

Oracle® Fusion Middleware

Administering Oracle HTTP Server

12c (12.2.1.2.0)

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This document describes how to configure and use Oracle HTTP Server as a framework for hosting static pages, dynamic pages, and applications over the Web.

Oracle Fusion Middleware Administering Oracle HTTP Server, 12c (12.2.1.2.0)

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Preface

This guide describes how to manage Oracle HTTP Server, including how to start and stop Oracle HTTP Server, how to manage network components, configure listening ports, and extend basic functionality using modules.

Audience

Administering Oracle HTTP Server is intended for application server administrators, security managers, and managers of databases used by application servers. This documentation is based on the assumption that readers are already familiar with Apache HTTP Server.

Unless otherwise mentioned, the information in this document is applicable when Oracle HTTP Server is installed with Oracle WebLogic Server and Oracle Fusion Middleware Control. It is assumed that readers are familiar with the key concepts of Oracle Fusion Middleware as described in the *Oracle Fusion Middleware Concepts Guide* and the *Administering Oracle Fusion Middleware*.

For information about installing Oracle HTTP Server in standalone mode, see *Installing and Configuring Oracle HTTP Server*.

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Related Documents

For more information, see the following documents in the Oracle Fusion Middleware 12c (12.2.1) documentation set:

- *Understanding Oracle Fusion Middleware*
- *Administering Oracle Fusion Middleware*
- *Tuning Performance*

- *High Availability Guide*
- *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*
- [Apache documentation](http://httpd.apache.org/docs/2.4/) included in this library. See: <http://httpd.apache.org/docs/2.4/>

Note:

Readers using this guide in PDF or hard copy formats will be unable to access third-party documentation, which Oracle provides in HTML format only. To access the third-party documentation referenced in this guide, use the HTML version of this guide and click the hyperlinks.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

What's New in Oracle HTTP Server 12c (12.2.1.x)

The following topics introduce the new and changed features of Oracle HTTP Server and other significant changes that this guide describes, and provides pointers to additional information.

New and Changed Features in 12c (12.2.1.2)

The current release includes no new features. See the following sections for changed features.

Significant Updates in 12c (12.2.1.2)

This section describes features that have been significantly updated from the earlier versions of Oracle HTTP Server.

Oracle HTTP Server No Longer Supports Certificates Signed Using the MD5 Algorithm

Oracle HTTP Server no longer supports the certificate signed using the Message Digest 5 (MD5) algorithm. For more information, see [Oracle HTTP Server Fails to Start due to Certificates Signed Using the MD5 Algorithm](#).

New and Changed Features in 12c (12.2.1.1)

There are no new features or significant updates in the current release.

New and Changed Features in 12c (12.2.1)

This section contains the following information:

- [New Features in 12c \(12.2.1\)](#)
- [Significant Updates in 12c \(12.2.1\)](#)

New Features in 12c (12.2.1)

This section describes features that have been added to the current release of Oracle HTTP Server:

- [New and Changed Features Available with Apache httpd 2.4](#)

- [New Operational Mode—Restricted-JRF](#)
- [New Modules](#)
- [iPlanet Migration to Oracle HTTP Server](#)
- [Trust Flags](#)
- [Oracle WebLogic Server Proxy Monitoring](#)
- [Support for Multi-tenancy and Partitions for Oracle WebLogic Server Proxy Plug-Ins](#)

New and Changed Features Available with Apache httpd 2.4

In this release, the Oracle HTTP Server core runtime is based on the release of Apache httpd 2.4. Many new features have been added to the release that are outside the scope of this documentation. For more information on Apache 2.4 and its features, see the following URLs:

- <http://httpd.apache.org/docs/2.4/>
- http://httpd.apache.org/docs/2.4/new_features_2_4.html

For more information on critical changes in Apache 2.4 from earlier releases, see

- <http://httpd.apache.org/docs/2.4/upgrading.html>
- http://httpd.apache.org/docs/2.4/mod/mpm_winnt.html

New Operational Mode—Restricted-JRF

In previous 12c releases, the installation of the Oracle HTTP Server in a Weblogic Server domain required a connection to a database (11g did not). This is known as "full domain" mode. The current release introduces a new installation and operational mode for Oracle HTTP Server known as "Restricted-JRF". In this mode, the presence of a database is not required. All of the functionality that is available to Oracle HTTP Server in full domain mode is also available in Restricted-JRF mode, with the exception of cross component wiring.

With Restricted mode, customers can administer/manage OHS server lifecycle and handle configuration management by using WebLogic Management framework (WLST and Fusion Middleware Control) without additional database dependency. This capability provides customers with the ability to administer an entire OHS farm through the WebLogic Management Framework. For more information on this feature, see [Restricted-JRF Mode](#).

New Modules

The following are among the new modules that have been added to the current release of Oracle HTTP Server:

- [mod_proxy_fcgi](#)—This module provides FastCGI support for the [mod_proxy](#) module. The [mod_proxy_fcgi](#) module requires the service of the [mod_proxy](#) module and provides support for the FastCGI protocol. See [About Configuring mod_proxy_fcgi](#) and [Migrating to the mod_proxy_fcgi and mod_authnz_fcgi Modules](#).
- [mod_mpm_event](#) (event MPM)—This module is a variant of the worker MPM and consumes threads only for connections with active processing. Event is the default

MPM used in 12c (12.2.1) for Linux systems. For more information about MPM types and how to change the MPM type for your environment, see [Understanding Performance Directives](#).

- other modules that are new with Apache 2.4. See [Understanding Oracle HTTP Server Modules](#).

iPlanet Migration to Oracle HTTP Server

The current release defines a migration path from the iPlanet Web Server (iWS) to Oracle HTTP Server. The migration path is described in *Master Note For Migrating From iPlanet Web Server to Oracle HTTP Server 11g (Doc ID 1536893.1)* available at the following URL:

<https://support.oracle.com>

This document applies to release 11g and later versions of Oracle HTTP Server.

Trust Flags

The current release adds support for trust flags in Oracle HTTP Server. Trust flags allow adequate roles to be assigned to SSL certificates to facilitate operations like certificate chain validation and path building. For more information, see [Using Trust Flags](#).

Oracle WebLogic Server Proxy Monitoring

The current release adds support for monitoring the performance of the Oracle HTTP Server. The performance metrics are specific to the Oracle WebLogic Server Proxy Plug-In where a request is proxied to the backend WebLogic server.

The metrics are provided through the Oracle Dynamic Monitoring Service (DMS) which enables Oracle Fusion Middleware components to provide administration tools, such as Fusion Middleware Control, with data regarding the component's performance, state and on-going behavior.

See *Understanding Oracle WebLogic Server Proxy Plug-In Performance Metrics in Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*.

Support for Multi-tenancy and Partitions for Oracle WebLogic Server Proxy Plug-Ins

In the current release, Oracle HTTP Server can now front-end Oracle WebLogic Server-MT (Multi-Tenancy). For more information, see *Working with Partitions in Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*.

Significant Updates in 12c (12.2.1)

This section describes features that have been significantly updated from earlier versions of Oracle HTTP Server. These updates include:

- [New Ciphers](#)
- [Removal of Modules](#)
- [Replacements for mod_perl](#)
- [Replacements for mod_plsql](#)
- [Names of WLST Custom Command Have Changed](#)

- [createOHSTestDomain \(ohs_createTestDomain\) WLST Custom Command Has Been Removed](#)
- [Other Upgrade Notes](#)

New Ciphers

New ciphers that can be used with the TLS security protocols have been added to the current release. Also, the list of ciphers that can be used with FIPS 140 has been expanded. For more information, see [SSLCipherSuite Directive](#) and [SSLFIPS Directive](#).

Removal of Modules

The following modules have been removed and replaced with the `mod_proxy_fcgi` and `mod_authnz_fcgi` modules:

- `mod_perl`—This module allows administrators to run Perl scripts within Oracle HTTP Server. See [Replacements for mod_perl](#)
- `mod_fastcgi/mod_cgi`—These modules allow administrators to efficiently execute traditional CGI scripts within Oracle HTTP Server. See [Replacements for mod_fastcgi/mod_cgi](#)
- `mod_plsql`—This module allows administrators to create dynamic web pages from PL/SQL packages and stored procedures making it ideal for developing fast and flexible applications that can run on the Internet or an Intranet. See [Replacements for mod_plsql](#)

For more information on the `mod_proxy_fcgi` and `mod_authnz_fcgi` modules, see [Migrating to the mod_proxy_fcgi and mod_authnz_fcgi Modules](#).

Replacements for mod_perl

The `mod_perl` module has been removed from the Oracle HTTP Server 12c (12.2.1) release. If you have been using the `mod_perl` module with Oracle HTTP Server 12.1.3 and earlier releases, then you have the following choices:

- You can continue to run Perl scripts within Oracle HTTP Server 12c (12.2.1) as either CGI or FastCGI scripts.
If you want to run your Perl script as a CGI script, then you must modify your Perl script to run as a CGI or FastCGI script.
- If you are running CGI scripts, then switch to using the `mod_cgid` module directives. The directives are described in "Apache Module `mod_cgid`" at this URL: http://httpd.apache.org/docs/2.4/mod/mod_cgid.html
- Oracle HTTP Server 12c (12.2.1) contains a Perl interpreter, however, it is internal to the product. You cannot use this interpreter for hosting Perl under a FastCGI environment. You must provide your own Perl environment.

Replacements for mod_fastcgi/mod_cgi

The `mod_fastcgi` and `mod_cgi` modules have been removed from the Oracle HTTP Server 12c (12.2.1) release. Oracle provides an alternate implementation of `mod_fastcgi`. If you have any existing FastCGI scripts or configuration, then follow the migration steps described in [Migrating to the mod_proxy_fcgi and mod_authnz_fcgi Modules](#).

If you are running CGI scripts, then use the `mod_cgid` module directives instead. The directives are described in "Apache Module `mod_cgid`" at this URL:

http://httpd.apache.org/docs/2.4/mod/mod_cgid.html

Replacements for `mod_plsql`

The `mod_plsql` module has been removed from the Oracle HTTP Server 12c (12.2.1) release. Many Oracle customers use Oracle HTTP Server with `mod_plsql` to run Oracle Application Express (Oracle APEX), and to a lesser extent run stand-alone PL/SQL Web pages.

For more information, see the *Oracle Web Tier - Statement of Direction* (document ID 1576588.1) at the following URL:

<http://support.oracle.com>

Oracle recommends that customers implement Oracle REST Data Services (formerly known as Oracle APEX Listener) as an alternative. Oracle REST Data Services is a J2EE-based servlet which offers increased functionality including a web-based configuration, enhanced security, and file caching.

Oracle REST Data Services is a free product provided under Oracle Technology Network License Terms. To run in a supported configuration, you must install ORDS into Oracle WebLogic Server, Oracle Glassfish or Apache Tomcat. Running the standalone Java servlet (war file), provided in the distribution, is **not** supported in production environments. It is only intended for use in development and test environments.

For more information on Oracle REST Data Services, see the following URL:

<http://www.oracle.com/technetwork/developer-tools/rest-data-services/overview/index.html>

Names of WLST Custom Command Have Changed

For ease of use and greater visibility, the names of the Oracle HTTP Server WLST custom commands have been changed in the current release. Instead of incorporating "OHS" in the command name, the command is now prefixed with "ohs_". For example, the `createOHSInstance` command becomes `ohs_createInstance`.

The old command names should be considered to be deprecated. They will be accepted by WLST in the current release, but you should avoid using them. For more information and a table of old and changed WLST custom commands, see [Names of WLST Custom Commands Have Changed](#).

New WLST Commands

The current release adds these WLST custom commands for Oracle HTTP Server. For more information on these commands, see [Oracle HTTP Server WLST Custom Commands](#).

Command	Description
<code>ohs_exportKeyStore</code>	Exports the keyStore to the specified Oracle HTTP Server instance.
<code>ohs_postUpgrade</code>	Imports the contents of wallet for all of the Oracle HTTP Server instances (valid for those Oracle HTTP Server instances which have been upgraded from a previous version) in the domain to the KSS database.

Command	Description
ohs_updateInstances	Creates a keyStore in the KSS database in the case where Oracle HTTP Server instances were created using Configuration Wizard.

createOHSTestDomain (ohs_createTestDomain) WLST Custom Command Has Been Removed

The `createOHSTestDomain (ohs_createTestDomain)` WLST custom command has been removed from the current release. This command is no longer needed because Oracle HTTP Server 12.2.1 introduces Restricted-JRF (R-JRF) support for domain creation using the configuration wizard which does not have database dependencies.

Other Upgrade Notes

The current release of Oracle HTTP Server is based on Apache Server 2.4. If you are using an earlier release of Oracle HTTP Server, please note the following:

FilterProvider

The syntax of the `FilterProvider` directive under `mod_filter` has changed in Apache 2.4. This directive must be upgraded manually. For more information, see http://httpd.apache.org/docs/2.4/mod/mod_filter.html and <http://httpd.apache.org/docs/2.4/upgrading.html>

Authorization and Access Control

There have been significant changes in authorization and access control configuration in Apache 2.4. Oracle HTTP Server Upgrade Assistant does not upgrade the authorization and access control directives to the new configuration style. Instead, Oracle HTTP Server includes the `mod_access_compat` module to provide compatibility with old configurations.

Oracle recommends that you manually upgrade the authorization and access-control configuration to Apache 2.4 style. For more information, see the following URL: <http://httpd.apache.org/docs/2.4/upgrading.html#run-time>

umask Settings

Prior to Oracle HTTP Server 12c (12.2.1), the operating system level `umask` setting was applicable to Oracle HTTP Server as well. With Oracle HTTP Server 12c (12.2.1), a new property is introduced in `ohs.nodemanager.properties` file to specify the `umask` setting. By default, a value of 0027 is used. For more information, see section [Configuring the Log File Creation Mode \(umask\) \(UNIX/Linux Only\)](#).

Features Removed

Support for the ODL-XML file format has been removed.

Part I

Understanding Oracle HTTP Server

This part presents introductory and conceptual information about Oracle HTTP Server. It contains the following chapters:

- [Introduction to Oracle HTTP Server](#)
- [Understanding Oracle HTTP Server Modules](#)
- [Understanding Oracle HTTP Server Management Tools](#)

Introduction to Oracle HTTP Server

This chapter introduces the Oracle HTTP Server (OHS). It describes key features of OHS and its place within the Oracle Fusion Middleware Web Tier and also provides information on the OHS directory structure, the OHS configuration files, and how to obtain OHS support.

Oracle HTTP Server is the web server component for Oracle Fusion Middleware. It provides a listener for Oracle WebLogic Server and the framework for hosting static pages, dynamic pages, and applications over the Web.

This chapter includes the following sections:

- [What is Oracle HTTP Server?](#)
- [Oracle HTTP Server 12c \(12.2.1\) Topologies](#)
- [Key Features of Oracle HTTP Server](#)
- [Domain Types](#)
- [Understanding Oracle HTTP Server Directory Structure](#)
- [Understanding Configuration Files](#)
- [Upgrading from Earlier Releases of Oracle HTTP Server](#)
- [Oracle HTTP Server Support](#)

1.1 What is Oracle HTTP Server?

Oracle HTTP Server 12c (12.2.1) is based on Apache HTTP Server 2.4 infrastructure (with critical bug fixes from higher versions) and includes additional modules developed specifically by Oracle. The features of single sign-on, clustered deployment, and high availability enhance the operation of the Oracle HTTP Server. Oracle HTTP Server has the following components to handle client requests:

- HTTP listener, to handle incoming requests and route them to the appropriate processing utility.
- Modules (mods), to implement and extend the basic functionality of Oracle HTTP Server. Many of the standard Apache HTTP Server modules are included with Oracle HTTP Server. Oracle also includes several modules that are specific to Oracle Fusion Middleware to support integration between Oracle HTTP Server and other Oracle Fusion Middleware components.
- Perl interpreter, which allows Oracle HTTP Server to be set up as a reverse proxy through the fcgi protocol to a persistent Perl runtime environment using mod_proxy_fcgi.

Although Oracle HTTP Server contains a Perl interpreter, it is internal to the product. You cannot use this interpreter for hosting Perl under a FastCGI environment. You must provide your own Perl environment.

- Oracle WebLogic Server Proxy Plug-In, which enables Oracle HTTP Server to front-end WebLogic Servers and other Fusion Middleware-based applications.

Oracle HTTP Server enables developers to program their site in a variety of languages and technologies, such as:

- Perl (through mod_proxy_fcgi, CGI and FastCGI)
- C and C++ (through mod_proxy_fcgi, CGI and FastCGI)
- Java, Ruby and Python (through mod_proxy_fcgi, CGI and FastCGI)

Oracle HTTP Server can also be a proxy server, both forward and reverse. A reverse proxy enables content served by different servers to appear as if coming from one server.

Note:

For more information about Fusion Middleware concepts, see *Understanding Oracle Fusion Middleware*.

1.2 Oracle HTTP Server 12c (12.2.1) Topologies

Oracle HTTP Server leverages the WebLogic Management Framework to provide a simple, consistent and distributed environment for administering Oracle HTTP Server, Oracle WebLogic Server, and the rest of the Fusion Middleware stack. It acts as the HTTP front-end by hosting the static content from within and by leveraging its built-in Oracle WebLogic Server Proxy Plug-Ins 12c (12.2.1) to route dynamic content requests to WebLogic-managed servers. In such cases, there are multiple ways of implementing Oracle HTTP Server, depending on your requirements. [Table 1-1](#) describes the major implementations, or "topologies."

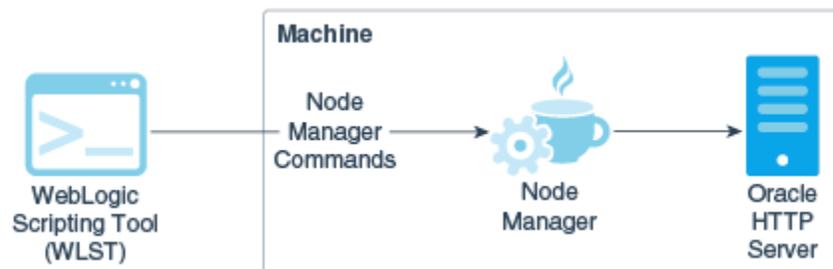
Table 1-1 Oracle HTTP Server Topologies

Topology	Description	For More Information
Standard Installation Topology for Oracle HTTP Server in a Standalone Domain	This topology is similar to an Oracle WebLogic Server Domain topology, but does not provide an administration server or managed servers. It is useful when you do not want your Oracle HTTP Server implementation to front a Fusion Middleware domain and do not need the management functionality provided by Fusion Middleware Control. This topology is depicted in Figure 1-1 . To obtain this topology, install Oracle HTTP Server in standalone mode. Can be paired with Oracle HTTP Server Collocated mode by using the Pack or UnPack commands.	See Standard Installation Topology for Oracle HTTP Server in a Standalone Domain in <i>Installing and Configuring Oracle HTTP Server</i> .

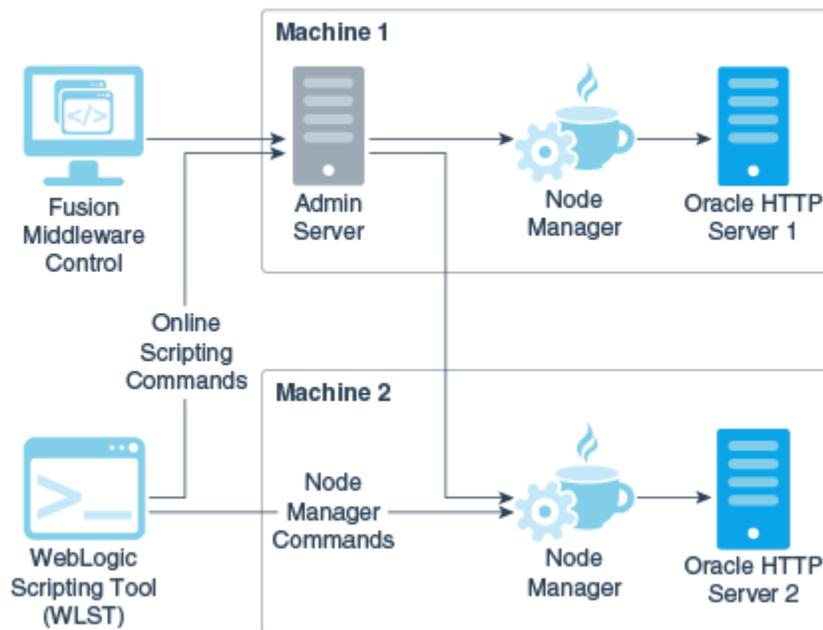
Table 1-1 (Cont.) Oracle HTTP Server Topologies

Topology	Description	For More Information
Standard Installation Topology for Oracle HTTP Server in a WebLogic Server Domain (Restricted-JRF)	<p>This topology is similar to the Full-JRF topology, except that it does not require a backing database. The Restricted-JRF mode offers all of the functionality as the Full-JRF mode, except cross component wiring is not available.</p> <p>To obtain this topology, install Oracle HTTP Server in Collocated mode, then choose the Oracle HTTP Server Restricted-JRF domain template for provisioning this domain. This topology handles most use cases except for cross-component wiring.</p>	See Standard Installation Topology for Oracle HTTP Server in a WebLogic Server Domain in <i>Installing and Configuring Oracle HTTP Server</i>
Standard Installation Topology for Oracle HTTP Server in a WebLogic Server Domain (Full-JRF)	<p>This topology provides enhanced management capabilities through the Fusion Middleware Control and WebLogic Management Framework. A WebLogic Server domain can be scaled out to multiple physical machines and be centrally managed by the administration server. This topology is depicted in Figure 1-2.</p> <p>To obtain this topology, install Oracle HTTP Server in Collocated mode, then choose the Oracle HTTP Server Full-JRF domain template. Note that this topology, requires a database in back-end and can support cross-component wiring.</p>	See Standard Installation Topology for Oracle HTTP Server in a WebLogic Server Domain in <i>Installing and Configuring Oracle HTTP Server</i> .

[Figure 1-1](#) illustrates the standard Installation Topology for Oracle HTTP Server in a Standalone Domain.

Figure 1-1 Standard Installation Topology for OHS in a Standalone Domain

[Figure 1-2](#) illustrates the high-availability implementation, with two separate hosts for Oracle HTTP Server on a Web Tier, managed by FMW Control.

