SUNWjdt/lib/props/`*group*`/selector.desktop`. You should add the GO-Joe entry to the appropriate groups `selector.desktop` file.

Upon installation of the GO-Joe packages, the Icon and all associated properties are added to the HotJava Views application palette automatically.

See the HotJavaViews online help for additional information.

▼ To Add the OCS Icon to the HotJava Views Selector

1. **Choose Network Computer Server ➤ HotJava Views Administration.**

   The HotJava Views Administration page is displayed.

2. **Choose Client-side Configuration ➤ Groups and Configuration.**

3. **Choose the Group to which you want to add the GO-Joe icon and click the Selector Applications button.**
4. **Choose the WebConnect entry in the Application Pallete and click Add.**
5. **Click OK.**
6. **Click Set Default Group to set this group as default.**

   The default is Basic.

   HotJava Views Selector is now configured with the GO-Joe icon.

Running GO-Joe

To start a GO-Joe session, simply load the HTML file with the applet embedded into your browser environment. GO-Joe will prompt you for a username and password to use for the session, and will proceed to provide the X display to your host.

This session is almost identical to that provided by the system console, with a few differences, which are illustrated below.

DISPLAY Environment Variable

The `$DISPLAY` environment variable tells X clients where to contact your X server. Unlike most X solutions which set the `$DISPLAY` variable to point to your JavaStation, GO-Joe sets this variable to point to an alternate display on your host machine. For example, if your host is named “workstation” and the JavaStation is named “smile,” you might expect the `$DISPLAY` variable to use `smile:0` as its value. However, GO-Joe uses the hostname for its `$DISPLAY` variable value, in this case, `workstation:1`.

GO-Joe makes an additional optimization that can be somewhat confusing. In X parlance, if the `$DISPLAY` variable is set to `unix:#` the JavaStation client will attempt to connect using a local transport. For example, instead of using TCP/IP, it will connect using a named pipe. This connection is faster than using TCP/IP for JavaStation clients running on the same host. However, the `unix:#` value cannot be used if you run clients from different hosts.

Instead, use the following shell script to change the `$DISPLAY` variable to point to the hostname of your machine. This can be included in `.profile` file:

```
DISPLAY=`/bin/uname -n``expr $DISPLAY : `[^:]*\(:.*\)'`
```

This translates `$DISPLAY` from, for example, `unix:3` to `workstation:3` allowing X clients on other machines to successfully contact the GlobalHost loadable ddx module on the workstation host.

Using a Two-Button Mouse

X requires and assumes the availability of a three-button mouse. Most Java environments provide a two-button mouse. In the session, the left and right mouse buttons correspond to the left and right mouse buttons under X. GO-Joe maps the simultaneous pressing of both mouse buttons into a middle mouse button press under X.

The Mouse Arrow

Current AWT implementations provide only limited support for specifying the shape of the mouse arrow in the Java environment. For this reason, GO-Joe currently does not change the shape of the pointer arrow. This effect is a visual one only, as the X application will believe that the arrow has indeed changed shape.

Advanced Configuration Options

You can configure GO-Joe to provide a varitey of functions. This flexibility can be complex, so it is not generally recommended for every user. GO-Joe provides several diagnostic tools and outputs to help diagnose problems that may arise due to misconfiguration and other difficulties. See Appendix D for problem-solving tips.

Token

The GO-Joe applet accepts a token parameter in its HTML file. If this parameter is present, the applet transmits it to the `go-login` program along with the username and password. The `go-login` program will create an environment variable containing the value `$GG_TOKEN` which is available for other startup scripts to process.

The format of the `$GG_TOKEN` variable is as follows:

```
[session=<openwin|cde>;] [ wm=<window_manager>; | nowm; ] <token>
```

If present, the `session= parameter` can be used to specify whether the session will be an OpenWindows style session or a CDE style session. Tokens under the CDE session type are not supported at this time.

Alternate window managers can be specified by prefixing the token proper with `wm=/path/to/window/manager;`. For security, you must specify an absolute path, and no spaces are allowed (and therefore, no arguments to the window manager). You can start a session without a window manager by prefixing the token proper with `nowm;`. The semicolon is necessary in both cases to delimit the window manager specification from the token value. Both `wm=<window_manager>;` and `nowm;` are optional and need not be specified if the default window manager is desired.

The token value can contain any alphanumeric character, as well as the plus (+), minus (-), and underscore (_) characters. The character set of supported characters is [A-Za-z0-9+-_]. Other symbols are not recommended and are not supported.

In the standard OpenWindows distribution, the `openwin` script checks for the existence of a `~/.xinitrc` file in the user's home directory. If this file exists, it is run by the `Xinit` program (which also starts the Xsun server). If this file does not exist, the system wide `$OPENWINHOME/lib/Xinitrc` file is run. The `Xinitrc` file checks for `~/.openwin-init` and will run it to start the sessions initial clients if it is present. If it is not present, the `Xinitrc` file will run the systemwide `$OPENWINHOME/lib/openwin-init` file.

When the GlobalHost loadable ddx module is installed, these files are modified to support GO-Joe's token facility. In this installation, the `openwin` script no longer checks for the existence of `~/.xinitrc`, but instead always runs the systemwide `$OPENWINHOME/lib/Xinitrc` file. This file has been modified to check for the token environment variable (`$GG_LOGIN`) set by `go-login`. If `$GG_TOKEN` is set, the systemwide `Xinitrc` file checks for a `~/.xgotokenrc` file in the user's home directory. If this file exists, it is run, otherwise, the systemwide `$OPENWINHOME/lib/Xgotokenrc` file is run. These files parse the `$GG_TOKEN` variable to determine what window manager will be run (if any). Then, they call `~/.xgotoken-init` (if it exists) or `$OPENWINHOME/lib/xgotoken-init`, which parses the `$GG_TOKEN` variable to determine what clients will be start up. If the token variable does not match any of the available tokens, control is passed to the standard `~/.openwin-init` or `$OPENWINHOME/lib/openwin-init`.

This structure enables you to create system-wide token processing routines by modifying `$OPENWINHOME/lib/xgotoken-init`, while enabling users to override the settings in the `~/.xgotoken-init` file. In addition, care has been taken to ensure that if the `$GG_TOKEN variable` is not set, the session startup will be the same as a standard OpenWindows installation.

Structure of xgotoken-init

The xgotoken-init is based on the standard openwin-init file, with the addition of the following section:

```
case “$GG_TOKEN” in
    xterm)
    if [ "$OW_WINDOW_MANAGER" = ':' ]; then
       toolwait=
    else
       toolwait=toolwait
    fi
    $toolwait $OPENWINHOME/bin/xterm
        exit
    ;;
    *)
    echo warning: /usr/openwin/lib/xgotoken-init: \'$GG_TOKEN\':
case not found.
    echo using defaults...
    ;;
esac
```

This section parses the $GG_TOKEN (with any prefixed wm= or nowm flags removed) and starts the appropriate clients. In this example, only one token, xterm , is defined. Any other token will return an error and use the default OpenWindows startup.

Note the handling of the $toolwait variable. In Xgotokenrc, if nowm is specified, it sets the $OW_WINDOW_MANAGER variable (in conformance to the standard OpenWindows method of specifying an alternate window manager) to the colon. This results in no window manager being executed when the shell interprets the colon as an empty command.

Modify the $toolwait variable, if there is a window manager running, the toolwait program starts xterm (which will run in the background). When no window manager is running, the last client started by xgotoken-init must not run in the background, or the GlobalInit program will think that the session is over and will shut down the X server. Conditionally running toolwait solves this problem.

Diagnostics and Troubleshooting

GO-Joe provides several diagnostic tools and outputs to help diagnose problems that may arise due to misconfiguration and other difficulties. Check them whenever problems are encountered.

Remote Windowing Procedures

Configure the Netra j server by using the Netra j Remote Windowing Tools module to reference remote windowing servers.

▼ To Reference Remote Windowing Servers

Note – Remote Windowing servers must be accessible to the Netra j server.

1. **From the Main Administration page, under "Remote Windowing Administration," click Remote Windowing Tools.**

   The Remote Windowing Administration page is displayed.

2. **Select one of the following:**
   - To reference a Citrix WinFrame server, click Configure Citrix.
   - To reference a GO-Joe X server, click GO-Joe.

3. **Complete the form using the information in** TABLE 7-3**.**

TABLE 7-3 Remote Windowing Information

Citrix Server Host Name or IP Address	The host name or IP address of the server running WinFrame.
Go-Joe Server Host Name or IP Address	The host name or IP address of the server running GlobalHost module.
Go-Joe Port Number	The port number in which the GlobalHost server (X server) is running. The default port is 491.

OC:/ /WebConnect Pro

OC:/ /WebConnect Pro software from OpenConnect Systems consists of OC:/ /WebConnect and OpenVista 1.0 software and is sold and supported by Sun Microsystems Inc.

For additional information on OpenConnect Systems software, refer to `http://www.oc.com`.

OC:/ /WebConnect

The OC:/ /WebConnect software enables users on Java-capable clients to access data and applications on IBM mainframes and on midrange computers from many vendors. OC:/ /WebConnect is a Java applet that provides 3270, 5250, and VT220 terminal emulation with any Java-capable web browser. OC:/ /WebConnect adds the client-side right-to-use license for the optional Open Vista graphical user interface, which can be used to rejuvenate classic 3270/5250 “green on black” screens. OC:/ /WebConnect's unique Java-enabled implementation provides end-to-end "persistent" and secure SNA sessions over the potentially unsecure internet/intranet for information access and host data and application publishing on the web.

OC:/ /WebConnect Features

The following features in OC:/ /WebConnect requires a JDK 1.1-capable browser. Because the quantity of new features in OC:/ /WebConnect increased the applet size, the user is presented with three applet options; Ultra-Lite, Enhanced, and Power User. The Ultra Lite version is the same applet as found in Webconnect 2.6.2, with no new 3.0 functionality, and does not require a JDK 1.1 browser. The Enhanced applet includes all the functionality listed with the exception of file transfer. The Power User applet includes all of the features listed.

Security

- *Enhanced Encryption* – 128 Bit Encryption (Domestic Security Option), configurable for 40 or 128Bit. Note: The Netra j 8 user WebConnect bundle will not include 128-bit encryption due to international security regulations. Customers requiring 128-bit encryption will have to request that version when ordering additional users.
- *SSL Support*

Management

- *Response Time Monitoring Statistics Support* – Support for timing marks that allow for collection of RTM statistics for use in IBM NetView/390.
- *Additional National Language Support* – Client-only language support for Japanese, Traditional and Simplified Chinese, and Swedish (in addition to the European languages)
- *Graphical Configuration Utility* – An interface that enables the administrator to create session files, graphically re-map keyboard and colors. All configurable options will be managed from this Administration console. Where appropriate, the user will be prompted to select from list boxes, check boxes, radio buttons, etc.
- *Year 2000 Compliance*

Usability

- *Hot Spots* – Provides the ability to administer server and session configurations. Keyboard mapping, color mapping, attribute mapping and server configuration functionality will be implemented.
- *Automatic GUI* – Provides the ability to automatically convert 3270 and 5250 screens to a graphical equivalent and the generation of hot spots for the standard screens.
- *Copy & Paste* – Provides the ability to highlight portions of a screen and paste it into other applications or back into the same screen.
- *Local and 3287 Printing capability* – Applet support for both "local screen copy" and 3287 type LU1 and LU3 printing.
- *File Transfer* – Support for `IND$FILE` from the host.

OpenVista

OpenVista software is a cross-platform integrated development environment (IDE) for creating custom Java applets for 3270 and 5250 clients.

OpenVista enables the design, development, and deployment of applications for simplified enterprise information access and for legacy host-based data and application publishing on the Web. OpenVista enables on-the-fly development of 3270 and 5250 front-end Java applets, without any prior Java knowledge or programming experience. OpenVista's unique visual metaphor enables developers to create simplified user screens, environments, or to automate processes normally associated with multiple mainframe views such as logging on, finding, accessing, manipulating, and viewing information located within traditional legacy data applications and repositories.

▼ To Access the OC:/ /WebConnect Server

Note – The OpenConnect software needs to be installed before you can access it through the Netra j Administration Interface.

- **From the Main Administration page, under "Network Services Administration," click OC://WebConnect Server.**

  The OC:/ /WebConnect Administration page is displayed.

  Refer to the OC:/ /WebConnect online help for information on how to use this software.

▼ To Add the OCS Icon to the HotJava Views Selector

At installation, The OC:/ /WebConnect Pro properties are dumped into the `selector.apps` file located in `/opt/SUNWjdt/lib/props`. There are several `selector.desktop` files corresponding to their group located under `/opt/SUNWjdt/lib/props/`*group*`/selector.desktop`. You should add the WebConnect entry to the appropriate groups `selector.desktop` file.

Upon installation of the OC:/ /WebConnect Pro packages, the Icon and all associated properties are added to the HotJava Views application palette automatically.

See the HotJavaViews online help for additional information.

1. **From the Main Administration page, under "Network Services Administration," click Network Computer Server.**

1. **Under "NC Webtop Applications Administration," click HotJava Views Administration.**

   The HotJava Views Administration page is displayed.

2. **Click Client-side Configuration, then click Groups and Configuration.**

3. **Choose the Group to which you want to add the OC://WebConnect icon and click the Selector Applications button.**

4. **Choose the WebConnect entry in the Application Pallete and click Add.**

5. **Click OK.**

6. **Click Set Default Group to set this group as default.**

   The default is Basic.

   HotJava Views Selector is now configured with the OC:/ /WebConnect icon.

CHAPTER 8

Booting the JavaStation Using Solaris

This chapter describes the JavaStation boot sequence and explains how to set up JavaStation boot services in the Solaris operating environment.

- JavaStation Boot Sequence—page 121
- Setting Up Boot Services—page 126

JavaStation Boot Sequence

The JavaStation boot sequence uses the following network services:

- DHCP
- TFTP
- NFS
- HTTP

These services do not have to reside on the same machine. As mentioned in Chapter 2, NIS and DNS services must also be provided on the network for JavaStation computers to operate correctly, but they are not directly involved in the boot sequence.

The boot sequence can occur in a variety of ways. Essentially, it must accomplish the following tasks:

1. *Lease an IP address to the JavaStation computer.* Each JavaStation must lease an IP address from an address pool managed by a DHCP server. It is recommended that the DHCP server assign addresses dynamically. However, the Solaris DHCP server can also be set up with statically assigned IP addresses.

2. *Deliver and boot JavaOS on the JavaStation computer.* JavaOS can be delivered to the JavaStation computers from a network server via TFTP or TFTP and NFS. Alternatively, if the JavaStation has flash memory, JavaOS can be booted from flash.

3. *Deliver the main user application to the JavaStation computer.* The main user application can be delivered to the JavaStation computers via HTTP. Alternatively, JavaOS and the main application can be compiled together into a single boot image.

4. *Update the JavaOS stored in flash memory.* This task applies only to JavaStation clients with flash memory (available only on "tower" models). After the JavaStation boots, the JavaOS file stored in flash memory can be updated if a newer copy of JavaOS exists on the network. If the flash memory is updated, the JavaStation immediately reboots with the newer copy of JavaOS.

The following sections describe the JavaStation power-on and boot sequence tasks in detail.

Power-On

The JavaStation programmable read-only memory (PROM) includes TFTP client and DHCP client implementations and is thus able to carry out the boot sequence. At power-on, the PROM checks to see if flash memory is present. If so, it then checks to make sure the JavaOS in flash is not corrupted. If the JavaOS in flash is valid, then the PROM loads it into memory and transfers control to it. JavaOS initializes itself and then completes Task 1, described below.

