Installation Guide

Sun™ ONE Portal Server

Version 6.2

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About This Guide

This guide explains how to install the Sun™ Open Net Environment (Sun™ ONE) Portal Server 6.2 software and its accompanying software components. Sun™ ONE Portal Server provides a platform to create portals for your organization's integrated data, knowledge management, and applications. The Sun ONE Portal Server platform offers a complete infrastructure solution for building and deploying all types of portals, including business-to-business, business-to-employee, and business-to-consumer.

This preface includes the following sections:

- Who Should Read This Book
- What You Need to Know
- How This Book is Organized
- Document Conventions Used in This Guide
- Accessing Sun Documentation Online
- Where to Find This Guide Online

Who Should Read This Book

You should read this book if you are responsible for installing Sun ONE Portal Server at your site.

What You Need to Know

In order to install Sun ONE Portal Server, you must be familiar with the following products:

- Sun™ ONE Directory Server
- Sun™ ONE Identity Server
- Sun™ ONE Web Server
- Sun™ ONE Application Server

This book assumes you have a basic understanding of:

- The Solaris™ Operating System
- UNIX command-line utilities and administrative tasks

How This Book is Organized

This book contains the following chapters:

- About This Guide (this chapter)
- Chapter 1, "Planning the Installation."

  This chapter discusses the recommendations and requirements for installing the Sun ONE Portal Server 6.2 software.
- Chapter 2, "Installing Sun ONE Portal Server."

  This chapter provides pre-install and post-install instructions for installing the Sun ONE Portal Server software.
- Chapter 3, "Uninstalling the Sun ONE Portal Server."

  This chapter includes post-installation tasks for reconfiguring the Portal Server to run as user nobody and user non-root.
- Chapter 4, "Tuning the Sun ONE Portal Server."

  This chapter provides instructions for removing the Sun ONE Portal Server software.
- Appendix A, "Installing Third-party Software."

  This chapter provides instructions for installing third-party software that can be used by the Portal Server product.

- Appendix B, "BEA WebLogic Server."

  This appendix provides information for Sun ONE Portal Server deployments on BEA WebLogic Server™ 6.1 SP5.

- Appendix C, "IBM WebSphere Application Server."
- This appendix provides information for Sun ONE Portal Server deployments on IBM WebSphere® Application Server.
- Appendix D, "Creating and Deleting Instances of the Server."

  This appendix provides information for creating and deleting multiple server instances.

- Appendix E, "Setting Up the Sun ONE Portal Server to Use Secure External LDAP Directory Server."

  This appendix provides a number of procedures for setting up the Sun ONE Portal Server running on the Sun ONE Web Server and the Sun ONE Application Server web containers to use a secure external LDAP directory server.

- Appendix F, "Configuring the Sun ONE Portal Server to Run as User Non-Root."

  This appendix provides information for re-configuring the server instance to run as non-root.

NOTE For information on setting up LDAP replication see the Sun ONE Directory Server documentation.

Document Conventions Used in This Guide

Monospaced Font

`Monospaced font` is used for any text that appears on the computer screen or text that you should type. It is also used for file names, distinguished names, functions, and examples.

Bold Monospaced Font

All paths specified in this manual are in Unix format. If you are using a Windows NT-based Sun ONE Portal Server, you should assume the Windows NT equivalent file paths whenever Unix file paths are shown in this book.

`Bold monospaced font` is used to represent text within a code example that you should type.

Italicized Font

Italicized font is used to represent text that you enter using information that is unique to your installation (for example, variables). It is used for server paths and names and account IDs.

Command-Line Prompts

Command-line prompts (for example, `%` for a C-Shell, or `$` for a Korn, or Bourne shell) are not displayed in the examples. Depending on which operating system environment you are using, you will see a variety of different command-line prompts. However, you should enter the command as it appears in the document unless specifically noted otherwise.

Variables

Table 0-1 is a two column table that describes the common variables used in this document. The first column lists the variables, and the second column provides a description of how the variables are used.

Table 0-1 Common Variables

Variable	Description
portal-server-install-root	The Sun ONE Portal Server installation directory. For example, `/opt`.

Table 0-1 Common Variables

Variable	Description
web-server-install-root	For example • Sun ONE Web Server `/opt/SUNWwbsvr` • Sun ONE Application Server `/opt/SUNWappserver7` • BEA WebLogic Server 6.1 `/opt/bea/wlserver6.1` • IBM WebSphere Application Server `/opt/WebSphere/AppServer`
directory-server-install-root	The Sun ONE Directory Server installation directory. For example, `/var/opt/mps/serverroot`.
identity-server-install-root	The Sun ONE Identity Server installation directory. For example, `/opt/IS6.1`.
UserID	User identification. For example, root or nobody.

Related Third-Party Web Site References

Third-party URLs are referenced in this document and provide additional, related information.

NOTE Sun is not responsible for the availability of third-party Web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Accessing Sun Documentation Online

In addition to this guide, Sun ONE Portal Server comes with supplementary information for administrators as well as documentation for developers. Use the following URL to see all the Sun ONE Portal Server documentation:

`http://docs.sun.com/prod/s1portalsrv`

Listed below are the additional documents released with the Sun ONE Portal Server 6.2 documentation suite:

- *Sun ONE Portal Server 6.2 Release Notes*
- *Sun ONE Portal Server 6.2 Administrator's Guide*
- *Sun ONE Portal Server 6.2 Migration Guide*
- *Sun ONE Portal Server, Secure Remote Access 6.2 Adminstrator's Guide*
- *Sun ONE Portal Server 6.2 Desktop Customization Guide*
- *Sun ONE Portal Server 6.2 Developer's Guide*
- *Sun ONE Portal Server 6.2 Deployment Guide*

Where to Find This Guide Online

You can find the *Sun ONE Portal Server 6.2 Installation Guide* online in PDF and HTML formats. This book can be found at the following URL:

`http://docs.sun.com/prod/s1portalsrv`

Chapter 1

Planning the Installation

Before you begin installing your Sun™ ONE Portal Server software, you must plan your installation carefully. Familiarize yourself with how the installation software is packaged, what the requirements for your system are, and what information you must have so that you can complete the installation successfully.

This chapter contains the following sections:

- Sun ONE Portal Server Overview
- System Requirements
- Sun ONE Portal Server Checklists
- Web Container Checklists

Sun ONE Portal Server Overview

The Sun ONE Portal Server 6.2 product gives end users a portal Desktop, which provides access to resources and applications. The Sun ONE Portal Server software also provides a search engine infrastructure that enables intranet content to be organized and accessed from the portal Desktop. Additionally, in this release, the Communication Channels are now installed with the Sun ONE Portal Server software. The communication channels consist of mail, calendar, address book, and instant messaging channels.

The Sun ONE Portal Server 6.2 release also offers Secure Remote Access support, which enables remote users to securely access their organization's network and its services over the Internet. Additionally, it gives your organization a secure Internet portal, providing access to content, applications, and data to any targeted audience--employees, business partners, or the general public.

The Sun ONE Portal Server software also includes data migration tools for sites that are upgrading from previous Sun ONE Portal Server versions.

The layers below the Sun ONE Portal Server software provide functions and services such as web application container (via the Sun™ ONE Web Server software or the Sun™ ONE Application Server), user, service and policy management, authentication and single sign-on, administration console (via the Sun™ ONE ONE Identity Server software), directory schema and data storage (via the Sun™ ONE Directory Server software), and protocol support (by standard browser software). The Sun ONE Portal Server software is installed separately, and makes use of these services rather than implementing them in the Sun ONE Portal Server software itself.

NOTE The Sun ONE Portal Server is available as a bundled product in the Sun Java™ Enterprise System. See the Java Enterprise System installation documentation.

Sun ONE Portal Server Components

The Sun ONE Portal Server is composed of several distinct functional components. These components can be installed on a node with Portal Server (referred to as a Portal Server node) or a node without Portal Server (referred to as a separate node). Table 1-1 lists the installable components, their descriptions, and the nodes on which they can be installed.

Table 1-1 The Sun ONE Portal Server Components

Component	Description	Node
Sun ONE Portal Server	Gives end users a portal Desktop, which provides access to resources, applications, and a search engine infrastructure. Subcomponents include: • Secure Remote Access Support—this configures the Sun ONE Portal Server to communicate with the gateway, Netlet Proxy, and Rewriter Proxy. • Sample Portal—This provides the sample Desktop. • Secure Remote Access Sample • Migration Tools	Portal Server node
Gateway	This component provides the interface and security barrier between remote user sessions originating from the Internet, and the corporate intranet.	Portal Server node, separate node

Table 1-1 The Sun ONE Portal Server Components

Component	Description	Node
Netlet Proxy	This component extends the secure tunnel from the client through the gateway to Netlet Proxy that resides in the intranet. It restricts the number of open ports in a firewall between the demilitarized zone (DMZ) and the intranet. Netlet Proxy is an optional component. You can choose not to install it, or install it later. It cannot be installed on a gateway node.	Portal Server node, separate node
Rewriter Proxy	This components extends the secure connection from the gateway to the Portal Server. Install Rewriter Proxy to redirect HTTP requests to the rewriter Proxy instead of directly to the destination host. Rewriter Proxy, in turn, sends the request to the destination server. If you do not specify a proxy, the gateway component makes a direct connection to intranet computers when a user tries to access one of those intranet computers.	Portal Server node, separate node.

Installation Guidelines

Consider these guidelines for your installation:

- The Sun ONE Portal Server can be installed on the same machine as Sun ONE Directory Server or on a different machine.
    - Use the Java Enterprise System installer to install the Sun ONE Directory Server, a web container, and the Sun ONE Identity Server at the same time or before installing the Sun ONE Portal Server software.
    - The machine running Sun ONE Portal Server must be able to access the machine running Sun ONE Directory Server. Any firewalls between the systems must not block connections to the Sun ONE Directory Server port.

NOTE For better performance, you may want to install the Sun ONE Portal Server and the Sun ONE Directory Server on separate machines.

- The Sun ONE Portal Server must be installed on the same machine as the Sun™ ONE Identity Server.

Migration Guidelines

Sun ONE Portal Server 6.2 supports migration from iPlanet™ Portal Server 3.0 Service Pack 3a, Service Pack 4 or Service Pack 5. The migration tools are automatically installed with the Sun ONE Portal Server product.

You can install Sun ONE Portal Server 6.2 on an iPlanet Portal Server 3.0 (Service Pack 3a, Service Pack 4, or Service Pack 5) system for a single-system migration.

For complete migration information see the *Sun ONE Portal Server 6.2 Migration Guide*.

Upgrade Guidelines

Sun ONE Portal Server 6.2 supports upgrade from Sun ONE Portal Server versions 6.0 and 6.1. The upgrade tools are installed by the Java Enterprise System installer as part of the Sun ONE Portal Server.

For complete upgrade information see the *Sun ONE Portal Server 6.2 Migration Guide*.

Installation Scenarios

The Sun ONE Portal Server 6.2 product includes support for Secure Remote Access and can be installed in open-portal mode or secure-portal mode.

- Open Mode
- Secure Mode

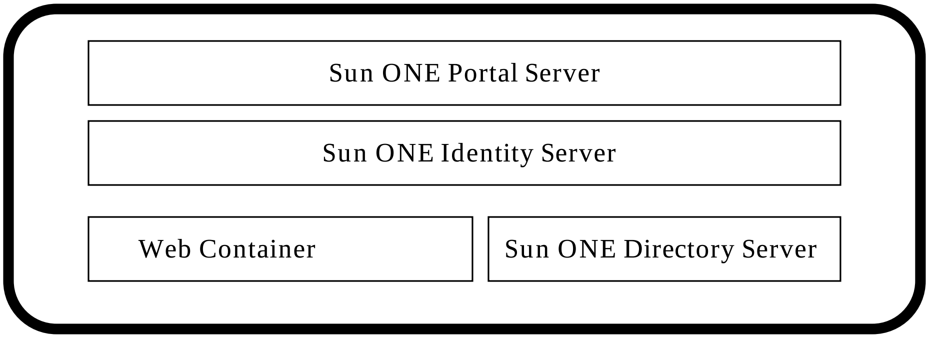
Open Mode

The Sun ONE Portal Server software can be installed in open mode, that is, without the gateway.

Single Server Installation

Figure 1-1 shows an example installation of the Sun ONE Portal Server, Sun ONE Identity Server, a web container, and Sun ONE Directory Server on a single machine.