Figure 1-2 Standard Installation Topology for OHS in a WebLogic Server Domain

1.3 Key Features of Oracle HTTP Server

The following sections describe some key features of Oracle HTTP Server:

- [Restricted-JRF Mode](#)
- [Oracle WebLogic Server Proxy Plug-In \(mod_wl_ohs\)](#)
- [CGI and Fast CGI Protocol \(mod_proxy_fcgi\)](#)
- [Security Features](#)
- [URL Rewriting and Proxy Server Capabilities](#)

1.3.1 Restricted-JRF Mode

Oracle HTTP Server12c (12.2.1) introduces the Restricted-JRF mode. If you choose to install Oracle HTTP Server in a Oracle WebLogic Server domain in this mode, then a connection to an external database is not required. All of the Oracle HTTP Server functionality through Fusion MiddleWare Control and WLST described in this documentation is still available, with the exception of cross component wiring.

Lack of support for cross component wiring means that:

- There are changes to the Fusion MiddleWare Control menu options: some of the menu options which support cross component wiring are removed or disabled.
- Any database dependencies are completely removed.

See Also:

Wiring Components to Work Together in *Administering Oracle Fusion Middleware*.

The management of keys and certificates for an Oracle HTTP Server instance in a Restricted-JRF domain continue to be keystore services (KSS). In a Restricted-JRF domain, the database persistency of KSS is replaced with file persistency. To an end user, there are no visible change in basic KSS APIs to manage keys or certificates.

Oracle HTTP Server continues to support multiple Oracle wallets for complex virtual server configurations both in Restricted-JRF and full JRF mode.

1.3.2 Oracle WebLogic Server Proxy Plug-In (mod_wl_ohs)

The Oracle WebLogic Server Proxy Plug-In (mod_wl_ohs) enables requests to be proxied from Oracle HTTP Server12c (12.2.1) to Oracle WebLogic Server. This plug-in enhances an Oracle HTTP server installation by allowing Oracle WebLogic Server to handle requests that require dynamic functionality. In other words, you typically use a plug-in where the HTTP server serves static pages such as HTML pages, while Oracle WebLogic Server serves dynamic pages such as HTTP Servlets and Java Server Pages (JSPs).

For more information on the Oracle WebLogic Server Proxy Plug-In, see *Configuring the Plug-In for Oracle HTTP Server* in *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*

1.3.3 CGI and Fast CGI Protocol (mod_proxy_fcgi)

CGI programs are commonly used to program Web applications. Oracle HTTP Server enhances the programs by providing a mechanism to keep them active beyond the request lifecycle by using the mod_proxy_fcgi module.

The mod_proxy_fcgi module is the Oracle replacement for the deprecated mod_fastcgi module. The mod_proxy_fcgi module requires the service of the mod_proxy module and provides support for the FastCGI protocol.

For information on configuring the mod_proxy_fcgi module, see [About Configuring mod_proxy_fcgi](#). For information on migrating from the mod_fastcgi module to mod_proxy_fcgi, see [Migrating to the mod_proxy_fcgi and mod_authnz_fcgi Modules](#).

1.3.4 Security Features

Oracle HTTP Server employs many security features. Key among them are:

- [Oracle Secure Sockets Layer \(mod_oss\)](#)
- [Security: Encryption with Secure Sockets Layer](#)
- [Security: Single Sign-On with WebGate](#)

1.3.4.1 Oracle Secure Sockets Layer (mod_oss)

The mod_oss module, the Oracle Secure Sockets Layer (SSL) implementation used in the Oracle database, enables strong cryptography for Oracle HTTP Server. It is a plug-in to Oracle HTTP Server that enables the server to use SSL and is very similar to the OpenSSL module, mod_ssl. The mod_oss module supports TLS version 1.0, 1.1 and 1.2.

1.3.4.2 Security: Encryption with Secure Sockets Layer

Secure Sockets Layer (SSL) is required to run any website securely. Oracle HTTP Server supports SSL encryption based on patented, industry standard, algorithms. SSL

works seamlessly with commonly-supported Internet browsers. Security features include the following:

- SSL hardware acceleration support uses dedicated hardware for SSL. Hardware encryption is faster than software encryption.
- Variable security per directory allows individual directories to be protected by different strength encryption.
- Oracle HTTP Server and Oracle WebLogic Server communicate using the HTTP protocol to provide both encryption and authentication. You can also enable HTTP tunneling for the T3 or IIOP protocols to provide non-browser clients access to WebLogic Server services.

See Also:

Securing Applications with Oracle Platform Security Services

1.3.4.3 Security: Single Sign-On with WebGate

WebGate enables single sign-on (SSO) for Oracle HTTP Server. WebGate examines incoming requests and determines whether the requested resource is protected, and if so, retrieves the session information for the user. Through WebGate, Oracle HTTP Server becomes an SSO partner application enabled to use SSO to authenticate users, obtain their identity by using Oracle Single Sign-On, and to make user identities available to web applications accessed through Oracle HTTP Server.

See Also:

Securing Applications with Oracle Platform Security Services

1.3.5 URL Rewriting and Proxy Server Capabilities

Active websites usually update their web pages and directory contents often, and possibly their URLs as well. Oracle HTTP Server makes it easy to accommodate the changes by including an engine that supports URL rewriting so end users do not have to change their bookmarks.

Oracle HTTP Server also supports reverse proxy capabilities, making it easier to make content served by different servers to appear from one single server.

1.4 Domain Types

You can install Oracle HTTP Server as collocated with Oracle WebLogic Server, called a *WebLogic Server Domain*, in full or Restricted-JRF mode. The server can also be installed as a *standalone domain*. You can select which environment you want to use during server configuration. Be aware that certain functionality will not be available to standalone domains.

- [WebLogic Server Domain \(Full-JRF Mode\)](#)
- [WebLogic Server Domain \(Restricted-JRF Mode\)](#)
- [Standalone Domain](#)

1.4.1 WebLogic Server Domain (Full-JRF Mode)

A WebLogic Server Domain in Full-JRF mode contains a WebLogic Administration Server, zero or more WebLogic Managed Servers, and zero or more System Component Instances (for example, an Oracle HTTP Server instance). This type of domain provides enhanced management capabilities through the Fusion Middleware Control and WebLogic Management Framework present throughout the system. A WebLogic Server Domain can span multiple physical machines, and it is centrally managed by the administration server. Because of these properties, a WebLogic Server Domain provides the best integration between your System Components and Java EE Components.

WebLogic Server Domains support all WebLogic Management Framework tools.

Because Fusion Middleware Control provides advanced management capabilities, Oracle recommends using WebLogic Server Domain, which requires installing a complete Oracle Fusion Middleware infrastructure before you install Oracle HTTP Server.

- For more information about installing a WebLogic Server Domain, see *Installing and Configuring the Oracle Fusion Middleware Infrastructure*.
- For information about installing Oracle HTTP Server either as part of a Oracle Fusion Middleware infrastructure or as standalone component, see *Installing and Configuring Oracle HTTP Server*.

1.4.2 WebLogic Server Domain (Restricted-JRF Mode)

The Weblogic Server Domain in Restricted-JRF mode is similar in architecture and functionality to Weblogic Server Domain in Full mode, except it does not define a connection to an external database. There are no database dependencies in Restricted-JRF mode.

This lack of a backing database means that cross component wiring is not supported by Oracle HTTP Server in a Restricted-JRF domain; this is the major differentiating factor between a Full JRF- and a Restricted-JRF-based domain.

Like the Full -JRF domain, the management of keys and certificates of an Oracle HTTP Server instance in a Restricted-JRF domain continues to be keystore service (KSS). In a Restricted-JRF domain, the database persistency of KSS is replaced with file persistency, although to an end user there is no visible change in basic KSS APIs to manage keys and certificates.

Like the Full -JRF domain, Oracle HTTP Server in a Restricted-JRF domain supports multiple Oracle wallets for complex virtual server configurations.

1.4.3 Standalone Domain

A standalone domain is a container for system components, such as Oracle HTTP Server. It has a directory structure similar to an Oracle WebLogic Server Domain, but it does not contain an Administration Server or Managed Servers. It can contain one or more instances of system components of the same type, such as Oracle HTTP Server, or a mix of system component types.

For standalone domains, the WebLogic Management Framework supports these tools:

- Node Manager

- The WebLogic Scripting Tool (WLST) commands, including:
 - `nmStart()`, `nmKill()`, `nmSoftRestart()`, and `nmKill()` that start and stop Oracle HTTP Server instance.
 - `nmConnect()` to connect to the node manager
 - `nmLog()` to get the node manager log information

For a complete list of supported WLST Node Manager commands, see Node Manager Commands in *WLST Command Reference for WebLogic Server*.

Note:

If you have a remote Oracle HTTP Server in a managed mode and another in standalone with the remote administration mode enabled, you can use WLST to perform management tasks such as SSL configuration. A vanilla Oracle HTTP Server in a standalone domain can be used only as a WebLogic Server Node Manager and for Oracle HTTP Server start/stop purposes. You can also do this by using a command-line script.

- Config Wizard
- Pack/Unpack

Generally, you would use a standalone domain when you do not want your Oracle HTTP Server implementation installed with a WebLogic Server domain and do not need the management functionality provided by Oracle Fusion Middleware Control. Nor would you use it when you want to keep Oracle HTTP Server in a "demilitarized zone" (DMZ; that is, the zone between the internal and external firewalls) and you do not want to open management ports used by Node Manager.

1.5 Understanding Oracle HTTP Server Directory Structure

Oracle HTTP Server domains can be either WebLogic Server or standalone. When installed, each domain has its own directory structure that contains files necessary to implement the domain type. For a complete file structure topology, see Understanding the Directory Structures in *Installing and Configuring Oracle HTTP Server*.

1.6 Understanding Configuration Files

The Oracle HTTP Server configuration is specified through configuration files of several types, notably `.conf` files, similar to those used in Apache HTTP Server. This section explains the layout of the configuration file directories, mechanisms for editing the files, and more about the files themselves.

This section contains the following topics:

- [Staging and Run-time Configuration Directories](#)
- [Oracle HTTP Server Configuration Files](#)
- [Modifying an Oracle HTTP Server Configuration File](#)

1.6.1 Staging and Run-time Configuration Directories

Two configuration directories are associated with each Oracle HTTP Server instance: a staging directory and a run-time directory.

- Staging directory

DOMAIN_HOME/config/fmwconfig/components/OHS/componentName

- Run-time directory

*DOMAIN_HOME/config/fmwconfig/components/OHS/instances/
componentName*

Each of the configuration directories contain the complete Oracle HTTP Server configuration -- `httpd.conf`, `admin.conf`, `auditconfig.xml`, and so on.

Modifications to the configuration are made in the staging directory. These modifications are automatically propagated to the run-time directory during the following operations:

Note:

Before making any changes to files in the staging directory manually (that is, without using Fusion Middleware Control or WLST), stop the Administration Server.

- Oracle HTTP Server instances which are part of a WebLogic Server Domain

Modifications are replicated to the run-time directory on the node with the managed Oracle HTTP Server instance after changes are activated from within Fusion Middleware Control, or when the administration server initializes and prior changes need to be replicated. If communication with node manager is broken at the time of the action, replication will occur at a later time when communication has been restored.

- Standalone Oracle HTTP Server instances

Modifications are synchronized with the run-time directory when a start, restart, or stop action is initiated. Some changes might be written to the run-time directory during domain update, but the changes will be finalized during synchronization.

Any modifications to the configuration within the run-time directory will be lost during replication or synchronization.

Note:

When a standalone instance is created, the keystores directory containing a demo wallet is created only in the run-time directory.

Before creating the first new wallet for the instance, the user must create a keystores directory within the staging directory.

*DOMAIN_HOME/config/fmwconfig/components/OHS/componentName/
keystores*

Wallets must then be created within that keystores directory.

1.6.2 Oracle HTTP Server Configuration Files

The default Oracle HTTP Server configuration contains the files described in [Configuration Files](#).

Additional files can be added to the configuration and included in the top-level .conf file httpd.conf using the `Include` directive. For information on how to use this directive, see the `Include` directive documentation, at:

<http://httpd.apache.org/docs/2.4/mod/core.html#include>

The default configuration provides an `Include` directive which includes all .conf files in the `moduleconf/` directory within the configuration.

An `Include` directive should be added to an existing .conf file, usually httpd.conf, for .conf files which are not stored in the `moduleconf/` directory. This may be required if the new .conf file must be included at a different configuration scope, such as within an existing virtual host definition.

1.6.3 Modifying an Oracle HTTP Server Configuration File

For instances that are part of a WebLogic Server Domain, Fusion Middleware Control and the management infrastructure manages the Oracle HTTP Server configuration. Direct editing of the configuration in the staging directory is subject to being overwritten after subsequent management operations, including modifying the configuration in Fusion Middleware Control. For such instances, direct editing should only be performed when the administration server is stopped. When the administration server is subsequently started (with `start` or `restart`), the results of any manual edits will be replicated to the run-time directory on the node of the managed instance. For more information, see [About Editing Configuration Files](#).

Note:

Fusion Middleware Control and other Oracle software that manage the Oracle HTTP Server configuration might save these files in a different, equivalent format. After using the software to make a configuration change, multiple configuration files might be rewritten.

1.7 Upgrading from Earlier Releases of Oracle HTTP Server

Follow the instructions in *Upgrading with the Upgrade Assistant* to upgrade Fusion Middleware and Oracle HTTP Server from an earlier release to 12c (12.2.1).

If you are upgrading a collocated Oracle HTTP Server setup (not a standalone installation), then you must perform the following manual steps after you complete the Upgrade Assistant.

1. Start the Administration Server (WebLogic) of the upgraded domain, for example

UNIX/Linux: `./startWebLogic.sh`

Windows: `startWebLogic.cmd`

2. Start the version of WLST that resides in the Middleware Home of your 12c (12.2.1) installation, for example:

Linux or UNIX: `$ORACLE_HOME/oracle_common/common/bin/wlst.sh`

Windows: `$ORACLE_HOME\oracle_common\common\bin\wlst.cmd`

3. Connect to the Administration Server of the upgraded domain, for example:

```
> connect('loginID', 'password', '<adminHost>:<adminPort>')
```

4. Execute the `ohs_postUpgrade()` WLST custom command, for example:

```
> ohs_postUpgrade()
```

For more information on the `ohs_postUpgrade` WLST custom command, see [Importing Wallets to the KSS Database after an Upgrade Using WLST](#) and [ohs_postUpgrade](#).

1.8 Oracle HTTP Server Support

Oracle provides technical support for the following Oracle HTTP Server features and conditions:

- Modules included in the Oracle distribution. Oracle does not support modules obtained from any other source, including the Apache Software Foundation. Oracle HTTP Server will still be supported when non-Oracle-provided modules are included. If non-Oracle-provided modules are suspect of contributing to reported problems, customers may be requested to reproduce the problems without including those modules.
- Problems that can be reproduced within an Oracle HTTP Server configuration consisting only of supported Oracle HTTP Server modules.

Understanding Oracle HTTP Server Modules

This chapter provides a high-level description of the Oracle-developed modules, or "plug-ins," used by the Oracle HTTP Server (OHS). It also provides a list of all other Apache- and third party-developed modules for OHS.

Modules (mods) extend the basic functionality of Oracle HTTP Server and support integration between Oracle HTTP Server and other Oracle Fusion Middleware components.

This chapter includes the following sections:

- [Oracle-Developed Modules for Oracle HTTP Server](#)
- [Apache HTTP Server and Third-party Modules in Oracle HTTP Server](#)

2.1 Oracle-Developed Modules for Oracle HTTP Server

The following sections describe modules that have been developed specifically by Oracle for Oracle HTTP Server:

- [mod_certheaders Module—Enables Reverse Proxies](#)
- [mod_context Module—Creates or Propagates ECIDs](#)
- [mod_dms Module—Enables Access to DMS Data](#)
- [mod_odl Module—Enables Access to ODL](#)
- [mod_ora_audit—Supports Authentication and Authorization Auditing](#)
- [mod_ossl Module—Enables Cryptography \(SSL\)](#)
- [mod_webgate Module—Enables Single Sign-on](#)
- [mod_wl_ohs Module—Proxies Requests to Oracle WebLogic Server](#)

2.1.1 mod_certheaders Module—Enables Reverse Proxies

The mod_certheaders module enables reverse proxies that terminate Secure Sockets Layer (SSL) connections in front of Oracle HTTP Server to transfer information regarding the SSL connection, such as SSL client certificate information, to Oracle HTTP Server and the applications running behind Oracle HTTP Server. This information is transferred from the reverse proxy to Oracle HTTP Server using HTTP headers. The information is then transferred from the headers to the standard CGI environment variable. The mod_ossl module or the mod_ssl module populate the variable if the SSL connection is terminated by Oracle HTTP Server.

The `mod_certheaders` module also enables certain requests to be treated as HTTPS requests even though they are received through HTTP. This is done using the `SimulateHttps` directive.

`SimulateHttps` takes the container it is contained within, such as `<VirtualHost>` or `<Location>`, and treats all requests received for this container as if they were received through HTTPS, regardless of the real protocol used by the request.

See [mod_certheaders Module](#) for a list and description of the directives accepted by `mod_certheaders`.

2.1.2 mod_context Module—Creates or Propagates ECIDs

The `mod_context` module creates or propagates Execution Context IDs, or ECIDs, for requests handled by Oracle HTTP Server. If an ECID has been created for the request execution flow before it reaches Oracle HTTP Server, `mod_context` will make the ECID available for logging within Oracle HTTP Server and for propagation to other Fusion Middleware components, such as WebLogic Server. If an ECID has not been created when the request reaches Oracle HTTP Server, `mod_context` will create one.

`mod_context` is not configurable. It enables loading ECIDs into the server with the `LoadModule` directive, and disabled by removing or commenting out the `LoadModule` directive corresponding to this module. It should always be enabled to aid with problem diagnosis.

2.1.3 mod_dms Module—Enables Access to DMS Data

The `mod_dms` module provides FMW infrastructure access to the OHS Oracle Dynamic Monitoring Service (DMS) data.

See Also:

Oracle Dynamic Monitoring Service in *Tuning Performance*.

2.1.4 mod_odl Module—Enables Access to ODL

The `mod_odl` module allows Oracle HTTP Server to access Oracle Diagnostic Logging (ODL). ODL generates log messages in text or XML-formatted logs, in a format which complies with Oracle standards for generating error log messages. Oracle HTTP Server uses ODL by default.

ODL provides the following benefits:

- The capability to limit the total amount of diagnostic information saved. You can set the level of information saved and you can specify the maximum size of the log file and the log file directory.
- When you reach the specified size, older segment files are removed and newer segment files are saved in chronological fashion.
- Components can remain active, and do not need to be shutdown, when older diagnostic logging files are deleted.

You can view log files using Fusion Middleware Control or with WLST commands, or you can download log files to your local client and view them using another tool (for example, a text edit or another file viewing utility)

For more information on using ODL with Oracle HTTP Server, see [Managing Oracle HTTP Server Logs](#).

See Also:

Managing Log Files and Diagnostic Data in *Administering Oracle Fusion Middleware*.

2.1.5 mod_ora_audit—Supports Authentication and Authorization Auditing

This module provides the OraAuditEnable directive to support authentication and authorization auditing by using the FMW Common Audit Framework. Previously the code for Audit was integrated in Oracle HTTP Server binary itself. In the current release, this is provided as a separate loadable module. For more information, see [Support for FMW Audit Framework](#).

2.1.6 mod_ossll Module—Enables Cryptography (SSL)

The mod_ossll module, the Oracle Secure Sockets Layer (SSL) implementation used in the Oracle database, enables strong cryptography for Oracle HTTP Server. It is a plug-in to Oracle HTTP Server that enables the server to use SSL and is very similar to the OpenSSL module, mod_ssl. The mod_ossll module supports TLS versions 1, 1.1 and 1.2, and is based on Certicom and RSA Security technology.

Oracle HTTP Server complies with the Federal Information Processing Standard publication 140 (FIPS 140); it uses a version of the underlying SSL libraries that has gone through formal FIPS certification. As part of Oracle HTTP Server's FIPS 140 compliance, the mod_ossll plug-in now includes the SSLFIPS directive. For more information, see [SSLFIPS Directive](#).

Oracle no longer supports the mod_ssl module. A tool is provided to enable you to migrate from mod_ssl to mod_ossll, and convert your text certificates to Oracle wallets.

The mod_ossll modules provides these features:

- Encrypted communication between client and server, using RSA or DES encryption standards.
- Integrity checking of client/server communication using MD5 or SHA checksum algorithms.
- Certificate management with Oracle wallets.
- Authorization of clients with multiple access checks, exactly as performed in the mod_ssl module.

mod_ossll Module Directives

See [mod_ossll Module](#) for a list and descriptions of directives accepted by the mod_ossll module.

Note:

For more information, see Configuring SSL for the Web Tier in *Administering Oracle Fusion Middleware*.

2.1.7 mod_webgate Module—Enables Single Sign-on

The mod_webgate module enables single sign-on (SSO) for Oracle HTTP Server. WebGate examines incoming requests and determines whether the requested resource is protected, and if so, retrieves the session information for the user.

For more information, see [Authenticating Users with WebGate](#) and [Security: Single Sign-On with WebGate](#). For information on configuring WebGate, see [Configuring WebGate for Oracle Access Manager in *Installing and Configuring Oracle HTTP Server*](#).

See Also:

Securing Applications with Oracle Platform Security Services

2.1.8 mod_wl_ohs Module—Proxies Requests to Oracle WebLogic Server

The mod_wl_ohs module is a key feature of Oracle HTTP Server that enables requests to be proxied from Oracle HTTP Server to Oracle WebLogic Server. This module is generally referred to as the Oracle WebLogic Server Proxy Plug-In. This plug-in enhances an Oracle HTTP server installation by allowing Oracle WebLogic Server to handle requests that require dynamic functionality. In other words, you typically use a plug-in where the HTTP server serves static pages such as HTML pages, while Oracle WebLogic Server serves dynamic pages such as HTTP Servlets and Java Server Pages (JSPs).

For information about the prerequisites and procedure for configuring mod_wl_ohs, see [Configuring the Plug-In for Oracle HTTP Server in *Using Oracle WebLogic Server Proxy Plug-Ins*](#). Directives for this module are listed in [Parameters for Oracle WebLogic Server Proxy Plug-Ins in *Using Oracle WebLogic Server Proxy Plug-Ins*](#).

Note:

mod_wl_ohs is similar to the mod_wl plug-in, which you can use to proxy requests from Apache HTTP Server to Oracle WebLogic server. However, while the mod_wl plug-in for Apache HTTP Server should be downloaded and installed separately, the mod_wl_ohs plug-in is bundled with Oracle HTTP Server.

2.2 Apache HTTP Server and Third-party Modules in Oracle HTTP Server

Oracle HTTP Server includes the Apache HTTP Server and third-party modules listed in [Table 2-1](#). These modules are *not* developed by Oracle.