If any of the above tests fail, JavaOS is not loaded into memory and the PROM proceeds to complete Task 1 itself.

Task 1: Lease an IP Address

Either the PROM or JavaOS leases an IP address from the DHCP server by completing the following handshake with the JavaStation DHCP server. For simplicity, the description below refers to the PROM or JavaOS as "the DHCP client."

1. The DHCP client broadcasts DHCPDISCOVER packets at intervals until a DHCPOFFER is received. The DHCPDISCOVER packet includes the Client Class Identifier option, which identifies the DHCP client as being a JavaStation (see "Vendor-Specific Options" on page 130). During this broadcast, a notice is displayed on the JavaStation screen approximately every minute so the user knows if the server is not responding.

2. One or more DHCP servers respond with DHCPOFFER packets. The DHCPOFFER(s) are examined by the DHCP client to determine whether they contain the options required to boot JavaStation computers (see "DHCP" on page 126).

3. The DHCP client chooses the first OFFER it receives that contains the required options. The DHCP client remembers the IP address of the server that sent the OFFER.

4. The DHCP client broadcasts a DHCPREQUEST packet. This packet contains the IP address of the server chosen in the previous step. All other DHCP servers that responded in the second step are thus informed that they have not been selected.

5. The selected server sends a DHCPACK packet back to the DHCP client.

At this point, the JavaStation has received all of its configuration information from the DHCP server. FIGURE 8-1 illustrates the initial handshake.

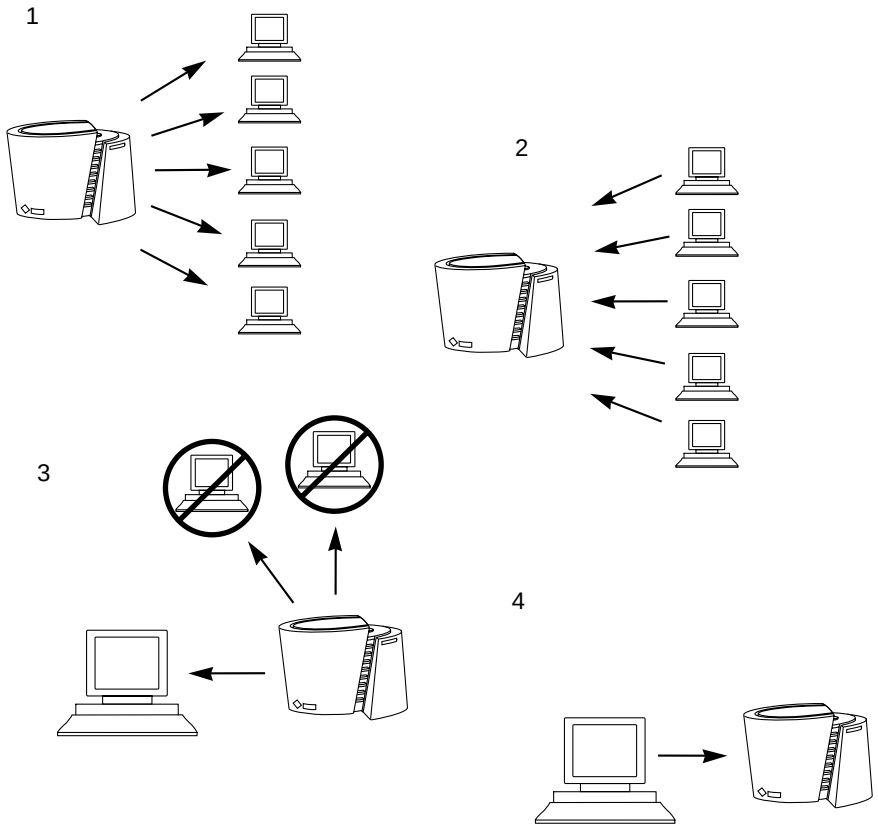


FIGURE 8-1 JavaStation Client – DHCP Server Handshake

Task 2: Deliver and Boot JavaOS

Task 2 is to pass control of the JavaStation to JavaOS. If JavaOS has not been loaded from flash memory, Task 2 is performed using a method determined by information delivered by the DHCP server in the initial handshake. TABLE 8-1 shows JavaOS boot information from the DHCP server and the resulting actions taken by the JavaStation PROM.

TABLE 8-1 DHCP Information for Booting JavaOS

If the DHCP server delivers...	JavaOS is downloaded and booted as follows
The IP address of a server that has an initial boot program (the "booter") in its TFTP root directory	The JavaStation PROM downloads the booter from the server using TFTP, then transfers control to it. When the booter begins execution, it scans the PROM's device tree for the name and location of the JavaOS image and the name of a server that contains this image in an NFS-exported directory. If the booter does not find this information in the PROM, it obtains it from the DHCP server. The booter mounts this directory, copies the JavaOS image, and transfers control to it.
The IP address of a server that has JavaOS in its TFTP root directory	The JavaStation PROM downloads JavaOS from the server using TFTP, then transfers control to it. (Note that this is the slower of the two options.)

The DHCP server delivers information in the DHCP options, which are described on page 128. For instructions on setting the options used to deliver the above information, see TABLE 8-6 on page 134.

Task 3: Deliver Main Application

The main application can be compiled with JavaOS into a single executable that is stored in flash or delivered to the JavaStation using either method described in the table above.

Alternatively, the main application is delivered to the JavaStation by a web server (HTTP server) on the network. The URL of the application zip file and other JavaOS application loading properties are passed to the DHCP client in the initial handshake through the DHCP Vendor-Specific Options, described on page 130. For descriptions of the JavaOS application loading properties, see page 141.

Task 4: Update Flash Memory with New JavaOS

Tower model JavaStation computers include flash memory to store the JavaOS binary file. After JavaOS finishes its initialization, it determines whether it needs to update the flash memory with a new JavaOS based on the following criteria:

- The value of the JavaOS property `javaos.alwaysUpdate`
- Whether the JavaOS checksum value is different from the checksum of the JavaOS already in flash

Both the property and the checksum are delivered by DHCP as Vendor-Specific Options. See "Vendor-Specific Options" on page 130.

The JavaOS checksum identifies the revision level of the JavaOS binary file. It is contained in the first four bytes of the last 12 bytes of the file. For more information, see "Managing the JavaOS Checksum" on page 133.

The results of each possible set of conditions are shown in TABLE 8-2.

TABLE 8-2 Conditions for Updating JavaStation Flash Memory

Conditions		Results
javaos.alwaysUpdate	**Checksum**	
not set	different	JavaOS opens a Flash Update dialog box on the JavaStation screen. You have the option of updating flash memory with the new copy of JavaOS.
not set	same	JavaOS does not update the flash memory.
`true`	different	JavaOS updates flash memory without querying the user.
`true`	same	JavaOS does not update the flash memory.
`false`	different	JavaOS does not update the flash memory.
`false`	same	JavaOS does not update the flash memory.

If the flash memory is updated, the JavaStation immediately reboots with the new copy of JavaOS.

Note that if any of the following conditions exist, flash memory is *never* updated:

- `javaos.alwaysUpdate` is set to `false`
- the checksum is set to zero
- the checksum is not delivered by the DHCP server

Setting Up Boot Services

This section describes how to set up DHCP, TFTP, NFS, and HTTP services to administer JavaStation computers on your network.

DHCP

The DHCP server manages a pool of IP addresses for a variety of systems on the subnet, including JavaStation computers. During the boot sequence, the DHCP server delivers to the JavaStation its IP address along with other options that enable the JavaStation to operate on the network.

There are three types of configuration information for DHCP in the Solaris operating environment:

- `/etc/default/dhcp`. A file that defines where the next two tables of information are stored. They can be stored either in files or in NIS+ tables.
- *DHCP network table.* A table that maps IP addresses to all the clients on the subnet. The table is updated dynamically as IP addresses are leased and then returned to the pool. If the table is stored in a file, it is generally stored in `/var/dhcp`. Its name is the IP address of the (sub)net being served by the DHCP server (example: `129_444_124_0`).
- *DHCP service configuration table (*`dhcptab`*).* A table containing the DHCP options, symbol definitions, and macros used in composing replies to clients. If this information is stored in a file, the filename is `dhcptab` and it is generally stored in `/var/dhcp/`.

Solaris DHCP configuration information is managed using the following command line utilities:

- `dhtadm`
- `dhcpconfig`
- `pntadm`

This section provides guidelines for setting up DHCP configuration information (in files) for JavaStation clients. Complete instructions for setting up a Solaris DHCP server are provided in Chapter 4 of the *TCP/IP Data Communication Administration Guide*, available at `http://docs.sun.com` and in the following Solaris man pages:

- `dhcp(4)`
- `dhcptab(4)`
- `in.dhcpd(1M)`
- `dhtadm(1M)`
- `dhcp_network(4)`

- dhcpconfig(1M)
- pntadm(1M)

The /etc/default/dhcp file

The /etc/default/dhcp file defines where DHCP configuration files are located. The following is a sample dhcp file.

```
# This file controls the defaults for datastore type and location
# for the DHCP service. Two directives are currently supported,
# RESOURCE and PATH. RESOURCE can be either “files” or “nisplus.”
# PATH can be a UNIX pathname for “files” resources, or a legal
# NIS+ directory for “nisplus” resources.
#
RESOURCE=files
PATH=/var/dhcp
```

The DHCP Network Table

The DHCP network table contains a single entry for each client. Each entry contains the client identifier, the client IP address, the lease time, and other information. The DHCP server updates the network table dynamically as IP addresses are leased or relinquished by the clients.

A full description of the DHCP network table is provided in the dhcp_network(4) man page. The following is an example network table contained in the file /var/dhcp/192_9_100_0.

```
# /var/dhcp/192_9_100_0
#
# Client ID|Flags|Client IP Addr|Server IP Addr|Lease Time|Macro
#
010800208E2091 00 192.9.100.10 129.144.205.69 876425811 elvis
010060972CF0D6 00 192.9.100.11 129.144.205.69 876432501 elvis
0108002087EC88 00 192.9.100.12 129.144.205.69 876507437 elvis
00 00 192.9.100.13 129.144.205.69 0 elvis
00 00 192.9.100.14 129.144.205.69 0 elvis
```

The DHCP Service Configuration Table

The DHCP Service Configuration Table contains groups of DHCP options that will be delivered to DHCP clients. For a complete description of this table, refer to the `dhcptab(4)` man page. Throughout this section this table will be called the `dhcptab` file.

The DHCP options that can be delivered to JavaStation computers are a subset of all the options supported by the DHCP specification. Some DHCP options are required for a successful JavaStation boot; others are optional.

Required DHCP Options

TABLE 8-3 lists the DHCP options required in `dhcptab` to boot JavaStation computers. For your reference, the left column gives the option number as defined in the DHCP specification (RFC 2132), if it exists. The middle column gives the symbol name for the option in the Solaris implementation of DHCP (the name used in `dhcptab`). See "Sample `dhcptab` File" on page 131 to see how these names are used.

TABLE 8-3 DHCP Options Required to Boot JavaStation computers

DHCP Option Name (Number)	Symbol Name in Solaris `dhcptab` File	Definition
N / A (This symbol is a DHCP field, not an option.)	`BootSrvA`	The IP address of the server with the initial boot file (either the booter or JavaOS). See TABLE 8-6 on page 134 for more information.
IP Address Lease Time (51)	`LeaseTim`	The duration of the IP address lease. A value of -1 indicates an infinite lease. After this period of time (expressed in seconds) has expired without being renewed, JavaOS shuts down the networking port.
Subnet Mask (1)	`Subnet`	The subnet mask.
Time Server (4)	`Timeserv`	The IP address of a server supporting the RFC 868 time port.
Domain Name Server (6)	`DNSserv`	The IP addresses of one or more DNS servers. JavaOS queries additional DNS servers if the primary server fails to respond.
DNS Domain Name (40)	`DNSdmain`	The DNS domain name.

The options DHCP Message Type (53) and Server Identifier (54) are also required in every DHCP packet. However, these options are provided automatically by the DHCP server and do not need to be specified in `dhcptab`.

Optional DHCP Options

TABLE 8-4 lists the DHCP options that can be interpreted by the DHCP client during the JavaStation boot sequence but are not necessarily required for the boot sequence.

TABLE 8-4 Optional DHCP Options for Booting JavaStation computers

DHCP Option Name (Number)	Symbol Name in Solaris `dhcptab` File	Definition
Bootfile Name (67)	`Bootfile`	The path name of the initial boot file, which can be a "booter" file or JavaOS. The path name is assumed to be relative to the TFTP root directory. If this option is not provided, the name of the booter is assumed to be the same as the Client Class Identifier shown in TABLE 8-5 on page 131 and is assumed to be in the TFTP root directory. See TABLE 8-6 on page 134 for more information.
Root Path (17)	`Rootpath`	The NFS-exported directory containing the JavaOS image. This option is used by the booter to locate JavaOS and by JavaOS to locate a newer image to update the flash. This option is required if you are using the booter method or if flash update is enabled. See TABLE 8-6 on page 134 for more information.
Broadcast Address (28)	`Broadcst`	The network broadcast address.
Router (3)	`Router`	The IP address of the router to be used by the JavaStation clients. If not given, JavaOS uses router discovery to broadcast for a router.
N/A (Solaris-specific flag)	`LeaseNeg`	A boolean flag which by its presence tells the DHCP server to renew the leases of clients requesting IP address lease renewal.
NIS Servers (41)	`NISservs`	If not given, JavaOS broadcasts looking for NIS servers. (This only works if the NIS server is on the same subnet.)
NIS Domain Name (40)	`NISdmain`	The NIS domain name.

TABLE 8-4 Optional DHCP Options for Booting JavaStation computers *(Continued)*

DHCP Option Name (Number)	Symbol Name in Solaris `dhcptab` File	Definition
Vendor-Specific Options (43)	Symbol names are defined by the user. By convention, use `JOScmd1-4` and `JOSchksm`	A list of vendor-specific options. See "Vendor-Specific Options" on page 130.

See "Sample `dhcptab` File" on page 131 for examples of how these options are set in `dhcptab`.

Vendor-Specific Options

The DHCP specification enables hardware and software vendors to create their own DHCP options. These options are delivered through the use of the Client Class Identifier option and the Vendor-Specific Options option. If a DHCP client identifies itself as being of a certain class of clients, and the DHCP server has been configured to serve that class of clients, then the DHCP server can respond with a set of options that make sense only to that client type.

Vendor-Specific Options can be used to deliver the JavaOS checksum and JavaOS property settings to the JavaStation during the boot sequence.

- The checksum identifies the JavaOS image that is available from a network server and helps determine whether that image is updated in JavaStation flash memory, as described on page 125. For more information, see "Managing the JavaOS Checksum" on page 133.
- JavaOS property settings determine the resources JavaOS uses and other JavaOS attributes. JavaOS properties are described in Chapter 9.

The delivery of Vendor-Specific Options to JavaStation clients works as follows. The DHCP client on the JavaStation (the PROM or JavaOS) includes the JavaStation's Client Class Identifier (DHCP Option #60) in every packet sent to the DHCP server. When the DHCP server receives the Client Class Identifier, it can deliver the JavaOS checksum and/or JavaOS property settings in the Vendor-Specific Options if it has been configured to do so.