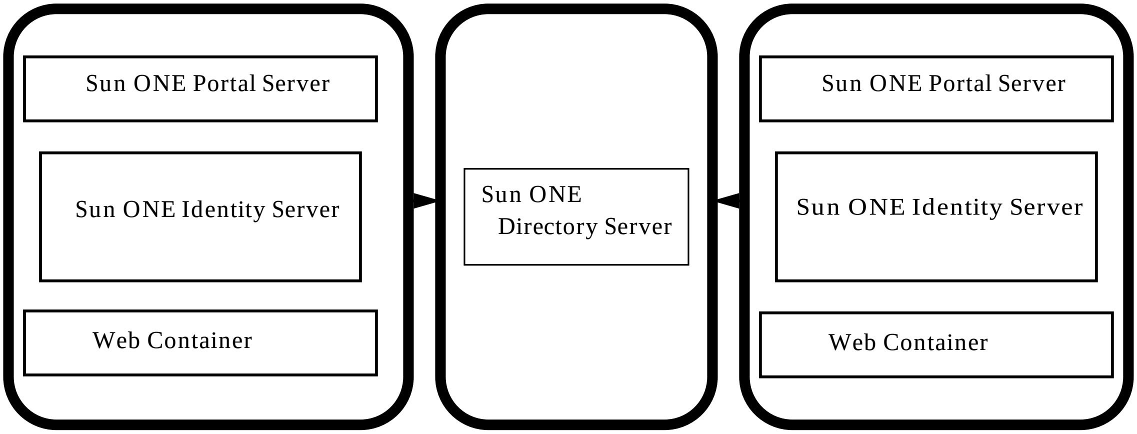
Figure 1-1 Single Machine Installation



Multiple Server Installation

Figure 1-2 shows an example installation of the Sun ONE Portal Server, Sun ONE Identity Server, and a web container on multiple machines using Sun ONE Directory Server on another machine.

Figure 1-2 Multiple Machines Installation



Secure Mode

Depending on the end user and system requirements, you can install the gateway, the Netlet Proxy, or the Rewriter Proxy on a single machine with the Portal Server, or you can install them all on separate machines. A single-machine deployment is not generally recommended for production environments.

The Portal Server also supports an installation group that includes multiple gateways communicating with multiple servers. Figure 1-3 shows a diagram of the Portal Server in an installation that contains multiple gateway and server components.

See the *Sun ONE Portal, Secure Remote Access 6.2 Deployment Guide* for other possible configurations.

Figure 1-3 Multiple Gateway and Server Component Installation

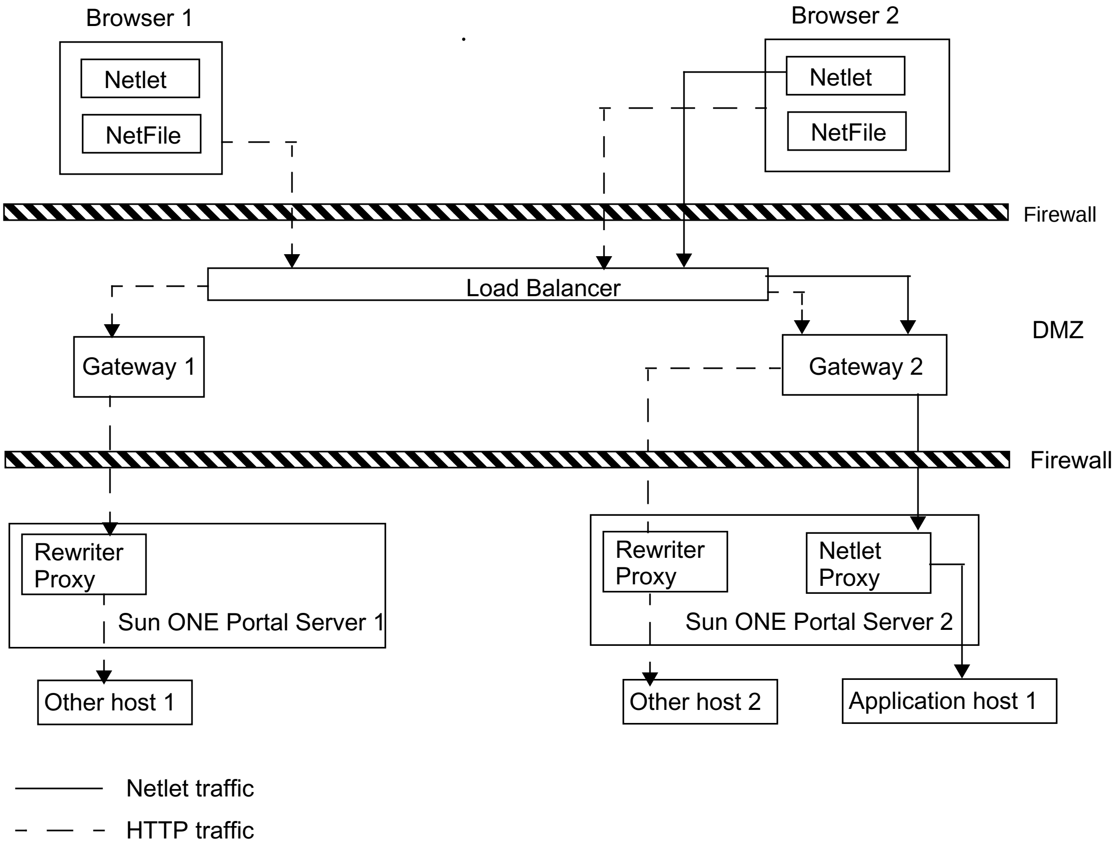


Figure 1-3 shows a sample deployment of Secure Remote Access, consisting of the following components:

- Two clients: Browser 1 and Browser 2.
- Two Gateway hosts: Gateway 1 and Gateway 2. Gateway hosts are in the demilitarized zone (DMZ).
- A load balancer is also present in the DMZ to direct the HTTP and Netlet traffic to the available Gateway host.
- Two installations of the Portal Server with Secure Remote Access: Sun ONE Portal Server 1 and Sun ONE Portal Server 2.
- Sun ONE Portal Server 1 has the Rewriter Proxy installed on it, and Sun ONE Portal Server 2 has both the Rewriter and the Netlet Proxies installed on it.

- There is one application host: Application host 1.
- There are two other hosts: Other host 1 and Other host 2.

HTTP and Netlet requests from Browser 1 and Browser 2 are directed to the load balancer. The load balancer directs this to any available gateway.

The HTTP request from Browser 1 is directed to Gateway 1. This in turns directs the request to the Rewriter Proxy configured on Sun ONE Portal Server 1. In the absence of the Rewriter Proxy, HTTP requests to multiple intranet hosts would result in multiple ports being opened in the firewall. The Rewriter Proxy ensures that only one port is opened in the firewall. The Rewriter Proxy also extends SSL traffic from Gateway to the Portal Server node.

The HTTP request from Browser 2 is directed to the load balancer. This in turn directs the request to Gateway 2. From Gateway 2, the request is passed to Other host 2 through the Rewriter Proxy installed on Sun ONE Portal Server 2.

The Netlet request from Browser 2 is directed to Gateway 2 by the load balancer. Gateway 2 directs the request to the required Application host 2 through Netlet Proxy installed on Sun™ ONE Portal Server 2.

System Requirements

Before installing the Sun ONE Portal Server software, ensure that your system meets the following requirements.

Operating System Requirements

The Sun ONE Portal Server software requires at least a user distribution of the Solaris™ 8 Operating System or Solaris™ 9 Operating System.

Hardware Requirements

For a new installation of the software, your system must meet the following minimal hardware requirements:

Table 1-2 Hardware Requirements

Hardware Component	Solaris™ Requirement
Operating System	Solaris™ 8 or Solaris ™ 9 Operating System (SPARC® platforms)
CPU	Sun SPARC or Solaris™ Operating System (x86 Platform Edition) workstation
RAM	512 Mbytes for evaluation install 1.2 Gbytes for deployment
Disk Space	1 Gbyte for Sun ONE Portal Server and associated applications

Required Software Components

The Sun ONE Portal Server

For installing the Sun ONE Portal Server, the following software products are required and must be installed before installing the Portal Server.

- Java™ 2 SDK (J2SDK™) 1.4.1_05
- A web container—The Sun ONE Portal Server can be deployed on the following web containers:
    - Sun ONE Application Server 7.0 MU 1
    - Sun ONE Web Server 6.1
    - BEA WebLogic Server™ 6.1 (SP5)
    - IBM WebSphere® Application Server 4.0.5
- Sun ONE Directory Server 5.2
- Sun ONE Identity Server 6.1
- Sun™ ONE Administration Server 5.2

Install these software products before installing the Sun ONE Portal Server.

The Gateway

For installing the gateway alone, on a separate node, the following software is required:

- J2SDK 1.4.1_05
- Sun ONE Identity Server 6.1 SDK

The Netlet Proxy

For installing the Netlet Proxy alone, on an independent node, the following software is required:

- J2SDK 1.4.1_05
- Sun ONE Identity Server 6.1 SDK

The Rewriter Proxy

For installing the Rewriter Proxy alone, on an independent node, the following software is required:

- J2SDK 1.4.1_05
- Sun ONE Identity Server 6.1 SDK

Browser Recommendations

The following browsers are supported for administration and for accessing the Sun ONE Portal Server Desktop:

- Internet Explorer 5.5 and 6.0
- Netscape™ 4.7x or higher.

Sun ONE Portal Server Checklists

The parameters you define during the Sun ONE Portal Server installation depend on the components you choose to install. The following checklists describe the parameters needed for each of the following:

- Sun ONE Portal Server And Secure Remote Access
- Gateway
- Netlet Proxy
- Rewriter Proxy

See “Web Container Checklists” for installation information needed for specific web containers.

Depending in the type of installation that you are performing, you might or might not use all the values shown in the following checklists. When using the Java Enterprise System Installer, you can install several component products at the same time, or perform different levels of configuration during install.

If you choose a custom installation or a minimal installation using the Java Enterprise System, you will use the values shown in the following checklist.

If you have performed a minimal installation, you will need to use the Sun ONE Portal Server configurator script to configure your Portal Server installation.

Sun ONE Portal Server And Secure Remote Access

Table 1-3 is a three column table that lists all the values that you might need for a Portal Server installation or post-minimal install configuration. Depending on the type of installation you perform, the values that you use might vary.

Table 1-3 is an example checklist that assumes a web server deployment. If you are deploying on Sun ONE Application Server, BEA WebLogic, or IBM WebSphere Application Server, see the section, “Web Container Checklists,” for those web container values.

Table 1-3 Sun ONE Portal Server Installation Checklist

Parameter	Default Value	Description
Installation Directory		
Component Installation Directory	`/opt`	This is the base directory in which the Sun ONE Portal Server software is installed.
Deployment Information		
Deployment Type	Sun ONE Web Server	The Sun ONE Portal Server can be deployed on the Sun ONE Web Server, Sun ONE Application Server, BEA WebLogic Server, or IBM WebSphere Application Server. This parameter is needed only if installing the Sun ONE Portal Server.

Table 1-3 Sun ONE Portal Server Installation Checklist *(Continued)*

Parameter	Default Value	Description
Deployment URI	`/portal`	The URI is the space on the web server or application server that the Sun ONE Portal Server uses. By default, content is deployed in *portal-server-install-root*`/SUNWps/web-apps/`*Server-Instance/URI* where the URI, by default, is `/portal`. The value for the deployment URI must have a leading slash and must contain only one slash. However, the deployment URI cannot be a "/" by itself.
Web Container Information (Sun ONE Web Server)		
Installed Directory	`/opt/SUNWwbsvr`	This is the base directory in which the Sun ONE Web Server software is installed.
Instance	*host*	The default is the fully qualified host name. The value is the web server instance you want the Portal Server to use. The instance name should not contain spaces.
Document Root Directory	`/opt/SUNWwbsvr/docs`	The directory where static pages are kept. This directory is created during the Sun ONE Identity Server install.
Identity Server Information		
Installed Base Directory	`/opt`	This is the base directory in which the Sun ONE Identity Server software is installed.
Internal LDAP Authentication User Password		The Internal LDAP Authentication User Password chosen during the Sun ONE Identity Server installation. This parameter is needed only when installing the Sun ONE Portal Server.
Administrator (amadmin) Password		The top level administrator (amadmin) password chosen during the Sun ONE Identity Server software installation.
Directory Manager DN	cn=Directory Manager	The LDAP directory manager distinguished name (DN).
Directory Manager Password		The directory manager password chosen during the installation of the Sun ONE Directory Server.
Secure Remote Access Information (for configuring Secure Remote Access Support)		
Gateway Protocol	https	The Protocol that the gateway will use to communicate. The gateway will communicate using Secure Sockets Layer (SSL).

Table 1-3 Sun ONE Portal Server Installation Checklist *(Continued)*

Parameter	Default Value	Description
Portal Server Domain	*portal-server-domain-name*	The domain name for the machine on which the Sun ONE Portal Server is installed.
Gateway Domain	*gateway-domain-name*	The domain name of the gateway machine.
Gateway Port	443	The port on which the gateway listens.
Gateway Profile Name	default	This is the gateway profile that the Rewriter Proxy needs to use. A gateway profile contains all the information related to gateway configuration, such as the port on which gateway listens, SSL options, and proxy options. You can create multiple profiles in the gateway administration console and associate different instances of gateway with different profiles. Specify the same profile name specified when you installed Sun ONE Portal Server or Secure Remote Access support. See "Creating a Gateway Profile" in the *Sun ONE Portal Server, Secure Remote Access 6.2 Administrator's Guide*.
Password Encryption Key		The value of the encryption key. The encryption key is located in *identity-server-installation-root* `/SUNWam/lib/AMConfig.properties` as the parameter am.encryption.pwd.
Log User Password		This allows administrators with non-root access to look at gateway log files.
Retype Password		Retype to verify password.

Gateway

Table 1-4 Gateway Installation Checklist

Parameter	Default Value	Description
Protocol	https	The protocol that the gateway uses to communicate. The gateway will usually communicate using Secure Sockets Layer (SSL).
Host Name	*host*	The fully qualified host name of the machine on which the gateway is installed.