Table 2-1 *Apache HTTP Server and Third-party Modules in Oracle HTTP Server*

Module	Enabled by Default?	For more information, see:
mod_access_compat	No	http://httpd.apache.org/docs/2.4/mod/mod_access_compat.html
mod_actions	Yes	http://httpd.apache.org/docs/2.4/mod/mod_actions.html

Table 2-1 (Cont.) Apache HTTP Server and Third-party Modules in Oracle HTTP Server

Module	Enabled by Default?	For more information, see:
mod_alias	Yes	http://httpd.apache.org/docs/2.4/mod/mod_alias.html
mod_asis	Yes	http://httpd.apache.org/docs/2.4/mod/mod_asis.html
mod_auth_basic	Yes	http://httpd.apache.org/docs/2.4/mod/mod_auth_basic.html
mod_authn_anon	Yes	http://httpd.apache.org/docs/2.4/mod/mod_authn_anon.html
mod_authn_core	Yes	http://httpd.apache.org/docs/2.4/mod/mod_authn_core.html
mod_authn_file	Yes	http://httpd.apache.org/docs/2.4/mod/mod_authn_file.html
mod_authz_core	Yes	http://httpd.apache.org/docs/2.4/mod/mod_authz_core.html
mod_authnz_fcgi	No	http://httpd.apache.org/docs/2.4/mod/mod_authnz_fcgi.html
mod_authz_groupfile	Yes	http://httpd.apache.org/docs/2.4/mod/mod_authz_groupfile.html
mod_authz_host	Yes	http://httpd.apache.org/docs/2.4/mod/mod_authz_host.html
mod_authz_owner	No	http://httpd.apache.org/docs/2.4/mod/mod_authz_owner.html
mod_authz_user	Yes	http://httpd.apache.org/docs/2.4/mod/mod_authz_user.html
mod_autoindex	Yes	http://httpd.apache.org/docs/2.4/mod/mod_autoindex.html
mod_cache (Windows only)	No	http://httpd.apache.org/docs/2.4/mod/mod_cache.html
mod_cache_disk	No	http://httpd.apache.org/docs/2.4/mod/mod_cache_disk.html
mod_disk_cache (Windows only)	No	http://httpd.apache.org/docs/2.2/mod/mod_disk_cache.html
mod_cern_meta	Yes	http://httpd.apache.org/docs/2.4/mod/mod_cern_meta.html
mod_cgi	Yes	http://httpd.apache.org/docs/2.4/mod/mod_cgi.html
mod_cgid (UNIX only)	Yes	http://httpd.apache.org/docs/2.4/mod/mod_cgid.html

Table 2-1 (Cont.) Apache HTTP Server and Third-party Modules in Oracle HTTP Server

Module	Enabled by Default?	For more information, see:
mod_deflate	No	http://httpd.apache.org/docs/2.4/mod/mod_deflate.html
mod_dir	Yes	http://httpd.apache.org/docs/2.4/mod/mod_dir.html
mod_dumpio	No	http://httpd.apache.org/docs/2.4/mod/mod_dumpio.html
mod_env	Yes	http://httpd.apache.org/docs/2.4/mod/mod_env.html
mod_expires	Yes	http://httpd.apache.org/docs/2.4/mod/mod_expires.html
mod_file_cache	Yes	http://httpd.apache.org/docs/2.4/mod/mod_file_cache.html
mod_filter	No	http://httpd.apache.org/docs/2.4/mod/mod_filter.html Note: The syntax of the <code>FilterProvider</code> directive under <code>mod_filter</code> has changed in Apache 2.4. This directive must be upgraded manually. For more information, see http://httpd.apache.org/docs/2.4/upgrading.html
mod_headers	Yes	http://httpd.apache.org/docs/2.4/mod/mod_headers.html
mod_imagemap	Yes	http://httpd.apache.org/docs/2.4/mod/mod_imagemap.html
mod_include	Yes	http://httpd.apache.org/docs/2.4/mod/mod_include.html
mod_info	Yes	http://httpd.apache.org/docs/2.4/mod/mod_info.html
mod_lbmethod_bybusyness	No	http://httpd.apache.org/docs/2.4/mod/mod_lbmethod_bybusyness.html
mod_lbmethod_byrequests	No	http://httpd.apache.org/docs/2.4/mod/mod_lbmethod_byrequests.html
mod_lbmethod_bytraffic	No	http://httpd.apache.org/docs/2.4/mod/mod_lbmethod_bytraffic.html
mod_log_config	Yes	http://httpd.apache.org/docs/2.4/mod/mod_log_config.html
mod_log_forensic	Yes	http://httpd.apache.org/docs/2.4/mod/mod_log_forensic.html
mod_logio	No	http://httpd.apache.org/docs/2.4/mod/mod_logio.html
mod_macro	No	http://httpd.apache.org/docs/2.4/mod/mod_macro.html

Table 2-1 (Cont.) Apache HTTP Server and Third-party Modules in Oracle HTTP Server

Module	Enabled by Default?	For more information, see:
mod_mime	Yes	http://httpd.apache.org/docs/2.4/mod/mod_mime.html
mod_mime_magic	Yes	http://httpd.apache.org/docs/2.4/mod/mod_mime_magic.html
mod_mpm_event	Yes (Linux only)	http://httpd.apache.org/docs/2.4/mod/event.html
mod_mpm_prefork	No	http://httpd.apache.org/docs/2.4/mod/prefork.html
mod_mpm_winnt (Windows only)	Yes	http://httpd.apache.org/docs/2.4/mod/mpm_winnt.html
mod_mpm_worker	Yes (on Non-Windows and non-Linux platforms)	http://httpd.apache.org/docs/2.4/mod/worker.html
mod_negotiation	Yes	http://httpd.apache.org/docs/2.4/mod/mod_negotiation.html
mod_proxy	Yes	http://httpd.apache.org/docs/2.4/mod/mod_proxy.html
mod_proxy_balancer	Yes	http://httpd.apache.org/docs/2.4/mod/mod_proxy_balancer.html
mod_proxy_connect	Yes	http://httpd.apache.org/docs/2.4/mod/mod_proxy_connect.html
mod_proxy_fcgi	No	http://httpd.apache.org/docs/2.4/mod/mod_proxy_fcgi.html
mod_proxy_ftp	Yes	http://httpd.apache.org/docs/2.4/mod/mod_proxy_ftp.html
mod_proxy_http	Yes	http://httpd.apache.org/docs/2.4/mod/mod_proxy_http.html
mod_remoteip	No	http://httpd.apache.org/docs/2.4/mod/mod_remoteip.html
mod_reqtimeout	No	http://httpd.apache.org/docs/2.4/mod/mod_reqtimeout.html
mod_rewrite	Yes	http://httpd.apache.org/docs/2.4/mod/mod_rewrite.html
mod_security2	No	http://www.modsecurity.org/documentation/ Also, for Oracle HTTP Server-specific information regarding mod_security, see Configuring mod_security in the httpd.conf File.

Table 2-1 (Cont.) Apache HTTP Server and Third-party Modules in Oracle HTTP Server

Module	Enabled by Default?	For more information, see:
mod_sed	No	http://httpd.apache.org/docs/2.4/mod/mod_sed.html
mod_setenvif	Yes	http://httpd.apache.org/docs/2.4/mod/mod_setenvif.html
mod_slotmem_shm	Yes	http://httpd.apache.org/docs/2.4/mod/mod_slotmem_shm.html
mod_socache_shmcb	Yes	http://httpd.apache.org/docs/2.4/mod/mod_socache_shmcb.html
mod_speling	Yes	http://httpd.apache.org/docs/2.4/mod/mod_speling.html
mod_status	Yes	http://httpd.apache.org/docs/2.4/mod/mod_status.html
mod_substitute	No	http://httpd.apache.org/docs/2.4/mod/mod_substitute.html
mod_unique_id	Yes	http://httpd.apache.org/docs/2.4/mod/mod_unique_id.html
mod_unixd	Yes	http://httpd.apache.org/docs/2.4/mod/mod_unixd.html
mod_userdir	Yes	http://httpd.apache.org/docs/2.4/mod/mod_userdir.html
mod_usertrack	Yes	http://httpd.apache.org/docs/2.4/mod/mod_usertrack.html
mod_version	Yes	http://httpd.apache.org/docs/2.4/mod/mod_version.html
mod_vhost_alias	Yes	http://httpd.apache.org/docs/2.4/mod/mod_vhost_alias.html
mod_proxy_wstunnel	No	http://httpd.apache.org/docs/2.4/mod/mod_proxy_wstunnel.html

Understanding Oracle HTTP Server Management Tools

This chapter describes the management tools available with the Oracle HTTP Server. It includes information on Oracle HTTP Server management, how to access Fusion Middleware Control, how to access the Oracle HTTP Server home page, and how to use the WebLogic Scripting Tool (WLST).

Oracle provides the following management tools for Oracle HTTP Server:

- Configuration Wizard, which enables you to create and delete Oracle HTTP Server instances. For more information, see *Installing and Configuring Oracle HTTP Server*.
- Fusion Middleware Control, which is a browser-based management tool. For more information, see *Administering Oracle Fusion Middleware*.
- WebLogic Scripting Tool, which is a command-driven scripting tool. For more information, see *Understanding the WebLogic Scripting Tool*.

Note:

- The management tools available to your Oracle HTTP Server implementation depend on whether you have configured it in a WebLogic Server domain (with FMW Infrastructure) or in a standalone domain. For details, see [Domain Types](#).
 - The Oracle HTTP Server MBeans, which might be visible in Fusion Middleware Control or the WebLogic Scripting Tool (WLST) are provided for the use of Oracle management tools. The interfaces are not supported for other use and are subject to change without notice.
-

This chapter includes the following sections:

- [Administering Oracle HTTP Server Using Fusion Middleware Control](#)
- [Administering Oracle HTTP Server Using WLST](#)

3.1 Administering Oracle HTTP Server Using Fusion Middleware Control

The main tool for managing Oracle HTTP Server is Fusion Middleware Control, which is a browser-based tool for administering and monitoring the Oracle Fusion Middleware environment. This section described some of the basic Oracle HTTP Server administration tasks you can perform with Fusion Middleware Control.

- [Accessing Fusion Middleware Control](#)

- [Accessing the Oracle HTTP Server Home Page](#)
- [Understanding the Oracle HTTP Server Home Page](#)
- [Editing Configuration Files Using Fusion Middleware Control](#)

See Also:

Administering Oracle Fusion Middleware

3.1.1 Accessing Fusion Middleware Control

To display Fusion Middleware Control, you enter the Fusion Middleware Control URL, which includes the name of the WebLogic Administration Server host and the port number assigned to Fusion Middleware Control during the installation. The following shows the format of the URL:

```
http://hostname.domain:port/em
```

If you saved the installation information by clicking **Save** on the last installation screen, the URL for Fusion Middleware Control is included in the file that is written to disk.

1. Display Fusion Middleware Control by entering the URL in your Web browser. For example:

```
http://host1.example.com:7001/em
```

The Welcome page appears.

2. Enter the Fusion Middleware Control administrator user name and password and click **Login**.

The default user name for the administrator user is `weblogic`. This is the account you can use to log in to the Fusion Middleware Control for the first time. The `weblogic` password is the one you supplied during the installation of Fusion Middleware Control.

3.1.2 Accessing the Oracle HTTP Server Home Page

When you select a target, such as a WebLogic Managed Server or a component, such as Oracle HTTP Server, the target's home page is displayed in the content pane and the target's menu is displayed at the top of the page, in the context pane.

To display the Oracle HTTP Server home page and the server menu, select an Oracle HTTP Server component from the HTTP Server folder. You can also display the Oracle HTTP Server menu by right-clicking the Oracle HTTP Server target in the navigation pane.

[Understanding the Oracle HTTP Server Home Page](#) describes the target navigation pane and the home page of Oracle HTTP Server.

3.1.3 Understanding the Oracle HTTP Server Home Page

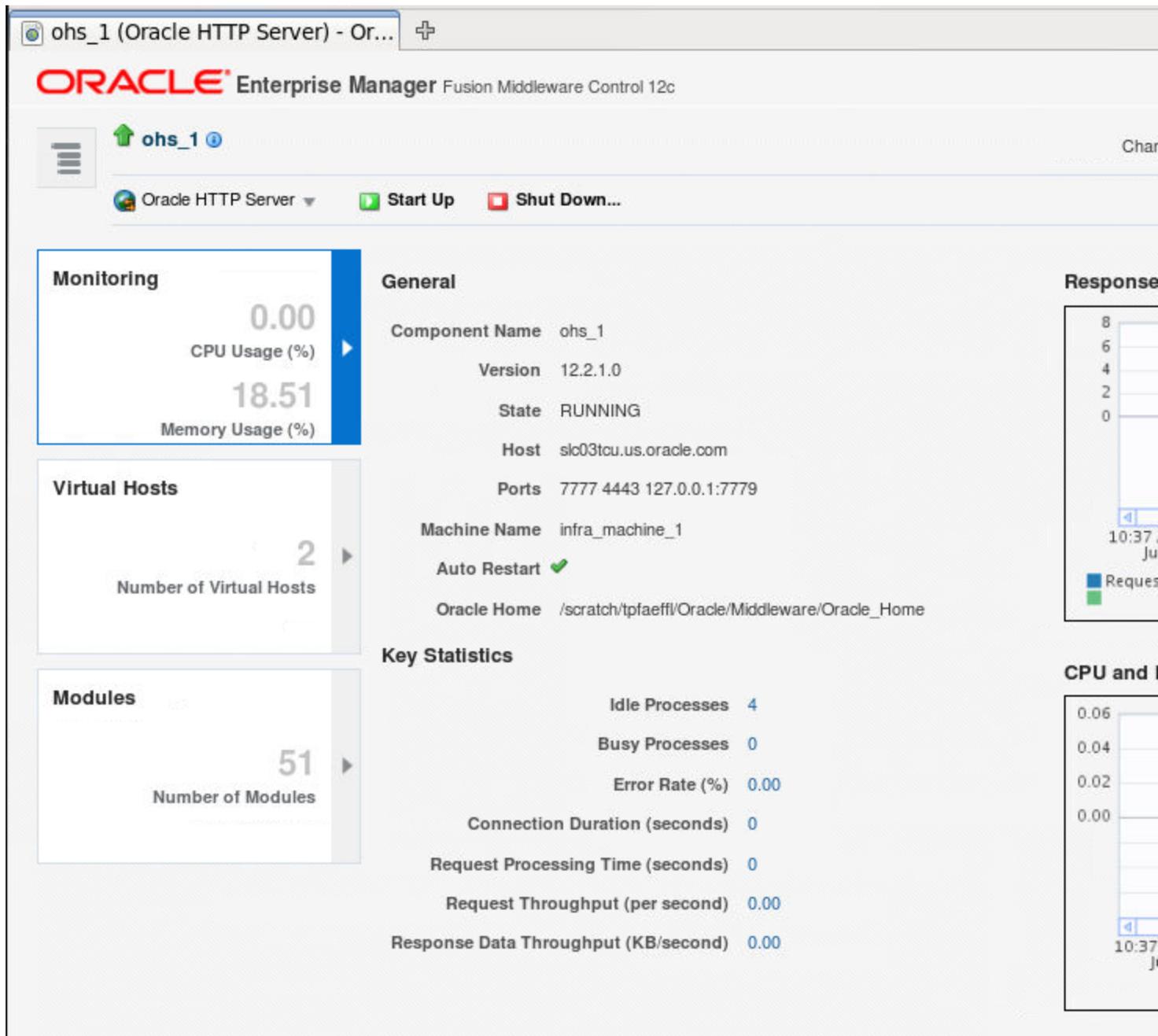
The Oracle HTTP Server Home page in Fusion Middleware Control contains menus and regions that enable you to manage the server. Use the menus for monitoring, managing, routing, and viewing general information.

The Oracle HTTP Server home page contains the following regions:

- **General Region:** Shows the name of the component, its state, host, port, and machine name, and the location of the Oracle Home.
- **Key Statistics Region:** Shows the processes and requests statistics.
- **Response and Load Region:** Provides information such as the number of active requests, how many requests were submitted, and how long it took for Oracle HTTP Server to respond to a request. It also provides information about the number of bytes processed with the requests.
- **CPU and Memory Usage Region:** Shows how much CPU (by percentage) and memory (in megabytes) are being used by an Oracle HTTP Server instance.
- **Resource Center:** Provides links to books and topics related to Oracle HTTP Server.

[Figure 3-1](#) shows the target navigation pane and the home page of Oracle HTTP Server.

Figure 3-1 Oracle HTTP Server Home in Fusion Middleware Control



Note:

Administering Oracle Fusion Middleware contains detailed descriptions of all the items on the target navigation pane and the home page.

3.1.4 Editing Configuration Files Using Fusion Middleware Control

The Advanced Server Configuration page in Fusion Middleware Control enables you to edit your Oracle HTTP Server configuration without directly editing the configuration (.conf) files (for details, see [Modifying an Oracle HTTP Server](#)).

[Configuration File](#)). Be aware that Fusion Middleware Control and other Oracle software that manage the Oracle HTTP Server configuration might save these files in a different, equivalent format. After using the software to make a configuration change, multiple configuration files might be rewritten. For instructions on how to edit a configuration file from Fusion Middleware Control, see [Editing a Configuration File for a WebLogic Server Domain](#).

3.2 Administering Oracle HTTP Server Using WLST

The WebLogic Scripting Tool (WLST) is a command-driven scripting tool. For detailed information on WLST, see *Understanding the WebLogic Scripting Tool*.

For more information on the WLST custom commands that are available for Oracle HTTP Server, see [Oracle HTTP Server WLST Custom Commands](#).

This section contains the following information:

- [Oracle HTTP Server-Specific WLST Commands](#)
- [Using WLST in a Standalone Environment](#)

3.2.1 Oracle HTTP Server-Specific WLST Commands

WLST provides Oracle HTTP Server-specific commands for server management in WebLogic Server Domains. For more information on the commands, see [Oracle HTTP Server WLST Custom Commands](#).

The following are online commands, which require a connection between WLST and the administration server for the domain.

- `ohs_createInstance`
- `ohs_deleteInstance`
- `ohs_addAdminProperties`
- `ohs_addNMProperties`
- `ohs_exportKeyStore`
- `ohs_postUpgrade`
- `ohs_updateInstances`

Oracle recommends that you use the `ohs_createInstance` and `ohs_deleteInstance` commands to create and delete Oracle HTTP Server instances instead of using the Configuration Wizard. These commands perform additional error checking and, in the case of instance creation, automatic port assignment.

3.2.2 Using WLST in a Standalone Environment

If your Oracle HTTP Server instance is running in a standalone environment, you can use WLST but must use the `offline`, or "agent", commands that route tasks through. The specific WLST commands are described in [Running Oracle HTTP Server](#), in the context of the task they perform (for example, the WLST command for starting a standalone Oracle HTTP Server instance is documented in [Starting Oracle HTTP Server Instances Using WLST](#)); however, you must use the `nmConnect()` command to actually connect to offline WLST. For both Linux and Windows, the format of the command is the same:

```
nmConnect('login','password','hostname','port','<domainName>')
```

For example:

```
nmConnect('weblogic','welcome1','localhost','5556','myDomain')
```

If you have a remote Oracle HTTP Server in a managed mode and another in standalone with the remote administration mode enabled, you can use WLST to perform management tasks such as SSL configuration. A vanilla Oracle HTTP Server in a standalone domain can be used only as a WebLogic Server and for Oracle HTTP Server start/stop purposes. You can also do this by using a command-line script.

Part II

Managing Oracle HTTP Server

This part presents information about management tasks for Oracle HTTP Server. It contains the following chapters:

- [Running Oracle HTTP Server](#)
- [Working with Oracle HTTP Server](#)
- [Managing and Monitoring Server Processes](#)
- [Managing Connectivity](#)
- [Managing Oracle HTTP Server Logs](#)
- [Managing Application Security](#)

Running Oracle HTTP Server

This chapter provides information on how to run Oracle HTTP Server. It contains procedures for creating a server instance and how to start, stop, and manage an instance in both a WebLogic and a standalone environment.

This chapter includes the following sections:

- [Before You Begin](#)
- [Creating an OHS Instance](#)
- [Performing Basic Oracle HTTP Server Tasks](#)
- [Remotely Administering Oracle HTTP Server](#)

4.1 Before You Begin

Before performing any of the activities described in this chapter, you must complete the following tasks.

1. Install and configure Oracle HTTP Server as described in *Installing and Configuring Oracle HTTP Server*.
2. If you run Oracle HTTP Server in a WebLogic Server Domain, start WebLogic Server as described in Starting and Stopping Servers in *Administering Server Startup and Shutdown for Oracle WebLogic Server*.

Note:

- When you start WebLogic Server from the command line, you might see many warning messages. Despite these messages, WebLogic Server should start normally.
 - On the Windows platform, Oracle HTTP Server requires Microsoft Visual C++ run-time libraries to be installed on the system to function. For more information, see *Installing and Configuring Oracle HTTP Server*.
-

3. Start Node Manager (required for both WebLogic and standalone domains) as described in Using Node Manager in *Administering Node Manager for Oracle WebLogic Server*.

4.2 Creating an OHS Instance

The Configuration Wizard enables you to create multiple Oracle HTTP Server instances simultaneously when you create a domain. If you are creating a WebLogic Server Domain (Full or Restricted JRF domain types), you are not required to create

any instances. If you elect *not* to create any instances, a warning appears; however, you are allowed to proceed with the configuration process.

If you are creating a standalone domain, an Oracle HTTP Server instance is created by default.

This section contains the following information:

- [Creating an Oracle HTTP Server Instance in a WebLogic Server Domain](#)
- [Creating an Oracle HTTP Server Instance in a Standalone Domain](#)

Note:

If you are attempting to create an Oracle HTTP Server instance that uses a TCP port in the reserved range (typically less than 1024), then you must perform some extra configuration to allow the server to bind to privileged ports. For more information, see [Starting Oracle HTTP Server Instances on a Privileged Port \(UNIX Only\)](#).

4.2.1 Creating an Oracle HTTP Server Instance in a WebLogic Server Domain

You can create a managed Oracle HTTP Server instance in a WebLogic Server Domain by using either the WLST custom command `ohs_createInstance()` or from Fusion Middleware Control installed as part of a Oracle Fusion Middleware infrastructure. The following sections describe these procedures.

- [Creating an Instance by Using WLST](#)
- [Creating an Instance by Using Fusion Middleware Control](#)
- [About Instance Provisioning](#)

Note:

If you are working with a WebLogic Server Domain, it is recommended to use the Oracle HTTP Server WLST custom commands, described in [Administering Oracle HTTP Server Using WLST](#). These commands offer superior error checking, provide automatic port management, and so on.

4.2.1.1 Creating an Instance by Using WLST

You can create an Oracle HTTP Server instance in a WebLogic Server Domain by using WLST. Follow these steps.