The JavaStation's Client Class Identifier is specified in the PROM. TABLE 8-5 lists the Client Class Identifiers for each JavaStation model.

TABLE 8-5 JavaStation Client Class Identifiers

JavaStation Model	Client Class Identifier
Brick model	SUNW.JDM1
Tower model	SUNW.JSIIep

See "Sample dhcptab File" for examples of setting the JavaOS checksum and JavaOS properties in dhcptab. Note, however, that JavaOS properties can be delivered to JavaOS using methods other than the DHCP Vendor-Specific Options. See Chapter 9 for more information.

Sample dhcptab *File*

The following sample dhcptab file will supply DHCP options to a variety of clients on a network. Some options are common to all clients. Other options are specific to clients attached to the server; to classes of JavaStation clients; or to specific JavaStation machines. Note that dhcptab can serve many different clients, not just JavaStation computers.

```
# /var/dhcp/dhcptab
#
# This file is a sample DHCP server configuration database for
# JavaStation clients.
#
# Refer to dhcptab(4) for details. This table is generated by
# using the dhcpconfig(1M) command in conjunction with the
# dhtadm(1M) command. It can be administered with the dhtadm
# command.

# The following are symbol definitions for the Vendor-Specific
# Options. JOScmd1-4 can be used in macros that set JavaOS
# properties. JOSchksm is the JavaOS checksum. Refer to the
# dhcptab(4) man page for symbol definition syntax.

JOScmd1    s   Vendor=SUNW.JSIIep SUNW.JDM1,101,ASCII,1,0
JOScmd2    s   Vendor=SUNW.JSIIep SUNW.JDM1,102,ASCII,1,0
JOScmd3    s   Vendor=SUNW.JSIIep SUNW.JDM1,103,ASCII,1,0
JOScmd4    s   Vendor=SUNW.JSIIep SUNW.JDM1,104,ASCII,1,0

JOSchksm   s   Vendor=SUNW.JSIIep,128,NUMBER,4,1
```

```
# Standard macros generated when configured with dhcpconfig(1M).
# The first is the time offset from GMT (UTC) time, the second
# applies to all clients serviced by this server, and the third
# applies to all clients attached to one of the nets attached to
# the server.

Locale  m   :UTCoffst=-25200:

gibson  m   :Include=Locale:Timeserv=10.146.103.191:\
            :LeaseTim=259200:LeaseNeg:\
            :DNSserv=10.146.1.151 10.146.1.152 10.144.1.57:\
            :DNSdmain=foo.bar.com:
10.146.103.0   m   :Broadcst=10.146.103.255:\
                   :Subnet=255.255.255.0:\
                   :MTU=1500:Router=10.146.103.1:\
                   :NISdmain=nis.foo.bar.com:\
                   :NISservs=10.146.103.22:\
                   :BootSrvA=10.146.103.191:

# These are macros used to configure specific classes of clients.
# In this case the JavaStation tower and brick models respectively.

SUNW.JSIIep    m   :Rootpath="/export/root/javaos/JSIIep":\
                   :JOScmd1="-ihttp://gibson:8080/properties":\
                   :JOSchksm=0x13d624be:

SUNW.JDM1  m   :Rootpath="/export/root/javaos/JDM1":\
               :JOScmd1="-ihttp://gibson:8080/properties.JDM1":

# The macros below contain individual DHCP options for the two
# JavaStation computers whose client ID's (derived from the
# Ethernet address) match the keys. Here each JavaStation gets
# its boot image from a boot server other than the DHCP server.
# Notice also that the second JavaStation gets a different
# properties file as well as empty vendor options that override
# any previous default definitions.

0800208E0668   m       :BootSrvA=10.146.103.11:\
                       :JOSchksm=0x13b74098:

08002087BED4   m       :BootSrvA=10.146.103.114:\
                       :JOScmd1="-ihttp://redwings/properties":\
                       :JOScmd2="":JOScmd3="":JOScmd4="":\
                       :JOSchksm=0x13dd4e2d:
```

Managing the JavaOS Checksum

Each time you receive a new copy of JavaOS, you can configure the DHCP server to deliver the new copy to JavaStation computers by following the first set of instructions below. To disable JavaOS updating on the JavaStation computers, follow the second set of instructions.

▼ To Configure the DHCP Server for a New JavaOS

1. **Determine the checksum.**

   The checksum is contained in the first four bytes of the last 12 bytes of the JavaOS binary file. To determine the checksum, type:

```
% tail -4c /export/root/javaos/JSIIep/javaos | od -xv \
    | nawk '{print $2 $3}'
14eb02a1
```

2. **Use** `dhtadm` **to add the new checksum to the DHCP configuration.**

   The command to add a new checksum is:

```
% dhtadm -M -m SUNW.JSIIep -e JOSchksm=0x checksum
```

   For example,

```
% dhtadm -M -m SUNW.JSIIep -e JOSchksm=0x14eb02a1
```

   At boot up, each JavaStation will update its flash memory with the new JavaOS and then reboot using the new JavaOS.

▼ To Disable JavaOS Updating

Set the checksum to zero:

```
% dhtadm -M -m SUNW.JSIIep -e JOSchksm=0
```

or delete the checksum entirely from the DHCP configuration by typing:

```
% dhtadm -M -m SUNW.JSIIep -e JOSchksm=
```

Note that there is nothing after the equal sign.

TFTP

Depending on how you set up the boot sequence, the TFTP server delivers either the booter or JavaOS to the JavaStation computers (see TABLE 8-1 on page 124).

▼ To Set Up a JavaStation TFTP Server

1. **Follow the instructions in the** *TCP/IP and Data Communications Administration Guide* **to configure a server on the network as a TFTP server.**

   This guide is available at `http://docs.sun.com`. From the main web page, click the following links in the order shown.

   - System Administration
   - Solaris 2.6 System Administrator Collection, Volume 1
   - Setting Up and Administering TCP/IP Networks
   - Configuring TCP/IP on the Network
   - Configuring Standard TCP/IP Services.

   Also, refer to the `inetd(1M)` and `in.tftpd(1M)` man pages.

2. **Use** `dhtadm` **to add the relevant boot information to** `dhcptab`**, as described in** TABLE 8-6**:**

TABLE 8-6 DHCP Option Settings for TFTP

If the TFTP server delivers..	Set the following in `dhcptab`	Relative Performance
the booter	• Set `Bootfile` to the path name of the booter file. The path name is assumed to be relative to the TFTP root directory. (If `Bootfile` is not set, the name of the booter file is assumed to be the Client Class Identifier – see TABLE 8-5 on page 131.) • Set `BootSrvA` to the IP address of the TFTP server. • Set `Rootpath` to the directory on `BootSrvA` where the JavaOS image is located.	preferred method (fastest)
JavaOS	• Set `Bootfile` to the path name of the JavaOS image. The path name is assumed to be relative to the TFTP root directory. • Set `BootSrvA` to the IP address of the TFTP server. • If flash update will be enabled, set `Rootpath` to the directory on `BootSrvA` where the JavaOS image is located.	slow

NFS

If a booter is used at the start of the boot process, the NFS server delivers the JavaOS image to the JavaStation computers.

▼ To Set Up a JavaStation NFS Server

1. **Follow the instructions in the** *NFS Administration Guide* **to configure a server on the network as an NFS server.**

   This guide is available at `http://docs.sun.com`. From the main web page, click the following links in the order shown.

   - System Administration
   - Solaris 2.6 System Administrator Collection, Volume 1

2. **Use** `dhtadm` **to set** `Rootpath` **to the directory on the NFS server where the JavaOS image is located.**

HTTP

The HTTP (web) server delivers the user's main application to the JavaStation.

▼ To Set Up a JavaStation Web Server

1. **Follow the vendor's instructions for setting up the web server.**
2. **Prepare the application to be delivered to the JavaStation computers.**

   See Chapter 10 for instructions.

3. **Set JavaOS application loading properties.**

   See Chapter 9 and Chapter 10 for information.

CHAPTER 9

Setting JavaOS Properties

There are two kinds of properties in JavaOS: system properties and JavaOS properties. Generally, system properties control the operation of applets or of any Java applications built into the JavaOS image (such as a browser). JavaOS properties determine the resources used by JavaOS, such as the language and fonts of the interface and the printers available to the JavaStation.

This chapter lists the JavaOS and system properties by functional group and explains how to set properties.

- JavaOS and System Properties —page 137
- Setting Properties —page 147

JavaOS and System Properties

TABLE 9-1 to TABLE 9-5 list all JavaOS and system properties. The properties are grouped by function. Each table includes the name of the property, its default value, and a description of what the property controls. All properties are JavaOS properties unless marked as system properties.

Note – Due to space constraints, property names may take up two or more lines in the tables below. However, they should be typed on one line only. For example, the first property in TABLE 9-1 is `javaos.mountlist`.

General Properties

TABLE 9-1 lists miscellaneous JavaOS properties.

TABLE 9-1 JavaOS General Properties

Property Name	Default Value	Description
`javaos.mountlist`	null	A semicolon-separated list of pairs of network paths and local paths. As soon as the network is up, each remote file system is mounted onto the local file system. The syntax of each pair is: *server*`:`*remote_path*`|`*local_path* For example, to enable localized keyboards, mount `/REMOTE` from the server and file system that has JavaOS: `-djavaos.mountlist=myserver:/export/root/javaos/classes|/REMOTE` See Chapter 11 “Setting Locales and Adding Fonts” for more details.
`javaos.snmpSysContact`	null	This property sets the value that will be returned in the system Management Information Base (MIB) for the system contact field. It can be set with a string of your choice, which should be enclosed in quotes. Example: `-djavaos.snmpSysContact=”Bob”`
`javaos.snmpSysLocation`	null	This property sets the value that will be returned in the system MIB for the system Location field. It can be set with a string of your choice, which should be enclosed in quotes. Example: `-djavaos.snmpSysLocation="Sun MPK14"`
`javaos.kbd`	null	By default, JavaOS assumes you are using a U.S. keyboard, To enable a different keyboard, use the syntax `javaos.kbd=`*keyboard*. Possible values for *keyboard* are provided in Chapter 11 “Setting Locales and Adding Fonts.”

TABLE 9-1 JavaOS General Properties *(Continued)*

Property Name	Default Value	Description
`javaos.consoleHotKey`	`VK_PRINTSCREEN`	This property sets the keyboard hotkey that activates the JavaStation console, which displays debugging information. The value of the property is the JDK virtual keycode name for the hotkey. The following codes are valid: • `VK_F1` • `VK_F2` • `VK_F3` • `VK_F4` • `VK_F5` • `VK_F6` • `VK_F7` • `VK_F8` • `VK_F9` • `VK_F10` • `VK_F11` • `VK_F12` • `VK_PRINTSCREEN` • `VK_UNDEFINED` (to disable the console) The value of this property is case-insensitive; `VK_PRINTSCREEN` and `vk_PrInTSCreen` are equivalent.
`javaos.login`	`true`	If true, JavaOS displays a login screen after booting and before starting the initial application. If false, JavaOS runs the main application as soon as it boots, without displaying a login screen. This means there is no user home directory and no system properties are read from a `properties` file. You may want to use the `javaos.homedir` property to specify an NFS directory to mount (see below).

TABLE 9-1 JavaOS General Properties *(Continued)*

Property Name	Default Value	Description
`javaos.alwaysUpdate`	`null`	This property specifies that JavaOS is always or never updated in the JavaStation's flash memory, regardless of the value of the JavaOS checksum. It is useful for public kiosks or other systems where user input is not expected. • If not set, the default behavior occurs: if the DHCP-supplied checksum is present and is not zero and does not match the checksum stored in flash, then an Update Flash dialog is displayed. • If set to `true`, then if the above conditions hold, no dialog is displayed and flash is updated. • If set to any value other than `true`, then regardless of checksum presence / value, flash is not updated. Note that if the DHCP checksum is not present or is zero, the flash is not updated.
`javaos.allowGuest`	`false`	If true, the login screen (if displayed at all) will contain a guest login button.
`javaos.homedir`	null	This property specifies the NFS path JavaOS should mount if NIS is not used to find the path based on the user name. The NFS path is specified as `hostname:/path`. This property is most often used if the `javaos.login` property is set to false, or, if NIS is not enabled or available, to determine the directory to use for the `properties` file that is read by HotJava at launch.
`javaos.dns`	`true`	When set to true, host name-to-address and address-to-host name resolution is performed using the DNS protocol. See also `javaos.nis`. If lookup using NIS is enabled also, NIS is attempted first, and DNS is attempted only if NIS lookup fails. See also `javaos.hostaddrmap` and `javaos.hostnamemap`.
`javaos.hostnamemap`	`host.byname`	The name of the NIS map used to perform host name-to-address resolution.
`javaos.hostaddrmap`	`host.byaddr`	The name of the NIS map used to perform address-to-host name resolution.
`javaos.homedirmap`	`auto.home` (sought first), `auto_home`	If NIS is enabled, this property is used to set the name of the NIS map used by JavaOS to determine a user's home directory.

TABLE 9-1 JavaOS General Properties *(Continued)*

Property Name	Default Value	Description
`javaos.nis`	`true`	When set to `true`, login authentication, host name-to-address resolution and address-to-host name resolution are performed using the NIS protocol. See also `javaos.dns`. If lookup using DNS is also enabled, NIS is attempted first, and DNS is attempted only if NIS fails.

Application Loading Properties

The properties listed in TABLE 9-2 control selection and loading of the main application on the JavaStation after the user logs in. For instructions on using these properties, see Chapter 10.

TABLE 9-2 JavaOS Application Loading Properties

Property Name	Default Value	Description
`javaos.apps`	null	If defined, JavaOS launches a simple point-and-click Application Launcher window. This property should be set to the URL of an HTML document that lists the applications to display.
`javaos.mainProgram`	`sun.applet.AppletViewer`	Set to the name of the application's `main` class.
`javaos.mainHomeprop`	`appletviewer`	Set to the name of the property specifying the application's root directory. For example, HotJava Views uses the `hotjava.home` property to specify its root directory. Other applications may have different property names. When the virtual file system is created, this property is set to enable the application to find its files.
`javaos.mainZip`	null	Set to the name of the archive containing the application files.

User Properties

TABLE 9-3 lists miscellaneous user properties that affect JavaOS operation. Most are related to localization. Certain settings cause other settings to be assumed. For example, setting `user.region` to `ja` causes the system to assume the JST time zone, even if `user.timezone` is not defined.

TABLE 9-3 JavaOS User Properties

Property Name	Default Value	Description
`user.timezone`	null	This system property tells the Java date and time API the time zone in which the JavaStation system is located. Example: `-Duser.timezone=PST`. Valid time zones are as follows (this list is from `java.util.TimeZone`.) • GMT – Greenwich Mean Time • ECT – European Central Time • EET – Eastern European Time • ART – (Arabic) Egypt Standard Time • EAT – Eastern African Time • MET – Middle East Time • NET – Near East Time • PLT – Pakistan Lahore Time • IST – India Standard Time • BST – Bangladesh Standard Time • VST – Vietnam Standard Time • CTT – China Taiwan Time • JST – Japan Standard Time • ACT – Australia Central Time • AET – Australia Eastern Time • SST – Solomon Standard Time • NST – New Zealand Standard Time • MIT – Midway Islands Time • HST – Hawaii Standard Time • AST – Alaska Standard Time • PST – Pacific Standard Time • PNT – Phoenix Standard Time • MST – Mountain Standard Time • CST – Central Standard Time • EST – Eastern Standard Time • IET – Indiana Eastern Standard Time • PRT – Puerto Rico and US Virgin Islands Time • CNT – Canada Newfoundland Time • AGT – Argentina Standard Time • BET – Brazil Eastern Time • CAT – Central African Time

TABLE 9-3 JavaOS User Properties *(Continued)*

Property Name	Default Value	Description
`user.language`	`en`	This system property must be set to a valid, lowercase, ISO-639 Language Code. Valid codes are listed at `http://www.ics.uci.edu/pub/ietf/http/related/iso639.txt`. Example: `-Duser.language=en`
`user.country`	null	This system property must be set to a valid ISO-3166 Country Code. Valid codes are listed at `http://userpage.chemie.fu-berlin.de/diverse/doc/ISO_3166.html`. Example: `-Duser.country=US`

Printing Properties

TABLE 9-4 lists properties related to printing.