Table 1-4 Gateway Installation Checklist *(Continued)*

Parameter	Default Value	Description
Subdomain	*gateway-subdomain-name*	The subdomain name of the gateway machine.
Domain	*gateway-domain-name*	The domain name of the gateway machine.
IP Address	*host-ip-address*	The IP address of the Sun ONE Portal Server machine. Specify the IP address of the machine on which the Sun ONE Identity Server was installed for the Sun ONE Portal Server.
Access Port	443	The port on which the gateway machine listens.
Gateway Profile Name	default	A gateway profile contains all the information related to gateway configuration, such as the port on which gateway listens, SSL options, and proxy options. You can create multiple profiles in the gateway administration console and associate different instances of gateway with different profiles. Specify the same profile name specified when you installed Sun ONE Portal Server or Secure Remote Access support. See "Creating a Gateway Profile" in the *Sun ONE Portal Server, Secure Remote Access 6.2 Administrator's Guide* for more information
Log User Password		This allows administrators with non-root access to look at gateway log files.
Start the gateway after installation	Checked	The gateway can be started automatically (if this option is checked) or it can be started later. To start the gateway manually use the following command located in *portal-server-install-root*`/SUNWps/bin`: `./gateway -n` *gateway-profile-name* `start`
Certificate Information		
Organization	MyOrganization	The name of your organization.
Division	MyDivision	The name of your division.
City or Locality	MyCity	The name of your city or locality
State or Province	MyState	The name of your state
Two-Letter Country Code	us	The two letter country code for your country.
Certificate Database Password		This can be any password you choose.
Retype Password		Retype the password to verify.

Netlet Proxy

Table 1-5 Netlet Proxy Installation Checklist

Parameter	Default Value	Description
Host Name	*hostname*	The host name of the machine on which you want to install the Netlet Proxy.
Subdomain	*localhost-subdomain-name*	The sub-domain name of the machine on which the Netlet Proxy is installed.
Domain	*localhost- domain-name*	The domain name of the machine on which the Netlet Proxy is installed.
IP Address	*host-ip-address*	The IP address of the Sun ONE Identity Server machine. Specify the IP address of the machine on which the Sun ONE Identity Server was installed for the Sun ONE Portal Server.
Access Port	10555	The port on which the Netlet Proxy listens.
Gateway Profile Name	default	A gateway profile contains all the information related to gateway configuration, such as the port on which gateway listens, SSL options, and proxy options. You can create multiple profiles in the gateway administration console and associate different instances of gateway with different profiles. Specify the same profile name specified when you installed Sun ONE Portal Server or Secure Remote Access support. See "Creating a Gateway Profile" in the *Sun ONE Portal Server, Secure Remote Access 6.2 Administrator's Guide* for more information.
Log User Password		This allows administrators with non-root access to look at gateway log files.
Start Netlet Proxy after installation	checked	The Netlet Proxy can be started automatically (if this option is checked) or it can be started later. To start the Netlet Proxy manually use the following command located in *netlet-proxy-install-root*`/SUNWps/bin` `./netletd -n default start`
Certificate Information		
Organization	MyOrganization	The name of your organization.
Division	MyDivision	The name of your division.

Table 1-5 Netlet Proxy Installation Checklist *(Continued)*

Parameter	Default Value	Description
City or Locality	MyCity	The name of your city or locality.
State or Province	MyState	The name of your state or province.
Two-letter Country Code	us	The two-letter country code for your country.
Certificate Database Password		This can be any password you choose.
Retype Password		Retype the password to verify.

Rewriter Proxy

Table 1-6 Rewriter Proxy Installation Checklist

Parameter	Default Value	Description
Host Name	*hostname*	The host name of the machine on which you want to install the Rewriter Proxy.
Subdomain	l*ocalhost-subdomain-name*	The sub-domain name of the machine on which the Rewriter Proxy is installed.
Domain	*localhost- domain-name*	The domain name of the machine on which the Rewriter Proxy is installed.
IP Address	*host-ip-address*	The IP address of the Sun ONE Identity Server machine. Specify the IP address of the machine on which the Sun ONE Identity Server was installed for the Sun ONE Portal Server.
Access Port	10443	The port on which the Rewriter Proxy listens.
Gateway Profile Name	default	A gateway profile contains all the information related to gateway configuration, such as the port on which gateway listens, SSL options, and proxy options. You can create multiple profiles in the gateway administration console and associate different instances of gateway with different profiles. Specify the same profile name specified when you installed Sun ONE Portal Server or Secure Remote Access support. See “Creating a Gateway Profile” in the *Sun ONE Portal Server, Secure Remote Access 6.2 Administrator’s Guide* for more information.

Table 1-6 Rewriter Proxy Installation Checklist *(Continued)*

Parameter	Default Value	Description
Log User Password		This allows administrators with non-root access to look at gateway log files.
Start the Rewriter Proxy after installation	Checked	The Rewriter Proxy can be started automatically (if this option is checked) or it can be started manually later. To start the Rewriter Proxy manually use the following command located in *rewriter-proxy--install-root*`/SUNWps/bin` `./rwproxyd -n default start`
Certificate Information		
Organization	MyOrganization	The name of your organization.
Division	MyDivision	The name of your division.
City or Locality	MyCity	The name of your city or locality.
State or Province	MyState	The name of your state or province.
Two-letter Country Code	us	The two-letter country code for your country.
Certificate Database Password		This can be any password you choose.
Retype Password		Retype the password to verify.

Web Container Checklists

The Sun ONE Portal Server installation has dependencies on some web container parameters. The following checklists describe the parameters that will be needed during the Sun ONE Portal Server installation process. See the checklist that pertains to the web container on which you are deploying the Sun ONE Portal Server product.

- Sun ONE Web Server Checklist
- Sun ONE Application Server Checklist
- BEA WebLogic Server Checklist
- IBM WebSphere Application Server Checklist

For more information about using the supported application servers with the Sun ONE Portal Server, see the appendix in this guide that pertains to your application server deployment.

Sun ONE Web Server Checklist

Table 1-7 Sun ONE Web Server Values Used During Sun ONE Portal Server Installation

Parameter	Default Value	Description
Installed Directory	`/opt/SUNWwbsvr`	The base directory in which the Sun ONE Web Server is installed.
Instance	*host*	The web server instance you want the Portal Server to use. The instance name should not contain spaces.
Document Root Directory	`/opt/SUNWwbsvr/docs`	The directory where static pages are kept. This directory is created during the Sun ONE Identity Server install.

Sun ONE Application Server Checklist

Table 1-8 Sun ONE Application Server Values Used During Sun ONE Portal Server Installation

Parameter	Default Value	Description
Installed Directory	`/opt/SUNWappserver7`	Directory in which the Sun ONE Application Server is installed.
Domain	`/var/opt/SUNWappserver7/domains/domain1`	The Sun ONE Application Server domain contains a set of instances. The domain specified will contain the instance used by the Sun ONE Portal Server. This domain must already be configured.
Instance	server1	The name of the Sun ONE Application Server instance to which the Sun ONE Portal Server will be deployed. This instance must already be configured. The instance name should not contain spaces.
Document Root Directory	`/var/opt/SUNWappserver7/domains/domain1/server1/docroot`	The directory where static pages are kept. This directory is created during the Sun ONE Identity Server install.
Administrator	admin	The administrator user ID.
Administration Port	4848	The port number of the administration server.
Administration Password		The administration server password.

BEA WebLogic Server Checklist

Table 1-9 BEA WebLogic Server Values Used During Sun ONE Portal Server Installation

Parameter	Default Value	Description
Installed Directory	`/bea/wlserver6.1`	The directory in which the BEA WebLogic Server software is installed.
Domain	mydomain	The BEA WebLogic Server domain contains a set of instances. The domain specified will contain the instance used by the Sun ONE Portal Server. This domain must already be configured.
Instance	myserver	The name of the BEA WebLogic Server instance to which the Sun ONE Portal Server will be deployed. This instance must already be configured. The name must not contain a space. If you are installing Sun ONE Portal Server on an administration server instance this will be the name of the administration server instance. Otherwise it will be the name of the managed server instance.
Document Root Directory	`/bea/wlserver6.1/config/mydomain/applications/DefaultWebApp`	The document root value of DefaultWebApp needs to be deployed to the BEA WebLogic Server instance you are running the Portal Server software on. DefaultWebApp is the default web application, from which is served static content in a BEA WebLogic Server. By default it is only deployed to the domain (mydomain) and the server instance defined or created during the BEA WebLogic Server install. This means that if you create your own BEA WebLogic Server or domain, you need to deploy the DefaultWebApp to it, either by copying the directory to the new server's deployment directory, or by using the BEA WebLogic Server administration console. See the BEA WebLogic Server documentation for more detail on how to configure a default web application.
Administrator	system	The administrator's user ID.
Administration Password		The system password.
Administration Protocol	http	Protocol on which the administration server of BEA WebLogic Server runs on.

Table 1-9 BEA WebLogic Server Values Used During Sun ONE Portal Server Installation *(Continued)*

Parameter	Default Value	Description
Administration Port	7001	Port on which the administration server of BEA WebLogic Server is running. If the Sun ONE Portal Server is installed on the BEA WebLogic Server administration server itself, the port on which Portal Server runs and the administration port of BEA WebLogic Server will be the same.

IBM WebSphere Application Server Checklist

Table 1-10 IBM WebSphere Application Server Values Used During Sun ONE Portal Server Installation

Parameter	Default Value	Description
Installed Directory	`/opt/WebSphere/AppServer`	The directory in which the IBM WebSphere Application Server software is installed.
Virtual Host	default_host	
Node	*machine-name*	
Instance	Default_Server	The name of the instance to which the Sun ONE Portal Server will be deployed. This instance must already be configured. Portal Server cannot be installed into an application server instance or domain whose name contains a dash or a space, for example, Default-Server or Default Server. For instructions on renaming an instance, see Appendix C, “IBM WebSphere Application Server.”
Document Root Directory	`/opt/IBMHTTPD/htdocs/en_US`	The directory where static pages are kept. This directory is created during the Sun ONE Identity Server installation.

Chapter 2

Installing Sun ONE Portal Server

Installation Overview

The Sun™ ONE Portal Server and required underlying component products are installed using the Java™ Enterprise System installer program. Detailed information and instructions for using the Java Enterprise System installer can be found in the *Java Enterprise System Installation Guide*.

This chapter contains the following sections:

- Pre-Installation Information
- Installing Sun ONE Portal Server (general installation instructions)
- Sun ONE Portal Server Post-Installation Tasks
- Verifying the Sun ONE Portal Server Installation

Pre-Installation Information

Before installing Sun ONE Portal Server software, remove all previous versions of the web container software and Sun™ ONE Identity Server software.

Web Containers

The Sun™ ONE Web Server and Sun™ ONE application Server web containers can be installed using the Java Enterprise System installer and can be installed along with the Directory Server, Identity Server, and Portal Server in a single install session. If you choose to install the Sun ONE Portal Server and required components in a single session, no pre-install steps are necessary.

However, if you choose to install the Sun ONE Portal Server later, into an existing installation of the Sun ONE Web Server or the Sun ONE Application Server, the web container instance must first be restarted.

If you choose to deploy the Sun ONE Portal Server on BEA WebLogic Server™ or IBM WebSphere® Application Server web containers, these products must first be installed and started according to their product documentation.

Installing Sun ONE Portal Server

The Sun ONE Portal Server is installed as a component product of the Java Enterprise System enterprise solution. The Java Enterprise System provides a common installer that is used to install the Sun ONE Portal Server and the required component products required to run Sun ONE Portal Server.

Based on the information gathered from the checklists in Chapter 1, if you have performed a minimal installation with the Java Enterprise System installer, use the `configurator` script to configure the Sun ONE Portal Server. The configurator script is located in *portal-server-install-root*`/SUNWps/lib`.

Sun ONE Portal Server components that can be installed are:

- Sun ONE Portal Server
- Sun ONE Portal Server, Secure Remote Access
- Gateway
- Netlet Proxy
- Rewriter Proxy

The Sun ONE Portal Server, Sun ONE Portal Server Secure Remote Access, the gateway, Netlet Proxy, and Rewriter Proxy, can be installed on a single machine (on the Sun ONE Portal Server web application node), or they can be installed on separate nodes. However, the gateway should be installed on a separate node.

In this release, the communication channels are now installed with the Sun ONE Portal Server software. The communication channels consist of mail, calendar, address book, and instant messaging channels.

To Install the Sun ONE Portal Server Software

To install the Sun ONE Portal Server software:

1. Use the Java Enterprise System install wizard to select Sun ONE Portal Server.

2. Select the Sun ONE Portal Server components you want to install.

   The Sun Java Enterprise System install wizard lets you select multiple Sun ONE Portal Server components to be installed on one machine. For example, you can choose to install the following components on a single machine:

   - Sun ONE Portal Server portal software
   - Sun ONE Portal Server, Secure Remote Access Support
   - Netlet Proxy
   - Rewriter Proxy

NOTE When installing the gateway, Netlet Proxy, or Rewriter Proxy, you must select secure remote access support to be installed on the Portal Server node.