1. From the command line, launch WLST.

Linux or UNIX: `$ORACLE_HOME/oracle_common/common/bin/wlst.sh`

Windows: `$ORACLE_HOME\oracle_common\common\bin\wlst.cmd`

2. Connect to WLST:

- In a WebLogic Server Domain:

```
> connect('loginID', 'password', '<adminHost>:<adminPort>')
```

For example:

```
> connect('weblogic', 'welcome1', 'abc03111.myCo.com:7001')
```

3. Use the `ohs_createInstance()` command, with an instance and machine name—which was assigned during domain creation—to create the instance:

```
> ohs_createInstance(instanceName='ohs1', machine='abc03111.myCo.com',
[listenPort=XXXX], [sslPort=XXXX], [adminPort=XXXX])
```

Note:

If Node Manager is down, the create command takes place partially. The master copy of the config files appear at `OHS/componentName`. Once Node Manager comes back up, the system syncs again and the runtime copy of the files appear at `OHS/instances/componentName`.

For example:

```
> ohs_createInstance(instanceName='ohs1', machine='abc03111.myCo.com')
```

Note:

If you do not provide port numbers, they will be assigned automatically.

Note:

For information about using the WebLogic Scripting Tool (WLST), see *Understanding the WebLogic Scripting Tool*.

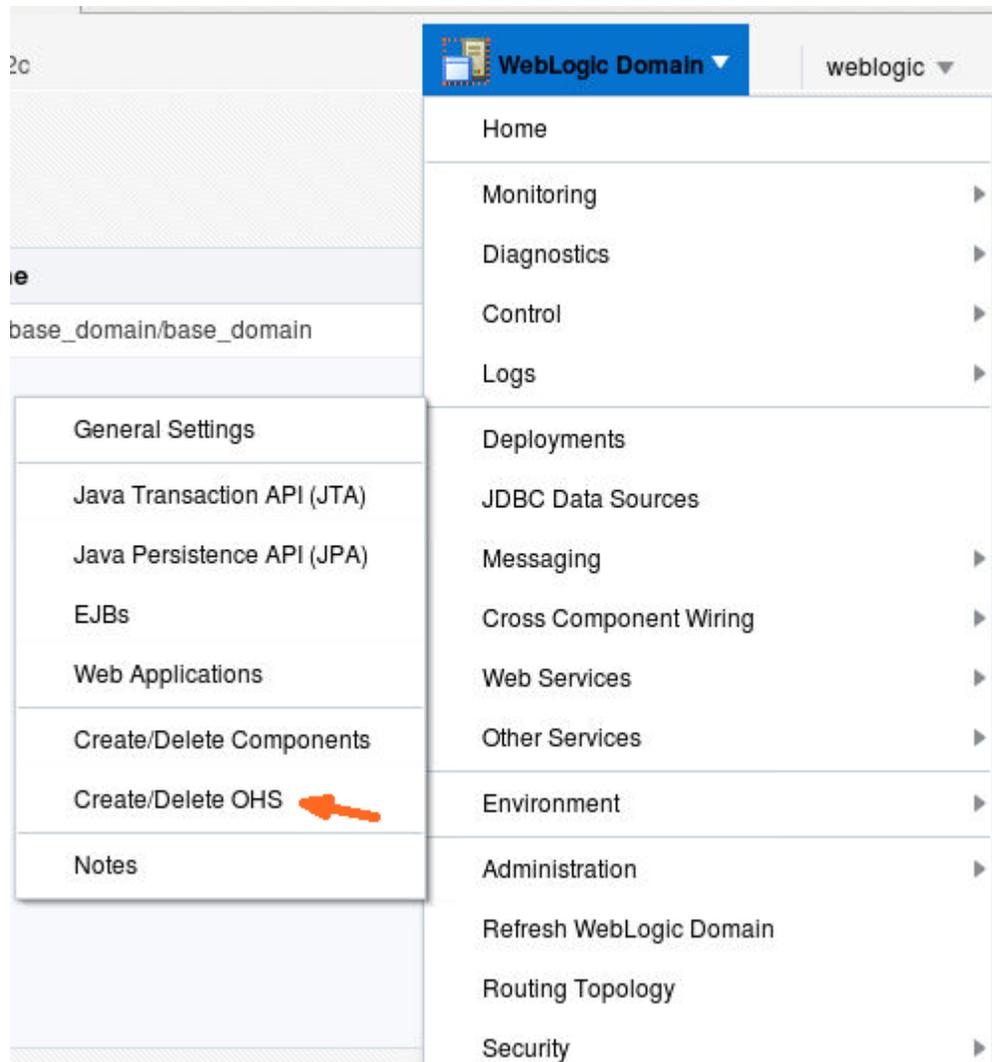
4.2.1.2 Creating an Instance by Using Fusion Middleware Control

You can create an Oracle HTTP Server instance in a WebLogic Server Domain by using Fusion Middleware Control installed as part of the Oracle Fusion Middleware infrastructure. Follow these steps.

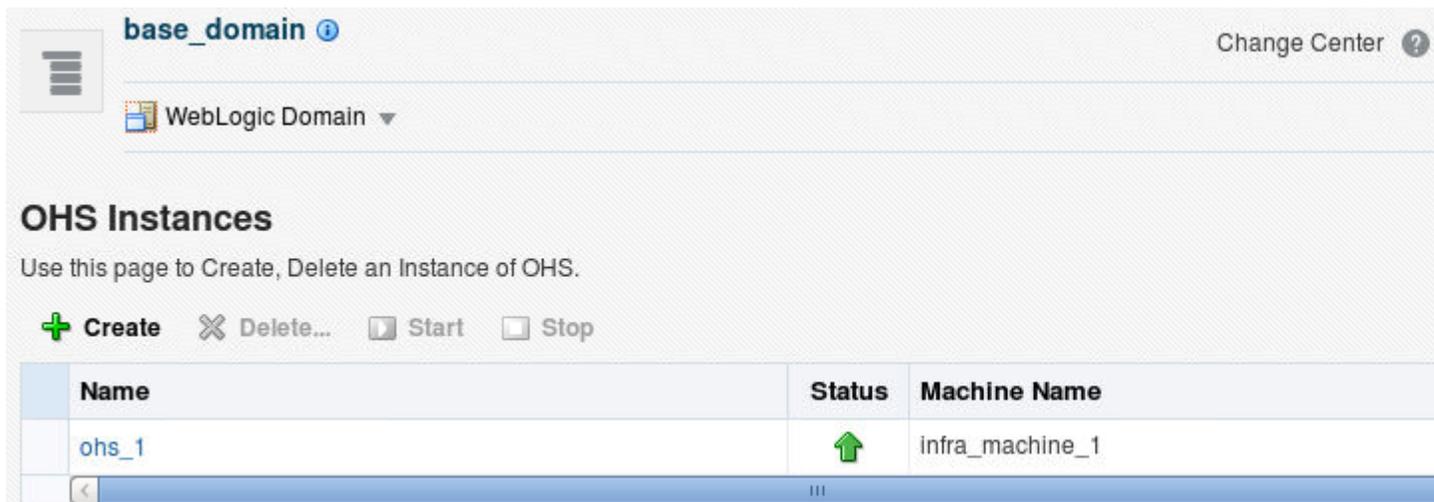
1. Log in to Fusion Middleware Control and navigate to the system component instance home page for the WebLogic Server Domain within which you want to create the Oracle HTTP Server instance.
2. Open the WebLogic Server Domain menu and select **Administration** then **Create/Delete OHS**.

Note:

Create/Delete OHS will appear only if you have extended the domain by using the Oracle HTTP Server domain template. Otherwise, this command will not be available.

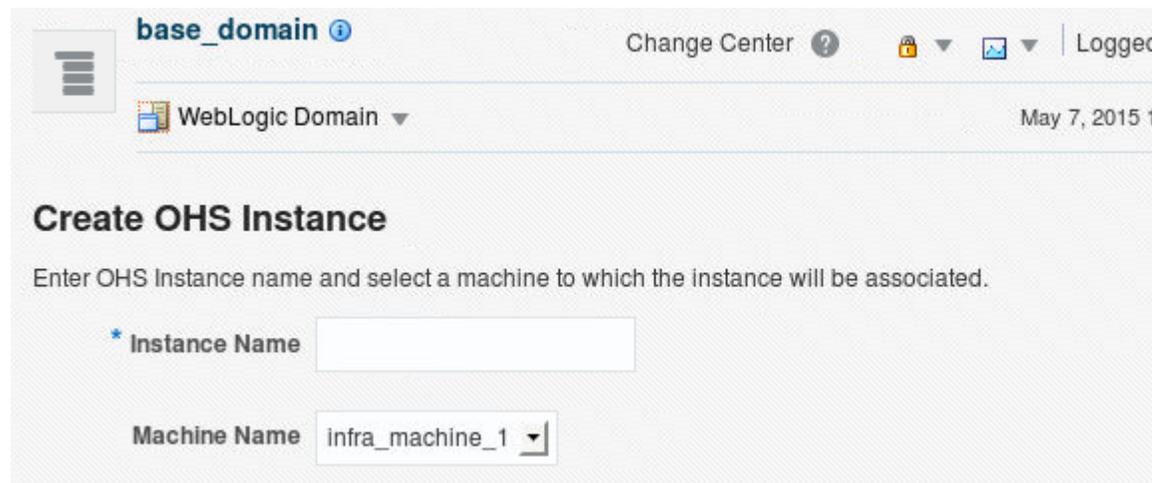


The OHS Instances page appears.



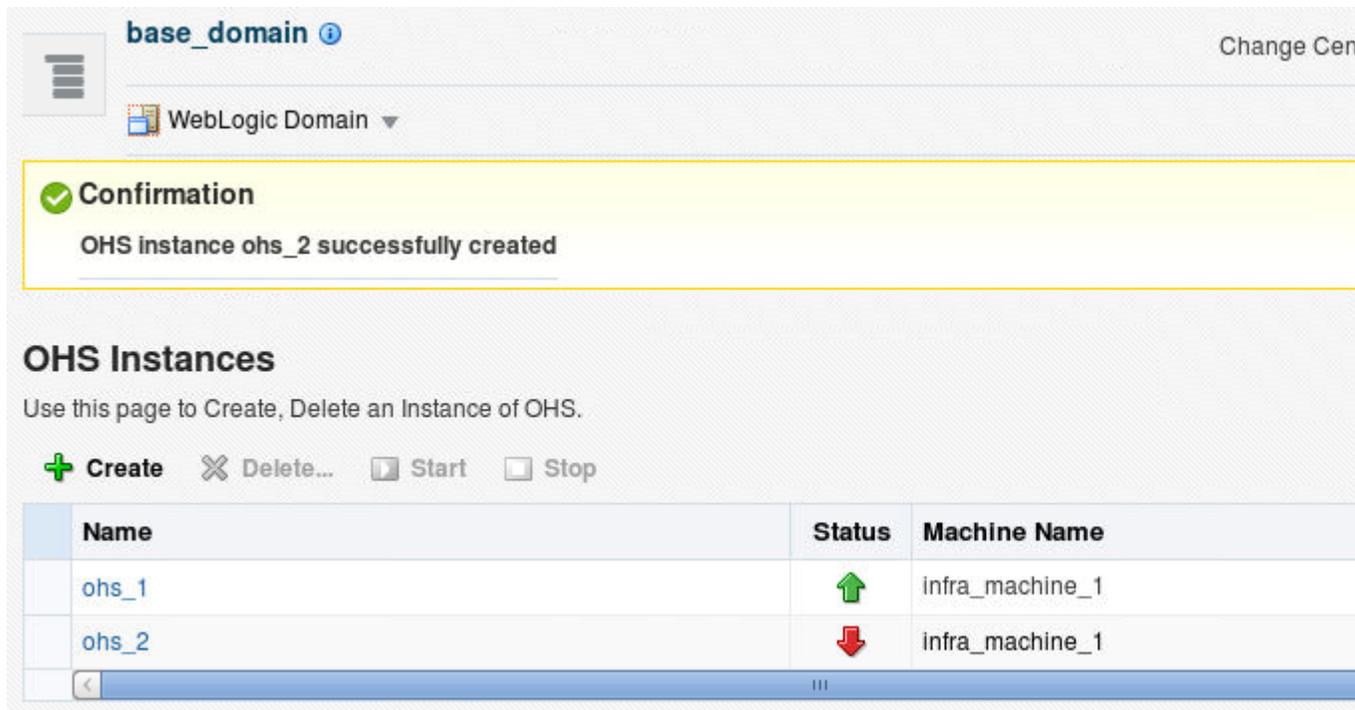
3. Click Create.

The Create OHS Instance page appears.



4. In **Instance Name**, enter a unique name for the Oracle HTTP Server instance; for example, ohs_2.
5. In **Machine Name**, click the drop-down control and select the machine to which you want to associate the instance.
6. Click **OK**.

The OHS Instance page reappears, showing a confirmation message and the new instance. The port number is automatically assigned.



After creating the instance, the Column on the OHS Instances page shows a down-arrow for that instance.

This indicates that the instance is not running. For instructions on starting an instance, see [Starting Oracle HTTP Server Instances](#). Once started, the arrow will point up.

4.2.1.3 About Instance Provisioning

Once an instance is created, it will be provisioned within the *DOMAIN_HOME*.

- The master (staging) copy will be in:

DOMAIN_HOME/config/fmwconfig/components/OHS/componentName

- The runtime will be in:

*DOMAIN_HOME/config/fmwconfig/components/OHS/instances/
componentName*

Node Manager must be running to provision an instance in runtime.

Immediately after creation, the state reported for an Oracle HTTP Server instance will vary depending on how the instance was created:

- If `ohs_createInstance()` was used, the reported state for the instance will be SHUTDOWN.
- If the Configuration Wizard was used, the reported state for the instance will be UNKNOWN.

4.2.2 Creating an Oracle HTTP Server Instance in a Standalone Domain

If you select Standalone as your domain during server configuration, the Configuration Wizard will create the domain, and during this process an Oracle HTTP Server instance will also be created. For more information, see *Installing and Configuring Oracle HTTP Server*.

4.3 Performing Basic Oracle HTTP Server Tasks

This section contains information on how to use WLST or Fusion Middleware Control to perform basic administration tasks. It also provides information on WLST and the process ID (PID) file.

- [About Using the WLST Commands](#)
- [Understanding the PID File](#)
- [Starting Oracle HTTP Server Instances](#)
- [Stopping Oracle HTTP Server Instances](#)
- [Restarting Oracle HTTP Server Instances](#)
- [Checking the Status of a Running Oracle HTTP Server Instance](#)
- [Deleting an Oracle HTTP Server Instance](#)
- [Changing the Default Node Manager Port Number](#)

4.3.1 About Using the WLST Commands

If you plan to use WLST, you should familiarize yourself with that tool. You should also be aware of the following restriction on WLST:

- If you run a standalone version of Oracle HTTP Server, you must use the offline, or "agent", WLST commands. These commands are described in their appropriate context.

For more information, see "Getting Started Using the Oracle WebLogic Scripting Tool (WLST)" in the *Oracle® Fusion Middleware Administrator's Guide*.

4.3.2 Understanding the PID File

The process ID can be used by the administrator when restarting and terminating the daemon. If a process stops abnormally, it is necessary to stop the `httpd` child processes using the `kill` command. You must not change the default PID file name or its location.

When Oracle HTTP Server starts, it writes the process ID (PID) of the parent `httpd` process to the `httpd.pid` file located in the following directory:

```
DOMAIN_HOME/servers/<componentName>/logs
```

The `PidFile` directive in `httpd.conf` specifies the location of the PID file; however, *you should never modify the value of this directive*.

Note:

On UNIX/Linux platforms, if you edit the `PidFile` directive, you also have to edit the `ORACLE_HOME/ohs/bin/apachectl` file to specify the new location of the PID file.

See Also:

`PidFile` directive in the Apache HTTP Server documentation at:

http://httpd.apache.org/docs/current/mod/mpm_common.html#pidfile

4.3.3 Starting Oracle HTTP Server Instances

This section contains information on how to start Oracle HTTP Server using Fusion Middleware Control and WLST.

Note:

On the Windows platform, Oracle HTTP Server requires Microsoft Visual C++ run-time libraries to be installed on the system to function. For information, see *Installing and Configuring Oracle HTTP Server*.

- [Starting Oracle HTTP Server Instances Using Fusion Middleware Control](#)
- [Starting Oracle HTTP Server Instances Using WLST](#)
- [Starting Oracle HTTP Server Instances from the Command Line](#)
- [Starting Oracle HTTP Server Instances on a Privileged Port \(UNIX Only\)](#)
- [Starting Oracle HTTP Server Instances as a Different User \(UNIX Only\)](#)

4.3.3.1 Starting Oracle HTTP Server Instances Using Fusion Middleware Control

In Fusion Middleware Control, you start the Oracle HTTP Server from the Oracle HTTP Server home page. Navigate to the HTTP Server home page and do one of the following:

- From the Oracle HTTP Server menu:
 1. Select **Control**.
 2. Select **Start Up** from the Control menu.
- From the Target Navigation tree:
 1. Right-click the Oracle HTTP Server instance you want to start.
 2. Select **Control**.
 3. Select **Start Up** from the Control menu.
- From the page header, select **Start Up**.

The instance will start in the state UNKNOWN.

4.3.3.2 Starting Oracle HTTP Server Instances Using WLST

To start an Oracle HTTP Server instance by using WLST, use the `start()` command in a WebLogic Server Domain or `nmStart()` for a standalone domain. The commands are illustrated in the following table.

Note:

- Node Manager must be running for these commands to work. If it is down, you will receive an error message.
 - `serverType` is required for standalone domains. If it is not included an error will be thrown referencing an inability to find `startWebLogic`.
-
-

These commands assume you have created as OHS instance, as described in [Creating an OHS Instance](#) and WLST is running.

Domain	Syntax	Example
WebLogic	<code>start('instanceName')</code>	<code>start('ohs1')</code>
	or	or
	<code>nmStart(serverName='name', serverType='type')</code>	<code>nmStart(serverName='ohs1', serverType='OHS')</code>
Standalone	<code>nmStart(serverName='name', serverType='type')</code>	<code>nmStart(serverName='ohs1', serverType='OHS')</code>

4.3.3.3 Starting Oracle HTTP Server Instances from the Command Line

You can start up Oracle HTTP Server instances from the command line via a script.

1. Ensure that Node Manager is running.
2. Enter the following command:

Linux or UNIX: `$DOMAIN_HOME/bin/startComponent.sh componentName`

Windows: `%DOMAIN_HOME%\bin\startComponent.cmd componentName`

For example:

```
$DOMAIN_HOME/bin/startComponent.sh ohs1
```

The `startComponent` script contacts the Node Manager and runs the `nmStart()` command.

3. When prompted, enter your Node Manager password. The system responds with these messages:

```
Successfully started server componentName...
Successfully disconnected from Node Manager...
```

```
Exiting WebLogic Scripting Tool.
```

Note:

If you encounter any odd system messages upon startup, you can ignore them.

4.3.3.3.1 Storing Your Node Manager Password

You can avoid having to enter your Node Manager password every time you launch the server with `startComponent` command by starting it with the `storeUserConfig` option for the first time. Do the following:

1. At the prompt, enter the following command:

```
$DOMAIN_HOME/bin/startComponent.sh componentName storeUserConfig
```

The system will prompt for your Node Manager password.

2. Enter your password.

The system responds with this message:

```
Creating the key file can reduce the security of your system if it is not kept
in a secured location after it is created. Creating new key...
The username and password that were used for this WebLogic NodeManager
connection are stored in $HOME/.wlst/nm-cfg-myDomainName.props and
$HOME /.wlst/nm-key-myDomainName.props.
```

4.3.3.4 Starting Oracle HTTP Server Instances on a Privileged Port (UNIX Only)

WARNING:

When this procedure is completed, *any* Oracle HTTP Server processes running from this Oracle Home will be able to bind to privileged ports.

On a UNIX system, TCP ports in a reserved range (typically less than 1024) can only be bound by processes with root privilege. Oracle HTTP Server always runs as a non-root user; that is, the user who installed Oracle Fusion Middleware. On UNIX, special configuration is required to allow Oracle HTTP Server to bind to privileged ports.

To enable Oracle HTTP Server to listen on a port in the reserved range (for example, the default port 80 or port 443) use the following one-time setup on each Oracle HTTP Server machine:

1. Update the `ORACLE_HOME/ohs/bin/launch` file by performing the following steps as the super user (if you do not have access to super user privileges, have your system administrator perform these steps):

- a. Change ownership of the file to root:

```
chown root $ORACLE_HOME/ohs/bin/launch
```

- b. Change the permissions on the file as follows:

```
chmod 4750 $ORACLE_HOME/ohs/bin/launch
```

The steps that require root permissions are now complete.

- c. Modify the port settings for Oracle HTTP Server as described in [Managing Ports](#).

2. Configure the User and Group directive in `httpd.conf`.

The configured user ID for User should be the same user ID that created the instance. The configured group ID for Group must be the same group ID used to create the instance. See [Oracle HTTP Server Configuration Files](#). To configure Oracle HTTP Server to run as a different user id see [Starting Oracle HTTP Server Instances as a Different User \(UNIX Only\)](#).

3. Stop the instance if it is running by using any of the stop methods described in [Stopping Oracle HTTP Server Instances](#).
4. Start the instance by using any of the start-up methods described in [Starting Oracle HTTP Server Instances](#).

4.3.3.5 Starting Oracle HTTP Server Instances as a Different User (UNIX Only)

On UNIX systems, the Oracle HTTP Server worker processes (the processes that accept connections and handle requests) may be configured to run as a different user id than the user id used to create the instance.

Follow the directions in [Starting Oracle HTTP Server Instances on a Privileged Port \(UNIX Only\)](#) and configure the User directive with the desired user id. The configured user id must be in the same group as the group that owns the instance directory. The

Group directive must also be configured and set to the same group id used to create the instance.

Note:

- The parent process and logging processes of the Oracle HTTP Server will run as root—these processes neither accept connections nor handle requests.
- If the node manager is configured to use the SSL listener, then ensure that other users have the appropriate permissions to access the SSL trust store used by the node manager so that the `startComponent.sh` or `nmConnect` commands can run successfully as a different user.

For more information on node manager, see *Node Manager Overview* in *Administering Node Manager for Oracle WebLogic Server*.

4.3.4 Stopping Oracle HTTP Server Instances

This section contains information on how to stop Oracle HTTP Server using Fusion Middleware Control and WLST. Be aware that other services might be impacted when Oracle HTTP Server is stopped.