TABLE 9-4 JavaOS Printing Properties

Property Name	Default Value	Description
`javaos.printservice.NIS.mapname`	`printers.conf`	The name of the NIS map used to locate printers.
`javaos.printservice.lpd.printers`	null	A semicolon-separated list of printers available for use by the lpd printing client. The format of each entry is *printer@server*

TABLE 9-4 JavaOS Printing Properties *(Continued)*

Property Name	Default Value	Description
`javaos.printdialog.alwaysShowPrinters`	null	A semicolon-separated list of the printers available from this host. This property enables administrators to add access to the printer nearest a given JavaStation. The syntax of the printer name is the print service name, a colon, and the full name used by the print service to identify the printer. Example: `-djavaos.printdialog.alwaysShowPrinters=lpd:raw@konaprint;lpd:ps@konaprint;NIS:droid@fred`
`javaos.printers.selected`	null	A semicolon-separated list of the printers the user has selected to appear in print dialogs. The format is the same as for `alwaysShowPrinters`. This is a system property. Example: `-Djavaos.printers.selected`.
`javaos.printservice.local.params.serial-`*port*	null	The *port* portion of this property is the name of a serial port (which is always `Serial` for the JavaStation). This property sets the communications parameters for the serial port. The syntax of the parameters is *baud_rate*:*data_bits*:*stop_bit*: *parity*: *flow_control*. For example: `-djavaos.printservice.local.params.serial-Serial=57600:8:1:none:hh` Valid values for each parameter are as follows: • *baud_rate*: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 • *data_bits*: 5, 6, 7, 8 • *stop_bits*: 1, 1.5, 2 • *parity*: none, odd, even • *flow_control*: none, {s,h}{s,h} You can disable flow control by specifying none. Otherwise, specify an {input}{output} pair by selecting from Xon / Xoff (s) or RTS / CTS (h) for input and output.

Localization Properties

TABLE 9-5 lists properties related to localization.

TABLE 9-5 JavaOS Localization Properties

Property Name	Default Value	Description
`javaos.font.properties.home`	`/FONTS`	The local path name of a directory that contains a `lib` subdirectory. The `font.properties` files are read from this `lib` directory. The `javaos.mountlist` property is typically used to associate some server path with the `/FONTS` directory to enable JavaOS to load and use fonts from a server. For more information, refer to Chapter 11 “Setting Locales and Adding Fonts.”
`javaos.im.compose.deadkeys`	`false`	This property changes the following keys into accent keys: '(single quote) "(double quote) `(grave accent) and ^(circumflex). Use this property if your keyboard is a U.S. keyboard, you are not setting the `javaos.kbd` property, and you wish to produce accented characters for ISO Latin locales. If set to `true`, the above keys do not produce a value of their own but cause the next key pressed to be an accented character. For example, pressing ‘ plus “a” produces á. If this property is false, these keys generate their expected values.
`javaos.im.url`	null	Set this property to the host name of the machine running Asian or Japanese Solaris that has the language engine you want to access. (A Microsoft Windows95™ or Microsoft NT™ system can also be used if a IIIMP (Internet/Intranet Input Method Protocol) server from JavaSoft™ for the PC server is installed on it.) Set as follows: `iiimp://`*iiimphost*`:`*port*`/`*engine* where: • *iiimphost* is the system running the language engine • *port* is `9010` by default but can be different if configured that way during the server installation. Valid values of *engine* are provided in Chapter 11 “Setting Locales and Adding Fonts.”

TABLE 9-5 JavaOS Localization Properties *(Continued)*

Property Name	Default Value	Description
`javaos.loginLocaleList`	`en_US`	A semicolon-separated list of the locales to be presented as choices to the user at login. A locale is defined using one of the ISO-639 standard two-letter codes that define `user.language` followed by an underscore character "_" and one of the ISO-3166 standard two-letter codes that define `user.country`. For example: `-djavaos.loginLocaleList=\ en_US;fr_FR;ja_JP;zh_CN;zh_TW`
`javaos.im.lookup.button`	`false`	This property controls how the JavaStation user selects characters when using a Korean, Japanese, or Chinese input method. If `false`, when the list of candidate characters is displayed, letters are used to indicate each choice, and the user selects a choice by typing the letter. If `true`, letters are replaced with buttons so that the user clicks on a button to pick a choice. Note that enabling this option will negatively impact user input performance.
`javaos.im.status.fixpopup`	`false`	Setting this property to true enables a pop-up window with input method status information.

Setting Properties

You can set the properties that control JavaOS operation on the JavaStation in one of two places:

- In the DHCP Vendor Options (see Chapter 8).
- In a text file referenced in the DHCP Vendor Options.

The second option is preferable because the total length of DHCP Vendor Options is limited to 255 characters. In contrast, the text file can have any length.

Syntax

Each property setting must use one of the flags in TABLE 9-6. There is no space between each flag and its value. Note that certain flags are used only for JavaOS properties, while others are used only for system properties.

TABLE 9-6 Property Flags

Flag	Syntax	Definition
`-d`	`-d`*JavaOS_property=value*	The property name and value are stored in the JavaOS properties object. The names of properties set with this option always begin with `javaos`. Example: `-djavaos.kbd=UKPS2`
`-D`	`-D`*system_property=value*	The system property and value are stored in the global system properties object. Example: `-Duser.timezone=PST`.

TABLE 9-6 Property Flags *(Continued)*

Flag	Syntax	Definition
`-a`	`-a`*JavaOS_property=value*	The JavaOS property is set to the given value if it has never been set before. If the property already has a value, then its current value is appended with a semicolon and the value. Example: `-ajavaos.printservice.lpd.printer\ =printer2` This example sets the property `javaos.printservice.lpd.printer` to `printer2` if the property has no current value. If the property already has a value (say, `printer1`), the new value is appended (`printer1;printer2`). This flag is useful if you are building the value of a property from multiple places using the `-i` option below. Note that this property can itself be a semicolon-separated list of values; the entire list is added or appended as described above.
`-A`	`-A`*system_property=value*	This works just like the `-a` option, except that it sets system properties.
`-u`	`-u`*JavaOS_property*	Used to undefine a JavaOS property.
`-U`	`-U`*system_property*	Used to undefine a system property.
`-i`	`-i`*HTTP_URL*	The HTTP URL is expanded and the file referenced by the URL is itself evaluated as if it were a JavaOS command line. Properties are stored one per line in this file. One file can use `-i` to include another file. There is currently no check on infinite recursion.

Properties will be interpreted as the *JavaOS command line*, which is a formatted text string of any length that is interpreted when JavaOS boots. The command line can include:

- JavaOS and system properties
- Arguments to be used by JavaOS or an application launched by JavaOS

The syntax of the command line is as follows:

prop_setting1 prop_setting2... prop_settingn -- arg1 arg2... argn

where *prop_setting* is a JavaOS property setting and *arg* is an argument. Property settings and arguments are separated by two contiguous hyphens.

▼ To Reference a Properties File in the DHCP Vendor Options

Use the `-i` flag described in TABLE 9-6 in a `dhcptab` macro (see Chapter 8). The relevant line of the macro should have the following syntax:

```
JOScmd1="-ihttp://hostname[:port_number]/filename"
```

The text file should contain property settings using the flags described in TABLE 9-6 and can also include arguments. Each property setting and argument is typed on a separate line, with the separator hyphens on their own line, as follows:

```
-Duser.timezone=PST
-djavaos.login=false
--
http://www.sun.com
```

The following is a sample properties text file.

CODE EXAMPLE 9-1 Sample Text File

```
# Sample text file of JavaOS properties
#####################################################################
# General setup
#####################################################################

# Define the key that brings up the screen console (PRINTSCREEN
# is the default)
-djavaos.consoleHotKey=VK_PRINTSCREEN

# Set up values that will be returned by SNMP in the System MIB
-djavaos.snmpSysContact=JavaOS group, js_team@ignacio
-djavaos.snmpSysLocation=JavaSoft

#####################################################################
# Locale-specific settings
#####################################################################

# Set Server for /REMOTE file system
-ajavaos.mountlist=fred:/tftpboot/lunaserver/classes|/REMOTE
# We're all on the US West Coast...
-Duser.timezone=PST

# Set list of countries we support, English first
# (The order doesn't matter, but the Login window shows them
# in the order in which they appear in the property list.)
-djavaos.loginLocaleList=en_US

# Add the European Locales
-ajavaos.loginLocaleList=fr_FR;de_DE;it_IT;sv_SE;es_ES

# Add the Asian Locales
-ajavaos.loginLocaleList=ja_JP;ko_KR;zh_CN;zh_TW
#####################################################################
# FONT-specific settings
#####################################################################

# Set the server location for where to find fonts for the
# /FONTS directory
-ajavaos.mountlist=fred:/tftpboot/lunaserver/fonts|/FONTS
```

```
######################################################################
# Printing properties
######################################################################

# Always show these printers
-djavaos.printdialog.alwaysShowPrinters=NIS:dirk@fred;\
NIS:rita@scorpio

# The name of the NIS map for printers (this is the default, so it's
# not really necessary)

-djavaos.printservice.NIS.mapname=printers.conf

# Set up the hardware parameters for locally connected printers
-djavaos.printservice.local.params.serial-Serial=57600:8:1:none:hh

######################################################################
# set doc.url
# This allows us to read the HotJava Browser User's Guide from
# a server.
######################################################################
-Ddoc.url=http://fred.eng/JavaOS/LunaApps/
```

CHAPTER 10

Dynamically Loading Applications

JavaOS supports dynamic delivery of the user's main application to the JavaStation system by a web (HTTP) server when the JavaStation boots. This chapter describes how to set up an application to be dynamically loaded.

- Overview—page 153
- Setting Up Applications for Dynamic Loading—page 154

For more information on the JavaStation boot sequence, see Chapter 8.

Overview

There are two methods for loading an application. One is to configure a single "fixed" application to be loaded and launched in the JavaStation boot. The other is to provide each client with a dialog window containing a list of applications to choose from. In the second case, JavaOS passes control to Application Launcher to do the following:

- Fetch and parse an `HTML` file containing a list of applications
- Display a graphical user interface (GUI) enabling the user to select an application from a pick list
- Perform the loading and launching of the target application

Applications are bundled as JAR or zip archives and are referenced by URLs. Application Launcher uses the `java.util.zip` classes to download and expand an application archive into a virtual RAM-based file system on the JavaStation. Since the application archive is referenced by a URL, it can reside anywhere on the network.

Note – Application Launcher does not provide an environment to enable multiple applications to run on a single virtual machine. Only one application can run at a time.

Setting Up Applications for Dynamic Loading

The following procedures describe how to load and launch an application using the methods described in the previous section.

▼ To Create an Archive

Applications are typically made up of class, text, graphics, HTML, and property files.

Many application hierarchies are organized so that all the class files are in the `classes` directory and everything else is in the `lib` directory. This policy is enforced for dynamic loading to ensure the application classes can be found and added to the system CLASSPATH.

1. **Verify that your project directory contains both a `classes` and a `lib` directory and that all application classes reside in the `classes` directory.**
2. **Remove any unnecessary files from the `classes` and `lib` directories.**

   It is important to conserve memory on the JavaStation system.
3. **Create a JAR file containing the `classes` and `lib` directories.**

   The JAR (Java Archive) utility is provided in JDK software. Use the following syntax:

   `jar -cf` *archive_name* `classes lib`

   For example, to create a JAR file of the HotJava Views application:

```
% jar -cf hotjava.jar classes lib
```

Note – You can also use the zip utility (not provided in the JDK) to create archives.

4. **Place the archive in a directory that is accessible to the HTTP server.**

▼ To Launch a Single Application at Login

1. **Create the application archive.**
2. **Set the JavaOS properties listed in** TABLE 10-1

TABLE 10-1 JavaOS Properties Required to Load a Single Application

Property	Description
`javaos.mainProgram`	The name of the application's `main` class.
`javaos.mainZip`	The name of the application archive. The archive name is absolute. Example: `http://amber.eng/~fredw/javaos/hotjava.jar`.
`javaos.mainHomeprop`	The name of the property specifying the application's root directory. For example, HotJava Views uses the `hotjava.home` property to specify its root directory. Other applications may have different property names. When the virtual file system is created, this property is set to enable the application to find its files.

For example, to launch HotJava Views, you would set the following JavaOS properties. In the following example, `amber.eng/~fredw/javaos` are the host, user, and directory names.

```
-djavaos.mainProgram=sunw.hotjava.Main
-djavaos.mainZip=http://amber.eng/~fredw/javaos/hotjava.zip
-djavaos.mainHomeprop=hotjava.home
```

JavaOS properties are delivered to the JavaStation in the DHCP options or in a file referenced in the DHCP options. For complete instructions on setting JavaOS properties, see Chapter 9.

▼ To Provide a Dialog Window With a Pick List of Applications

1. **Create an archive for each application.**
2. **Create an application tag file.**

The application tag file is an HTML file containing information (a “tag”) on each application archive. Application Launcher parses the application tag file and presents a window displaying a list for the user to select from.

Each application tag contains the attributes listed in TABLE 10-2.

TABLE 10-2 Application Tag Attributes

Attribute	Description
`code`	The name of the application’s `main` class.
`name`	The name to be displayed in the Application Launcher list window. This attribute is optional. By default, the path to the archived zip file will be displayed in the list.
`archive`	The name of the application archive. The archive name can be either relative (`hotjava.jar`) to the directory containing the application tag file or absolute (`http://amber.eng/~fredw/javaos/hotjava.jar`).

An application tag can also have the parameters listed in TABLE 10-3.

TABLE 10-3 Application Tag Parameters

Parameter	Description
`homeprop`	The name of the property specifying the application’s root directory. For example, HotJava Views uses the `hotjava.home` property to specify its root directory. Other applications may have different property names. When the virtual file system is created, this property is set to enable the application to find its files.
`args`	Enables you to pass an arbitrary list of arguments to the `main()` of your application. The list is separated with a space, just as on the command line.

The following is a sample application tag file.

```
<DOCTYPE HTML PUBLIC "-//IETF//DTD HTML//EN">
<html>
  <head>
    <title>Applications</title>
  </head>
  <body>
      <h1>Applications</h1>

<application code="sunw.hotjava.Main" name="HotJava Browser"
archive="hotjava.jar">
<param name="homeprop" value="hotjava.home">
<param name="args" value="http://java.sun.com/">
</application>

<application code="sunw.hotjava.Main" name="HotJava Views"
archive=jdt/html/classes/Selector.jar>
<param name="homeprop" value="hotjava.home">
<param name="args" value="http://http_server/apps/selector.init">
</application>

<application code="sunw.applet.AppletViewer" name="AppletViewer"
archive="appletviewer.zip">
<param name="args" value="http://http_server/taos/taos.html">
</application>

  </body>
</html>
```

3. **Place the application tag file in your HTTP server's document root directory or a subdirectory under it.**

4. **Use the JavaOS property** `javaos.apps` **to specify the location of the application tag file. For example**:

```
-djavaos.apps=http://amber.eng/~fredw/javaos/applauncher.html
```

JavaOS properties are delivered to the JavaStation in the DHCP options or in a file referenced in the DHCP options. For complete instructions on setting JavaOS properties, see Chapter 9.