3. Use the Java Enterprise System install wizard to complete the configuration and to install the selected components.

To Install the Sun ONE Portal Server and the Gateway, the Netlet Proxy, or theRewriter Proxy on A Separate Node

To install Sun ONE Portal Server, with the gateway, the Netlet Proxy, or the Rewriter Proxy on a node other than the Sun ONE Portal Server node:

1. Use the Java Enterprise System install wizard to select the following component install options.

   - Identity Server SDK Alone Install.
   - The gateway, or the Netlet Proxy, or the Rewriter Proxy.

   The gateway, or the Netlet Proxy or the Rewriter Proxy, need to be installed on a machine with the Sun ONE Identity Server SDK.

2. Use the Java Enterprise System install wizard to complete the configuration and to install the selected components.

NOTE When installing the gateway, or the Netlet Proxy, or the Rewriter Proxy, you must select secure remote access support to be installed on the Portal Server node.

NOTE When installing the Sun ONE Identity Server SDK, give the same encryption password key as the one that was given when the Sun ONE Identity Server was installed.

Make sure to give the correct Sun ONE Identity Server details when installing the Sun ONE Identity Server SDK.

For more installation details and specific download instructions see the *Java Enterprise System Installation Guide*.

Sun ONE Portal Server Post-Installation Tasks

Post-installation tasks need to be performed for each of the following components:

- Sun ONE Portal Server
- Secure Remote Access
- Gateway
- Netlet and Rewriter Proxy

Sun ONE Portal Server

To access the Portal Server or the Identity Server administration console the directory server and the web container must first be started.

Use the following command to start a local installation of the directory server:

```
/var/opt/mps/serverroot/slapd-hostname/start-slapd
```

NOTE To provide UNIX login for your users, configure UNIX authentication in the Portal Server administration console, then stop and restart the amserver:

```
/etc/init.d/amserver stop
```

```
/etc/init.d/amserver start
```

The following post-installation tasks depend on the type of web container on which you deployed the Sun ONE Portal Server.

- Sun ONE Web Server
- Sun ONE Application Server
- BEA WebLogic Server
- IBM WebSphere Application Server

Sun ONE Web Server

To start the Sun ONE Web Server:

1. Start the admin instance. In a terminal window type:

   ```
   cd web-server-install-root/https-admserv
   ```

   ```
   ./start
   ```

2. Access the Sun ONE Web Server administration console.
3. Click Apply Changes to restart the web container.

Sun ONE Application Server

Configuring the Application Server Instance

1. Start the admin instance. In a terminal window, type:

   ```
   cd /var/opt/SUNWAppserver7/domains/domain1/admin
   ```

   ```
   ./start
   ```

2. In a browser, go to the Sun ONE Application Server administration console. The default URL is

   `http://`*hostname*`:4848`

3. In the left navigation frame, click on the key to left of App Server Instances.
4. Select server1 or the name of the application server instance on which Sun ONE Identity Server was installed.
5. Click Apply Changes.

Stopping and Starting the Sun ONE Application Server

Start the Sun ONE Application Server instance.

In a terminal window, change directories to the application server's instances utilities directory and run the `startserv` script. The following example assumes that the default application server domain and instance have been used.

```
cd /var/opt/SUNWappserver7/domains/domain1/server1/bin
```

```
./startserv
```

To stop and start the Sun ONE Application Server using the `asadmin` utility or from the Sun ONE Application Server administration console, consult the Sun ONE Application Server documentation.

Changing the MIME Mapping for Secure Remote Access

If You have installed Secure Remote Access on the Sun ONE Portal Server node:

1. Replace the following mime mapping entry in each gateway profile, from something similar to:

   ```
   JAVASCRIPT=application/x-javascript
   ```

   to:

   ```
   JAVASCRIPT=application/x-javascript:text/javascript
   ```

2. Save the profile.
3. Restart the gateway.
4. Modify `/var/opt/SUNWappserver7/domains/domain1/server1/config/server.policy` as follows:

   ```
   permission java.net.SocketPermission"*","connect,accept,listen,resolve"
   ```

   ```
   permission
   java.io.FilePermission"<<ALLFILES>>","read,write,execute,delete"
   ```

5. Restart the application server.

BEA WebLogic Server

When deploying the Portal Server on BEA WebLogic Server, perform the following steps following the installation of the Sun ONE Portal Server software.

1. Check the `/var/sadm/install/logs/Java_Enterprise_System_install.B/MMddhhmm` file for errors.

   MM = month

   dd = day

   hh = hour

   mm = minute

2. Run the `perftune` script.

3. Comment out the following line in the `startWebLogic.sh` script. An example location for this script is `/opt/bea/wlserver6.1/config/mydomain/startWebLogic.sh`

   ```
   #JAVA_OPTIONS="-hotspot $JAVA_OPTIONS"
   ```

   Using the -hotspot option causes the server to hang with out-of-memory errors.

4. Stop all BEA WebLogic Server instances (the admin and managed servers).

5. Start the BEA WebLogic admin server instance. If you have installed on a managed instance, start the managed instance too.)

6. From the command line, execute the following:

   portal-server-install-root/`SUNWps/bin/deploy`

   Choose the default for the deploy URI and server instance name, and enter the BEA WebLogic Server admin password when prompted.

7. Execute the following command:

   portal-server-install-root/`SUNWps/lib/postinstall_PortletSamples`

   Enter the BEA WebLogic Server admin password and the Identity Server admin password when prompted.

   This deploys the `portletsamples.war` file.

8. Restart the BEA WebLogic Server instance into which Sun ONE Portal Server was deployed.See your web container documentation for instructions on starting the web container instance.

NOTE In the case of a managed server installation, the `.war` files do not get deployed. The `.war` files should be deployed using the BEA WebLogic Server administration console.

If you will be supporting multiple authentication methods, for example, LDAP, UNIX, Anonymous, you must add each authentication type to the Core authentication service to create an authentication menu. See the *Sun ONE Portal Server 6.2 Administrator's Guide* for further information.

IBM WebSphere Application Server

1. Check the `/var/sadm/install/logs/Java_Enterprise_System_install.B/MMddhhmm` file for errors.

2. Stop and restart the application server instance and the application server node. See your web container documentation for instructions on starting the web container instance.

When downloading the NetFile, NetMail and Netlet applet archives, the content-type is set to text/html in the response header. You need to explicitly associate the `.jar` and `.cab` extension to mime type application/octet-stream in the portal web application deployment descriptor file. By default, the deployment descriptor file is located at:

`/opt/WebSphere/AppServer/installedApps/PortalURI.ear/portal.war/`
`WEB-INF/web.xml`

1. Add the following lines to the file after the line containing:

```
</session-config>:
<mime-mapping>
<extension>jar</extension>
<mime-type>application/octet-stream</mime-type>
</mime-mapping>
<mime-mapping>
<extension>cab</extension>
<mime-type>application/octet-stream</mime-type>
</mime-mapping>
```

NOTE During migration the mime mappings configuration necessary for the Secure Remote Access product are removed. These mappings need to be added again after migration is done.

2. Restart the application server.

Secure Remote Access

When using the Sun ONE Portal Server with the gateway, the gateway Certificate Authority (CA) certificate must be added to the Sun ONE Portal Server trusted CA list, regardless of whether the Sun ONE Portal Server is running in HTTP or HTTPs mode.

When a user session time out or user session logout action happens, the Sun ONE Identity Server sends a session notification to the gateway. Even when the Sun ONE Identity Server is running in HTTP mode, it will act as an SSL client using HttpsURLConnection to send the notification. Since it is connecting to an SSL server (the gateway), it should have the gateway CA certificate as part of the Trusted CA list or it should have an option to allow self signed certificate.

NOTE The method for adding the CA to the trusted CA list depends on the protocol handler defined.

To create HttpsURLConnection, the Java Virtual Machine (JVM™) property `-Djava.protocol.handler.pkgs` needs to be set.

If Sun ONE Portal Server is running on the Sun ONE Web Server, this property is correctly set to `-Djava.protocol.handler.pkgs` by default. The Sun ONE Identity Server com.iplanet.services.comm package has the implementation of HttpsURLConnection and it provides an option to add the flag `com.iplanet.am.jssproxy.trustAllServerCerts=true` to accept self-signed certificates from any SSL server.

The `-Djava.protocol.handler.pkgs` is not set by default for the Sun ONE Application Server, BEA WebLogic Server and IBM WebSphere Application Server. The HttpsURLConnection implementation for supported application servers must use their own default handler (this could be JSSE or custom SSL implementation).

Gateway

1. Start the gateway using the following command:

   gateway-install-root/`SUNWps/bin/gateway -n` *new-profile-name* `start`

   `default` is the default name of the gateway profile that is created during installation. You can create your own profiles later, and restart the gateway with the new profile. See Creating a Gateway Profile in Chapter 2 of the *Sun ONE Portal Server, Secure Remote Access 6.2 Administrator's Guide*.

   If you have multiple gateway instances, use:

   gateway-install-root/`SUNWps/bin/gateway start`

NOTE This step is not required if you chose **y** for the Start Gateway after installation option during the gateway installation.

CAUTION Ensure that only the configuration files for the instances that you want to start are in the `/etc/opt/SUNWps` directory.

If you want to stop all the gateway instances that are running on that particular node, use the following command:

gateway-install-root/`SUNWps/bin/gateway stop`

The Netlet and the gateway need Rhino JavaScript™ parser (bundled as `rhino/js.jar`) for PAC file support. This must be installed in the Gateway and Portal Server node. To install, copy `rhino/js.jar to ${JAVA_HOME}/jre/lib/ext` directory.

Netlet and Rewriter Proxy

Before starting the Netlet Proxy and the Rewriter Proxy, ensure that the gateway profile is updated with the Netlet Proxy and the Rewriter Proxy options.

- If you did not choose the option to start the Netlet Proxy during installation, you can start the Netlet Proxy manually. In the directory, *portal-proxy-install-root*/`SUNWps/bin`, type:

  ```
  ./netletd -n default start
  ```

- If you did not choose the option to start the Rewriter Proxy manually during installation, you can start it manually. In the directory *portal-proxy-install-root*`/SUNWps/bin`, type:

  ```
  ./rwproxyd -n default start
  ```

NOTE Ensure that you enable the Access List service for all users, to allow access through the gateway.

The Sun ONE Portal Server Gateway, Netlet Proxy, and Rewriter Proxy work only with the JSS 3.2, NSS 3.4.2, and NSPR 4.2. After installing Gateway, Netlet Proxy, and Rewriter Proxy:

1. Download and copy the required JSS, NSS, or NSPR versions into the `/usr/share/lib` directory.
2. Restart the Gateway, Netlet Proxy, and Rewriter Proxy.

NOTE This should be done only for the stand alone installation of Gateway, Netlet Proxy, and Rewriter Proxy.

The Sun ONE Portal Server software NetFile needs jCIFS libraries (bundled as SUNWjcifs) for Windows access. This needs to be installed in Portal Server node only. To install, use the following steps.

1. Add this package by running `pkgadd -d . SUNWjcifs` from the current (this) directory.
2. Run *portal-server-install-root*`/SUNWps/bin/postinstall_JCIFS`
3. Run *portal-server-install-root*`/SUNWps/bin/undeploy` followed by *portal-server-install-root*`/SUNWps/bin/deploy` command.
4. Restart the server.

Configuring Sun ONE Portal Server After A Minimal Install

After performing a minimal configuration installation with the Java Enterprise System installer, use the Portal Server configurator script to configure the Sun ONE Portal Server component product. The checklists in Chapter 1 of this guide describe the parameters used to configure the Sun ONE Portal Server component product.

To run the configurator:

1. As root in a terminal window, go to the directory that contains the configurator script:

   `cd` *portal-server-install-root*`/lib`

2. Run the configurator script by typing:

   ```
   ./configurator
   ```

NOTE To turn on debugging:

```
configurator -DPS_CONFIG_DEBUG=y
```

If you turn on debugging, passwords are displayed on the screen as well as the debugging information.

Verifying the Sun ONE Portal Server Installation

Accessing the Sun ONE Portal Server Administration Console and Desktop

To Access the Sun ONE Identity Server Administration Console

1. Open a browser.

2. Type *protocol*`://`*hostname.domain*`:`*port*`/amconsole`

   For example,

   ```
   http://example.com/amconsole
   ```

3. Enter the administrator's name and password to view the administration console.

   This is the name and password you specified at the time of installing the Sun ONE Identity Server software.

To Access the Sun ONE Portal Server Desktop

Verify the Sun ONE Portal Server installation by accessing the Desktop. Use the following URL to access the Desktop:

protocol`://`*fully-qualified-hostname*`/`*portal-URI*

For example,

```
http://example.com/portal
```

When you access the Desktop, the Authless Desktop is displayed. This allows users accessing the Desktop URL to be authenticated automatically and granted access to the Desktop.

If the sample Portal Desktop displays without any exception, then your Portal Server installation is good.

Verifying the Gateway Installation

1. Run the following command to check if the gateway is running on the specified port:

   ```
   netstat -an | grep port-number
   ```

   where the default gateway port is 443.

   If the gateway is not running, start the gateway in the debug mode, and view messages that are printed on the console. Use the following command to start the gateway in debug mode:

   ```
   portal-server-install-root/SUNWps/bin/gateway -n profilename start debug
   ```

   Also view the log files after setting the gateway.debug attribute in the `platform.conf.profilename` file to message. See the section Understanding the `platform.conf` File in Chapter 2, "Administering Gateway" in the *Sun ONE Portal Server, Secure Remote Access 6.2 Administrator's Guide,* for details.