- [Stopping Oracle HTTP Server Instances Using Fusion Middleware Control](#)
- [Stopping Oracle HTTP Server Instances Using WLST](#)
- [Stopping Oracle HTTP Server Instances from the Command Line](#)

4.3.4.1 Stopping Oracle HTTP Server Instances Using Fusion Middleware Control

In Fusion Middleware Control, you can stop Oracle HTTP Server from the Oracle HTTP Server home page. Navigate to the Oracle HTTP Server home page and do one of the following:

- From the Oracle HTTP Server home page:
 1. Select the server instance you want to stop.
 2. Select **Control** then **Shut Down** from the Oracle HTTP Server drop-down menu on the server instance home page.
- From the Target Navigation tree:
 1. Right-click the Oracle HTTP Server component you want to stop.
 2. Select **Control**.
 3. Select **Shut Down** from the Control menu.
- From the page header on the server instance home page, select **Shut Down**.

4.3.4.2 Stopping Oracle HTTP Server Instances Using WLST

You can stop Oracle HTTP Server by using WLST. From within the scripting tool, use one of the following commands:

Note:

- Node Manager must be running for these commands to work. If it is down, you will receive an error message.
- `serverType` is required for standalone domains. If it is not included, an error will be thrown referencing an inability to find `startWebLogic`

Domain	Syntax	Example
WebLogic	<code>shutdown('serverName')</code>	<code>shutdown('ohs1')</code>
Standalone	<code>nmKill(serverName='serverName', serverType='type')</code> ¹	<code>nmKill(serverName='ohs1', serverType='OHS')</code>

¹ `nmKill()` will also work in a WebLogic domain.

WARNING:

If you run `shutdown()` without specifying any parameters, WebLogic Server will terminate and exit WLST. Oracle HTTP Server will continue running. To recover, restart WebLogic Server, launch WLST, and reconnect to the AdminServer. Then re-run the shutdown with the Oracle HTTP Server instance name.

4.3.4.3 Stopping Oracle HTTP Server Instances from the Command Line

You can stop Oracle HTTP Server instances from the command line via a script.

1. Enter the following command:

```
$DOMAIN_HOME/bin/stopComponent.sh componentName
```

For example:

```
$DOMAIN_HOME/bin/stopComponent.sh ohs1
```

This command invokes WLST and executes the `nmKill()` command. The `stopComponent` command will not function if the Node Manager is not running.

2. When prompted, enter your Node Manager password.

If you started the Node Manager with the `storeUserConfig` option as described in [Storing Your Node Manager Password](#), you will not be prompted.

Once the server is stopped, the system will respond:

```
Successfully killed server componentName...
Successfully disconnected from Node Manager...
```

```
Exiting WebLogic Scripting Tool.
```

4.3.5 Restarting Oracle HTTP Server Instances

Restarting Oracle HTTP Server causes the Apache parent process to advise its child processes to exit after their current request (or to exit immediately if they are not serving any requests). Upon restarting, the parent process re-reads its configuration files and reopens its log files. As each child process exits, the parent replaces it with a child process from the new generation of the configuration file, which begins serving new requests immediately.

The following sections contain information on how to restart Oracle HTTP Server using Fusion Middleware Control and WLST.

- [Restarting Oracle HTTP Server Instances Using Fusion Middleware Control](#)
- [Restarting Oracle HTTP Server Instances Using WLST](#)

4.3.5.1 Restarting Oracle HTTP Server Instances Using Fusion Middleware Control

In Fusion Middleware Control you restart Oracle HTTP Server from the Oracle HTTP Server home page. Navigate to the Oracle HTTP Server home page and do one of the following:

- From the Oracle HTTP Server home page:
 1. Select the server instance you want to restart. Select **Control**.
 2. Click **Start Up** on the instance home page, or select **Control** then **Restart** from the Oracle HTTP Server drop-down menu.
- From the Target Navigation tree:
 1. Right-click the Oracle HTTP Server instance you want to restart.
 2. Select **Control**.
 3. Select **Restart** from the Control menu.

4.3.5.2 Restarting Oracle HTTP Server Instances Using WLST

To restart Oracle HTTP Server by using WLST, use the `softRestart()` command. From within the scripting tool, enter one of the following commands:

Note:

- For the WebLogic and the Standalone domains, the Node Manager must be running (that is, state is `RUNNING`) for these commands to work. If it is down, you will receive an error message.
 - All parameters are required for standalone domains. If they are not included, an error will be thrown referencing an inability to find `startWebLogic`.
 - The `nmSoftRestart` command can also be used in WebLogic domains. To do this, you must first connect to the Node Manager by using the `nmConnect` command.
-

Domain	Syntax	Example
WebLogic	<code>softRestart('serverName')</code>	<code>softRestart('ohs1')</code>
Standalone	<code>nmSoftRestart(serverName='name', serverType='type')</code>	<code>nmSoftRestart(serverName='ohs1', serverType='OHS')</code>

4.3.6 Checking the Status of a Running Oracle HTTP Server Instance

This section contains information on how to check the status of a running Oracle HTTP Server instance. You can check this information from either Fusion Middleware Control installed as part of an Oracle Fusion Middleware infrastructure or by using WLST.

- [Checking Server Status Using Fusion Middleware Control](#)
- [Checking Server Status Using WLST](#)

4.3.6.1 Checking Server Status Using Fusion Middleware Control

An up or down arrow in the top left corner of any Oracle HTTP Server page's header indicates whether the selected server instance is running. This image shows the up arrow, indicating that the server instance, in this case, `ohs_2`, is running:



This image shows a down arrow, indicating that the server instance, in this case, `ohs_2`, is not running:



4.3.6.2 Checking Server Status Using WLST

In a WebLogic Server Domain, if you used `ohs_createInstance()` to create the Oracle HTTP Server instance, its initial state (that is, before starting it) will be SHUTDOWN.

If you used the Configuration Wizard to generate the instance (both WebLogic Server Domain and standalone domain), its initial state (that is, before starting) will be UNKNOWN.

To check the status of a running Oracle HTTP Server instance by using WLST, from within the scripting tool, enter the following:

Note:

- Node Manager must be running for these commands to work. If it is down, you will receive an error message. If Node Manager goes down in a WebLogic Server Domain, the state will be returned as UNKNOWN, regardless of the real state of the instance. Additionally `state()` does not inform you that it cannot connect to Node Manager.
- Unlike other WLST commands, `state()` will not tell you when Node Manager is down so there is no way to distinguish an instance that truly is in state UNKNOWN as opposed to Node Manager simply being down.
- All parameters are required for standalone domains. If they are not included, then an error will be thrown referencing an inability to find `startWebLogic`.
- The `nmServerStatus` command can also be used in WebLogic domains. To do this, you must first connect to the Node Manager by using the `nmConnect` command.

Domain	Syntax	Example
WebLogic	<code>state('serverName')</code>	<code>state('ohs1')</code>
Standalone	<code>nmServerStatus(serverName='name', serverType='type')</code>	<code>nmServerStatus(serverName='ohs1', serverType='OHS')</code>

Note:

This command does not distinguish between non-existent components and real components in state UNKNOWN. Thus, if you enter a non-existent instance (for example, you made a typo), a state of UNKNOWN will be returned.

4.3.7 Deleting an Oracle HTTP Server Instance

You can delete an Oracle HTTP Server instance in both a WebLogic Server Domain and a standalone domain.

- [Deleting an Oracle HTTP Server Instance in a WebLogic Server Domain](#)
- [Deleting an Oracle HTTP Server Instance from a Standalone Domain](#)

4.3.7.1 Deleting an Oracle HTTP Server Instance in a WebLogic Server Domain

In a WebLogic Server Domain, you can use either the WLST custom command `ohs_deleteInstance()` or from Fusion Middleware Control installed as part of an Oracle Fusion Middleware infrastructure. The following sections describe these procedures.

- [Deleting an Instance Using WLST](#)

- [Deleting an Instance Using Fusion Middleware Control](#)

4.3.7.1.1 Deleting an Instance Using WLST

If you are in a WebLogic Server Domain, you can delete an Oracle HTTP Server instance by using the WLST custom command `ohs_deleteInstance()`. When you use this command, the following happens:

- The selected instance information is removed from `config.xml`.
- All OHS configuration directories and their contents are deleted; for example, `OHS/instanceName` and `OHS/instances/instanceName`. These paths refer to both the runtime and master copies of the configuration.
- All logfiles associated with the deleted instance are deleted.
- All state information for the deleted instance is removed.

Note:

You cannot delete an instance by using `ohs_deleteInstance()` if Node Manager is down.

To delete an instance using WLST:

1. From the command line, launch WLST:

Linux or UNIX: `$ORACLE_HOME/oracle_common/common/bin/wlst.sh`

Windows: `$ORACLE_HOME\oracle_common\common\bin\wlst.cmd`

2. Connect to WLST:

- In a WebLogic Server Domain:

```
> connect('loginID', 'password', '<adminHost>:<adminPort>')
```

For example:

```
> connect('weblogic', 'welcome1', 'abc03111.myCo.com:7001')
```

3. At the command prompt, enter:

```
ohs_deleteInstance(instanceName='instanceName')
```

For example, to delete an Oracle HTTP Server instance named `ohs1` use the following command:

```
ohs_deleteInstance(instanceName='ohs1')
```

You cannot delete an OHS instance in either an UNKNOWN or a RUNNING state.

Note:

For newly created OHS instances in state UNKNOWN (for example, created with config wizard), one can start and stop the instance to move the state to SHUTDOWN. It can then be deleted successfully.

For instances in state RUNNING... first stop the instance to move it to state SHUTDOWN and then it can be deleted successfully.

4.3.7.1.2 Deleting an Instance Using Fusion Middleware Control

To delete an Oracle HTTP Server instance by using Fusion Middleware Control:

Note:

You cannot delete a running Oracle HTTP Server instance. If the instance is running, stop it, as described in [Stopping Oracle HTTP Server Instances](#) and then proceed with the following steps.

1. Log in to Fusion Middleware Control. Navigate to the system component instance home page for the WebLogic Server Domain that contains the Oracle HTTP Server instance you want to delete.
2. Open the WebLogic Server Domain menu and select **Administration** then **Create/Delete OHS**.
3. In the OHS Instances page, select the instance you want to delete and click **Delete**.
4. In the confirmation window, click **Yes** to complete the deletion.

The OHS Instances page appears, with an information message indicating that the selected Oracle HTTP Server instance was deleted.

4.3.7.2 Deleting an Oracle HTTP Server Instance from a Standalone Domain

You can delete an Oracle HTTP Server instance in a standalone domain by using the Configuration Wizard if it is not the only instance in the domain. The Configuration Wizard always requires at least one Oracle HTTP Server instance in a standalone domain; you will not be able to delete the instance if it is the only one in the domain. To delete the only instance in a standalone domain, you should instead completely remove the entire domain directory.

Deleting Oracle HTTP Server instances by using the Configuration Wizard is actually only a partial deletion (and is inconsistent with the way WebLogic Server domain performs deletion by using `ohs_deleteInstance()`; see [Deleting an Instance Using WLST](#)). When you delete a standalone instance by using the Configuration Wizard, the following occurs:

- Information on the specific instance is removed from `config.xml`, so this instance is no longer recognized as valid. When you launch the Configuration Wizard again for another update, the deleted instance will not appear.
- The logs compiled for the deleted instance are left intact at: `DOMAIN_HOME/servers/ohs1` (assuming your instance name was `ohs1`). If a new instance with the same name is subsequently created, it will inherit and continue logging to these files.

- The deleted instance's configuration directories and their contents are *not* deleted; they remain intact at: *DOMAIN_HOME/config/fmwconfig/components/OHS/instanceName* and *DOMAIN_HOME/config/fmwconfig/components/OHS/instances/instanceName*. The only change in both directories is that the following files are renamed: *httpd.conf* becomes *httpd.conf.bak*; *ssl.conf* becomes *ssl.conf.bak*; and *admin.conf* becomes *admin.conf.bak*. This prevents the instance from being started. (If you create a new instance with the same name as the instance you deleted, this information will be overwritten, but the *.bak files will remain).
- The deleted instance's state information is left intact at *DOMAIN_HOME/system_components/...* If a new instance of the same name is subsequently created, it will inherit the state of the old instance. Instead of starting in UNKNOWN state, it could appear as SHUTDOWN or even FAILED_NOT_RESTARTABLE.

To delete an Oracle HTTP Server instance in a standalone domain, do the following:

1. Shutdown all running instances (see [Stopping Oracle HTTP Server Instances](#)). Be aware the Configuration Wizard will not check the state of the Oracle HTTP Server instance so you will need to verify that all instances are indeed stopped before deletion.
2. If it is running, shut down Node Manager.
3. Launch the Configuration Wizard (see *Installing and Configuring Oracle HTTP Server*) and do the following:
 - a. Select **Update an existing domain** and select the path to the domain.
 - b. Skip both the Templates screen and the JDK Selection screen by clicking **Next** on each.
 - c. On the System Components screen, select the instance you want to delete and click **Delete**.
The selected instance is deleted.
 - d. Click **Next**, and, on the OHS Server screen, click **Next** again.
 - e. On the Configuration Summary screen, verify that the selected instance has been deleted and click **Update**.
 - f. On the Success screen, click **Finish**.

4.3.8 Changing the Default Node Manager Port Number

You can change the default value of the Node Manager port by using either WLST or the Oracle WebLogic Server Administration console.

- [Changing the Default Node Manager Port Using WLST](#)
- [Changing the Default Node Manager Port Using Oracle WebLogic Server Administration Console](#)

4.3.8.1 Changing the Default Node Manager Port Using WLST

To change the default Node Manager port number using WLST, use the custom command `readDomain` to open the domain. Navigate to the directory containing the

node manager for the machine. Set the `ListenPort` property, then update the domain.

```
...
readDomain('DOMAIN_HOME')
cd('/Machines/Machine_Name/NodeManager/Node_Manager_Name')
set('ListenPort',9090)
updateDomain()
closeDomain()
...
```

In this example, `DOMAIN_HOME` represents the root directory of the domain. `Machines` and `NodeManager` are directories. The `Node_Manager_Name` is the name of the Node Manager belonging to the `Machine_Name` machine. The default Node Manager name is `localmachine`. The default `Machine_Name` is also `localmachine`. The `ListenPort` value is set to 9090.

4.3.8.2 Changing the Default Node Manager Port Using Oracle WebLogic Server Administration Console

Follow these steps to change the default Node Manager port number using Oracle WebLogic Server Administration Console.

1. Manually edit the `DOMAIN_HOME/nodemanager/nodemanager.properties` file to change the value of the `ListenPort` property.
2. In the WebLogic Server Administration Console, change the configuration of the machine associated with the Node Manager, to point it to the new port number.

From the left pane of the Console, expand Environment and then select Machines. Select the machine whose configuration you want to edit. Select the Configuration tab, then the Node Manager tab. Change the Listen Port to the port updated in `nodemanager.properties` file. Click Save.

4.4 Remotely Administering Oracle HTTP Server

You can remotely manage an Oracle HTTP Server running in a standalone environment from a collocated Oracle HTTP Server implementation running on a separate machine. This feature enables you to use WLST or Fusion Middleware Control installed as part of an Oracle Fusion Middleware infrastructure from the remote machine to start, restart, stop, and configure the component. This section describes how to set up Oracle HTTP Server to run remotely.

- [Setting Up a Remote Environment](#)
- [Task 4: Run Oracle HTTP Server Remotely](#)

4.4.1 Setting Up a Remote Environment

The following instructions describe how to set up a remote environment, which will enable you to run Oracle HTTP Server installed on one machine from an installation on another. This section contains the following information:

- [Host Requirements for a Remote Environment.](#)
- [Task 1: Set Up an Expanded Domain on host1.](#)
- [Task 2: Pack the Domain on host1.](#)

- [Task 3: Unpack the Domain on host2.](#)
- [Task 4: Run Oracle HTTP Server Remotely](#)

4.4.1.1 Host Requirements for a Remote Environment

To remotely manage Oracle HTTP Server, you must have separate hosts installed on separate machines:

- A collocated installation (for this example, this installation will be called *host1*).
- A standalone installation (*host2*). The path to standalone *MW_HOME* on *host2* must be the same as the path to the collocated *MW_HOME* on *host1*; for example:

```
/scratch/user/work
```

4.4.1.2 Task 1: Set Up an Expanded Domain on host1

The following steps describe how to set up an expanded domain and link it to a database on the collocated version of Oracle HTTP Server (*host1*):

1. Using the Repository Configuration Utility (RCU), set up and install a database for the expanded domain. For more information, see *Creating Schemas with the Repository Creation Utility*.
2. Launch the Configuration Wizard and create an expanded domain. Use the values specified in [Table 4-1](#).

Table 4-1 Setting Up an Expanded Domain

For...	Select or Enter...
Create Domain	Create a new domain and specify its path (for example, <i>MW_HOME/user_projects/domains/ohs1_domain</i>).
Templates	Oracle HTTP Server (Collocated)
Application Locations	The default.
Administrator Account	A username and password (for example, <i>weblogic</i> and <i>welcome1</i>).
Database Configuration Type	The RCU data. Then, click Get RCU Configuration and then Next .
Optional Configuration	The following items: <ul style="list-style-type: none"> • Administration Server • Node Manager • System Components • Deployment and Services
Administration Server	The listen address (All Local Addresses or the valid name or address for <i>host1</i>) and port.
Node Manager	Per Domain and specify the NodeManager credentials (for example, <i>weblogic</i> and <i>welcome1</i>).
System Components	Add and set the fields, using OHS as the Component Type (for example, use a System Component value of <i>ohs1</i>).

Table 4-1 (Cont.) Setting Up an Expanded Domain

For...	Select or Enter...
OHS Server	The listen addresses and ports or use the defaults.
Machines	Add. This will add a machine to the domain (for example, ohs1_Machine) and the Node Manager listen and port values. You must specify a listen address for host2 that is accessible from host1, such the valid name or address for host2 (do not use localhost or All Local Addresses).
Assign System Components	The OHS component (for example, ohs1) then use the right arrow to assign the component to the machine (ohs1_machine, for example).
Configuration Summary	Create (the OPSS steps may take some minutes).

4.4.1.3 Task 2: Pack the Domain on host1

On host1, use the `pack` command to pack the domain. The `pack` command creates a template archive (.jar) file that contains a snapshot of either an entire domain or a subset of a domain.

```
<MW_HOME>/ohs/common/bin/pack.sh -domain=path to domain -template=path to template -
template_name=name -managed=true
```

For example:

```
<MW_HOME>/ohs/common/bin/pack.sh -domain=<MW_HOME>/user_projects/domains/ohs1_domain
-template=/tmp/ohs1_tmplt.jar -template_name=ohs1 -managed=true
```

4.4.1.4 Task 3: Unpack the Domain on host2

The `unpack` command creates a full domain or a subset of a domain used for a Managed Server domain directory on a remote machine. Use the following steps to unpack the domain you packed on host1 in [Task 2: Pack the Domain on host1](#), on host2.

1. Copy the template file created in [Task 2: Pack the Domain on host1](#) from host1 to host2.
2. Use the `unpack` command to unpack the domain:

```
<MW_HOME>/ohs/common/bin/unpack.sh -domain=path to domain -template=path to
template
```

For example:

```
<MW_HOME>/ohs/common/bin/unpack.sh -domain=<MW_HOME>/user_projects/domains/
ohs1_domain -template=/tmp/ohs1_tmplt.jar
```

4.4.1.5 Task 4: Run Oracle HTTP Server Remotely

Once you have unpacked the domain created on host1 onto host2, you can use the same set of WLST commands and Fusion Middleware Control tools you would in a collocated environment to start, stop, restart, and configure the component.

To run an Oracle HTTP Server remotely, do the following:

1. Start the WebLogic Administration Server on host1:

```
<MW_HOME>/user_projects/domains/ohs1_domain/bin/startWebLogic.sh &
```

2. Start Node Manager on host2:

```
<MW_HOME>/user_projects/domains/ohs1_domain/bin/startNodeManager.sh &
```

You can now run the Oracle HTTP Server instance on host2 from the collocated implementation on host1. You can use any of the WLST commands or any of the Fusion Middleware Control tools. For example, to connect host2 to Node Manager and start the server ohs1, from host1 enter:

```
<MW_HOME>/ohs/common/bin/wlst.sh
nmConnect('weblogic', '<password>', '<nm-host>', '<nm-port>', '<domain-name>',
'<domain-directory>', 'ssl')
nmStart(serverName='ohs1', serverType='OHS')
```

See [Performing Basic Oracle HTTP Server Tasks](#) for information on starting, stopping, restarting, and configuring Oracle HTTP Server components.

Working with Oracle HTTP Server

This chapter describes some common tasks you might be required to perform when working with an installed version of Oracle HTTP Server. It contains the following sections:

- [About Editing Configuration Files](#)
- [Specifying Server Properties](#)
- [Configuring Oracle HTTP Server Instances](#)
- [Configuring the mod_security Module](#)

5.1 About Editing Configuration Files

For instances that are part of a WebLogic Server Domain, Fusion Middleware Control and the management infrastructure manages the Oracle HTTP Server configuration. Direct editing of the configuration in the staging directory is subject to being overwritten after subsequent management operations, including modifying the configuration in Fusion Middleware Control. For such instances, direct editing should only be performed when the administration server is stopped. When the administration server is subsequently started (or restarted), the results of any manual edits will be replicated to the run-time directory on the node of the managed instance.

For more information, see [Understanding Configuration Files](#).

The following sections provide more information on modifying configuration files.

- [Editing a Configuration File for a Standalone Domain](#).
- [Editing a Configuration File for a WebLogic Server Domain](#).

5.1.1 Editing a Configuration File for a Standalone Domain

For standalone instances, you can edit the configuration directly within the staging directory at any time. The runtime config files are updated on start, restart or stopping of the OHS instance.

5.1.2 Editing a Configuration File for a WebLogic Server Domain

You can open and edit configuration files from within Fusion Middleware Control. Follow these steps to modify the files.

1. Select **Administration** from the HTTP Server menu.
2. Select **Advanced Configuration** from the Administration menu item.
3. In the Advanced Server Configuration page, select the configuration file from the **Select File** drop-down list, such as the `httpd.conf` file, then click **Go**.

4. Edit the file, as needed.
5. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
6. Restart Oracle HTTP Server as described in [Restarting Oracle HTTP Server Instances](#) .

The file is saved and displayed on the Advanced Server Configuration page.

5.2 Specifying Server Properties

You can set Oracle HTTP Server properties only by using Fusion Middleware Control or by directly editing the Oracle HTTP Server configuration files. *You cannot use WLST commands to specify the server properties.*

- [Specifying Server Properties Using Fusion Middleware Control](#)
- [Specify Server Properties by Editing the httpd.conf File](#)

5.2.1 Specifying Server Properties Using Fusion Middleware Control

Server properties include items like the document root, the administrator's e-mail address, the directory index and operating system details. Follow these steps to specify the server properties by using Fusion Middleware Control.

1. Select **Administration** from the Oracle HTTP Server menu.
2. Select **Server Configuration** from the Administration menu.

ohs_1 Change Cen...

Oracle HTTP Server Start Up Shut Down...