CHAPTER 11

Setting Locales and Adding Fonts

This chapter explains how to configure JavaStation computers that will be used in countries other than the United States.

- What You Will Need to Configure—page 159
- Setting the Locale—page 160
- Adding Fonts—page 161
- Adding a Keyboard—page 166
- Setting the Input Method—page 168
- Changing the File Encoding Setting—page 170

What You Will Need to Configure

You will need to change the following settings for JavaStation computers that will be used outside the United States.

TABLE 11-1 Description of Settings to be Changed for Localization

Setting	Description
Locale	Controls the language and font that appears in the user interface, help text, and error messages
Keyboard	Controls the mechanical input of each character when it is typed
Font	Controls the appearance of characters typed by the user
Input Method	Controls how the user composes characters; for Chinese, Japanese, and Korean languages only; requires a localized version of Solaris
File Encoding	Controls the character set used in files that are saved

Many of the settings are delivered in JavaOS properties to the JavaStation. For instructions on setting JavaOS properties, see Chapter 9.

Setting the Locale

You can set the user's locale to a language other than English in the JavaStation user interface, help text, and error messages.

JavaOS supports the locales listed in TABLE 11-2.

TABLE 11-2 JavaStation Locale Settings

Language	Locale Setting
German	de
English	en
Spanish	es
French	fr
Italian	it
Japanese	ja
Korean	ko
Swedish	sv
Chinese	zh

JavaOS also supports the language variants American English and Simplified Chinese, shown in TABLE 11-3.

TABLE 11-3 JavaStation Country Settings

Country	Country Setting
United States	US
Republic of China	TW

▼ To Change the Locale Setting

1. **Set the** `user.language` **property.**

```
-Duser.language=locale
```

locale is one of the locale settings listed in TABLE 11-2.

2. **If needed, set the** `user.country` **property.**

```
-Duser.country=country
```

country is one of the country settings listed in TABLE 11-3.

For instructions on setting JavaOS properties, see Chapter 9.

Modifying the Languages Displayed at Login

The localized version of the JavaStation software supports all the locales described in "Setting the Locale." At login, the user is asked to choose one of these locales.

If you want to restrict or add to the locales presented at login, especially if you will be running an application that is localized for a language not listed in "Setting the Locale," you will need to modify the `login.LocaleList` property.

▼ To Modify the Languages Displayed at Login

Set the following JavaOS system property:

```
-Dlogin.LocaleList=locale-1;locale-2; ... ;locale-n
```

The default value of this property is:

```
-Dlogin.LocaleList=en_US;de;es;fr;it;ja;ko;sv;zh;zh_TW
```

Adding Fonts

Font sets must reside on a network directory that is accessible to JavaOS via NFS. By default, this directory is `/export/root/javaos/fonts`. To install a font, go to the fonts directory and perform the following tasks:

- Add the font files (`.ttf` files). You can install any TrueType or TrueType-compliant font.
- Modify the file `FONTS.LST`, which maps font names recognized by JavaOS to the font filenames on the server.

- Modify font property files in the subdirectory `lib`.

You then make the font available to the JavaStation computers by setting the `javaos.mountlist` property to enable JavaOS to mount the fonts directory during boot-up.

▼ To Install and Configure Fonts

1. **Install the font files in the fonts directory.**

   By default, this directory is `/export/root/javaos/fonts` on the fonts server.

   Follow the instructions that accompany the font package.

2. **Modify the `FONTS.LST` file, which maps font names recognized by JavaOS to the font file names you have installed.**

   `FONTS.LST` contains a list of one-line entries, each of which contains:

   font_name style `truetype` *file_name*

   where:

   font_name is the alias that JavaOS uses for the font.
   style is one of `PLAIN`, `BOLD`, `ITALIC`, and `BOLDITALIC`.
   file_name is the font file you have installed.

   Example:

```
hggothicb PLAIN truetype HG-GothicB.ttf
heiseimin PLAIN truetype HeiseiMin-W3H.ttf
hgminchol PLAIN truetype HG-MinchoL.ttf
```

   In this example, three TrueType fonts have been installed. The font file names in the *font_dir* directory are:

   - `HG-GothicB.ttf`
   - `HeiseiMin-W3H.ttf`
   - `HG-MinchoL.ttf`

   They are being aliased to the names for use by JavaOS:

   - `hggothicb`
   - `heiseimin`
   - `hgminchol`

   They are all of style `PLAIN`.

Note – *font_name* is case-insensitive. JavaOS recognizes `HGGothicB`, `hggothicb`, and `HggothicB` as the same name.

3. **In the `lib` subdirectory, modify the `font.properties.`*locale* file.**

   locale is the locale that the font properties file is relevant for. For the English locale, the name `font.properties` (without a locale specification) is used.

   The font properties file has four sections.

   - Section 1 defines where the new fonts are to be used in place of default system fonts.

     The server provides five default system fonts to JavaStation computers: serif, sansserif, monospaced, dialog, and dialoginput. Section 1 contains up to one line for each default system font, where each line uses the following syntax:

     system_font`.`*suffix*`=`*JavaOS_font_name*

     If you want a new font (identified by its JavaOS font name) to override the system font, set *suffix* to 0. If you want the new font to be available in addition to the system font, set *suffix* to any other number (1 is a good choice). The following example makes the `hgminchol` font available in addition to the serif font:

     ```
     serif.1=hgminchol
     ```

     The serif font will be used for all English characters. The hgminchol font will be used for all Kana and Kanji characters.

   - Section 2 makes each new font name available to JavaOS.

     Section 2 makes it possible for JavaOS to recognize the new font by its name, in addition to supplementing one of the default fonts. Section 2 contains up to one line for each new font, where each line uses the following syntax:

     JavaOS_font_name`.0=`*JavaOS_font_name*

     The following example makes the `hgminchol` font name available to JavaOS:

     ```
     hgminchol.0=hgminchol
     ```

   - Section 3 (optional) enables you to further alias the new font names.

     Section 3 contains up to one line for each new font, where each line uses the following syntax:

     `alias.`*new_name*`=`*JavaOS_font_name*

The following example aliases the `hgminchol` font to the name “mincho.”

```
alias.mincho=hgminchol
```

- Section 4 specifies the character set encoding of each font. Supported encodings are listed in TABLE 11-4.

TABLE 11-4 Character Set Encodings Supported by JavaOS

Encoding	Locales
8859-1	West European locales
8859-2	East European locales
8859-5	Russian
GB2312	Chinese (PRC)
CNS11643	Chinese (Taiwan)
BIG5	Chinese (Taiwan)
Ja-EUC	Japanese
EUCJIS	Japanese
KOI8	Korean
Unicode	Large, universal character set (all languages)

For each font, you must add a line with the following syntax:

`fontcharset.`*font*`.1=sun.io.CharToByte`*encoding*

Where *encoding* is one of the values in TABLE 11-4. The following example is for the monospaced font that is Unicode-encoded:

```
fontcharset.monospaced.1=sun.io.CharToByteUnicode
```

The following is an example font properties file for a server that has two new Unicode-encoded Japanese fonts. The new fonts will be available to JavaOS in addition to the system fonts. Thus both English and Japanese can be used on the JavaStation computers.

```
# Copyright (c) 1994-1996 by Sun Microsystems, Inc.
#
# AWT Font Properties for handling Japanese in JavaOS
# using disk-based fonts

serif.1=hgminchol
sansserif.1=hggothicb
monospaced.1=hggothicb
dialog.1=hggothicb
dialoginput.1=hggothicb

hgminchol.0=hgminchol
hggothicb.0=hggothicb

alias.mincho=hgminchol
alias.gothic=hggothicb

fontcharset.serif.1=sun.io.CharToByteUnicode
fontcharset.sansserif.1=sun.io.CharToByteUnicode
fontcharset.monospaced.1=sun.io.CharToByteUnicode
fontcharset.dialog.1=sun.io.CharToByteUnicode
fontcharset.dialoginput.1=sun.io.CharToByteUnicode
```

Making Fonts Available to JavaStation Computers

You can make new fonts available to JavaStation computers using the `javaos.mountlist` property.

▼ To Make Fonts Available to JavaStation Computers

Note – This procedure can be performed automatically by the Netra j 2.0 software. See “Defining Boot Server Global Parameters” on page 22.

---

1. **Set the** `javaos.mountlist` **property.**

   This property setting tells JavaOS to mount the fonts directory at startup:

```
-djavaos.mountlist=host:font_dir|/FONTS
```

   For example, to mount the fonts directory `/export/root/javaos/fonts`, which resides on the server `sunroom`, you would type:

```
-djavaos.mountlist=sunroom:/export/root/javaos/fonts|/FONTS
```

2. **Reboot JavaStation computers that need access to the new fonts.**

   To reboot a JavaStation, turn it off and then on.

Adding a Keyboard

Note – If you install a native keyboard but do not install the fonts to support it, text that is typed does not appear on the screen.

JavaOS supports a number of PS/2 keyboards that may not have been supplied with your JavaStation. The following keyboards are supported:

- Arabic
- Belgian
- Bulgarian
- CanadianBi
- CanadianFr
- Chinese ROC
- Czech
- Danish
- Estonian
- French
- German
- Greek
- Hebrew
- Hungarian
- Italian
- Japanese
- Korean
- Latvian
- Lithuanian
- Netherlands
- Norwegian
- Polish
- Portugese
- Russian
- Slovakian
- Spanish
- SpanishLatin
- Swedish
- Swiss
- Thai
- Turkish
- UK
- USInternatl

▼ To Add a Localized Keyboard

Note – This procedure can be performed automatically by the Netra j 2.0 software. See "Defining Boot Server Global Parameters" on page 22.

---

1. **Connect the keyboard to the JavaStation.**

2. **Set the** `javaos.mountlist` **property.**

   This property setting tells JavaOS to mount the locale directory at startup.

   ```
   -djavaos.mountlist=host:localization_top_dir|/REMOTE
   ```

   By default the locale directory is `/export/root/javaos/locale`. If you set `javaos.mountlist` as follows:

   ```
   -djavaos.mountlist=sunroom:/export/root/javaos/classes|/REMOTE
   ```

   JavaOS mounts the directory `/export/root/javaos/classes/sun/javaos`. Note that if you are specifying a `FONTS` directory as well as a `REMOTE` directory, the `javaos.mountlist` property is a list delimited by semicolons. For example:

   ```
   -djavaos.mountlist=sunroom:/export/root/javaos/fonts|/FONTS;
   /export/root/javaos/classes|/REMOTE
   ```

3. **Set the** `javaos.kbd` **property.**

   This property setting tells JavaOS the name of the keyboard file, which contains the keyboard mapping table. Keyboard files for all of the countries listed on the previous page are included in the Netra j 2.0 software and reside in the locale directory.

   ```
   -djavaos.kbd=keyboard
   ```

   The syntax of *keyboard* is *name*`PS2`, where *name* is one of the countries listed on the previous page. For example, to add the Swedish keyboard:

   ```
   -djavaos.kbd=SwedishPS2
   ```

Enabling Special Characters on the U.S. Keyboard

The `compose.deadkeys` property allows you to modify the characters typed at the U.S. English keyboard. When this property is set to `true`, the following keys can be used in combination with other keys to produce special characters.

- ‘ (single quote)
- ‘ (back single quote)
- “ (double quote)
- ^ (circumflex)

For example, pressing the ‘ key plus the “a” key produces an á. This feature is commonly used in European locales.

Pressing a special character key twice produces its normal value.

▼ To Enable Special Characters on the U.S. Keyboard

Set the following JavaOS property:

```
-djavaos.im.compose.deadkeys=true
```

Setting the Input Method

An input method controls how users in Chinese, Japanese, and Korean locales will compose characters at the keyboard. Localized versions of Solaris offer language engines to support the input methods listed below.

TABLE 11-5 Input Methods by Language

Language	Input Methods
Chinese Simplified	• Location • Double Pinyin • Stroke • Full Pinyin • Golden Input • Intelligent Pinyin • Chinese Symbol

TABLE 11-5 Input Methods by Language *(Continued)*

Language	Input Methods
Chinese Traditional	• TsangChieh • ChuYin • I-Tien • Telecode • ChienI • NeiMa • ChuanHsing
Korean	• 2-Bulsik • Hanja Input • Special Character • Code Value
Japanese	• CS00 • Wnn6 (Solaris 2.6 only)

▼ To Set the Input Method

Note – This procedure can be performed automatically by the Netra j 2.0 software. See "Defining Boot Server Global Parameters" on page 22.

1. **Set the** `javaos.im.url` **property.**

   If your network has a Solaris machine running an Asian language engine, you can provide access to the engine from the JavaStation computer by setting the following JavaOS property:

   ```
   -djavaos.im.url=iiimp://iiimphost:port/input_method
   ```

   where:

   hostname is the Solaris host that is running the Asian language engine.
   port is 9010 by default.
   input_method is one of the input methods listed in TABLE 11-5.

2. **(Optional) Set the input method status pop-up option.**

   The following JavaOS property enables a pop-up window with input method status information to appear on the JavaStation monitor.

   ```
   -djavaos.im.status.fixpopup=true
   ```

3. **(Optional) Set the `javaos.im.lookup.button` property.**

   The following JavaOS property controls how the JavaStation user selects characters when using an input method. If false, when the list of candidate characters is displayed, letters are used to indicate each choice. If true, letters are replaced with buttons so that the user must click on a button to pick a choice. Note that enabling this option will negatively impact the performance of user input.

```
-djavaos.im.lookup.button=true
```

4. **Reboot the JavaStation.**

   To reboot a JavaStation, turn it off and then on.

Changing the File Encoding Setting

If the locale you have chosen does not use the 8859-1 character set (Roman alphabet), you need to change the `file.encoding` property to describe which character set will be used when files are saved. Supported character sets are listed in TABLE 11-4 on page 164.

▼ To Change the File Encoding Setting

Set the following JavaOS system property:

```
-Dfile.encoding=encoding
```

where *encoding* is one of the settings listed in TABLE 11-4.