2. Run the Portal Server in secure mode by typing the gateway URL in your browser:

   `https://`*gateway-machine-name*`:`*portnumber*

   If you have chosen the default port (443) during installation, you need not specify the port number.

3. Login to the directory server administration console as administrator using the user name `amadmin`, and using the password specified during installation.

You can now create new organizations, roles, and users and assign required services and attributes in the administration console.

Chapter 3

Uninstalling the Sun ONE Portal Server

The Sun™ ONE Portal Server software, the gateway, the Netlet Proxy and the Rewriter Proxy are uninstalled using the Java™ Enterprise System uninstaller. For instructions on how to remove the software, see the *Java Enterprise System Installation Guide*.

The uninstall log is located at:

```
/var/sadm/install/Java_Enterprise_System_uninstall.B/MMddhhmm
```

After removing the Sun ONE Portal Server software, stop and start the Sun™ ONE Identity Server instance or instances.

1. Stop all instances using:

   ```
   /etc/init.d/amserver stopall
   ```

2. Restart all the instances using:

   ```
   /etc/init.d/amserver startall
   ```

NOTE If you are uninstalling a Sun ONE Portal Server deployed on Sun™ ONE Web Server and have created server instances with the `multiserverinstance` command, you need to delete each created instance. See Appendix D "Creating and Deleting Instances of the Server"for instructions on removing instances.

Chapter 4

Tuning the Sun ONE Portal Server

This chapter describes the configuration parameters for optimizing the performance and capacity of the Sun™ ONE Portal Server. The `perftune` script (in *portal-server-install-root*/`SUNWps/bin` directory), bundled with Sun ONE Portal Server, automates most of the tuning process discussed in this chapter.

Introduction

The `perftune` script:

- Tunes the Solaris™ Operating System Kernel and TCP settings (see Solaris Tuning)
- Modifies the following configuration files as part of:
    - Sun ONE Web Server 6.0 Tuning:
        - *web-server-install-root*/`SUNWwbsvr/`*webserver-instance*/`config/magnus.conf`
        - *web-server-install-root*/`SUNWwbsvr/`*webserver-instance*/`config/web-apps.xml`
        - *web-server-install-root*/`SUNWwbsvr/`*webserver-instance*/`config/server.xml`
        - *web-server-install-root*/`SUNWwbsvr/https-admserv/start-jvm`
    - Sun ONE Directory Server Tuning:
        - `/var/opt/mps/serverroot/slapd-`*hostname*/`config/dse.ldif`
    - Sun ONE Identity Server Tuning:
        - *directory-server-install-root*/`SUNWam/config/ums/serverconfig.xml`

        - *directory-server-install-root*/SUNWam/lib/AMConfig.properties
    - Sun ONE Portal Server Desktop Tuning
        - /etc/opt/SUNWps/desktop/desktopconfig.properties
- Modifies properties of the Sun ONE Portal Server Desktop service and Sun™ ONE Identity Server authentication service.

Tuning Strategies

When you run the `perftune` script, performance tuning options for two typical usage scenarios, called Production Optimum and Production Large, is offered. These scenarios are defined to address the majority of Sun ONE Portal Server usage patterns. These deployment scenarios are characterized by the following:

- Production Optimum:
    - Higher level of concurrent user requests
    - Small number of connected users (few hundreds per instance)
    - CPU bound
    - Most important Java™ Virtual Machine (JVM™) performance factors are throughput and promptness
    - Predominance of short-lived objects life time distribution
- Production Large:
    - Lower level of concurrent user requests
    - Large number of connected users (couple thousands per instance)
    - Memory bound
    - Most important JVM performance factor is JVM memory capacity
    - Predominance of long-lived objects life time distribution

For example, during peak hours in a business to enterprise portal, a significant number of the company's employees connect to the portal at the same time in a production large environment.

Memory Allocation

The larger amount of memory to allocate per JVM is determined by two parameters:

1. Maximum size of physical memory per CPU. On E45* class of machines it is about 1 GB
2. Recommended number of instances per CPU for performance and scalability is still 1:1 (one instance per CPU) for Sun ONE Portal Server for optimum performance. For production large, the ratio is rather 1:2 (one instance per 2 CPUs) which allows a maximum JVM heap size of 2 GB.

The JVM performance matrix driving the tuning effort looks at the throughput, footprint, and promptness as defined below. The second, third, and fourth columns show the level of performance in the areas of throughput, footprint, and promptness for production optimum and production large environments respectively.

	throughput	**footprint**	**promptness**
production optimum	high	less critical	high
production large	less critical	low	less critical

Here:

- throughput refers to the time not spent in GC
- footprint refers to a working set of process
- promptness refers to the time between when a object becomes dead and when memory it occupies becomes available

Tuning Instructions

When you run the `perftune` script, you can specify whether or not to execute the following tuning recommendation. Review the recommendations carefully and use the `perftune` script to execute these recommended modifications.

To run the `perftune` script:

1. Log in to the machine and become super user.

   You need root access to run this script.

2. Change directories to *portal-server-install-root*/SUNWps/bin.

3. Enter:

   ./perftune.

The perftune script performs start and stop operation of servers during tuning process. It creates backup copies of modified files in *filename*-orig-*date*-*pid* format. Reboot the system after running the script to take effect tuning changes.

Solaris Tuning

Kernel Tuning

To the /etc/system file, the script appends the following setters:

- File Descriptor Limits - Number of open files limits
  - set rlim_fd_max=16384
  - set rlim_fd_cur=16384
- Stream queue Size - The depth of the syncq (number of messages) before a destination streams queue generates a QFULL
  - set sq_max_size=0
- TCP Connection Hash Size (<= file descriptors)
  - set tcp:tcp_conn_hash_size=8192

TCP Parameters Tuning

Changes to TCP parameters (shown within parenthesis) in /dev/tcp include:

- TCP Time Wait Interval (tcp_time_wait_interval) - The amount of time a TCP socket will remain in the TIME_WAIT state (after the connection is closed) is set to 60000
- TCP Fin Wait 2 Interval (tcp_fin_wait_2_flush_interval) - The amount of time a TCP socket will remain in the FIN_WAIT_2 state (after the connection is closed) is set to 60000

- TCP Maximum Connection Size (tcp_conn_req_max_q) - The maximum number of fully established connection is set to 8192
- TCP List Queue (tcp_conn_req_max_q0) - The size of the queue containing unestablished connections is set to 8192
- TCP Packet Drop Time (tcp_ip_abort_interval) - The amount of time before a packet is dropped is set to 60000
- TCP Keep Alive Interval (tcp_keepalive_interval) - This is set to 90000
- TCP Maximum Retransmit Interval (tcp_rexmit_interval_max) - This is set to 6000
- TCP Minimum Retransmit Interval (tcp_rexmit_interval_min) - This is set to 3000
- TCP Initial Retransmit Interval (tcp_rexmit_interval_initial) - This is set to 500
- TCP Smallest Anonymous Port (tcp_smallest_anon_port) - This is set to 1024
- TCP Initial Packets for Slow Start Algorithm (tcp_slow_start_initial) - This is set to 2
- TCP Transmit/Receive Buffer Size Limit (tcp_xmit_hiwat and tcp_recv_hiwat) - These are set to 32768 each

In order to execute the ndd commands automatically when the system is rebooted, the perftune script copies the S99ndds_tcp file into /etc/rc2.d/ directory.

Sun ONE Identity Server Tuning

Directory Server Connection Pool

Changes made to the *portal-server-install-root*/SUNWam/config/ums/serverconfig.xml file are as follows:

- Increases the minimum connection pool size to 10
- Increases the maximum connection pool size to 90

LDAP Authentication Service

- Updates LDAP connection pools default size (min:max) to 10:90

LDAP Authentication

- Specifies DN to Start User Search to `ou=people,o=<organization>,o=isp`
- Specifies Search Scope to `OBJECT`

Sun ONE Identity Server Services Configuration Parameters

Changes are made to the *portal-server-install-root*`/SUNWam/lib/AMConfig.properties` file as follows:

- Specifies `com.iplanet.am.logstatus` to `INACTIVE`
- Increases `com.iplanet.am.session.maxSession` (default 50000) if expected number of concurrent sessions exceeds this value
- Disables `com.iplanet.am.session.httpSession.enabled`

The following threadpool properties in the `/opt/SUNWam/lib/AMConfig.properties` file are exposed in Sun ONE Portal Server 6.2:

- `com.iplanet.am.notification.threadpool.threshold`. This property indicates the maximum size of the task queue in the thread pool. The thread pool will reject further requests if the number of unprocessed tasks in the queue exceeds that threshold value. This number depends on the system memory resource. Each task requires about 3k. You should decide how many tasks can be queued given the size of thread pool. A task is queued only when no thread in the pool is available.

  The default value is set at 100. This might be high for your particular usage, and can be adjusted. For example use a value of 40 for a 4-CPU Ultra Sparc II or III machine.

- `com.iplanet.am.notification.threadpool.size`. This parameter allows reliable authentication for Sun ONE Portal Server on Sun™ ONE Application Server under a heavy load. The default value is 10 but can be changed. For example, a value of 50 should be used for a 4-CPU Ultra Sparc II or III machine.

Sun ONE Directory Server Tuning

If the Sun™ ONE Directory Server is shared by other applications, you may need to verify that those parameters are not conflicting with the other application’s parameters tuning.

Enough virtual memory space must be provisioned for `/tmp/slapd-`*DSinstance*`1` and the total amount of used memory, including the allocated for database caching, should not exceed the size of physical memory to avoid paging. In any events, the cumulative values of `nsslapd-dbcachesize + nsslapd-cachememsize + fixed memory` used for `slapd` process itself cannot exceed the 4 GB of process address space. `Nslapd` is a 32-bit application.

With regard to the sizing of resources pooling (connections and threads), Sun ONE Directory Server provides best performance with a concurrency level of around 15 for search type of operations.

The `perftune` script tunes `ns-slapd` threading, `db cache` and database file system mapping in the `/var/opt/mps/serverroot/slapd-`*hostname*`/config/dse.ldif` file as follows:

- Under `dn: cn=config` LDAP entry:
    - Adds the line `nsslapd-threadnumber` to `nThreads`. In most cases, default value (30) should be fine unless a fair amount of profile changes (LDAP writes) is expected, in which case, the script applies the following formula:

`nThreads = 30 for 1 CPU, nThreads = 45 for 2 CPUs, nThreads = 60 for 3 CPUs, nThreads = 90 for 4 CPUs.`

    - Specifies `nsslapd-accesslog-logging-enabled` to off to disable access log
- Under `dn: cn=config,cn=ldbm database,cn=plugins,cn=config LDAP` entry:
    - Adds the line `nsslapd-db-home-directory to /tmp/slapd-dsame1`
    - Changes the line `nsslapd-maxthreadsperconn` to 20
    - Modifies the line `nsslapd-dbcachesize` to `newSize` where `newSize = 1.2 *` size of all `db3` files located under `/var/opt/mps/serverroot/slapd-`*hostname*`/db/userRoot`.
- Under `dn: cn=userRoot,cn=ldbm database,cn=plugins,cn=config LDAP` entry, modifies the line `nsslapd-cachememsize to newSize` where `newSize = 3 *` the size of `id2entry.db3`.

NOTE If you are tuning the Sun ONE Directory Server manually, you need to stop the Sun ONE Directory Server before tuning these parameters.

Sun ONE Web Server 6.0 Tuning

The following describe the JVM Tuning offered by the `perftune` script to help tune Sun™ ONE Web Server for Sun ONE Portal Server performance in the Production Optimum and Production Large environments.

For Production Optimum

Heap size

Heap size is the most significant option that needs attention. Consult the Sun ONE Web Server tuning guide for details on these parameters. The `perftune` script:

1. Specifies the following in `magnus.conf` located at *web-server-install-root*`/SUNWwbsvr/https-`*hostname*`/config`
   - `RqThrottle 256`
   - `StackSize 393216`
   - `ThreadIncrement 20`
   - `ConnQueueSize 20000`
2. Specifies the following (modifications shown in bold) in `web-apps.xml` file located at *web-server-install-root*`//https-/`*hostname*`//config`. That is, it:
   - Defines the following session manager above the `web-app` tags:

```
      <session-manager
class="com.iplanet.server.http.session.IWSSessionManager>
          <init-param>
              <param-name>maxSessions</param-name>
              <param-value>50000</param-value>
          </init-param>
          <init-param>
              <param-name>timeOut</param-name>
              <param-value>360</param-value>
          </init-param>
          <init-param>
              <param-name>reapInterval</param-name>
              <param-value>180</param-value>
```

```
        </init-param>
    </session-manager>
```

- Increases `maxSession` (default 50000) if expected number of concurrent sessions exceeds this value.
- Defines the classes reload interval to 5 minutes (default 30 seconds)

```
    <class-loader classpath="[...]" delegate="false" 
reload-interval="300"/>
```

3. Specifies the following in `server.xml` file at *web-server-install-root*`//https-/`*hostname*`//config` for JVM Tuning
    - `jvm.minHeapSize=1073741824`
    - `jvm.maxHeapSize=1073741824`
    - `jvm.option=-Xrs`
    - `jvm.option=-server`
    - `jvm.option=-XX:MaxPermSize=128M`
    - `jvm.option=-XX:PermSize=128M`
    - `jvm.option=-XX:+OverrideDefaultLibthread`
    - `jvm.option=-XX:MaxNewSize=256M`
    - `jvm.option=-XX:NewSize=256M`
4. Specifies the following in `start-jvm` file for alternate T2 `libthread`

```
NSES_JRE_RUNTIME_LIBPATH=/usr/lib/lwp:${NSES_JRE}/lib/sparc/server:${NSES_
JRE}/lib/sparc:${NSES_JRE}/lib/sparc/classic:${NSES_JRE}/lib/sparc/native_
threads;export NSES_JRE_RUNTIME_LIBPATH
```

For Production Large

1. Specifies the following in `magnus.conf` located at *web-server-install-root*`/SUNWwbsvr/https-`*hostname*`/config`
    - `RqThrottle 256`
    - `StackSize 131072`
2. Specifies the following in `web-apps.xml` file located at *web-server-install-root*`//https-/`*hostname*`//config`.