Server Configuration

Configure basic OHS settings, such as document root directory, the user and group under which the s

General

Server Root Directory: "\${ORACLE_INSTANCE}/config/fmwconfig/components/\${COMPONENT_NAME}

Document Root: "\${ORACLE_INSTANCE}/config/fmwconfig/components/\${COMPONENT_NAME}/htdocs"

Administrator's E-mail:

Directory Index: index.html

Modules

The following are the installed OHS modules that can be enabled or disabled.

mod_authnz_fcgi mod_proxy_fcgi

Aliases

Alias is used to map URLs to filesystem locations. This allows for documents to be stored in the

+ Add Row ✕ Remove

URL Path	File Path or Directory Path
/error/	"\${ORACLE_INSTANCE}/config/fmwconfig/components/\${COMPONENT_NAME}/htdocs/error"
/icons/	"\${PRODUCT_HOME}/icons/"

TIP For example, the columns can have the following values: URL Path:/image, File Path or Directory Path: /image

3. In the Server Configuration page, enter the server properties.
 - a. Enter the documentation root directory in the **Document Root** field that forms the main document tree visible from the website.
 - b. Enter the e-mail address in the **Administrator's E-mail** field that the server will include in error messages sent to the client.
 - c. Enter the directory index in the **Directory Index** field. This is the main (index) page that will be displayed when a client first accesses the website.

- d. Use the Modules region to enable or disable modules. The available modules are `mod_authnz_fcgi` and `mod_proxy_fcgi`. See also [About Configuring `mod_proxy_fcgi`](#).
 - e. Create an alias, if necessary in the Aliases table. An alias maps to a specified directory. For example, to use a specific set of content pages for a group you can create an alias to the directory that has the content pages.
4. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
 5. Restart Oracle HTTP Server as described in [Restarting Oracle HTTP Server Instances](#).

The server properties are saved, and shown on the Server Configuration page.

5.2.2 Specify Server Properties by Editing the `httpd.conf` File

You can specify server properties by manually editing the `httpd.conf` file. Follow these steps to edit the `httpd.conf` file.

Note:

Before attempting to edit any `.conf` file, you should familiarize yourself with the layout of the configuration file directories, mechanisms for editing the files, and learn more about the files themselves. For this information, see [Understanding Configuration Files](#).

1. Open the `httpd.conf` file (the "master" or "staging" copy: `$DOMAIN_HOME/config/fmwconfig/components/OHS/ohs1/httpd.conf`) by using either a text editor or the Advanced Server Configuration page in Fusion Middleware Control. (See [Modifying an Oracle HTTP Server Configuration File](#).)
2. In the `DocumentRoot` section of the file, enter the directory that stores the main content for the website. The following is an example of the syntax:


```
DocumentRoot "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/instances/${COMPONENT_NAME}/htdocs"
```
3. In the `ServerAdmin` section of the file, enter the administrator's email address. This is the e-mail address that will appear on client pages. The following is an example of the syntax:


```
ServerAdmin WebMaster@example.com
```
4. In the `DirectoryIndex` section of the file, enter the directory index. This is the main (index) page that will be displayed when a client first accesses the website. The following is an example of the syntax:


```
DirectoryIndex index.html index.html.var
```
5. Create aliases, if needed. An alias maps to a specified directory. For example, to use a specific set of icons, you can create an alias to the directory that has the icons for the Web pages. The following is an example of the syntax:

```
Alias /icons/ "${PRODUCT_HOME}/icons/"<Directory "${PRODUCT_HOME}/icons">
Options Indexes MultiViews AllowOverride None Require all granted</
Directory>
```

6. Save the file.
7. Restart Oracle HTTP Server as described in [Restarting Oracle HTTP Server Instances](#) .

5.3 Configuring Oracle HTTP Server Instances

This section describes some of the common Oracle HTTP Server instance configuration procedures, such as secure sockets, MIME settings, Oracle WebLogic Server Proxy Plug-In (mod_wl_ohs), mod_proxy_fcgi and others.

Note:

This section does not include initial system configuration information; for those configuration instructions, see *Installing and Configuring Oracle HTTP Server*.

This section includes the following information:

- [Secure Sockets Layer Configuration](#)
- [Configuring Secure Sockets Layer in Standalone Mode](#)
- [Exporting the Keystore to an Oracle HTTP Server Instance Using WLST](#)
- [Importing Wallets to the KSS Database after an Upgrade Using WLST](#)
- [Associating Oracle HTTP Server Instances With a Keystore Using WLST](#)
- [Configuring MIME Settings using Fusion Middleware Control](#)
- [About Configuring mod_proxy_fcgi](#)
- [About Configuring the Oracle WebLogic Server Proxy Plug-In \(mod_wl_ohs\)](#)
- [Removing Access to Unneeded Content](#)
- [Using the apxs Command to Install Extension Modules](#)
- [Disabling the Options Method](#)
- [Updating Oracle HTTP Server Component Configurations on a Shared Filesystem](#)

Note:

Fusion Middleware Control and other Oracle software which manage the Oracle HTTP Server configuration might save configuration files in a different, equivalent format. After using the software to make a configuration change, multiple configuration files might be rewritten.

5.3.1 Secure Sockets Layer Configuration

Secure Sockets Layer (SSL) is an encrypted communication protocol that is designed for securely sending messages across the Internet. SSL resides between Oracle HTTP Server on the application layer and the TCP/IP layer. It transparently handles encryption and decryption when a secure connection is made by a client.

One common use of SSL is to secure Web HTTP communication between a browser and a Web server. This case does not preclude the use of non-secured HTTP. The secure version is simply HTTP over SSL (HTTPS). The differences are that HTTPS uses the URL scheme `https://` rather than `http://`. The default communication port is 4443 in Oracle HTTP Server. Oracle HTTP Server does not use the 443 standard `https://` privileged port because of security implications. For information about running Oracle HTTP Server on privileged ports, see [Starting Oracle HTTP Server Instances on a Privileged Port \(UNIX Only\)](#).

By default, an SSL listen port is configured and enabled using a default wallet during installation. Wallets store your credentials, such as certificate requests, certificates, and private keys.

The default wallet that is automatically installed with Oracle HTTP Server is for testing purposes only. A real wallet must be created for your production server. The default wallet is located in the `DOMAIN_HOME/config/fmwconfig/components/OHS/instances/componentName/keystores/default` directory. You can either place the new wallet in this location, or change the `SSLWallet` directive in `DOMAIN_HOME/config/fmwconfig/components/OHS/componentName/ssl.conf` to point to the location of your real wallet.

Oracle strongly recommends that you do not use a certificate that uses the Message Digest 5 algorithm (MD5). This algorithm has been severely compromised. The MD5 certificate must be replaced with a certificate that uses Secure Hash Algorithm 2 (SHA-2), which provides more secure encryption.

For the changes to take effect, restart Oracle HTTP Server, as described in [Restarting Oracle HTTP Server Instances](#).

For information about configuring wallets and SSL by using Fusion Middleware Control, see Enabling SSL for Oracle HTTP Server Virtual Hosts in the *Administering Oracle Fusion Middleware* guide.

5.3.2 Configuring Secure Sockets Layer in Standalone Mode

The following sections contain information about how to enable and configure SSL for Oracle HTTP Server in standalone mode. These instructions use the `mod_ossl` module to Oracle HTTP Server which enables the server to use SSL.

- [Configure SSL](#)
- [Specify SSLVerifyClient on the Server Side](#)
- [Enable SSL Between Oracle HTTP Server and Oracle WebLogic Server](#)

5.3.2.1 Configure SSL

By default, SSL is enabled when you install Oracle HTTP Server. Perform these tasks to modify and configure SSL:

- [Task 1: Create a Real Wallet](#)

- [Task 2: \(Optional\) Customize Your Configuration](#)
- [Basic SSL Configuration Example](#)

5.3.2.1.1 Task 1: Create a Real Wallet

To configure Oracle HTTP Server for SSL, you need a wallet that contains the certificate for the server. Wallets store your credentials, such as certificate requests, certificates, and private keys.

The default wallet that is automatically installed with Oracle HTTP Server is for testing purposes only. A real wallet must be created for your production server. The default wallet is located in `$ORACLE_INSTANCE/config/fmwconfig/components/$COMPONENT_TYPE/instances/$COMPONENT_NAME/keystores/default`. You can either place the new wallet in that location, or change the `SSLWallet` directive in `$ORACLE_INSTANCE/config/fmwconfig/components/$COMPONENT_TYPE/$COMPONENT_NAME/ssl.conf` (the pre-installation location) to point to the location of your real wallet.

See Also:

`orapki` in *Administering Oracle Fusion Middleware* for instructions on creating a wallet. It is important that you do the following:

Generate a certificate request: For the Common Name, specify the name or alias of the site you are configuring. Make sure that you enable this `auto_login_only` feature.

5.3.2.1.2 Task 2: (Optional) Customize Your Configuration

Optionally, you can further customize your configuration using `mod_oss1` directives.

See Also:

- [mod_oss1 Module](#) for a list and descriptions of directives accepted by `mod_oss1`.
 - [SSLFIPS Directive](#) for information on how to configure the `SSLFIPS` directive and a list of the cipher suites it accepts.
-
-

Note:

The files installed during configuration contain all of the necessary SSL configuration directives and a default setup for SSL.

5.3.2.1.3 Basic SSL Configuration Example

Your SSL configuration must contain, at minimum, the directives in the following example.

```
LoadModule oss1_module          "${PRODUCT_HOME}/modules/mod_oss1.so"
Listen 4443
ServerName www.testohs.com
SSLEngine on
# SSL Protocol Support:
```

```
# List the supported protocols.
SSLProtocol TLSv1.2 TLSv1.1 TLSv1
# SSL Cipher Suite:
# List the ciphers that the client is permitted to negotiate.
SSLCipherSuite
SSL_RSA_WITH_RC4_128_MD5,SSL_RSA_WITH_RC4_128_SHA,SSL_RSA_WITH_3DES_EDE_CBC_SHA,TLS_R
SA_WITH_AES_128_CBC_SHA,TLS_RSA_WITH_AES_256_CBC_SHA
SSLWallet "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/
instances/${COMPONENT_NAME}/keystores/default"
</VirtualHost>To enable client authentication, do the following:
```

5.3.2.2 Specify SSLVerifyClient on the Server Side

This section describes the different ways of using the **SSLVerifyClient** directive to authenticate and authorize access. Use the appropriate client certificate on the client side for the HTTPS connection. See your client documentation for information on getting and using a client certificate. Ensure that the Oracle server wallet trusts your client certificate.

To ensure that the server trusts the client certificate, you can check whether the client certificate is self-signed or signed by a certificate authority (CA). In both cases, the certificate must be added to the list of trusted certificates.

You can add a trusted client certificate to an Oracle wallet using one of the following ways:

- [Adding a Trusted Client Certificate in a Standalone Oracle HTTP Server Installation](#)
- [Adding a Trusted Client Certificate in Collocated Oracle HTTP Server Installation](#)

The following subsections describe the different methods of using the **SSLVerifyClient** directive to authenticate and authorize access:

- [Forcing Clients to Authenticate Using Certificates](#)
- [Forcing a Client to Authenticate for a Particular URL](#)
- [Authorizing a Client for a Particular URL](#)
- [Allowing Clients with Strong Ciphers and CA Client Certificate or Basic Authentication](#)

5.3.2.2.1 Adding a Trusted Client Certificate in a Standalone Oracle HTTP Server Installation

To add a trusted certificate to the wallet in a standalone installation, use the **orapki** command. For more information, see **orapki** in *Administering Oracle Fusion Middleware*.

5.3.2.2.2 Adding a Trusted Client Certificate in Collocated Oracle HTTP Server Installation

To add a trusted certificate to a wallet in a collocated installation, use the Fusion Middleware Control or the WebLogic Scripting Tool.

1. Import the certificate into the trusted certificate list of the Keystore.
2. Export the certificate into the server's wallet.

To import and export a certificate using the Fusion Middleware Control, see *Managing Certificates with Fusion Middleware Control* in *Securing Applications with Oracle Platform Security Services*.

To import and export a certificate using the WebLogic Scripting Tool, see *Managing Certificates with WLST in Securing Applications with Oracle Platform Security Services*.

5.3.2.2.3 Forcing Clients to Authenticate Using Certificates

You can force the client to validate its client certificate and allow access to the server using `SSLVerifyClient`. This scenario is valid for all clients having a client certificate supplied by the server Certificate Authority (CA). The server can validate client's supplied certificates against its CA for additional permission.

```
# require a client certificate which has to be directly
# signed by our CA certificate
SSLVerifyClient require
SSLWallet "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/
instances/${COMPONENT_NAME}/keystores/default"
```

5.3.2.2.4 Forcing a Client to Authenticate for a Particular URL

To force a client to authenticate using certificates for a particular URL, you can use the per-directory reconfiguration features of `mod_oss1`. In this case, the `SSLVerifyClient` appears in a `Location` block.

```
SSLVerifyClient none
SSLWallet "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/
instances/${COMPONENT_NAME}/keystores/default"
<Location /secure/area>
    SSLVerifyClient require
</Location>
```

5.3.2.2.5 Authorizing a Client for a Particular URL

To authorize a client for a particular URL, check that part of the client certificate matches what you expect. Usually, this means checking all or part of the Distinguished Name (DN), to see if it contains some known string. There are two ways to do this, using either `mod_auth_basic` or `SSLRequire`.

The `mod_auth_basic` method is generally required when the certificates are completely arbitrary, or when their DNs have no common fields (usually the organization, and so on). In this case, you should establish a password database containing all of the clients allowed, for example:

```
SSLVerifyClient    none
<Directory /access/required>
    SSLVerifyClient    require
    SSLOptions          +FakeBasicAuth
    SSLRequireSSL
    AuthName            "Oracle Auth"
    AuthType            Basic
    AuthBasicProvider   file
    AuthUserFile        httpd.passwd
    Require             valid-user
</Directory>
```

The password used in this example is the DES encrypted string password. For more information on this directive, see [SSLOptions Directive](#) which describes the `SSLOptions` directive of the `mod_oss1` module.

```
httpd.passwd
```

```
Subject:      OU=Class 3 Public Primary Certification Authority,O=VeriSign\,
```

```

Inc.,C=US
Subject:      CN=GTE CyberTrust Global Root,OU=GTE CyberTrust Solutions\,
Inc.,O=GTE Corporation,C=US
Subject:      CN=localhost,OU=FOR TESTING ONLY,O=FOR TESTING ONLY
Subject:      OU=Class 2 Public Primary Certification Authority,O=VeriSign\,
Inc.,C=US
Subject:      OU=Class 1 Public Primary Certification Authority,O=VeriSign\,
Inc.,C=US

```

When your clients are all part of a common hierarchy, which is encoded into the DN, you can match them more easily using `SSLRequire`, for example:

```

SSLVerifyClient      none
SSLWallet            "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/
instances/${COMPONENT_NAME}/keystores/default"

<Directory /access/required>
  SSLVerifyClient    require
  SSLOptions         +FakeBasicAuth
  SSLRequireSSL
  SSLRequire         %{SSL_CLIENT_S_DN_O} eq "VeriSign\, Inc." \
and %{SSL_CLIENT_S_DN_OU} in {"Class", "Public", "Primary"}
</Directory>

```

5.3.2.6 Allowing Clients with Strong Ciphers and CA Client Certificate or Basic Authentication

The following examples presume that clients on the Intranet have IPs in the range 192.168.1.0/24, and that the part of the Intranet website you want to allow Internet access to is `/access/required`. This configuration should remain outside of your HTTPS virtual host, so that it applies to both HTTPS and HTTP.

```

SSLWallet            "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/instances/
${COMPONENT_NAME}/keystores/default"
<Directory /access/required>
  # Outside the subarea only Intranet access is granted
  Require            ip 192.168.1.0/24
</Directory>

<Directory /access/required>
  # Inside the subarea any Intranet access is allowed
  # but from the Internet only HTTPS + Strong-Cipher + Password
  # or the alternative HTTPS + Strong-Cipher + Client-Certificate

  # If HTTPS is used, make sure a strong cipher is used.
  # Additionally allow client certs as alternative to basic auth.
  SSLVerifyClient    optional
  SSLOptions         +FakeBasicAuth +StrictRequire
  SSLRequire         %{SSL_CIPHER_USEKEYSIZE}>= 128
  # Force clients from the Internet to use HTTPS
  RewriteEngine      on
  RewriteCond        %{REMOTE_ADDR} !^192\.168\.1\.[0-9]+$
  RewriteCond        %{HTTPS} !=on
  RewriteRule        . - [F]
  # Allow Network Access and/or Basic Auth
  Satisfy            any

  # Network Access Control
  Require            ip 192.168.1.0/24
  # HTTP Basic Authentication
  AuthType           basic
  AuthName           "Protected Intranet Area"

```

```

AuthBasicProvider    file
AuthUserFile         httpasswd
Require              valid-user
</Directory>

```

5.3.2.3 Enable SSL Between Oracle HTTP Server and Oracle WebLogic Server

Use the Oracle WebLogic Server Proxy Plug-In to enable SSL between Oracle HTTP Server and Oracle WebLogic Server. The plug-ins allow you to configure SSL libraries and configure one-way and two-way SSL communications. For more information, see *Use SSL with Plug-Ins and Parameters for Oracle WebLogic Server Proxy Plug-In in Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2.*

5.3.3 Exporting the Keystore to an Oracle HTTP Server Instance Using WLST

Use the WLST custom command `ohs_exportKeyStore` to export the keystore to a specified Oracle HTTP Server instance location. For more information on this command, see [ohs_exportKeyStore](#).

Note:

There are conventions governing keystore names. For more information, see [Naming Conventions for Keystores](#)

1. Launch WLST from the command line.

Linux or UNIX: `$ORACLE_HOME/oracle_common/common/bin/wlst.sh`

Windows: `$ORACLE_HOME\oracle_common\common\bin\wlst.cmd`

2. Connect to the Administration Server instance:

```
connect('<userName>', '<password>', '<host>:<port>')
```

3. Issue the `ohs_exportKeyStore` WLST custom command:

```
ohs_exportKeyStore(keyStoreName = '<keystore_name>', instanceName =
'<name_of_the_OHS_instance>')
```

For example, to export the `ohs1_myKeystore` keystore to the `ohs1` Oracle HTTP Server instance:

```
ohs_exportKeyStore(keyStoreName = 'ohs1_myKeystore', instanceName = 'ohs1')
```

5.3.4 Importing Wallets to the KSS Database after an Upgrade Using WLST

When you use Upgrade Assistant to upgrade from a previous version of Oracle HTTP Server to release 12c (12.2.1), you must perform some additional wallet management. Use the `ohs_postUpgrade` command to import the wallets for Oracle HTTP Server instances to the KSS database.

This command will parse across all of the Oracle HTTP Server instances in the domain and import the wallets to the KSS database if an entry does not already exist in the database for the same keystore name. For more information on this command, see [ohs_postUpgrade](#).

1. Launch WLST from the command line.

Linux or UNIX: `$ORACLE_HOME/oracle_common/common/bin/wlst.sh`

Windows: `$ORACLE_HOME\oracle_common\common\bin\wlst.cmd`

2. Connect to the Administration Server instance:

```
connect('<userName', '<password>', '<host>:<port>')
```

3. Issue the `ohs_postUpgrade` WLST custom command, for example:

```
ohs_postUpgrade()
```

5.3.5 Associating Oracle HTTP Server Instances With a Keystore Using WLST

After using the Configuration Wizard to create Oracle HTTP Server instances in collocated mode, use the `ohs_updateInstances` WLST custom command to associate the instances with a keystore.

This command will parse across all of the Oracle HTTP Server instances in the domain and perform the following tasks:

- Create a new keystore with the name `<instanceName>_default` if one does not exist.
- Put a demonstration certificate, `demoCASignedCertificate`, in the newly created keystore.
- Export the keystore to the instance location.

For more information on this command, see [ohs_updateInstances](#).

To associate Oracle HTTP Server instances with a keystore:

1. Launch WLST from the command line.

Linux or UNIX: `$ORACLE_HOME/oracle_common/common/bin/wlst.sh`

Windows: `$ORACLE_HOME\oracle_common\common\bin\wlst.cmd`

2. Connect to the Administration Server instance:

```
connect('<userName', '<password>', '<host>:<port>')
```

3. Issue the `ohs_updateInstances` WLST custom command, for example:

```
ohs_updateInstances()
```

5.3.6 Configuring MIME Settings using Fusion Middleware Control

Oracle HTTP Server uses Multipurpose Internet Mail Extension (MIME) settings to interpret file types, encodings, and languages. MIME settings for Oracle HTTP Server can only be set using Fusion Middleware Control. You cannot use WLST commands to specify the MIME settings.

The following tasks can be completed on the MIME Configuration page:

- [Configuring MIME Types](#)
- [Configuring MIME Encoding](#)
- [Configuring MIME Languages](#)

5.3.6.1 Configuring MIME Types

MIME type maps a given file extension to a specified content type. The MIME type is used for filenames containing an extension.

To configure a MIME type using Fusion Middleware Control, do the following:

1. Select **Administration** from the Oracle HTTP Server menu.
2. Select **MIME Configuration** from the Administration menu. The MIME configuration page appears. Scroll to the MIME Types region.

MIME Type	File Extension
application/x-compress	.Z
application/x-gzip	.gz .tgz
application/x-x509-ca-cert	.crt
application/x-pkcs7-crl	.crl

3. Click **Add Row** in MIME Configuration region. A new, blank row is added to the list.
4. Enter the MIME type and its associated file extension.
5. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
6. Restart Oracle HTTP Server, as described in [Restarting Oracle HTTP Server Instances](#).

The MIME configuration is saved, and shown on the MIME Configuration page.

5.3.6.2 Configuring MIME Encoding

MIME encoding enables Oracle HTTP Server to determine the file type based on the file extension. You can add and remove MIME encodings. The encoding directive maps the file extension to a specified encoding type.

1. Select **Administration** from the Oracle HTTP Server menu.
2. Select **MIME Configuration** from the Administration menu. The MIME configuration page appears. Scroll to the MIME Encoding region.

MIME Encodings

Create MIME settings to map file extensions to a particular content encoding.

+ Add Row **X Remove**

MIME Encoding	File Extension
No MIME Encodings Found	

3. Expand the MIME Encoding region, if necessary, by clicking the plus sign (+) next to MIME Encoding.
4. Click **Add Row** in MIME Encoding region. A new, blank row is added to the list.
5. Enter the MIME encoding, such as `x-gzip`.
6. Enter the file extension, such as `.gz`.
7. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
8. Restart Oracle HTTP Server as described in [Restarting Oracle HTTP Server Instances](#).

5.3.6.3 Configuring MIME Languages

The MIME language setting maps file extensions to a particular language. This directive is commonly used for content negotiation, in which Oracle HTTP Server returns the document that most closely matched the preferences set by the client.