APPENDIX **A**

Network Computer Configuration Form

The Network Computer Configuration form shows the information required to set up and configure network computers in a network environment. Complete this form and proceed to “Booting the JavaStation Using Netra j” on page 19 for JavaStation configuration instructions

Field Name	Description	Your System Information
NIS Domain Name (optional)	The NIS domain in which the network computers reside.	
NIS Server Address(es) (optional)	The host address(es) of NIS servers for the network computers.	
DNS Domain Name	The DNS domain in which the network computers reside.	
DNS Server Address(es)	The host address of the DNS server for the network computers.	
Boot Server Address	The host address of the network computer boot server on the local network. The boot server provides DHCP, TFTP, and NFS services.	
Time Server Address	The IP address of a server supporting the NTP protocol.	
Router Address(es) (optional)	The host address(es) of the routers to be used by the network computers. If not specified, the JavaOS on each network computer will broadcast looking for a router.	
Lease Time (in days)	The duration (in days) of an IP address lease. IP addresses are leased to network computers, not assigned permanently. For more information, refer to the *Netra j Administrator’s Guide.*	

Field Name	Description	Your System Information
Lease Negotiation	A yes or no value that specifies whether the boot server renews the IP address leases of clients requesting lease renewal.	
Network Interfaces	A list of the network interfaces accessible to the Netra j system. Each interface is associated with a physical device. However, a physical device can have multiple network interfaces.	
Input Method Server (optional)	A server with a language engine to interpret the keyboard input method (for Korean, Chinese, and Japanese languages only). This server must be running a localized version of Solaris.	
Input Method Port (optional)	The port where the language engine is accessible.	
Time Zone	The time zone in which the JavaStation clients are located.	
Fonts Server (optional)	The host address or host name of the fonts server for the network computers. A fonts server is required if alternate fonts will be used by the network computers. For more information, refer to the *Netra j Administrator's Guide.*	
Fonts Directory (optional)	The directory location of the fonts for the network computers.	
Localized Resources Server (optional)	The host address or host name of the localized resources server for the network computers. Localized resources, such as keyboard mapping tables, support network computer operation in different languages. For more information, refer to the *Netra j Administrator's Guide.*	
Localized Resources Directory (optional)	The directory location of the localized resources for the network computers.	
Login Locales List (optional)	The list of locales presented as choices to the user logging on to a network computer.	
JavaOS Command Line	The JavaOS command line is a formatted text string containing definitions of either JavaOS or system properties. These properties control characteristics of JavaOS such as the language it uses. For more information, refer to the *Netra j Administrator's Guide.*	

APPENDIX **B**

Netra j Package Information

This appendix describes the packages included in the Netra j 2.0 software.

- Netra j 2.0 Administration Interface—page 173
- JavaStation Software—page 174
- Solaris 2.5.1 Add-ons—page 175
- OpenConnect System Software—page 175
- Additional Software—page 176

Netra j 2.0 Administration Interface

Use the Netra j 2.0 Administration Interface to set up and configure the servers and clients needed in your network environment. The Netra j 2.0 Administration Interface comprises the following packages:

TABLE B-1 Netra j 2.0 Software

Package Name	Package ID
Netra Anonymous FTP Administration	SUNWaftpA
Netra Application Support	SUNWappA
Netra Asynchronous PPP Administration	SUNWapppA
Netra SunATM Interface Administration	SUNWatmA
Netra Tape Backup and Restore	SUNWbkupA
Netra External Disk Administration	SUNWdiskA
Core English-based Netra version	SUNWenntr
Netra HSI Administration	SUNWhsiA
HTTP server root package	SUNWhttpr

TABLE B-1 Netra j 2.0 Software *(Continued)*

Package Name	Package ID
HTTP server user package	SUNWhttpu
HTTP server var package	SUNWhttpv
Netra Sun ISDN Interface Administration	SUNWisdnA
Netra Java Server Administration	SUNWjsA
Netra Mail Administration	SUNWmailA
Netra j HotJava Browser for Solaris	SUNWnhjb
Netra Name System Administration	SUNWnsA
Netra Required Functionality	SUNWntr
Netra Common Administration	SUNWntrA
Netra j Server Personality	SUNWntrjP
Netra Software Administration	SUNWswA
Netra TCP Wrappers and Administration	SUNWtcpwp
Netra User Administration	SUNWuserA
SSL 1.0 Software (Library Global Version)	SUNWssl
Sun Internet Mail Server	SUNWimap
Solstice Internet Mail POP3 server	SUNWipop

JavaStation Software

These software packages provide the operating system, boot image, and client applications for the JavaStation computers.

TABLE B-2 JavaStation Software

Package Name	Package ID
JavaOS 1.1, inetboot images	SUNWjsos
HotJava Views 1.1	SUNWjdt
HotJava Views Documentation	SUNWjdtdc
HotJava Views Demo Support	SUNWjdtd
HotJava Browser 1.1	SUNWjshjb

Solaris 2.5.1 Add-ons

Netra j 2.0 also includes Solaris 2.5.1 add-on software. The following software is required for systems running the Solaris 2.5.1 operating environment.

TABLE B-3 Solaris 2.5.1 Add-ons

Package Name	Package ID
PPP/IP Asynchronous PPP daemon	SUNWapppr
PPP/IP Asynchronous PPP daemon	SUNWapppu
Networking UUCP Utilities	SUNWbnur
Networking UUCP Utilities	SUNWbnuu
System Localization	SUNWloc
PPP/IP and IPdialup	SUNWpppk
X Windows optional fonts	SUNWxwoft
NIS Kit 1.2	SUNWnsktr, SUNWnsktu, and SUNWnskta (AnswerBook Documentation)
Dynamic Host Configuration Protocol (DHCP)	• Federated Naming System — SUNWfns • BOOTP/DHCP server services (root) SUNWdhcsr • BOOTP/DHCP server services (usr) –SUNWdhcs

OpenConnect System Software

The OC:/ /WebConnect and OpenVista software enables Java-capable clients to access data and applications on IBM mainframes and on midrange computers from many vendors. OC:/ /WebConnect is a Java applet that provides 3270, 5250, and VT220 terminal emulation with any Java-capable web browser.

TABLE B-4 OpenConnect System Software

Package Name	Package ID
OpenVista	OCSvista
OC:/ /WebConnect	OCSwcd

Additional Software

Sun WebServer software enables companies to publish and distribute information and deploy web-based applications across any network environment.

TABLE B-5 Sun WebServer

Package Name	Package ID
Sun WebServer SKI 1.0 Software (User Package)	SUNWski
Sun WebServer SKI 1.0 Software (CA Package)	SUNWskica
Sun WebServer SKI 1.0 Software (Licensing Package for CA)	SUNWskicw
Sun WebServer SKI 1.0 Software (CA Manual Page Package)	SUNWskimc
Sun WebServer SKI 1.0 Software (User Manual Page Package)	SUNWskimu

GO-Joe is a thin client X server that provides access to all UNIX and X Window applications, including browsers such as HotJava Browser.

TABLE B-6 GO-Joe

Package Name	Package ID
GO-Joe Virtual X Server 2.0	SUNWgjvxs
GO-Joe Virtual X Viewer 2.0	SUNWgjvxv

Solaris 2.6 customers can also view the *Netra j AnswerBook*™ online documentation which includes the *Netra j 2.0 Installation Guide* and *Netra j 2.0 Administrator's Guide*. Refer to the *Information Library for Solaris 2.6 (SPARC Platform Edition)* included with the Solaris 2.6 CD-ROM for installation procedures.

TABLE B-7 Netra j AnswerBook for Solaris 2.6

Package Name	Package ID
Netra j 2.0 AnswerBook	SUNWnjdoc

APPENDIX C

JavaStation User Setup Forms

This appendix contains forms that show JavaStation users how to boot their JavaStation computers. The first form shows how to boot using the traditional boot sequence. The second form shows how to boot using PPP (Point-to-Point Protocol) modem dial-up.

Copy a form for each user and fill in the required information. Be sure to add contact information at the bottom of the form. Deliver the form to the user with the JavaStation system.

These forms are also accessible online from the Netra j Main Administration page. The online forms are in HTML format and can be edited to suit your users' specific needs.

Welcome to Your JavaStation Computer

1. Set up your hardware.

2. Turn on the JavaStation computer and monitor.

3. Log in.

Your user name is _____

Type it and press Enter.

Your password is _____

As you type your password, asterisks appear for each letter. This enables you to keep your password a secret.

Problems?

Contact:

Phone:

Welcome to Your JavaStation Computer

1. Set up your hardware.

2. Connect the modem cable to the JavaStation serial port.

3. Turn on the JavaStation computer and monitor. Turn on the modem.

4. Log in.

Your user name is _____

Type it and press Enter.

Your password is _____

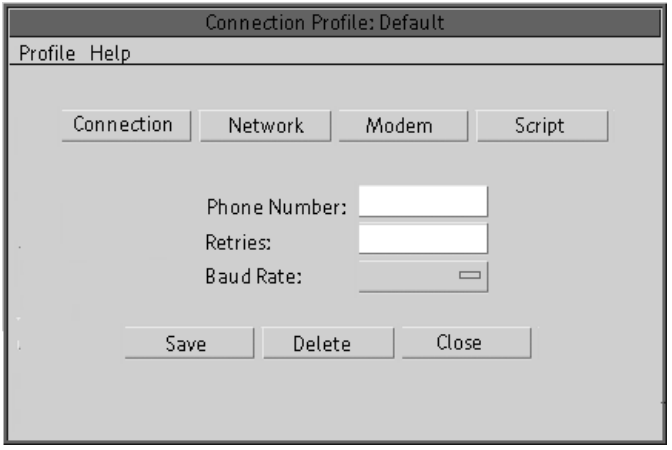
As you type your password, asterisks appear for each letter. This enables you to keep your password a secret.

5. Dial in.

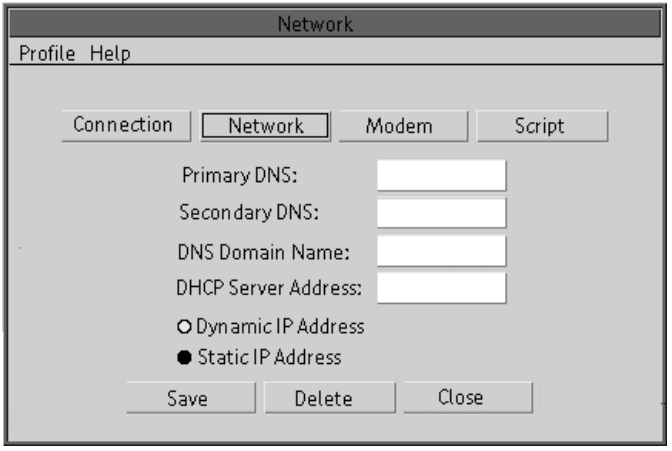
Type _____
and click Connect.

To set options:

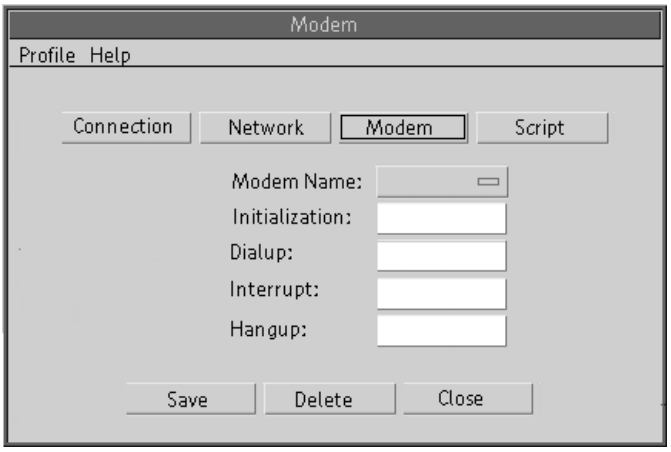
Before dialing in, click Options, then click an Options radio button. Select your options and click Save. Click Close to close the Options window.



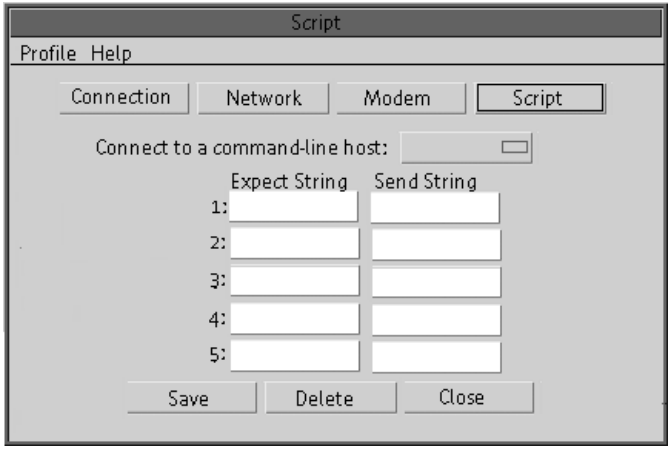
Connection options



Network options



Modem options



Script options

Problems?

Contact:

Phone:

APPENDIX **D**

Troubleshooting

This appendix provides problem-solving procedures:

- Viewing Network Activity—page 183
- Boot Problems—page 184
- Name Services—page 186
- HotJava Views—page 187
- GO-Joe—page 194
- Additional Error Messages and Known Problems—page 197

Viewing Network Activity

You can view network activity to help facilitate how to troubleshoot problems with the operating system.

You can also change the console key from PrintScreen to another key by setting a JavaOS property. See Chapter 9 “JavaOS and System Properties" for details.

▼ Using the JavaOS Console

1. **To open the JavaOS console window from the JavaStation client, wait until the star-field screen is displayed.**
2. **Press the print screen key.**

   The JavaOS console window displays the network activity.

Boot Problems

TABLE D-1 describes tips related to the JavaOS and TABLE D-2 describes boot problems and their solutions.

TABLE D-1 Tips

Tip	Description
Disabling the “flash-prom” update prompt.	Change the `javaos.alwaysUpdate` property. The default value is null. • If not set, the default behavior occurs: if the DHCP-supplied checksum is present and is not zero and does not match the checksum stored in flash, then an Update Flash dialog is displayed. • If set to `true`, then if the above conditions hold, no dialog is displayed and flash is updated. • If set to any value other than `true`, then regardless of checksum presence / value, flash is not updated. Note, that if the DHCP checksum is not present or is zero, the flash is not updated. See Chapter 9, for additional information.

TABLE D-2 Boot Problems and Suggested Actions

Problem	Solution
After typing `boot net/javaos` on a SPARCstation, the following message is displayed: `Timeout waiting for ARP/RARP packet`	The `rarpd` daemon on the server is not responding. On the server, type `ps -cfe | grep rarpd` to verify the daemon is running. Verify that there is an entry in the `/etc/ethers` and `/etc/hosts` files on the server for the client. Also make sure that the `/etc/nsswitch.conf` file on the server looks at the local copy of the `/etc/ethers` and `/etc/hosts` files before looking at the NIS copies.
After booting JavaOS over the net, messages indicate that the booter is unable to mount the root file system.	Make sure the `/etc/bootparams` file has the correct information for the JavaOS client root file system. It should be the directory that contains the JavaOS binary on the server. The contents should look something like: `cuesta root=capo:/tftpboot/cuesta` where `cuesta` is the name of the JavaOS client and `capo` is the name of the server. The `/tftpboot/cuesta` directory contains the JavaOS binary. Type `ps -cfe | grep bootparamd` to verify the `bootparamd` daemon is running. If it is not, type: `/usr/sbin/rpc.bootparamd`. Verify the client's root directory is exported over NFS by typing `share`. The directory containing the client's JavaOS binary (for example, `/tftpboot/cuesta`) should be in the output. If it is not, you need to update `/etc/dfs/dfstab` and then type `shareall`.
After booting JavaOS, the screen goes blank and nothing happens.	There are a number of reasons this could happen. The most likely reasons include incompatible network and graphics adapters.