- Defines the session manager as follows above the web-app tags.:

```
    <session-manager
class="com.iplanet.server.http.session.IWSSessionManager>

        <init-param>

            <param-name>maxSessions</param-name>

            <param-value>50000</param-value>

        </init-param>

        <init-param>

            <param-name>timeOut</param-name>

            <param-value>360</param-value>

        </init-param>

        <init-param>

            <param-name>reapInterval</param-name>

            <param-value>180</param-value>

        </init-param>

    </session-manager>
```

- Increases maxSession (default 50000) if expected number of concurrent sessions exceeds this value.

3. Specifies the following in `server.xml` file at *web-server-install-root*`//https-/`*hostname*`//config` for JVM Tuning

```
jvm.minHeapSize=1073741824

jvm.maxHeapSize=2147483648

jvm.option=-Xrs

jvm.option=-server

jvm.option=-XincGC

jvm.option=-XX:+UseLWPSynchronization

jvm.option=-XX:MaxPermSize=128M

jvm.option=-XX:PermSize=128M

jvm.option=-XX:+OverrideDefaultLibthread

jvm.option=-XX:MaxNewSize=256M

jvm.option=-XX:NewSize=256M
```

4. Specifies the following in `start-jvm` file for alternate T2 `libthread`

```
NSES_JRE_RUNTIME_LIBPATH=/usr/lib/lwp:${NSES_JRE}/lib/sparc/server:${NSES_
JRE}/lib/sparc:${NSES_JRE}/lib/sparc/classic:${NSES_JRE}/lib/sparc/native_
threads;export NSES_JRE_RUNTIME_LIBPATH
```

NOTE JVM Memory Heap size is 1 GB minimum and 2 GB maximum. Young generation is proportionally smaller than for optimum production so that more space is available for connected users.

Incremental (or Train) GC is more suitable to large production because GC speed is less of a concern than long pauses due to the potential large size of the old generation.

NOTE If you have deployed the Sun ONE Portal Server on an application server web container, the setup script changes the JVM maximum heapsize and minimum heapsize to 128 MB for the application server instance on which the Sun ONE Portal Server is installed. To use a different minimum and maximum JVM heap size, go into the Application Server's administration console and set the minimum and maximum JVM heap size values of your choice

Sun ONE Application Server 7.0 Tuning

When deploying the Sun ONE Portal Server on the Sun ONE Application Server, the minimum and maximum heap size for the application server instance is set.

The recommended JVM options for Sun ONE Application Server 7.0 are as follows for both JDK 1.4.1_01 and 1.4.2.

If the machine for the server can accommodate only 4 GB of physical memory, then the value -Xms2048M can be used instead of -Xms3072M; with only 4 GB of the physical memory, the JVM will not start if -Xms3072M is set. These JVM options should override the JVM options set by the `perftune` script.

The full set of JVM parameters includes:

- -Xms3072M
- -Xmx3072M

- -XX:NewSize=256M
- -XX:MaxNewSize=256M
- -XX:PermSize=256M
- -XX:MaxPermSize=256M
- -XX:SurvivorRatio=128
- -XX:SoftRefLRUPolicyMSPerMB=0
- -XX:MaxTenuringThreshold=1
- -XX:+UseParNewGC
- -XX:+UseConcMarkSweepGC
- -XX:+DisableExplicitGC
- -XX:+OverrideDefaultLibthread

Setting Additional Sun ONE Application Server Parameters for Gateway Reliability

To achieve optimal performance using Secure Remote Access, configure your implementation as follows:

1. Modify the *identity-server-install-root*`/SUNWam/lib/configAmConfig.properties` file to set the notification threadpool size for the application server. At the top of the file just below the following lines:

```
Sun, Sun Microsystems, the Sun logo, and iPlanet
* are trademarks or registered trademarks of Sun Microsystems,
* Inc. in the United States and other countries.
```

   add the following lines to set the threadpool size to 200:

```
/*Notification Thread Pool Size*/
com.iplanet.am.notification.threadpool.size=200
```

2. Log into the Portal Server administration console with the user name amadmin and the passphrase you entered during the installation.
3. Select Service Management in the View menu.
4. Select SRA Configuration and then Gateway.
5. Select the default server and click Edit.

6. Check the Enable HTTP Connections checkbox.

7. In the HTTP Port field, type 80 and click Save.

8. Log in to the Sun ONE Application Server administration console as administrator (admin) by entering http://*fullservername*:*port* in your browser's web address field. The default port is 4848. Use the password you entered at installation.

9. Select the application server instance where you installed the Identity Server.

10. Click JVM Settings and then JVM Options.

11. In the JVM Option field, enter the following string:

    ```
    -Dhttp.keepAlive=false
    ```

12. Click Add and then Save.

13. Select the application server instance on which you will install Portal Server.

    The right pane shows that the configuration has changed.

14. Click Apply Changes.

15. Click Restart.

16. The application server should automatically restart.

17. On the server where the gateway is installed, go to the /opt/SUNWps/bin/perf directory and enter the following to run a script that will set tuning parameters for Secure Remote Access:

    ```
    ./srapperftune
    ```

18. Modify the *identity-server-install-root*/SUNWam/lib/configAmConfig.properties file to set the notification threadpool size for the gateway. At the top of the file just below the following lines:

```
Sun, Sun Microsystems, the Sun logo, and iPlanet
* are trademarks or registered trademarks of Sun Microsystems,
* Inc. in the United States and other countries.
```

add the following lines to set the threadpool size to 200:

```
/*Notification Thread Pool Size*/
com.iplanet.am.notification.threadpool.size=200
```

19. Go to the `/opt/SUNWps/bin directory` and modify the gateway file to set the `-Dhttp.keepAlive` option to false and to increase the settings for the -Xms and -Xmx heap size options.

    By default, the `srapperftune` script sets the -Xms and -Xmx heap size options to 1024. In the line defining the CMD settings options, increase the default values defined for -Xms and -Xmx options to 2048 and add the string `-Dhttp.keepAlive=false`. For example, the correct lines would be:

    ```
    CMD="$JAVA_HOME/bin/java -server -Xms2048M -Xmx2048M
    -XX:+OverrideDefaultLibthread -XX:ThreadStackSize=128
    -XX:MaxPermSize=128M -XX:PermSize=128M -XX:MaxNewSize=256M
    -XX:NewSize=256M -Dhttp.keepAlive=false -classpath ${CLASSPATH}
    $DEFINES $PROXY_DEFINES $INSTANCE_DEFINES
    com.sun.portal.netlet.eproxy.EProxy"
    ```

20. Modify the `/etc/opt/SUNWps/platform.conf.default` file to set the gateway.protocol parameter to http and the gateway.port parameter to port 80 as follows:

    ```
    gateway.protocol=http
    ```

    ```
    gateway.port=80
    ```

21. Restart the gateway for the changes to take effect by typing the following command:

    portal-server-install-root`/SUNWps/bin/gateway -n default start`

- where default is the default gateway profile created during installation.

Sun ONE Portal Server Desktop Tuning

For Production Optimum

- For optimizing the Desktop Sessions, it disables `Enable XML Parsing Validation`

  Desktop sessions are different and disjoint from Sun ONE Identity Server SSOToken sessions. If a Desktop session times out before the Sun ONE Identity Server session expires, the Desktop transparently rebuilds the Desktop session when it is queried. Decreasing Desktop sessions idle time-out helps reclaiming memory used by session objects assuming production optimum is characterized by short-lived user sessions.

- The caller parameters are used to size the thread pool to render content through the providers. The caller pool is initialized to size 0. Items are added to to the pool as they are used and returned. The caller pool can expand to a very large size, however, in the normal case it will only be as big as the number of channels on the user's Desktop. In cases where there are multiple concurrent threads with the same sid, the pool may expand to an size that is n * m, where n = the number of concurrent same-sid threads and m = the number of channels on the Portal Desktop for the given sid.

  The perftune script changes the following parameters for optimizing Provider Caller Resource Pooling, in the /etc/opt/SUNWps/desktop/desktopconfig.properties file:

  - Increases callerPoolMinSize to 128
  - Increases callerPoolMaxSize to 512
  - Increases callerPoolPartitionSize to 16
  - Increases templateScanInterval to 3600

For Production Large

The caller parameters are used to size the thread pool to render content through the providers. The caller pool is initialized to size 0. Items are added to the pool as they are used and returned. The caller pool can expand to a very large size, however, in the normal case it will only be as big as the number of channels on the user's Portal Desktop. In cases where there are multiple concurrent threads with the same sid, the pool may expand to an size that is n * m, where n = the number of concurrent same-sid threads and m = the number of channels on the Portal Desktop for the given sid.

The perftune script changes the following parameters for optimizing the Provider Caller Resource Pooling, in the /etc/opt/SUNWps/desktop/desktopconfig.properties file:

- Increases callerPoolMinSize to 128
- Increases callerPoolMaxSize to 512
- Increases callerPoolPartitionSize to 16
- Increases templateScanInterval to 3600

To minimize unnecessary memory growth due to spawning of Portal Desktop caller threads when performing long-run tests, these properties (except for templateScanInterval) should be changed back to their original default values.

Make the following changes to these properties:

- Change callerPoolMinSize back to 0
- Change callerPoolMaxSize back to 0
- Change callerPoolPartitionSize back to 0
- Increase the templateScanInterval property from 30 to 3600

Appendix A

Installing Third-party Software

This appendix provides information on installing and using third-party software with Sun™ ONE Portal Server.

A separate third-party software CD called Sun Java Enterprise System Accessory CD Volume 2 is packaged along with the Sun Java Enterprise System. This CD contains the following software components to provide support required for some features of Sun ONE Portal Server, Secure Remote Access:

- JCIFS
- Rhino (which provides JavaScript™ for Netlet file support)

Other third-party software that is supported by Sun ONE Portal Server, but that is available as download-only software is `nsco.jar` file for IBM WebSphere Application Server support

This appendix includes the following sections:

- Installing the jICFS Software
- Installing Rhino

Installing the jICFS Software

If you want to allow NetFile users access to Microsoft Windows networks, you must install the jICFS server software on the Sun ONE Portal Server node.

NOTE After installation, you need to specify the Samba client path in the NetFile administration console, in the SMB Client Location field. By default, this value is `/usr/sfw/bin`.

To Install the jICFS Software:

1. As root, mount the third-party CD on the Portal Server node.
2. Run the `setup` script.

    ```
    ./setup
    ```

3. Select the option to install the Samba client.

The Samba software is installed in the `/usr/sfw/bin` directory. You do not have the option of changing the installation path.

Installing Rhino

Rhino is a JavaScript that is required for Netlet file support.

To Install Rhino Software:

1. As root, mount the third-party CD labeled on the Portal Server node.
2. Change to the `thirdparty/rhino` directory.
3. Copy the file `js.jar` to *`j2Sdk-path`*`/jre/lib/ext`.

    where *j2sdk-path* is the path to the J2SDK installation on your machine.

Appendix B

BEA WebLogic Server

Setting Up Sun ONE Portal Server on BEA Clusters

This section gives a brief description and example of how the Sun™ ONE Portal Server software can be used with BEA WebLogic Server™ clusters.

NOTE

- For a cluster, all the machines must be on the same subnet. All BEA WebLogic Server instances participating in the cluster must listen on the same port. In order to run the Portal Server software with session failover successfully you need three managed servers running the Portal Server software.
- Do not run `perftune` if you are planning on using clusters.
- SRA does not work with clusters.
- The BEA WebLogic Server proxy does not load balance. All server instances in a BEA WebLogic cluster must use the same listen port. The new cluster servlet needs to be used for `weblogic.servlet.proxy.HttpClusterServlet`.
- Resonate 3.3 cannot load balance a BEA WebLogic cluster.

For our example, there are five machines. All the machines must be on the same subnet. One has a directory server only (DSmach). Another is the BEA WebLogic administration server (AS). There are three cluster machines (CS1, CS2, and CS3). If you want to support load balancing, an additional machine or the administration server machine may be configured as a proxy servlet for load balancing. You may also use a hardware-based load balancer. Load balancing is needed for clusters. In this example, the proxy is on the administration server.