1. Select **Administration** from the Oracle HTTP Server menu.
2. Select **MIME Configuration** from the Administration menu. The MIME configuration page appears. Scroll to the MIME Languages region.

▲ MIME Languages

Create MIME settings to map file extensions to a particular content language. To apply a MIME language, select a row and click **Set As Default**.

Default MIME Language

+ Add Row **✕ Remove** **Set As Default**

MIME Language	File Extension
<input type="text" value="ca"/>	<input type="text" value=".ca"/>
<input type="text" value="cs"/>	<input type="text" value=".CZ .CS"/>
<input type="text" value="da"/>	<input type="text" value=".da"/>
<input type="text" value="de"/>	<input type="text" value=".de"/>

- Expand the MIME Languages region, if necessary, by clicking the plus sign (+) next to MIME Languages.
- Click **Add Row** in MIME Languages region. A new, blank row is added to the list.
- Enter the MIME language, such as en-US.
- Enter the file extension, such as en-us.
- To choose a default MIME language, select the desired row, then click **Set As Default**. The default language will appear in the Default MIME Language field.
- Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
- Restart Oracle HTTP Server as described in [Restarting Oracle HTTP Server Instances](#).

5.3.7 About Configuring mod_proxy_fcgi

The mod_proxy_fcgi module does not have configuration directives. Instead, it uses the directives set on the mod_proxy module. Unlike the mod_fcgid and mod_fastcgi modules, the mod_proxy_fcgi module has no provision for starting the application process. The purpose of mod_proxy_fcgi is to move this functionality outside of the web server for faster performance. So, mod_proxy_fcgi simply will act as a reverse proxy to an external FastCGI server.

For more information on configuring the mod_proxy_fcgi module, see [Task 3: Configure mod_proxy_fcgi to Act as a Reverse Proxy to an External FastCGI Server](#) and [Task 4: Setup an External FastCGI Server](#).

5.3.8 About Configuring the Oracle WebLogic Server Proxy Plug-In (mod_wl_ohs)

You can configure the Oracle WebLogic Server Proxy Plug-In (mod_wl_ohs) either by using Fusion Middleware Control or by manually editing the mod_wl_ohs.conf configuration file.

For information about the prerequisites and procedure for configuring the Oracle WebLogic Server Proxy Plug-In to proxy requests from Oracle HTTP Server to Oracle WebLogic Server, see *Configuring the WebLogic Proxy Plug-In for Oracle HTTP Server* in *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*.

5.3.8.1 Configuring SSL for mod_wl_ohs

You can use the Secure Sockets Layer (SSL) protocol to protect the connection between the plug-in and Oracle WebLogic Server. The SSL protocol provides confidentiality and integrity to the data passed between the plug-in and WebLogic Server. For more information, see *Using SSL with Plug-Ins* in *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*.

5.3.9 Removing Access to Unneeded Content

By default, the httpd.conf file allows server access to extra content such as documentation and sample scripts. This access might present a low-level security risk. Starting with the Oracle HTTP Server 12c (12.2.1) release, some of these sections are commented out.

You might want to tailor this extra content in your own environment to suit your use cases. To access the httpd.conf file, see [About Editing Configuration Files](#) to access the file.

- [Edit the cgi-bin Section](#)
- [Edit the Fancy Indexing Section](#)
- [Edit the Product Documentation Section](#)

5.3.9.1 Edit the cgi-bin Section

Examine the contents of the cgi-bin directory. You can either remove the code from the httpd.conf file that you do not need, or change the following Directory directive to point to your own CGI script directory.

```
...
#
# "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/instances/${
COMPONENT_NAME}/cgi-bin" should be changed to whatever your ScriptAliased
# CGI directory exists, if you have that configured.
#
<Directory "${ORACLE_INSTANCE}/config/fmwconfig/components/${COMPONENT_TYPE}/
instances/${COMPONENT_NAME}/cgi-bin">
    AllowOverride None
    Options None
    Require all granted
</Directory>
...
```

5.3.9.2 Edit the Fancy Indexing Section

Edit the following sections pertaining to fancy indexing in the `httpd.conf` file for your use cases.

```

...
# Uncomment the following line to enable the fancy indexing configuration
# below.
# Define ENABLE_FANCYINDEXING
<IfDefine ENABLE_FANCYINDEXING>

# IndexOptions: Controls the appearance of server-generated directory
# listings.
#
IndexOptions FancyIndexing HTMLTable VersionSort

# We include the /icons/ alias for FancyIndexed directory listings.  If
# you do not use FancyIndexing, you may comment this out.
#
Alias /icons/ "${PRODUCT_HOME}/icons/"

<Directory "${PRODUCT_HOME}/icons">
    Options Indexes MultiViews
    AllowOverride None
    Require all granted
</Directory>

#
# AddIcon* directives tell the server which icon to show for different
# files or filename extensions.  These are only displayed for
# FancyIndexed directories.
#
AddIconByEncoding (CMP,/icons/compressed.gif) x-compress x-gzip

AddIconByType (TXT,/icons/text.gif) text/*
AddIconByType (IMG,/icons/image2.gif) image/*
AddIconByType (SND,/icons/sound2.gif) audio/*
AddIconByType (VID,/icons/movie.gif) video/*

AddIcon /icons/binary.gif .bin .exe
AddIcon /icons/binhex.gif .hqx
AddIcon /icons/tar.gif .tar
AddIcon /icons/world2.gif .wrl .wrl.gz .vrm .vrm .iv
AddIcon /icons/compressed.gif .Z .z .tgz .gz .zip
AddIcon /icons/a.gif .ps .ai .eps
AddIcon /icons/layout.gif .html .shtml .htm .pdf
AddIcon /icons/text.gif .txt
AddIcon /icons/c.gif .c
AddIcon /icons/p.gif .pl .py
AddIcon /icons/f.gif .for
AddIcon /icons/dvi.gif .dvi
AddIcon /icons/uuencoded.gif .uu
AddIcon /icons/script.gif .conf .sh .shar .csh .ksh .tcl
AddIcon /icons/tex.gif .tex
AddIcon /icons/bomb.gif core

AddIcon /icons/back.gif ..
AddIcon /icons/hand.right.gif README
AddIcon /icons/folder.gif ^^DIRECTORY^^
AddIcon /icons/blank.gif ^^BLANKICON^^

```

```

#
# DefaultIcon is which icon to show for files which do not have an icon
# explicitly set.
#
DefaultIcon /icons/unknown.gif

#
# AddDescription allows you to place a short description after a file in
# server-generated indexes. These are only displayed for FancyIndexed
# directories.
# Format: AddDescription "description" filename
#
#AddDescription "GZIP compressed document" .gz
#AddDescription "tar archive" .tar
#AddDescription "GZIP compressed tar archive" .tgz
...

#
# ReadmeName is the name of the README file the server will look for by
# default, and append to directory listings.
#
# HeaderName is the name of a file which should be prepended to
# directory indexes.
ReadmeName README.html
HeaderName HEADER.html

#
# IndexIgnore is a set of filenames which directory indexing should ignore
# and not include in the listing. Shell-style wildcarding is permitted.
#
IndexIgnore .??* *~ *# HEADER* README* RCS CVS *,v *,t
</IfDefine>

```

5.3.9.3 Edit the Product Documentation Section

Uncomment the `Define MANUAL_ENABLE` line to enable the manual configuration of product documentation.

```

...
#
# Uncomment the following line to enable the manual configuration below.
# Define ENABLE_MANUAL
<IfDefine ENABLE_MANUAL>
AliasMatch ^/manual(?:/(?:de|en|es|fr|ja|ko|pt-br|ru|tr))?(/*.*)?$ "${PRODUCT_HOME}/
manual$1"

<Directory "${PRODUCT_HOME}/manual">
    Options Indexes
    AllowOverride None
    Require all granted

    <Files *.html>
        SetHandler type-map
    </Files>
    # .tr is text/troff in mime.types!
    <Files *.html,tr.utf8>
        ForceType text/html
    </Files>

    SetEnvIf Request_URI ^/manual/(de|en|es|fr|ja|ko|pt-br|ru|tr)/ prefer-language=$1

```

```

RedirectMatch 301 ^/manual(?:/(de|en|es|fr|ja|ko|pt-br|ru|tr)){2,}(/.*)?$ /
manual/$1$2

LanguagePriority en de es fr ja ko pt-br ru tr
ForceLanguagePriority Prefer Fallback
</Directory>
</IfDefine>

```

5.3.10 Using the apxs Command to Install Extension Modules

Note:

This command is only for UNIX and Linux and is necessary only for modules which are supplied in source code form. Follow the installation instructions for modules supplied in binary form.

For more information about the apxs command, see the Apache HTTP Server documentation at:

<http://httpd.apache.org/docs/2.4/programs/apxs.html>

The Apache Extension Tool (apxs) can build and install Apache HTTP Server extension modules for Oracle HTTP Server. apxs installs modules in the *ORACLE_HOME/ohs/modules* directory for access by any Oracle HTTP Server instances which run from this installation.

Note:

Once any third-party module is created and loaded, it falls under the third-party criteria specified in the Oracle HTTP Server support policy. Before continuing with this procedure, you should be aware of this policy. For more information, see [Oracle HTTP Server Support](#).

Recommended apxs options for use with Oracle HTTP Server are:

Option	Purpose	Example Command
-c	Compile module source	<code>\$ORACLE_HOME/ohs/bin/apxs -c mod_example.c</code>
-i	Install module binary into <i>ORACLE_HOME</i>	<code>\$ORACLE_HOME/ohs/bin/apxs -ci mod_example.c</code>

When the module binary has been installed into *ORACLE_HOME*, a `LoadModule` directive in `httpd.conf` or other configuration file loads the module into the server processes; for example:

```
LoadModule example_module "${ORACLE_HOME}/ohs/modules/mod_example.so"
```

The directive is required in the configurations for all instances which must load the module.

When the `-a` or `-A` option is specified, apxs will edit `httpd.conf` to add a `LoadModule` directive for the module. Do not use the `-a` and `-A` options with Oracle HTTP Server

instances that are part of a WebLogic Server Domain. Instead, use Fusion Middleware Control to update the configuration, as described in [Modifying an Oracle HTTP Server Configuration File](#).

You can use the `-a` or `-A` option with Oracle HTTP Server instances that are part of a standalone domain if the `CONFIG_FILE_PATH` environment variable is set to the staging directory for the instance before invoking `apxs`; for example:

```
CONFIG_FILE_PATH=$ORACLE_HOME/user_projects/domains/base_domain/config/fmwconfig/
components/OHS/ohs1
export CONFIG_FILE_PATH
$ORACLE_HOME/ohs/bin/apxs -cia mod_example.c
```

By default, `apxs` uses the Perl interpreter in `/usr/bin`. If `apxs` cannot locate the product install or encounters other operational errors when using `/usr/bin/perl`, use the Perl interpreter within the Middleware home by invoking `apxs` as follows:

```
$ORACLE_HOME/perl/bin/perl $ORACLE_HOME/ohs/bin/apxs -c mod_example.c
```

Modules often require directives besides `LoadModule` to properly function. After the module has been installed and loaded using the `LoadModule` directive, refer to the documentation for the module for any additional configuration requirements.

5.3.11 Disabling the Options Method

The Options method enables clients to determine which methods are supported by a web server. If enabled, it appears in the `Allow` line of HTTP response headers.

For example, if you send a request such as:

```
---- Request -----
OPTIONS / HTTP/1.0
Content-Length: 0
Accept: /*/*
Accept-Language: en-US
User-Agent: Mozilla/4.0 (compatible; MSIE 6.0; Win32)
Host: host123:80
```

you might get the following response from the web server:

```
---- Response -----
HTTP/1.1 200 OK
Date: Wed, 23 Apr 2008 20:20:49 GMT
Server: Oracle-Application-Server-11g/11.1.1.0.0 Oracle-HTTP-Server
Allow: GET,HEAD,POST,OPTIONS
Content-Length: 0
Connection: close
Content-Type: text/html
```

Some sources consider exposing the Options method a low security risk because malicious clients could use it to determine the methods supported by a web server. However, because web servers support only a limited number of methods, disabling this method will just slow down malicious clients, not stop them. In addition, the Options method may be used by legitimate clients.

If your Oracle Fusion Middleware environment does not have clients that require the Options method, you can disable it by including the following lines in the `httpd.conf` file:

```
<IfModule mod_rewrite.c>
RewriteEngine on
```

```

RewriteCond %{REQUEST_METHOD} ^OPTIONS
RewriteRule .* - [F]
</IfModule>

```

5.3.12 Updating Oracle HTTP Server Component Configurations on a Shared Filesystem

You might encounter functional or performance issues when an Oracle HTTP Server component is created on a shared filesystem, such as NFS (Network File System). In particular, lock files or UNIX sockets used by Oracle HTTP Server might not work or may have severe performance degradation; Oracle WebLogic Server requests routed by mod_wl_ohs may have severe performance degradation due to filesystem accesses in the default configuration.

[Table 5-1](#) provides information about the Lock file issues and the suggested changes in the `httpd.conf` file specific to the operating systems.

Table 5-1 Lock File issues

Operating System	Description	httpd.conf changes
Linux	Lock files are not required. The Sys V semaphore is the preferred cross-process mutex implementation.	Change <code>Mutex fnctl:fileloc</code> default to <code>Mutex sysvsem</code> default where <code>fileloc</code> is the value of the directive <code>Mutex</code> (three places in <code>httpd.conf</code>).
Solaris	Lock files are not required. The cross-process pthread mutex is the preferred cross-process mutex implementation.	Change <code>Mutex fnctl:fileloc</code> default to <code>Mutex pthread</code> default where <code>fileloc</code> is the value of the directive <code>Mutex</code> (three places in <code>httpd.conf</code>).
Other UNIX platforms		Change the file location specified in the <code>Mutex</code> directive to point to a local file system (three places in <code>httpd.conf</code>).
UNIX socket issues	<code>mod_cgid</code> is not enabled by default. If enabled, use the <code>ScriptSock</code> directive to place <code>mod_cgid</code> 's UNIX socket on a local filesystem.	

5.4 Configuring the mod_security Module

You can use the open-source `mod_security` module to detect and prevent intrusion attacks against Oracle HTTP Server. For example, you can specify a `mod_security` rule to screen all incoming requests and deny requests that match the conditions specified in the rule. The `mod_security` module (version 2.8.0) and its prerequisites are included in the Oracle HTTP Server installation as a shared object named `mod_security2.so` in the `ORACLE_HOME/ohs/modules` directory.

This release of Oracle HTTP Server supports only `mod_security` (version 2.8.0) directives, variables, action, phases and functions. *It will not be supported if you replace this module with a later version.*

For more information, see:

<http://www.modsecurity.org/documentation/>

[Sample mod_security.conf File](#) provides a usable example of the mod_security.conf file, including the `LoadModule` statement.

Note:

Be aware of the following:

- mod_security was removed from earlier versions of Oracle HTTP Server but was reintroduced in version 11.1.1.7. This version follows the recommendations and practices prescribed for open source mod_security 2.8.0. Only documentation applicable to open source mod_security 2.8.0 is applicable to the Oracle HTTP Server implementation of the module.
 - In Oracle HTTP Server 11.1.1.7 and later, mod_security is not loaded or configured by default; however, if you have an installation patched from 11.1.1.6, implementing the patch might have already loaded and configured the module.
 - Oracle only supports the Oracle-supplied version of mod_security. Newer versions from modsecurity.org will not be supported.
-

The mod_security configuration can be added to the httpd.conf configuration file, or it can appear in a separate mod_security.conf configuration file.

This section contains the following information:

- [Configuring mod_security in the httpd.conf File](#)
- [Configuring mod_security in a mod_security.conf File](#)
- [Sample mod_security.conf File](#)

5.4.1 Configuring mod_security in the httpd.conf File

You can configure the mod_security module by entering mod_security directives in the httpd.conf file in an `IfModule` container. To make the mod_security module available when Oracle HTTP Server is running, ensure that the mod_security configuration begins with the following lines:

```
...
#Load module
LoadModule security2_module "${PRODUCT_HOME}/modules/mod_security2.so"
...
```

5.4.2 Configuring mod_security in a mod_security.conf File

You can specify the mod_security directives in a separate mod_security.conf file and include that file in the httpd.conf file by using the `Include` directive.

1. You must create the mod_security.conf file yourself, preferably by using the template in [Sample mod_security.conf File](#).

Copy and paste the sample into a text editor, then edit it for your system.

2. To make the mod_security module available when Oracle HTTP Server is running, ensure that mod_security.conf begins with the following lines:

```
#Load module
LoadModule security2_module "${PRODUCT_HOME}/modules/mod_security2.so"
```

3. Save the file with the name "mod_security.conf" and include it in your httpd.conf file by using the Include directive.

If you implement mod_security.conf file as described, it will use the LoadModule directive to load mod_security2.so into the run time environment.

5.4.3 Sample mod_security.conf File

The following code illustrates a sample mod_security.conf configuration file.

Example 5-1 mod_security.conf Sample

```
#Load module
LoadModule security2_module "${PRODUCT_HOME}/modules/mod_security2.so"
# -- Rule engine initialization -----

# Enable ModSecurity, attaching it to every transaction. Use detection
# only to start with, because that minimizes the chances of post-installation
# disruption.
#
SecRuleEngine DetectionOnly

# -- Request body handling -----

# Allow ModSecurity to access request bodies. If you don't, ModSecurity
# won't be able to see any POST parameters, which opens a large security
# hole for attackers to exploit.
#
SecRequestBodyAccess On

# Enable XML request body parser.
# Initiate XML Processor in case of xml content-type
#
SecRule REQUEST_HEADERS:Content-Type "text/xml" "id:'200000',phase:
1,t:none,t:lowercase,pass,nolog,ctl:requestBodyProcessor=XML"

# Maximum request body size we will accept for buffering. If you support
# file uploads then the value given on the first line has to be as large
# as the largest file you are willing to accept. The second value refers
# to the size of data, with files excluded. You want to keep that value as
# low as practical.
#
SecRequestBodyLimit 13107200
SecRequestBodyNoFilesLimit 131072

# Store up to 128 KB of request body data in memory. When the multipart
# parser reaches this limit, it will start using your hard disk for
# storage. That is slow, but unavoidable.
#
SecRequestBodyInMemoryLimit 131072

# What do do if the request body size is above our configured limit.
# Keep in mind that this setting will automatically be set to ProcessPartial
```

```

# when SecRuleEngine is set to DetectionOnly mode in order to minimize
# disruptions when initially deploying ModSecurity.
#
SecRequestBodyLimitAction Reject

# Verify that we've correctly processed the request body.
# As a rule of thumb, when failing to process a request body
# you should reject the request (when deployed in blocking mode)
# or log a high-severity alert (when deployed in detection-only mode).
#
SecRule REQBODY_ERROR "!@eq 0" \
  "id:'200001', phase:2,t:none,log,deny,status:400,msg:'Failed to parse request \
  body.',logdata:'%{reqbody_error_msg}',severity:2"

# By default be strict with what we accept in the multipart/form-data
# request body. If the rule below proves to be too strict for your
# environment consider changing it to detection-only. You are encouraged
# _not_ to remove it altogether.
#
SecRule MULTIPART_STRICT_ERROR "!@eq 0" \
  "id:'200002',phase:2,t:none,log,deny,status:44, \
  msg:'Multipart request body failed strict validation: \
  PE %{REQBODY_PROCESSOR_ERROR}, \
  BQ %{MULTIPART_BOUNDARY_QUOTED}, \
  BW %{MULTIPART_BOUNDARY_WHITESPACE}, \
  DB %{MULTIPART_DATA_BEFORE}, \
  DA %{MULTIPART_DATA_AFTER}, \
  HF %{MULTIPART_HEADER_FOLDING}, \
  LF %{MULTIPART_LF_LINE}, \
  SM %{MULTIPART_MISSING_SEMICOLON}, \
  IQ %{MULTIPART_INVALID_QUOTING}, \
  IP %{MULTIPART_INVALID_PART}, \
  IH %{MULTIPART_INVALID_HEADER_FOLDING}, \
  FL %{MULTIPART_FILE_LIMIT_EXCEEDED}'"

# Did we see anything that might be a boundary?
#
SecRule MULTIPART_UNMATCHED_BOUNDARY "!@eq 0" \
  "id:'200003',phase:2,t:none,log,deny,status:44,msg:'Multipart parser detected a possible unmatched
  boundary.'"

# PCRE Tuning
# We want to avoid a potential RegEx DoS condition
#
SecPcreMatchLimit 1000
SecPcreMatchLimitRecursion 1000

# Some internal errors will set flags in TX and we will need to look for these.
# All of these are prefixed with "MSC_". The following flags currently exist:
#
# MSC_PCRE_LIMITS_EXCEEDED: PCRE match limits were exceeded.
#
SecRule TX:^(^MSC_/ "!@streq 0" \
  "id:'200004',phase:2,t:none,deny,msg:'ModSecurity internal error flagged: %
  {MATCHED_VAR_NAME}'"

# -- Response body handling -----

# Allow ModSecurity to access response bodies.
# You should have this directive enabled in order to identify errors
# and data leakage issues.