TABLE D-2 Boot Problems *(Continued)*and Suggested Actions

Problem	Solution
After booting JavaOS, the screen shows twinkling stars or a watch but no login window.	This is due to a misconfigured or missing DHCP server. Click on the print screen key to display the JavaOS console to view network activity.
JavaOS will not boot.	Use `snoop(1M)` to view network activity. For more information regarding `snoop`, type `man snoop` on any Solaris machine. In addition, you can click on the print screen key to display the JavaOS console to view network activity.
The following message is displayed: `date bootserver in.dhcpd[pid]: (Error 0) No more IP address for subnet network`	No action is required. This is an informational message from `/usr/lib/inet/in.dhcpd` that is displayed in the console window of the boot server when the JavaStation is powered on or rebooted.

Name Services

TABLE D-3 describes name service error messages.

TABLE D-3 Name Service Error Messages

Message	Action
DNS domain name is empty Host name field is empty	Specify a DNS domain name or host name
Invalid DNS server IP address Invalid IP address Invalid subnet mask Invalid router IP address	IP addresses must be in the form "xxx.xxx.xxx.xxx" where x is a number between 0 and 255. Type `man` inet for more information. Hex values are also acceptable.
Host name already exists IP address already exists Ethernet address already exists	Each client must have a unique host name, Ethernet address, and IP address. Enter a different value.
Invalid ethernet address	Ethernet addresses must be in the form "xx:xx:xx:xx:xx:xx," where xx is a hexadecimal number separated by colons.

HotJava Views

This section lists some of the known problems with the HotJava Views software.

General

- HotJava Views 1.1 requires a minimum of 32 Mbytes of memory to run on a JavaStation.
- There may be intermittent problems when running against a loaded JavaStation HTTP server.
- The selector desktop configuration file (`selector.desktop`) has changed. Applications are now in the `selector.apps` file. The `selector.desktop` file now refers only to the name of applications that are defined in `selector.apps`.

CalendarView

CalendarView works best with the CDE calendar server. The feature of storing mail messages with appointments is available only for data version 4 format calendars. This format is supported by the CDE calendar server. The OpenWindows calendar server does not support data version 4 format.

MailView

- On JavaStation systems, the right mouse button does not currently generate events to applets and applications. For this reason, MailView functionality in pop-up menus activated by the right mouse button are not available. This primarily affects folder management in the tree display in the upper left corner, and in attachments.
- make sure that when the JavaStation clients are installed, there are proper entries in DNS for each client system. If the JavaStation client is not in the DNS maps, the user may not be able to send mail.
- Temporary file space in `/var/tmp` can become full, causing append commands to fail. This may occur when large mail messages are sent, and the user gets an "Unable to send" error notice. More space is required in `/var/tmp` to resolve this issue.

HotJava Views Administration

Use of the HotJava Views Administration facility requires a fully JDK 1.1-compliant browser. Both HotJava Views 1.1 WebView and HotJava Browser 1.1 (currently in beta) are JDK 1.1-compliant. Other browsers may not yet be fully JDK 1.1-compliant. For example, Netscape Navigator Version 3.x supports only JDK 1.0.2 and Netscape Navigator Version 4.x supports only a subset of JDK 1.1.

The administration facility is applicable only when configuring HotJava Views installed on the HTTP server that is used to deliver Views applets and configuration files.

Tips

General

- Use a web browser to verify all URLs specified in `/var/dhcp/dhcptab` and in the `javaosopts.txt` file.
- Run `snoop(1M)` and watch the packets to and from the JavaStation.
- Early access versions of Views improperly saved properties into `~/.jdt`.
- See the `README` files in `/opt/SUNWjdt/doc` for each component.
- Refer to the following Solaris man pages: `dhcp(4)`, `dhcp_network(4)`, `dhcpconfig(1M)`, `dhcptab(4)`, `dhtadm(4)`, `pntadm(4)`, `in.dhcpd(1M)`, `snoop(1M)`
- To update the “About” button, you’ll need to edit the `lib/html/welcome/welcomeAbout.html` file.
- To change the alias associated with the “Feedback” button, you’ll need to update the `selector.props` property for each group configuration.

CalendarView

- CalendarView works best with the Common Desktop Environment (CDE) calendar server. The feature of storing mail messages with appointments is available only for calendars in the data version 4 format. This format is supported by the CDE calendar server. The OpenWindows calendar server does not support the data version 4 format.

- To find out whether the CDE calendar server is running on a particular machine, as superuser, type:

```
# /usr/dt/bin/sdtcm_admin -l -h name-of-machine-to-check
```

  If the `sdtcm_admin` command returns a list of calendar names, the CDE calendar server is running on that machine. Otherwise, the command returns the following message:

```
# /usr/dt/bin/sdtcm_admin: Could not list calendars because:
Service is unavailable.
```

  The CDE calendar server is available in the `SUNWdtdmn` package.

- When an appointment is scheduled through MailView, the mail message containing the appointment is saved in the login user's calendar mailbox and a reference to the saved mail message is stored with the appointment. This feature is not available for calendars in the OpenWindows calendar format, data version 3 or less. This is a limitation of the data version 3 (or less) format.

  You can use the `/usr/dt/bin/sdtcm_convert` calendar conversion utility to convert data version 3 calendars to data version 4 format. Refer to the `sdtcm_convert` man page for details.

- The Additional Permissions list within the Properties dialog may contain login IDs instead of complete names (for example, joes may be displayed instead of Joe Smith). This can occur if the user's calendar is in the OpenWindows data format or if the entry was added using calendar clients other than CalendarView. If the calendar is in the OpenWindows data format, use the `/usr/dt/bin/sdtcm_convert` utility to convert it to data version 4 format. Refer to the `sdtcm_convert` man page. Otherwise, use only CalendarView to add editors.

- For editable calendars, clicking within an empty time slot will create a new 1-hour appointment in that time slot. There may be a significant delay in refreshing the view. If you did not intend to create a new appointment, delete it by clicking the Delete button in the CalendarView detail area.

- To demonstrate automatic update, you need two calendar clients (two CalendarView or CalendarView and `dtcm`).

NameView

- It may be useful to capture output from the `Namesvc` proxy to a file. This can be enabled by editing `/opt/SUNWjdt/cgi-bin/namesvc`. Comment the line:

```
# $JAVA_HOME/bin/java sunw.jdt.dex.server.Namesvc
```

And uncomment the line:

```
# $JAVA_HOME/bin/java sunw.jdt.dex.server.Namesvc | tee /tmp
dex.last
```

If you perform a search and this file doesn't get created or updated, then chances are your `httpd` server is having problems launching the `cgi-bin` script. If the output in the file indicates some type of error:

```
Content-type: text/plain
<DBError>:6
```

then the database probably couldn't be found or the permissions on the file are not set correctly. Make sure the database files have read access for world.

- If you have enabled capturing output to `/tmp/dex.last` and this file isn't being updated, then it might be worth checking the `httpd` server error log file. This may indicate that there was some sort of `cgi-bin` error. The server may not be configured to run `cgi` scripts or maybe it couldn't find the `namesvc` script.
- Make sure the database files you have created have read access set for world (`chmod 664`).
- The 1.1 back end is not compatible with 1.0 clients. If you need to support both 1.1 and 1.0 clients, you have several choices. The easiest way to handle this is to install the 1.1 back end on a different server than the 1.0 back end. In this configuration you simply follow the steps that have already been outlined above. If you want to support 1.1 and 1.0 clients from the same server, follow these instructions:

  a. Install 1.1 on the server but do not install it on top of your 1.0 installation. Put 1.1 under `/opt/SUNWjdt1.1` or something similar.

  b. In your web server `cgi-bin` directory make a symbolic link from *webserver*`/cgi-bin/jdt1.1` to `/opt/SUNWjdtd1.1/cgi-bin`.

c. Edit the `namesvc` file in `/opt/SUNWjdtd1.1/cgi-bin`. Change the `JDT_HOME` environment variable from `/opt/SUNWjdt` to `/opt/SUNWjdt1.1`.

d. Edit `/opt/SUNWjdt1.1/lib/props/standard/nameview.props`. Change the value of the `dex.db.cgi.proxy` property to `/cgi-bin/jdt1.1/namesvc.2.0`.

e. Edit `/opt/SUNWjdt1.1/lib/props/namesvc.props` to point to your database.

Enabling Error Message Logging

This release of HotJava Views has an error message logging capability that is used most extensively by NameView. If you want to enable this capability, use the following procedure on the system running your web server.

1. **Assuming you have installed HotJava Views in `/opt/SUNWjdt`, make a symbolic link called `jdt` from within your `httpd` server's cgi-bin directory (this location will vary among servers) to `/opt/SUNWjdt/cgi-bin`.**

   For example, if you are running the Apache server, you can use the following commands:

```
# pwd
# /opt/WWW/Apache/httpd/cgi-bin  Your httpd server's cgi-bin dir
# ln -s /opt/SUNWjdt/cgi-bin ./jdt
# ls jdt
# getidsvc.2.0   jdtlogsvc  namesvc.2.0
```

6. Some web servers require that you explicitly turn on `cgi-bin` support before `cgi-bin` scripts can be executed. Refer to your httpd server's documentation to determine your server's requirements.

7. Edit the `/etc/syslog.conf` file and add the following line:

```
# local0.info/var/opt/SUNWjdt/jdt.log
```

Make sure that you use tabs, *not* the spaces between the values.

8. Create `/var/opt/SUNWjdt/jdt.log` and modify its permissions:

```
# mkdir /var/opt/SUNWjdt
# touch /var/opt/SUNWjdt/jdt.log
# chmod 666 /var/opt/SUNWjdt/jdt.log
```

9. Restart the `syslog` daemon:

```
# kill -HUP `cat /etc/syslog.pid
```

HotJava Views uses CGI to send error messages to the `jdtlogsvc` script on your web server. The `jdtlogsvc` script uses `syslog` to log the errors.

Troubleshooting

TABLE D-5 describes HotJava Views error messages and known problems.

TABLE D-4 HotJava Views Error Messages and Suggested Actions

Message/ Problem	Action
JavaOS 1.1 boots OK, but upon login, the heap viewer applet displays instead of Views.	The alternate main parameters are not getting passed to JavaOS. Make sure you have specified the correct URL in the `-i` option in `/var/dhcp/dhcptab`. Use a web browser to verify the URL. Make sure the j`avaos.mainProgram`, `javaos.mainZip` and `javaos.mainHomeprop` parameters are correctly specified in the `javaosopt.txt` file. Use the `-i` URL indirection. Make sure you have sent a `SIGHUP` to `in.dhcpd` if you have changed the `/var/dhcp/dhcptab` file.
JavaOS 1.1 boots OK, but upon login, a blue screen displays instead of Views.	JavaOS has received the alternate main parameters, but they are incorrect. Make sure `javaos.mainProgram` and `javaos.mainZip` are specified correctly in the `javaosopt.txt` file. Verify the URLs are correct by using a web browser.
`class not found/defined` error	This error is common if you are using the JavaServer™ server. Servers may fail to handle `HTTP` requests. If this happens when Views is trying to load a class file, you get a *class not found/ defined* error. Try using the Apache or Netscape server to correct this problem.
Tables do not parse well in WebView.	The `.jdt/props/selector.props` files may contain invalid entries for class names that handle `HTML` tags. Check your `selector.props` file for entries that specify classes that start with *sun.hotjava* . If you find such entries, move your `.jdt/props/ selector.props` file aside (don't forget to reset your proxies).
After modifying Appointment Reminder properties within the Properties dialog, the appointment reminder types (Post Notice and /or Ring Bell) do not match the property value settings.	Restart Selector for the new property setting to take effect.

TABLE D-4 HotJava Views Error Messages *(Continued)*and Suggested Actions

Message/ Problem	Action
Several (or many) reminders are posted for a single appointment.	Chances are your calendar file is in an older format, and/or your workstation has a different time than your calendar server. Update your calendar file and sync your workstation clock with the server's clock.
No reminders are displayed for appointments inserted through Month view.	After inserting appointments in Month view, perform an action that reloads your calendar, such as changing the month you're viewing or switching to Day view or Week view.
Closing the Mail Login dialog in Calendarview can cause HotJava Views to lock up.	Don't close the Mail Login dialog using the window menu. Use the Login and Cancel buttons to close the dialog.
HotJava Views complains about not being able to mount my home directory.	JavaOS mounts your home directory when you log in. It gets the location of your home directory from the `passwd` and `auto.home` NIS maps. Make sure these maps are correct and that your home directory is properly exported so the JavaStation can mount it. You can run `snoop(1M)` and watch for the `MOUNT` request that happens after you log into JavaOS.
`snoop(1M)` doesn't show all the packets from the JavaStation.	You may be on a switched network. In this case, packets from the JavaStation may not be visible to the system on which you are running `snoop`. The best way to make sure you see all packets is to plug the JavaStation and your Solaris system into a mini-hub and run `snoop etherid for javastation`.

nown problems.

GO-Joe

GO-Joe provides several diagnostic tools and outputs to help diagnose problems that may arise due to misconfiguration and other difficulties. These should be checked whenever problems are encountered.

JavaOS Console Output

On devices that provide it, the JavaOS console output can be highly informative if the applet terminates prematurely. When viewing this output, look for all exceptions that may be listed. Exceptions may occur that cause further exceptions as the program continues to execute, and it is usually the original exception that indicates the true cause of the problem. In addition, the GO-Joe applet will print messages to the status bar, but not all Java environments will show this status (or they may overwrite it with their own status messages). These messages are also sent to the JavaOS console, so they may be visible in the console log when they are not visible on the status line.

Applet `diagfile` Parameter

Recall that the applet supports a `diagfile` parameter that redirects the messages normally printed into the console log into a file on the local disk (or into a port on a remote machine). Note that depending on the configuration of the Java Security Manager, the applet may or may not be permitted to connect to the remote host.

The `/tmp/Xerr:n` File

The GlobalHost ddx loadable module redirects the standard error output for the session to a file called `/tmp/Xerr:n`, where `n` represents the display number of the session. This file s contains diagnostic messages from the `GlobalInit` program, from the ddx loadable module itself, and from the X clients that run throughout the session.

Common Problems

The GO-Joe product has been designed to be easy to configure and use, yet is somewhat complex in operation. Some of the more common problems encountered are described here.

Device Driver Permissions

The GlobalHost loadable module device driver in `/devices/pseudo/goglobal@0:goglobal0` must be `world` readable and `world` writable. Early versions of the GO-Joe package would not always preserve these permissions. This

problem has been corrected, but this remains a possible failure point for the session initialization. This problem can be diagnosed by checking the `/tmp/Xerr:n` file for `permission denied` messages related to the `/dev/fbs/goglobal0` device.

The `/etc/inetd.conf` Entry

The `inetd.conf` entry has proved to be one of the more trouble-prone parts of the GO-Joe installation. This should be corrected with the use of the `shim` script in `/usr/openwin/server/etc/shim`. Diagnose this problem by double-checking the `/etc/inetd.conf entry`: verify that an entry does exist, and that the path to the `shim` script is valid with no misspellings. Check also that the `shim` script contains the correct path to the `go-login` program.

HTML References

If the GO-Joe applet fails to load entirely, suspect the HTML file you are loading and verify that the APPLET tag is correctly formed. Check the codebase path and the path and file name to the applet file itself. Finally, investigate the log files for your HTTP server (usually called `access_log` and `error_log`) to see if the applet is being successfully transmitted to the Java environment. It may sometimes also help to exit your browser or Java environment and restart it to clear any cached files that may be interfering with the applet's execution.

Java Security Manager Exceptions

All Java environments implement a security manager that determines what operations may be dangerous for an applet to perform, and can allow or disallow these actions as it sees fit. The biggest restriction that most security managers implement with respect to GO-Joe, is that an applet is allowed to connect only to the host which served that applet. This means that, for example, if you have such a security manager, your GO-Joe applet will only be able to connect to `go-login` running on the server that the applet was loaded from. In addition, the `diagfile` functionality of GO-Joe is similarly restricted.