Install the directory server on DSmach. Install BEA WebLogic Server on all four of the other machines using the default installation. Check that all servers are working correctly.

On the four machines with BEA WebLogic Server, using the BEA WebLogic instructions, create a new domain (NEWDOMAIN on all machines) consisting of an administration server with listen port of 7001 (ADMINSERVER on all machines) and another server with a listen port of 80 (PORTALSERVER on all machines). Each listen port should be the same; the example uses 80.

Next install the Portal Server software on the four machines to the managed server instance (PORTALSERVER).

1. Respond **n** to the question: `Use these settings? [y]/n`

   A list of questions follows.

2. Accept the default values except for these questions. These questions show the values that need to be changed and important default values. This example is for the BEA WebLogic administration server. The installation values for the cluster machines is similar.

   ```
   What is the Application Server domain? [mydomain] NEWDOMAIN

   What is the Application Server instance? [myserver] PORTALSERVER

   What is the Application Server administration port? [7001]

   What port should be used to access the Portal Server? [80]

   Use an existing Directory Server? y/[n] y

   What is the name of the directory server?[...] DSmach
   ```

   Answer the questions about the directory server appropriately.

3. Stop and restart all the servers (the Portal Server, the managed server and the administration server) on all the machines.

4. Check and see that the installations were successful.

5. Log in to the Sun ONE Identity Server admin console as administrator.

   By default, Identity Management is selected in the location pane and All created organizations are displayed in the navigation pane.

6. Choose Service Configuration in the location pane.

7. Click on the Properties arrow next to Platform in the navigation pane.

8. Check that the Server List has the *full-ps-servername* for the machine you plan to put the proxy on. In our example, the machine is `http://AS.example.com:80`.

9. Click Save.

To set up a cluster:

1. Using the administration console of the admin machine AS (`http://AS:7001/console`), create a server for each of the machines to be in the cluster.

   a. Select Servers, configure new Server.

   b. Use the machine name for the new servername: CS1, CS2, and CS3.

2. Stop all the servers on the machines to be in the cluster.

3. Restart those servers, but have them connect to the administration server AS. For example,

   ```
   ./startManagedWebLogic.sh CS1 AS:7001
   ```

4. Using the administration console of the administration machine AS (`http://AS:7001/console`), create the cluster.

   a. Select Clusters, Configure a new Cluster.

      For Name, the example uses NEWCLUSTER.

   b. For Address, put in the names for the servers representing the machines to be clustered: CS1,CS2,CS3.

   c. Inside this same window, select the Servers tab, then select the servers CS1, CS2, and CS3; move them from the Available box to the Chosen box.

For more detail, see the BEA WebLogic Server instructions to set up a cluster.

As you set up clusters remember the following:

- Stop and restart all the servers each time you change the cluster configuration.
- Set up your cluster on the administration server (AS) machine in the NEWDOMAIN ADMINSERVER BEA WebLogic Server administration console.
- Use the BEA WebLogic Server tool to test for multicasting.

Check to see that cluster is set up correctly by going the BEA WebLogic Server administration console, selecting Cluster in the left pane, selecting the Monitoring tab in the right pane, then select Monitor server participation in cluster. If one or more of the started server instances does not appear in the display, use the BEA WebLogic Server tool to verify the correct multicast addresses and port numbers.

NOTE If you want to start and stop the BEA WebLogic managed servers remotely from the administration console, you need to configure and run a BEA Node Manager. See the BEA WebLogic Server documentation for detailed information.

If you are going to use a proxy servlet for load balancing, create a `web.xml` file for your cluster to use to configure the load balancing servlet. Using a temporary directory make a subdirectory `WEB-INF`. The `web.xml` file is the only file in a directory (`WEB-INF`). Use the fully qualified machine names in the file.

Figure B-1 Sample `web.xml` File

```
<!DOCTYPE web-app PUBLIC "-//Sun Microsystems, Inc.
         //DTD Web Application 2.2//EN"
         "http://java.sun.com/j2ee/dtds/web-app_2_2.dtd">

     <web-app>

     <servlet>
              <servlet-name>HttpClusterServlet</servlet-name>
                  <servlet-class>
                      weblogic.servlet.proxy.HttpClusterServlet
                  </servlet-class>

              <init-param>
                  <param-name>WebLogicCluster</param-name>
                  <param-value>

CS1.domain.COM:80:7002|CS2.domain.COM:80:7002|CS3.domain.COM:80:7002
                  </param-value>
              </init-param>

     </servlet>

     <servlet-mapping>
              <servlet-name>HttpClusterServlet</servlet-name>
              <url-pattern>/</url-pattern>
     </servlet-mapping>

     <servlet-mapping>
              <servlet-name>HttpClusterServlet</servlet-name>
              <url-pattern>*.jsp</url-pattern>
     </servlet-mapping>
```

Figure B-1 Sample `web.xml` File

```
    <servlet-mapping>
            <servlet-name>HttpClusterServlet</servlet-name>
            <url-pattern>*.htm</url-pattern>
    </servlet-mapping>

    <servlet-mapping>
            <servlet-name>HttpClusterServlet</servlet-name>
            <url-pattern>*.html</url-pattern>
    </servlet-mapping>

    </web-app>
```

1. Make `web.xml` with your cluster server values into a `.war` file. In a terminal window, type:

   ```
   jar cvf proxy.war WEB-INF
   ```

2. Deploy the `.war` file on the BEA WebLogic administration server using the `java weblogic.deploy` command supplied by the BEA WebLogic Server software.
3. In the BEA WebLogic Server administration console on the administration server, expand Servers and select PORTALSERVER:80.
4. Click the HTTP tab.
5. Set the Default Web Application to the proxy.
6. Restart the Portal Server.

   Or after making the `.war` file, copy the `.war` file to the applications directory in the new domain on the administration machine (AS).

7. Select Web Applications.
8. Click Configure a new Web Application.
9. Enter proxy as the Name and give the complete path to the `.war` file.
10. Click Create.
11. In the left pane under Web Applications, click proxy.
12. In the right pane, click the Target tab, and move Portal Server from the Available box to the Chosen box.

Next you need to deploy the Portal Server software to the cluster. For each web application (amconsole, amserver, amcommon, ampassword and portal) follow these steps.

1. Go to the BEA WebLogic Server administration console for the administration server (AS:7001/console).
2. Expand Web Applications in the left pane, then select one of the Portal Server software web applications (amconsole, amserver, amcommon, ampassword and portal).
3. Undeploy the admin server (you have installed Portal on the PORTALSERVER server, but it is not part of the cluster, so now you remove it from this server).
    a. Select the Target tab, then the Servers sub-tab.
    b. Move your server name from Chosen to Available box and click Apply.
4. Click the Edit Web Application Descriptor link; click the Configure a new Web App Ext Descriptor link.
5. In the left pane under WebApp Ext, Select Session Descriptor.
6. In the right pane, change Persistent Store Type to replicated. Click Apply.
7. Select top topic in the left pane, Web Descriptor or Identity Server Services. Select Persist. Close this window.
8. Select the Target tab, then the Cluster sub-tab.
9. Move your cluster name (NEWCLUSTER) from Available to Chosen box and click Apply.
10. For each of the three Portal Server machines, go to the *identity-server-install-root*/`SUNWam/lib` directory and open the `AMConfig.properties` files with a text editor.
11. Set the following values on all the machines:

```
com.iplanet.am.session.failover.enabled=true

com.iplanet.am.replica.enable=true

com.iplanet.am.naming.url=http://AS.example.com:80/amserver/namingservi
ce

com.iplanet.am.notification.url=http://AS.example.com:80/amserver/notif
icationservice

com.iplanet.am.session.server.host=AS.example.com

com.iplanet.am.server.host=ASNMS.example.com

com.iplanet.services.cdsso.CDCURL=http://AS.example.com:80/amserver/cdc
servlet
```

```
com.iplanet.services.cdc.authLoginUrl=http://AS.example.com:80/amserver
/login
```

12. Stop and restart all the servers. For the managed servers, on each machine, type:

    `./startManagedWebLogic.sh` *managed-servername* `http://AS.example.com:80`

13. Check to see if all is working well.

Setting the Cookie Encoding Values

The `com.iplanet.am.cookie.encode` property in the `AMConfig.properties` file should be set to "true" when the target web container is BEA WebLogic Server or WebSphere Application Server. This is necessary because WebLogic does not automatically encode cookie values set by web applications.

Setting `com.iplanet.am.cookie.encode` to "true" under BEA WebLogic Server and IBM WebSphere Application Server will prevent characters like the comma, semi-colon and white space to be set in cookie values by Sun ONE Identity Server without being escaped or encoded. When characters such as comma, semi-colon and white space are set as cookie values directly without being encoded or escaped, some web browsers will not parse the cookie value correctly. Thus, the application will receive corrupted cookie values in subsequent requests.

When the target web container is WebLogic, edit the `AMConfig.properties` file and set the value of the `com.iplanet.am.cookie.encode` property to true.

Appendix C

IBM WebSphere Application Server

Sun™ ONE Portal Server 6.2 can be deployed on an WebSphere Application Server 4.0.5 Advanced Edition using it as its web application container.

Renaming an IBM WebSphere Application Server Instance

To install the Portal Server, the application server instance to which you install must already exist. You can create a new application server instance or use an existing instance; however, the instance name must not contain a space.

The default instance name for IBM WebSphere Application Server is called "Default Instance." If this instance is not being used for other purposes, you can deploy Sun ONE Portal Server to this instance, but you must change the instance name to something that does not include a space.

To rename an IBM WebSphere Application Server instance:

NOTE	The admin server instance must be running. The IBM WebSphere Application Server instance should not be running.

1. Access the WebSphere administration console by running.

   ```
   /opt/WebSphere/AppServer/bin/adminclient.sh
   ```

2. Expand the tree under Nodes to access the application server instance settings . For example:

   a. Select Nodes.

   b. Select Application Server.
   c. Select Default Server.

3. In the Application Server field, change the instance name to one without a space, for example Default_Server.
4. Select Apply.
5. Regenerate the WebSphere plugin.
   a. Right click on the deploy node.
   b. In the menu, select Regen Webserver Plugin.
6. Stop the node.
7. Restart the node.

If you want to create a new instance for deploying the portal server, use the Create Application Server wizard in the administration console before starting the portal server install.

To create a new instance:

1. Open the admin console. For example, to start the console installed in the default base directory of `/opt`, type:

   ```
   /opt/WebSphere/AppServer/bin/adminclient.sh
   ```

2. Click Console, Wizards, and Create Application Server.
3. On the Specifying Application Server Properties page, enter the following:

   `Application Server:` ***new_instance_name***

   `Node to install server on:` ***node_name***

   where *node_name* is the machine name on which the application server is installed.

4. Click Next and Finish.

Setting the Cookie Encoding Values

The com.iplanet.am.cookie.encode property in the `AMConfig.properties` file should be set to “true” when the target web container is BEA WebLogic Server or WebSphere Application Server. This is necessary because WebLogic does not automatically encode cookie values set by web applications.

Setting com.iplanet.am.cookie.encode to “true” under WebLogic and WebSphere will prevent characters like the comma, semi-colon and white space to be set in cookie values by Sun ONE Identity Server without being escaped or encoded. When characters such as comma, semi-colon and white space are set as cookie values directly without being encoded or escaped, some web browsers will not parse the cookie value correctly. Thus, the application will receive corrupted cookie values in subsequent requests.

When the target web container is WebLogic, edit the `AMConfig.properties` file and set the value of the com.iplanet.am.cookie.encode property to true.

Appendix D

Creating and Deleting Instances of the Server

An instance is a server that listens on a particular port, bound to either one or more IP addresses. For the Sun™ ONE Portal Server, an instance corresponds to a web server process listening on a port and running a single Java™ Virtual Machine (JVM™).

NOTE Multiple-instances are supported only with Sun™ ONE Web Server.

To Create an Instance of the Server

1. Log in to the server running the Sun ONE Portal Server.
2. Go to the Sun™ ONE Identity Server utilities directory

   `cd` *identity-server-install-root*`/SUNWam/bin`
3. Run the following command:

   ```
   ./amserver create
   ```
4. Enter a name for the new instance when prompted.
5. Enter an unused port for the new instance when prompted.
6. If you want to create more instances, type **y** and press Enter when asked the question:

   `Do you want to create more server instances? y/[n]` **y**.

   Repeat Step 4 and Step 5 for each instance that you wish to create. Otherwise press Enter to create the server instances.

7. Enter the amadmin password when prompted.

8. Go to the web server install directory.

9. To verify that the instance has been created, use the `ls` command.

10. Go to the directory for the newly created instance.

    ```
    cd https-new-instance-name
    ```

11. Run the start script for the newly created instance.

    ```
    ./start
    ```

12. Go to the Portal Server utilities directory.

    ```
    cd portal-server-install-root/SUNWps/bin
    ```

13. Run the `multiserverinstance` script.

    ```
    ./multiserverinstance
    ```

14. Enter the name of the instance from Step 4.

15. Enter the port of the new instance from Step 5.

16. If you have portlets, redeploy them. For instructions to redeploy portlets, consult the *Sun ONE Portal Server 6.2 Administrator's Guide*.

17. After the multiservinstance script exits, go to the web server instance directory.

    ```
    cd web-server-install-root/https-new-instance-name
    ```

18. Stop the web server instance.

    ```
    ./stop
    ```

19. Restart the web server instance.

    ```
    ./start
    ```

20. Go to the newly created instance in a browser.

21. Repeat steps Step 9 through Step 20 for each newly created instance.

22. In a browser, enter:

    - `http://`*hostname.domain*`:`*instance-portnumber*`/amconsole` to access the administration console through the new instance

    - `http://`*hostname.domain*`:`*instance-portnumber*`/portal` to access the default URL for the Portal Desktop through the new instance

If you create any additional server instances and you want to run them as non-root or nobody, comment out the following lines for each instance at *identity-server-install-root*/`SUNWam/bin/amserver.`*instance-nickname*

```
if [ ’$ID | $AWK ’{print $1}’’ != "uid=0(root)" ]; then
    $ECHO "You must be root user. $BELL_CHAR"
exit 1
fi
```

To Delete an Instance of the Server

1. Log in to the server running the Sun ONE Portal Server.

2. Change directories to *portal-server-install-root*/`SUNWps/bin`.

   `cd` *portal-server-install-root*/`SUNWps/bin`

3. If you have portlets, remove them. For instructions, see the *Sun ONE Portal Server 6.2 Administrator’s Guide*

4. Enter:

   `./multiserverinstance delete -instance` *instance-name*

5. If you are also removing the Sun ONE Identity Server, change directories to the Identity Server utilities directory.

   `cd` *identity-server-install-root*/`SUNWam/bin`

6. Enter:

   `./amserver delete` *instance-name*

Appendix E

Setting Up the Sun ONE Portal Server to Use Secure External LDAP Directory Server

In the default install, the Sun™ ONE Portal Server, the Sun™ ONE Identity Server, and the Sun™ ONE Directory Server software are all running on the same host. However, depending on the performance, security, and integration requirements of your deployment, you might want to run the directory server on a separate, external host and have the Portal Server access the directory over a secure connection using Secure Sockets Layer (SSL). In order to access the Directory Server over a secure connection, the Sun™ ONE Application Server must be configured to trust the certificate authority that signed the directory's certificate.

Setting up the Sun ONE Portal Server to use an external LDAP directory, requires the following procedures:

- Installing the Sun ONE Portal Server. See "Installing Sun ONE Portal Server"in Chapter 2 of this guide.
- Configuring the Directory Server to run SSL. See "Configuring the Directory Server to Run in SSL."
- Creating a certificate database. See "Creating a Certificate Database."
- Installing a root Certificate Authority (CA) certificate. See "Installing A Root Certificate Authority (CA) Certificate."
- Enabling SSL for the Directory Server. See "Enabling SSL for the Directory Server."

Configuring the Directory Server to Run in SSL

1. Verify that both the Directory Server (ns-slapd process) and the administration server (ns-httpd process) are started and running.

2. As root, in a terminal window start the directory server console by typing:

   ```
   /var/opt/mps/serverroot/startconsole
   ```

3. In the login window that is displayed, enter `admin` as the user name and the passphrase for the Directory Server.

4. In the left pane of the console, expand the directory until you see the Directory Server instance under Server Group.

5. Select Directory Server instance and click Open.

6. Select Tasks and then Manage Certificates.

   The first time you perform this task, you'll be asked to create a certificate database by entering a password. Make a note of this password as you will need it later to start up the Directory Server.

7. Click Request.

   The Certificate Request Wizard appears. Follow the wizard and complete the steps to generate a certificate request. The request is sent to a Certificate Management Server (CMS) for approval. The CMS returns the real certificate. Save a copy of the certificate request by copying the request data to a file.

8. After the certificate request is sent to the CMS, have the administrator of the CMS approve the request and send back the approved certificate.

9. Get the generated certificate for the DS and the CMS certificate.

   Since the CMS generated the certificate for DS, the CMS will also have to be trusted by importing its certificate as a root CA.

10. Select Manage Certificates, Server Certificates and then click Install.

    The Certificate Install Wizard appears.

11. Copy and paste the approved certificate data from Step 8 into the text area and follow the steps of the wizard to install the certificate.

    When the certificate is successfully installed, the certificate displays as a line item on the Server Certificates tab.

12. Select Manage Certificates and CA Certificates, and then click Install.

    Copy and paste the CMS certificate data into the text area and follow the steps of the wizard to install the certificate.

13. Click Close to close the Manage Certificates window.

14. Select Configuration.

15. In the right pane, select Settings.

16. Verify or specify a valid port number in the Encrypted port field and click Save.

    The default is 636.

17. Click Encryption, check the Enable SSL for this server and Use the cipher family: RSA check boxes and click Save.

18. Restart the Directory Server and supply the certificate database password entered in Step 6.

    Your Directory is now listening on port 636 (default) for SSL connections.

Creating a Certificate Database

When you create the certificate database, you specify a password that will be used for a key-pair file. You will also need this password to start a server using encrypted communications. For a list of guidelines to consider when changing a password, see Changing Passwords or PINs.

In the certificate database you create and store the public and private keys, referred to as your key-pair file. The key-pair file is used for SSL encryption. You will use the key-pair file when you request and install your server certificate. The certificate is stored in the certificate database after installation. The key-pair file is stored encrypted in:

> `/var/opt/SUNWappserver7/domains/deploy-domain/deploy-instance/config/key3.db`.

The procedure for creating a certificate database depends on the type of web container that you are using. The following instructions are for creating a certificate database on the Sun ONE Web Server and can also be found in *Sun ONE Web Server, Enterprise Edition Administrator's Guide* at `http://docs.sun.com`.

For instructions on creating a certificate database on the Sun ONE Application Server refer to *Sun ONE Application Server 7 Administrator's Guide to Security* on `http://docs.sun.com`.

Creating a Certificate Database

To create a certificate database on the Sun ONE Web Server, perform the following steps:

1. Access either the Administration Server or the Server Manager and choose the Security tab.

   For the Server Manager you must first select the server instance from the drop-down list.

2. Click on the Create Database link.
3. Enter a password for the database.
4. Repeat.
5. Click OK.
6. For the Server Manager, click Apply, and then Restart for changes to take effect.

Using the password.conf File

By default, the web server prompts the administrator for the key database password before starting up. If you want to be able to restart an unattended web server, you need to save the password in a `password.conf` file. Only do this if your system is adequately protected so that this file and the key databases are not compromised.

Normally, you cannot start an Unix SSL-enabled server with the `/etc/rc.local` or the `/etc/inittab` files because the server requires a password before starting. Although you can start an SSL-enabled server automatically if you keep the password in plain text in a file, this is not recommended. The server's password.conf file should be owned by root or the user who installed the server, with only the owner having read and write access to them. On Unix, leaving the SSL-enabled server's password in the `password.conf` file is a large security risk. Anyone who can access the file has access to the SSL-enabled server's password. Consider the security risks before keeping the SSL-enabled server's password in the `password.conf` file.

Installing A Root Certificate Authority (CA) Certificate

The procedure for installing a root CA certificate depends on the type of web container that you are using. The following procedure describes how to install a root CA on the Sun ONE Web Server, and can also be found in *Sun ONE Web Server, Enterprise Edition Administrator's Guide* at `http://docs.sun.com`.

For instructions on installing a root CA certificate on the Sun ONE Application Server refer to *Sun ONE Application Server 7 Administrator's Guide to Security* on `http://docs.sun.com`.

1. Go the Web Server console and click on Install Certificate.
2. Click on Certificate for this Server.
3. Enter the Certificate Database password in the Key Pair File Password field.
4. Paste the certificate into the provided text field, or check the radio button and enter the filename in the text box. Click Submit.

   The browser will display the certificate, and provide a button to add the certificate.
5. Click Install Certificate.
6. Click Certificate for Trusted Certificate Authority.

Enabling SSL for the Directory Server

To enable SSL for the Directory server, edit the `AMConfig.properties` file. This step is container independent and must be done for Sun ONE Web Server as well as Sun ONE Application Server.

Change the following settings in the `AMConfig.properties` file from:

```
com.iplanet.am.directory.ssl.enabled=false
com.iplanet.am.directory.host=server12.example.com (if it needs to be changed)
com.iplanet.am.directory.port=51389
```

to

```
com.iplanet.am.directory.ssl.enabled=true
com.iplanet.am.directory.host=server1.example.com
com.iplanet.am.directory.port=51631 (port on which DS uses encryption)
```

If you are using the Sun ONE Application Server as your web container, edit the `AMConfig.properties` file to point to the certificate database path and prefix used by Sun ONE Application Server.

Change the following settings from:

```
com.iplanet.am.admin.cli.certdb.dir=/opt/SUNWappserver7/SUNWam/servers/alias
com.iplanet.am.admin.cli.certdb.prefix=https-myappserver.example.com-example-
```

to:

```
com.iplanet.am.admin.cli.certdb.dir=/var/opt/SUNWappserver7/domains/domain1/\
server1/config
com.iplanet.am.admin.cli.certdb.prefix=
```

Change the connection port and the connection type values in the `serverconfig.XML` file to change from open mode to SSL.

Edit the `serverconfig.XML` file and change the following line from:

```
    <Server name="Server1" host="gimli.example.com"
port="51389"
 type="SIMPLE" />
```

to:

```
to
<Server name="Server1" host="gimli.example.com"
port="51636"
type="SSL" />
```

After making these changes to the configuration files (`AMConfig.properties and serverconfig.xml`) restart the web container

If using Sun ONE Web Server type:

```
amserver stop
```

```
amserver start
```

Or use the appropriate method for stopping and starting the application server on which Sun ONE Portal Server is installed.

Appendix F

Configuring the Sun ONE Portal Server to Run as User Non-Root

The following optional, post-install procedure describes the steps to configure a Sun™ ONE Portal Server installation that is running as root user to run as a non-root user. This procedure assumes that the web container and the Sun™ ONE Directory Server are running as root user.

NOTE The Java Enterprise System installer provides a way to install the Sun ONE Directory Server and the Sun™ ONE Web Server or Sun™ ONE Application Server to run as a non-root user.

Perform all steps as superuser, except as noted. After installing the Sun™ ONE Portal Server software, use the following procedure to configure the Sun ONE Portal Server to run as user non-root.

1. Change the web container's user instance from root to a non-root value. Consult your web container's documentation for instructions on changing the running user.

   For example, to change the Sun ONE Web Server's running user, edit the *web-server-install-root*`/SUNWwbsvr/https-`*hostname*`.domain/config/magnus.conf` file.Change the entry `User root` to `User` *Userid*.

2. Change the web container's admin instance from root to a non-root value. Consult your web container's documentation for instructions on changing the running admin user.

   For example, to change the Sun ONE Web Server's admin user, edit the *web-server-install-root*`/SUNWwbsvr/https-admserv/config/magnus.conf` file.

   Change the entry `User root` to `User` *Userid*.

3. Change the Sun ONE Directory Server’s user instance from root to a non-root value. Consult the Sun ONE Directory Server documentation for instructions on changing the running user.

   For example, edit the `/var/opt/mps/serverroot/slapd-`*hostname*`/config/dse.ldif` file.

   Change `nsslapd-localuser: root` to `nsslapd-localuser:` *Userid*

4. Change the Sun ONE Directory Server admin user instance from root to a non-root value. Consult the Sun ONE Directory Server documentation for instructions on changing the running admin user.

   For example:

   a. Edit `/var/opt/mps/serverroot/admin-serv/config/local.conf` file.

      Change `configuration.nsSuiteSpotUser: root` to `configuration.nsSuiteSpotUser:` *Userid*

   b. Edit `/var/opt/mps/serverroot/admin-serv/config/magnus.conf` file.

      Change the entry `User root` to `User` *Userid*

5. Change the ownership of the following directories from root to *Userid:UserGroup*. That is, enter:

   - `chown -R` *Userid*`:`*UserGroup* `/opt/SUNWps`
   - `chown -R` *Userid*`:`*UserGroup* `/etc/opt/SUNWps`
   - `chown -R` *Userid*`:`❂▲❄❒✧❒❑◆❒ `/var/opt/SUNWps`

   If you did not use the Java Enterprise System installer to install the Sun ONE Identity Server as non-root, consult the Identity Server documentation for information on changing the Identity Server directories.

6. Set the following permissions for the Portal Server directories:

   - `chmod 0755 /opt/SUNWps`
   - `chmod 0755 /etc/opt/SUNWps`
   - `chmod 0755 /var/opt/SUNWps`

7. Restart the directory server as the non-root user.

8. Run `/etc/init.d/amserver stop`.

   A non-root user can run *identity-server-install-dir/SUNWam/bin/amserver stop*.

9. Ensure that all of the processes are stopped.

   To verify, type:

   ```
   ps -ef | grep SUNWam
   ```

   ```
   ps -ef | grep directory-server-base-dir
   ```

10. Kill off any processes that did not get shutdown. As root enter:

    ```
    /var/opt/mps/serverroot/stop-admin
    ```

Launching Sun ONE Portal Server

1. Become superuser or log in as user Userid.
2. Start the directory server.
   a. Go to `/var/opt/mps/serverroot/slapd-`*instancename*
   b. Type:

      ```
      ./start-slapd
      ```

3. Start the web server by entering `/etc/init.d/amserver start`

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