The exact exception that this generates is dependent on the Java environment in question, but it may appear similar to this message (from a Netscape browser):

```
security.AppletSecurityExceptionsecurity: Couldn't connect to
'x_host' with origin 'web_server_host'.
```

If your browser supports it (such as some versions of HotJava), you may be able to relax the behavior of the security manager to allow these connections.

Additional Error Messages and Known Problems

TABLE D-5 describes additional error messages and k

TABLE D-5 Miscellaneous Error Messages and Suggested Actions

Message	Action

Cannot read `/etc/hosts`
 	
File not found:
`/opt/SUNWjshm/bin/jdhostcfg`
 	
Cannot read
`/opt/SUNWjshm/lib/Help.txt`
 	
Cannot write `/tmp/.jdcfg`
	Check to ensure the Solaris operating environment and the `SUNWjshm` package are installed correctly. Also check file system permissions.

Cannot find java interpreter.	When installing Java Runtime Environment (JRE), include it in the `PATH` (environment variable).

Glossary

address resolution protocol A method for finding a host's ethernet address from its internet address. The sender broadcasts an ARP packet containing the internet address of another host and waits for it (or some other host) to send back its ethernet address. Each host maintains a cache of address translations to reduce delay and loading. ARP allows the internet address to be independent of the ethernet address but it only works if all hosts support it.

ARP See *address resolution protocol*.

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.

DHCP See *dynamic host protocol*.

DNS See *domain name service.*

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.

domain name service (DNS) 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 host configuration protocol (DHCP) A protocol that provides a host with an Internet protocol (IP) address and other Internet configuration parameters without any need for preconfiguration by the user.

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.

email address Electronic mail address (also referred to as "mail address" in this manual). An email 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.

file transfer protocol (FTP) 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.

FTP See *file transfer protocol*.

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

host address (IP 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 See *hypertext markup language*.

HTTP See *hypertext transport protocol*.

HTTPD See *hypertext transport protocol daemon*.

hypertext markup language (HTML) Used to format hypertext documents. Hypertext documents have text that contains links to other documents or to images, sound, graphics, or video files.

hypertext transport protocol (HTTP) 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 does not need to support full navigation features like the FTP protocols do. Because HTTP has low overhead, HTTP servers are commonly used for serving hypertext documents.

hypertext transport protocol daemon (HTTPD) The software component of a Web server. Using the HTTPD, the Netra server makes its administration tools available to clients on the LAN.

ICMP See *internet control message protocol*.

integer A whole 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.

internet control message protocol Internet control message protocol (ICMP) is an extension to the Internet Protocol (IP). It allows for the generation of error messages, test packets and informational messages related to IP. It is defined in STD 5, RFC 792.

integrated services digital network (ISDN) 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.

ISDN See *integrated services digital network*.

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.

Network File System (NFS) This Remote Procedure Call (RPC) service enables machines to share files across the network. It permits the user to access remote files and hierarchies transparently as if they were local to the user's machine.

Network Information Service (NIS) A network information service containing key information about the systems and the users on the network.

network time protocol (NTP) A protocol built on top of TCP/IP that assures accurate local timekeeping with reference to radio, atomic or other clocks located on the Internet. This protocol is capable of synchronizing distributed clocks within milliseconds over long time periods. It is defined in STD 12, RFC 1119.

NFS See *network file system*.

NIS See *network information service*.

NTP See *network time protocol.*

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.

PPP See *point-to-point protocol*.

RARP See *reverse address resolution protocol.*

reverse address resolution protocol (RARP) A protocol defined in RFC 903 which provides the reverse function of address resolution protocol (ARP). RARP maps a hardware address to an internet address. It is used primarily by diskless nodes when they first initialize to find their internet address.

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.

uniform resource locator (URL) 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/`).

URL See *uniform resource locator.*

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.

Web 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.”

Index

A

accessing HJV Administration, 60
adding fonts, 161
add-ons, 3
administering network computers, 55
  local parameters, 55
administering security, 77
administering the network connection, 65
administration interface, 20
  preparing for configuration, 20
  starting, 21
administration web server
  setting password, 77
anonymous, 29
anonymous FTP, 29
  configuring, 30
  definition, 29
application archive URL, 153
Application Launcher, 153
audio volume
  adjusting, 83

B

backup options, 87
  file system, 89
  setting, 88
boot sequence, 121

C

checksum, 125, 130, 133
client applications
  administering
    user's desktop environment, 58
  modifying, 59
clusters
  installing, 96
  removing, 97
configuring aliases
  aliases, 34
  configuring, 34
configuring DHCP
  /etc/default/dhcp, 127
  DHCP network file, 127
  dhcptab, 128
configuring global parameters, 48
connecting to Solaris and X applications, 106
connecting to Windows NT, 105
connecting to X Windows, 106
connectivity software, 105
  Citrix Systems, 105
  GO-Joe, 106
  WinFrame, 105
creating a pick list of applications, 155
creating an archive, 154

D

date and time, setting, 99
dead key option, 167

dead keys, 56
default application, 55
default web server, setting, 86
deleting, 35, 56, 59
delivering main application, 124
DHCP, 52, 126
DHCP options
  for TFTP, 134
  optional, 129
  required, 128
  vendor-specific, 130
DHCP server handshake, 122
DHCPACK, 123
DHCPDISCOVER, 122
DHCPOFFER, 122
DHCPREQUEST, 123
dhcptab, sample for a variety of clients, 131
diagnostic packet tester, 80
diskette
  ejecting a diskette, 95
distributed system admin, 80
DNS, 36
  client, 41, 47
  configuration options, 41
  primary domain server, 41
  running DNS and NIS together, 46
  running with NIS, 46
  secondary domain server, 41
  server, 41
document root
  web server, 51
domain
  definition, 39
domain name service, 39
downloading JavaOS, 124
dynamic router, 72
  configuring the Netra system, 73
  definition, 73
  modifying, 74
dynamically loading applications, 153

E

external disks
  erasing, 86
  mounting, 85
  unmounting, 85

F

file transfer protocol, see FTP, 79
flash memory, updating, 125
fonts
  adding, 161
  making available, 165
Fonts directory, 49
Fonts server, 50
forms
  definition, 10
  error, 12
  regular, 11
  special, 12
  verify, 13
FTP, 29, 79

G

global parameters
  boot server, 48
  configuring, 48
  DNS, 48
  Fonts server, 49, 50
  JavaOS command line, 50
  NIS, 48
  timezone, 49
GlobalHost loadable ddx module, 114
GO-Joe
  adding the GO-Joe icon, 111
  advanced configuration options, 113
  applet parameters, 109
  components, 108
  configuration, 109
  dependancies, 107
  DISPLAY environment variable, 112
  GlobalHost loadable ddx module, 110
  go-login program, 110
  running, 112
  xgotoken-init, 115
go-login program, 110
groups of directories, restoring, 90

H

help pages, definition, 14
host access, 78
host access control
  modifying, 78
host name
  changing, 91
  definition, 36
HostNC quick setup
  host name prefix, 53
HotJava Views
  adding the GO-Joe icon to Selector, 111
  administering HJV, 60
  client-side administration, 62
  network model, 61
  properties, 61
  server-side administration, 63
  setting the default application, 53
HTTP, 135

I

ICMP router discovery protocol, 73
icons
  information, definition, 15
  navigation, definition, 16
installation medium, specifying, 96
interface definition, 66
interface, understanding, 8

J

JAR archive, 153, 154
java.util.zip class, 153
javaos binary, 60
JavaOS checksum, 125, 130, 133
JavaOS command line, 148
  flags, 147
JavaOS property settings, 130
  required for application launch at login, 155
JavaOS, downloading, 124
javaos.alwaysUpdate, 125
javaos.apps, 157
JavaStation client software, 2

K

keyboard, 56

L

launching application
  at login, 155
  from pick list, 155
local name service, 36, 37
local parameters, setting
  dead keys, 56
  default application, 55
  Ethernet address, 55
  host address, 55
  host address assigned by, 55
  host name, 55
  keyboard, 56
  lease time, 55
  vendor-specifc options, 56
local parmeters, setting
  NC locale, 55
local printer,setup, 57
locale, 55
localizing, 159
  character set, 170
  dead key option, 167
  fonts, 161
  keyboard, 165
  language, 160
  login, 161

M

mail aliases
  alias names, 34
  creating, 35
  definition, 34
  mailing lists, 34
  modifying, 35
mail notification, 79
mail services, 30
  alias, aliases, 34
  configuring, 33
  directories, 31
  directory sharing, 31

disabling, 33
modifying, 33
return address format, 31
main application, delivering, 124
making fonts available, 165
modem
definitions, 70
log files, 71
port assignments, 71
modem procedures
adding a modem definition, 70
adding a remote host connection, 68
assigning a modem to a serial port, 71
changing the log file detail level, 71
clearing the log file, 72
deleting a modem definition, 70
deleting a remote host connection, 69
modifying a modem definition, 70
modifying a remote host connection, 69
viewing a modem definition, 70
viewing the log file, 72
modules
definition, 8

N

name resolution, definition, 36
name service, 36
modifying
a primary domain, 59
NIS client domain, 39, 50
setup process, 37
unconfiguring
NIS client domain, 39
name services
adding
a primary domain, 43
a secondary domain, 46
configuring, 37, 38
as a DNS client, 47
as a DNS server, 42
deleting
a primary domain, 43, 45, 47
a secondary domain, 46
DNS, 36, 39
domain name service, 36, 39
local name service, 36, 37
modifying
a primary domain, 43, 45, 47
a secondary domain, 46
NIS client domain, 50
network information service, 36
NIS, 38
unconfiguring
NIS client domain, 50
navigation icons, definition, 16
navigation page, definition, 10
NC operating system
updating, 60
NC quick setup
dead key option, 54
default application, 53
keyboard, 54
lease time, 53
number of NCs, 53
select locale, 53
starting IP addresses, 53
vendor-specific options, 54
Netra administration interface, understanding, 8
Netra administration module, definition, 8
Netra j
administrative interface, 2
Netra server
network services available, 79
routing configurations, 72
supported network hardware, 65
network computer
modifying, 56
quick setup, 52
network connection
modem, 67
remote host connection, 68
router, 72
network connection administration
dynamic router
configuring the Netra system, 73
modifying the Netra server, 74
modem procedures
adding a modem definition, 70
adding a remote host connection, 68
assigning a modem to a serial port, 71
changing the log file detail level, 71
clearing the log file, 72
deleting a modem definition, 70

deleting a remote host connection, 69
modifying a modem definition, 70
modifying a remote host connection, 69
viewing a modem definition, 70
viewing the log file, 72
network interface
configuring, 66
deleting, 67
modifying, 67
not a router
configuring the Netra server, 76
static router
configuring the Netra system, 74
modifying the Netra server, 75
network file system quota, 80
network information services, 38
network interface
configuring, 66
definition, 65
deleting, 67
modifying, 67
network port, definition, 65
network protocol, definition, 66
network services
available for the Netra server, 79
broadcast messages, 80
calendar manager, 80
controlling access, 80
diagnostic packet tester, 80
distributed system admin, 80
FTP, 79
mail notification, 79
network file system quota, 80
remote execution, 79
remote login, 79
remote shell, 79
remote system statistics
remote system statistics, 79
remote user information, 79
talk program, 79
telnet, 79
trivial name server, 80
UNIX-to-UNIX copy, 80
user info, 80
network services administration
anonymous FTP, configuring, 30
mail aliases
deleting, 35
modifying, 35
name service
adding a primary domain, 43
adding a secondary domain, 46
configuring the server as a DNS client, 47
configuring the server as a DNS server, 42
deleting a primary domain, 43, 45, 47
deleting a secondary domain, 46
modifying a primary domain, 43, 45, 47, 59
modifying a secondary domain, 46
modifying an NIS client domain, 39, 50
unconfiguring an NIS client domain, 39, 50
networkconnection
administration, 65
NFS, 135
NIS, 36, 38
running with DNS, 46
NIS client domain name, definition, 38
not a router
configuring the Netra system, 76
definition, 76

O

OpenVista, 118

P

packages
installing, 96
removing, 97
viewing, 98
patches
installing, 96
removing, 97
viewing, 98
point-to-point protocol, see PPP
pool of IP addresses, 121, 126
port 80, 51
PPP, 73, 74
definition, 67
supported protocol options, 67
PPP link, 75
primary domain name, definition, 44
PROM, 122, 131

property setting syntax, 147

R

RapidX, 106
RARP, 52
remote execution, 79
remote login, 79
remote shell, 79
remote user information, 79
remote windowing
  referencing servers, 116
restarting the Netra server, 93
restore device, changing, 89
restore options, 88
reverse address resolution protocol, see RARP, 52
RIP, 73
root password
  setting, 81
router
  configuring the system as not a router, 76
  dynamic, 72
  static, 74
routers
  dynamic
    configuring the Netra system, 73
    definition, 73
    modifying, 74
  Netra system configurations, 72
  not a router
    configuring the Netra system, 76
    definition, 76
  static
    configuring the Netra system, 74
    definition, 74
    modifying, 75

S

save and restore options, 93
secondary domain name, definition, 46
security administration, 77
  administration web server, 77
  host access, 78
  network service access, 77
  network services
    controlling access, 80
  root password, 77
    setting, 81
  setting administration web server password, 77
selected directories, restoring, 90
setting JavaOS properties
  applet, 141
  application, 141
  country, 143
  general, 138
  javaos. alwaysUpdate, 140
  keyboard, 145
  language, 143, 160
  localization, 145, 159
  login, 139
  printing, 143
  sample text, 150
  serial-port, 144
  timezone, 142
  User, 142
setting system properties, 137, 147
setting up a local printer, 57
setting up JavaStation boot sequence
  DHCP, 126
  HTTP, 135
  NFS, 135
  TFTP, 134
shutting down the system, 93
software management
  packages
    installing, 96
    removing, 97
    viewing, 98
  patches
    installing, 96
    removing, 97
  patches viewing, 98
software management options, 96
  clusters
    installing, 96
  installation medium, 96
Solaris 2.5.1 add-on software, 3
special characters, 167
static router, 74
  configuring the Netra system, 74
  definition, 74

modifying, 75
status page, definition, 15
Sun WebServer
accessing, 87
syntax, property setting, 147
system administration
adjusting audio volume, 83
backup options, setting, 88
clusters
installing, 96
date and time, setting, 99
diskette
ejecting a diskette, 95
restoring system configuration, 94
saving system configuration, 94
external disks
erasing, 86
mounting, 85
unmounting, 85
file sytem backup, 89
groups of directories, restoring, 90
host name, changing, 91
installation medium, specifying, 96
packages
installing, 96
removing, 97
viewing, 98
patches
installing, 96
removing, 97
viewing, 98
restarting the Netra server, 93
restore device, changing, 89
restore options
change restore device, 88
easy restore, 88
selective restore, 88
selected directories, restoring, 90
shutting down the system, 93
user accounts
adding, 100
deleting, 103

T

tag file for pick list, 155
talk program, 79
task page, see forms
telnet protocol, 79
TFTP, 134
token, 113

U

updating flash memory, 125

V

vendor-specific options, 56

W

web server, 51
configuring, 51
setting default, 86

X

xgotoken-init, 115

Z

zip archive, 153, 154