```

```
#
# Do keep in mind that enabling this directive does increases both
# memory consumption and response latency.
#
SecResponseBodyAccess On

# Which response MIME types do you want to inspect? You should adjust the
# configuration below to catch documents but avoid static files
# (e.g., images and archives).
#
SecResponseBodyMimeType text/plain text/html text/xml

# Buffer response bodies of up to 512 KB in length.
SecResponseBodyLimit 524288

# What happens when we encounter a response body larger than the configured
# limit? By default, we process what we have and let the rest through.
# That's somewhat less secure, but does not break any legitimate pages.
#
SecResponseBodyLimitAction ProcessPartial

# -- Filesystem configuration -----

# The location where ModSecurity stores temporary files (for example, when
# it needs to handle a file upload that is larger than the configured limit).
#
# This default setting is chosen due to all systems have /tmp available however,
# this is less than ideal. It is recommended that you specify a location that's private.
#
SecTmpDir /tmp/

# The location where ModSecurity will keep its persistent data. This default setting
# is chosen due to all systems have /tmp available however, it
# too should be updated to a place that other users can't access.
#
SecDataDir /tmp/

# -- File uploads handling configuration -----

# The location where ModSecurity stores intercepted uploaded files. This
# location must be private to ModSecurity. You don't want other users on
# the server to access the files, do you?
#
#SecUploadDir /opt/modsecurity/var/upload/

# By default, only keep the files that were determined to be unusual
# in some way (by an external inspection script). For this to work you
# will also need at least one file inspection rule.
#
#SecUploadKeepFiles RelevantOnly

# Uploaded files are by default created with permissions that do not allow
# any other user to access them. You may need to relax that if you want to
# interface ModSecurity to an external program (e.g., an anti-virus).
#
#SecUploadFileMode 0600

# -- Debug log configuration -----

# The default debug log configuration is to duplicate the error, warning
```

```
# and notice messages from the error log.
#
#SecDebugLog /opt/modsecurity/var/log/debug.log
#SecDebugLogLevel 3

# -- Audit log configuration -----

# Log the transactions that are marked by a rule, as well as those that
# trigger a server error (determined by a 5xx or 4xx, excluding 404,
# level response status codes).
#
SecAuditEngine RelevantOnly
SecAuditLogRelevantStatus "^(?:5|4(?:!04))"

# Log everything we know about a transaction.
SecAuditLogParts ABIJDEFHZ

# Use a single file for logging. This is much easier to look at, but
# assumes that you will use the audit log only occasionally.
#
SecAuditLogType Serial
SecAuditLog "${ORACLE_INSTANCE}/servers/${COMPONENT_NAME}/logs/modsec_audit.log"

# Specify the path for concurrent audit logging.
SecAuditLogStorageDir "${ORACLE_INSTANCE}/servers/${COMPONENT_NAME}/logs"
#Simple test
SecRule ARGS "\.\/" "t:normalisePathWin,id:99999,severity:4,msg:'Drive Access'"

# -- Miscellaneous -----

# Use the most commonly used application/x-www-form-urlencoded parameter
# separator. There's probably only one application somewhere that uses
# something else so don't expect to change this value.
#
SecArgumentSeparator &

# Settle on version 0 (zero) cookies, as that is what most applications
# use. Using an incorrect cookie version may open your installation to
# evasion attacks (against the rules that examine named cookies).
#
SecCookieFormat 0

# Specify your Unicode Code Point.
# This mapping is used by the t:urlDecodeUni transformation function
# to properly map encoded data to your language. Properly setting
# these directives helps to reduce false positives and negatives.
#
#SecUnicodeCodePage 20127
#SecUnicodeMapFile unicode.mapping
```

Managing and Monitoring Server Processes

This chapter describes how to manage and monitor Oracle HTTP Server. It discusses the procedures and tools to manage the server in your environment.

This chapter includes the following sections:

- [Oracle HTTP Server Processing Model](#)
- [Monitoring Server Performance](#)
- [Oracle HTTP Server Performance Directives](#)
- [Understanding Process Security for UNIX](#)

6.1 Oracle HTTP Server Processing Model

The following sections describe the processing models for Oracle HTTP Server.

- [Request Process Model](#)
- [Single Unit Process Model](#)

6.1.1 Request Process Model

After Oracle HTTP Server is started, it is ready to listen for and respond to HTTP(S) requests. The request processing model on Microsoft Windows systems differs from that on UNIX systems.

- On Microsoft Windows, there is a single parent process and a single child process. The child process creates threads that are responsible for handling client requests. The number of created threads is static and can be configured for performance.
- On UNIX, there is a single parent process that manages multiple child processes. The child processes are responsible for handling requests. The parent process brings up additional child processes as necessary, based on configuration. Although the server can dynamically start additional child processes, it is best to configure the server to start enough child processes initially so that requests can be handled without having to spawn more child processes.

6.1.2 Single Unit Process Model

Oracle HTTP Server provides functionality that allows it to terminate as a single unit if the parent process fails. The parent process is responsible for starting and stopping all the child processes for an Oracle HTTP Server instance. The failure of the parent process without first shutting down the child processes leaves Oracle HTTP Server in an inconsistent state that can only be fixed by manually shutting down all the orphaned child processes. Until all the child processes are closed, a new Oracle HTTP

Server instance cannot be started because the orphaned child processes still occupy the ports the new Oracle HTTP Server instance needs to access.

To prevent this from occurring, the DMS instrumentation layer in child processes on UNIX and monitor functionality within WinNT MPM on Windows monitor the parent process. If they detect that the parent process has failed, then all of the remaining child processes are shut down.

6.2 Monitoring Server Performance

Oracle Fusion Middleware automatically and continuously measures run-time performance for Oracle HTTP Server and for the Oracle WebLogic Server Proxy Plug-In module. The performance metrics are automatically enabled; you do not need to set options or perform any extra configuration to collect them. If you encounter a problem, such as an application that is running slowly or is hanging, you can view particular metrics to find out more information about the problem.

Fusion Middleware Control provides real-time data. If you are interested in viewing historical data, consider using Cloud Control.

This section contains the following information:

- [Oracle HTTP Server Performance Metrics](#)
- [Viewing Performance Metrics](#)

6.2.1 Oracle HTTP Server Performance Metrics

This section lists commonly-used metrics that can help you analyze Oracle HTTP Server performance.

OHS Server Metrics

The OHS Server Metrics folder contains performance metric options for Oracle HTTP Server. The following table describes the metrics in the OHS Server Metrics folder:

Element	Description
CPU Usage	CPU usage and idle times
Memory Usage	Memory usage and free memory, in MB
Processes	Busy and idle process metrics
Request Throughput	Request throughput, as measured by requests per second
Request Processing Time	Request processing time, in seconds
Response Data Throughput	Response data throughput, in KB per second
Response Data Processed	Response data processed, in KB per response
Active HTTP Connections	Number of active HTTP connections
Connection Duration	Length of time for connections
HTTP Errors	Number of HTTP 4xx and 5xx errors

OHS Virtual Host Metrics

The OHS Virtual Host Metrics folder contains performance metric options for virtual hosts, also known as access points. The following table describes the metrics in the OHS Virtual Host Metrics folder:

Element	Description
Request Throughput for a Virtual Host	Number of requests per second for each virtual host
Request Processing Time for a Virtual Host	Time to process each request for each virtual host
Response Data Throughput for a Virtual Host	Amount of data being sent for each virtual host
Response Data Processed for a Virtual Host	Amount of data being processed for each virtual host

OHS Module Metrics

The OHS Module Metrics folder contains performance metric option for modules. The following table describes the metrics in the OHS Module Metrics folder.

Element	Description
Request Handling Throughput	Request handling throughput for a module, in requests per second
Request Handling Time	Request handling time for a module, in seconds
Module Metrics	Modules including active requests, throughput, and time for each module

6.2.2 Viewing Performance Metrics

You can view Oracle HTTP Server and Oracle WebLogic Server Proxy Plug-In module performance metrics by using the procedures described in the following sections:

- [Viewing Server Metrics Using Fusion Middleware Control](#)
- [Viewing Server Metrics Using WLST](#)

6.2.2.1 Viewing Server Metrics Using Fusion Middleware Control

You can view metrics from the Oracle HTTP Server home menu of Fusion Middleware Control:

1. Select the Oracle HTTP Server that you want to monitor.
2. From the Oracle HTTP Server menu on the Oracle HTTP Server home page, choose **Monitoring**, and then select **Performance Summary**.

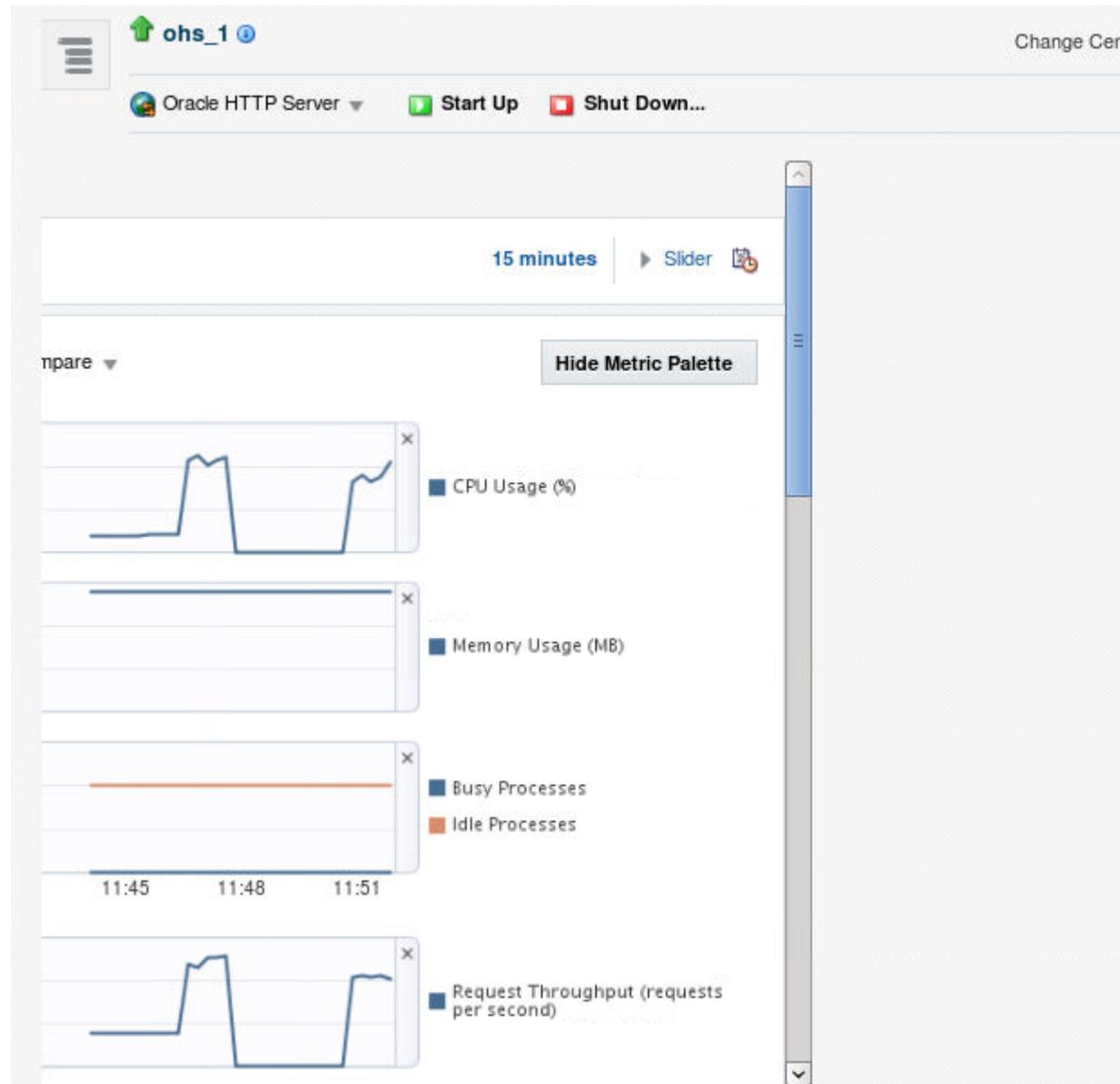
The Performance Summary page is displayed. It shows performance metrics and information about response time and request processing time for the Oracle HTTP Server instance.

3. To see additional metrics, click **Show Metric Palette** and expand the metric categories.

Tip:

Oracle HTTP Server port usage information is also available from the Oracle HTTP Server home menu.

The following figure shows the Oracle HTTP Server Performance Summary page with the Metric Palette displayed:



4. Select additional metrics to add them to the Performance Summary.

6.2.2.2 Viewing Server Metrics Using WLST

To obtain and view metrics for an instance from the command line, you must connect to, and issue the appropriate WLST command. These commands allow you to perform any of these functions:

- Display Metric Table Names

- Display metric tables
- Dump metrics

Note:

For more information on using WLST, see *Understanding the WebLogic Scripting Tool*.

Before attempting this procedure:

Before attempting to access server metrics from the command line, ensure the following:

- The domain exists and the instance for which you want to see the metrics exist.
- The instance is running.
- The Node Manager is running on the instance machine.

The Administration server can be running, but this is not required.

To view metrics using WLST:

Note:

In both managed and standalone domain types, the following procedure will work whether you run the commands from the same machine or from a machine that is remote to the server.

1. Launch WLST:

On Linux or UNIX:

```
$ORACLE_HOME/oracle_common/common/bin/wlst.sh
```

On Windows:

```
$ORACLE_HOME\oracle_common\common\bin\wlst.cmd
```

2. From the selected domain directory (for example, *ORACLE_HOME/user_projects/domains/domainName*), connect to the instance:

```
nmConnect('username', 'password', nm_host, nm_port, domainName)
```

3. Enter one of the following WLST commands, depending on what task you want to accomplish:

- `displayMetricTableNames(servers=['serverName'], servertype='serverType')`
- `displayMetricTables(servers=['serverName'], servertype='serverType')`
- `dumpMetrics(servers=['serverName'], servertype='serverType')`

For example:

```
displayMetricTableNames(servers=['ohs1'], servertype='OHS')
displayMetricTables(servers=['ohs1'], servertype='OHS')
dumpMetrics(servers=['ohs1'], servertype='OHS')
```

6.3 Oracle HTTP Server Performance Directives

The following sections describe the Oracle HTTP Server performance directives.

- [Understanding Performance Directives](#)
- [Configuring Performance Directives Using Fusion Middleware Control](#)

6.3.1 Understanding Performance Directives

Oracle HTTP Server uses directives declared in `httpd.conf` and other configuration files. This configuration file specifies the maximum number of HTTP requests that can be processed simultaneously, logging details, and certain limits and timeouts. Oracle HTTP Server supports and ships with the following Multi-Processing Modules (MPMs) which are responsible for binding to network ports on the machine, accepting requests, and dispatching children to handle the requests:

- **Worker:** This is the default MPM for Oracle HTTP Server in UNIX (non-Linux) environments. This MPM implements a hybrid multi-process multi-threaded server. By using threads to serve requests, it can serve many requests with fewer system resources than a process-based server. However, it retains much of the stability of a process-based server by keeping multiple processes available, each with many threads. If you are using Worker MPM, then you must configure the `mod_cgid` module for your CGI applications instead of the `mod_cgi` module. For more information, see the following URL:
http://httpd.apache.org/docs/2.4/mod/mod_cgid.html
- **WinNT:** This is the default MPM for Oracle HTTP Server on Windows platforms. It uses a single control process which launches a single child process which in turn creates threads to handle requests.
- **Prefork:** This MPM implements a non-threaded, pre-forking server that handles requests in a manner similar to Apache 1.3. It is appropriate for sites that need to avoid threading for compatibility with non-thread-safe libraries. It is also the best MPM for isolating each request, so that a problem with a single request will not affect any other. If you are going to implement a CGI module with this MPM, use only `mod_fastcgi`.
- **Event:** This is the default MPM for Oracle HTTP Server in Linux environments. This MPM is designed to allow more requests to be served simultaneously by passing off some processing work to supporting threads, freeing up the main threads to work on new requests. It is based on the Worker MPM, which implements a hybrid multi-process multi-threaded server. Run-time configuration directives are identical to those provided by Worker.

The following sections describe how to change the MPM type value for an Oracle HTTP Server instance in a standalone and an Oracle WebLogic Server domain

- [Changing the MPM Type Value in a Standalone Domain](#)
- [Changing the MPM Type Value in a WebLogic Server Managed Domain](#)

6.3.1.1 Changing the MPM Type Value in a Standalone Domain

To change the MPM type value for an Oracle HTTP Server instance in a standalone domain, follow these steps:

1. Navigate to the `ohs.plugins.nodemanager.properties` file at the following location: `${ORACLE_INSTANCE}/config/fmwconfig/components/OHS/${COMPONENT_NAME}`.
2. Edit the `ohs.plugins.nodemanager.properties` file to make the following changes.

Look for the key `mpm` in an uncommented line.

- If you find the key in an uncommented line, then replace the existing value of `mpm` with the value you want to set for MPM.
- If you do not find it in an uncommented line, then add a new line to the file using the following format:

```
mpm = mpm_value
```

where `mpm_value` is the value you want to set as MPM.

3. Start or re-start the Oracle HTTP Server instance.

6.3.1.2 Changing the MPM Type Value in a WebLogic Server Managed Domain

To change the MPM type value for an Oracle HTTP Server instance in an Oracle WebLogic Server domain, follow these steps.

Note:

The following steps assume that the Administration Server and the Node Manager for the domain are already up and running.

1. Launch WLST from the command line.

Linux or UNIX: `$ORACLE_HOME/oracle_common/common/bin/wlst.sh`

2. Connect to the Administration Server instance:

```
connect('<userName>', '<password>', '<host>:<port>')
```

3. Navigate to the Mbean containing the MPM type value key.

You can use the `editCustom()` command only when WLST is connected to the Administration Server. Use `cd` to navigate the hierarchy of management objects. This example assumes that Oracle HTTP Server instance with name 'ohs1'.

```
editCustom()
cd('oracle.ohs')
cd('oracle.ohs:type=OHSInstance,NMProp,OHSInstance=ohs1,component=OHS')
```

4. Set the MPM type value key.

Start an edit session and set the MPM type value key `Mpm` to the type value. In this example the type value is set to `event`.

```
startEdit()
set('Mpm', 'event')
save()
activate()
```

6.3.2 Configuring Performance Directives Using Fusion Middleware Control

The discussion and recommendations in this section are based on the use of Worker, Event, or WinNT MPM, which uses threads. The thread-related directives listed below are not applicable if you are using the Prefork MPM.

Use the Performance Directives page of Fusion Middleware Control, illustrated in the following figure, to tune performance-related directives for Oracle HTTP Server.

The screenshot displays the 'Performance Directives' page in Fusion Middleware Control. The page title is 'Performance Directives' and it includes a 'Reset to Default' button. A warning message states: 'All changes made in this page require a server restart to take effect.' The page is organized into four sections:

- General:** MPM Name is set to 'worker'.
- Request Configuration:**
 - Maximum Requests: 150
 - Maximum Connections per Child Server Process: No Limit, Limit To 0
 - Request Timeout (seconds): 60
- Connection Configuration:**
 - Maximum Connection Queue Length: 511
 - Multiple Requests per Connection: Allow with Connection Timeout (seconds) 5, Not Allowed
- Process Configuration:**
 - Initial Child Server Processes: 2
 - Maximum Idle Threads: 75
 - Minimum Idle Threads: 25
 - Threads per Child Server Process: 25

Performance directives management consists of these areas: request, connection, and process configuration. The following sections describe how to set these configurations.

- [Setting the Request Configuration Using Fusion Middleware Control](#)
- [Setting the Connection Configuration Using Fusion Middleware Control](#)
- [Setting the Process Configuration Using Fusion Middleware Control](#)

6.3.2.1 Setting the Request Configuration Using Fusion Middleware Control

To specify the Oracle HTTP Server request configuration using Fusion Middleware Control, do the following:

1. Select **Administration** from the Oracle HTTP Server menu.
2. Select **Performance Directives** from the Administration menu. The Performance Directives page appears.
3. Enter the maximum number of requests in the **Maximum Requests** field (`MaxRequestWorkers` directive).

This setting limits the number of requests that can be dealt with simultaneously. The default value is 400. This is applicable for all Linux/UNIX platforms.

4. Set the maximum requests per child process in the Maximum Request per Child Process field (`MaxConnectionsPerChild` directive).

You can choose to have no limit, or a maximum number. If you choose to have a limit, enter the maximum number in the field.

5. Enter the request timeout value in the Request Timeout (seconds) field (`Timeout` directive).

This value sets the maximum time, in seconds, Oracle HTTP Server waits to receive a GET request, the amount of time between receipt of TCP packets on a POST or PUT request, and the amount of time between ACKs on transmissions of TCP packets in responses.

6. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
7. Restart Oracle HTTP Server. For more information, see [Restarting Oracle HTTP Server Instances](#).

The request configuration settings are saved, and shown on the Performance Directives page.

6.3.2.2 Setting the Connection Configuration Using Fusion Middleware Control

To specify the connection configuration using Fusion Middleware Control, do the following:

1. Select **Administration** from the Oracle HTTP Server menu.
2. Select **Performance Directives** from the Administration menu. The Performance Directives page appears.
3. Enter the maximum connection queue length in the Maximum Connection Queue Length field (`ListenBacklog` directive).

This is the queue for pending connections. This is useful if the server is experiencing a TCP SYN overload, which causes numerous new connections to open up, but without completing the pending task.

4. Set the Multiple Requests per Connection field (`KeepAlive` directive) to indicate whether to allow multiple connections. If you choose to allow multiple connections, enter the number of seconds for timeout in the Allow With Connection Timeout field.

The Allow With Connection Timeout value sets the number of seconds the server waits for a subsequent request before closing the connection. Once a request has been received, the specified value applies. The default is 5 seconds.

5. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
6. Restart Oracle HTTP Server. For more information, see [Restarting Oracle HTTP Server Instances](#).

The connection configuration settings are saved, and shown on the Performance Directives page.

6.3.2.3 Setting the Process Configuration Using Fusion Middleware Control

The child process and configuration settings impact the ability of the server to process requests. You might need to modify the settings as the number of requests increase or decrease to maintain a well-performing server.

For UNIX, the default number of child server processes is 3. For Microsoft Windows, the default number of threads to handle requests is 150.

To specify the process configuration using Fusion Middleware Control, do the following:

1. Select **Administration** from the Oracle HTTP Server menu.
2. Select **Performance Directives** from the Administration menu. The Performance Directives page appears.
3. Enter the number for the initial child server processes in the Initial Child Server Processes field (`StartServers` directive).

This is the number of child server processes created when Oracle HTTP Server is started. The default is 3. This is for UNIX only.

4. Enter the number for the maximum idle threads in the Maximum Idle Threads field (`MaxSpareThreads` directive).

An idle thread is a process that is running, but not handling a request.

5. Enter the number for the minimum idle threads in the Minimum Idle Threads field (`MinSpareThreads` directive).
6. Enter the number for the threads per child server process in the Threads per Child Server Process field (`ThreadsPerChild` directive).
7. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.

8. Restart Oracle HTTP Server. For more information, see [Restarting Oracle HTTP Server Instances](#) .

The process configuration settings are saved, and shown on the Performance Directives page.

6.4 Understanding Process Security for UNIX

By default, Oracle HTTP Server is not able to bind to ports on UNIX in the reserved range (typically less than 1024). To enable Oracle HTTP Server to listen on ports in the reserved range (for example, port 80 and port 443) on UNIX, see [Starting Oracle HTTP Server Instances on a Privileged Port \(UNIX Only\)](#).

Managing Connectivity

This chapter describes how to manage Oracle HTTP Server connectivity. It includes procedures for viewing port number usage, managing ports, and configuring virtual hosts.

This chapter includes the following sections:

- [Default Listen Ports](#)
- [Defining the Admin Port](#)
- [Viewing Port Number Usage](#)
- [Managing Ports](#)
- [Configuring Virtual Hosts](#)

7.1 Default Listen Ports

Automatic port assignment occurs only if you use `ohs_createInstance()` or Fusion Middleware Control. The default, non-SSL port is 7777. If port 7777 is occupied, the next available port number, within a range of 7777-65535, is assigned. The default SSL port is 4443. Similarly, if port 4443 is occupied, the next available port number, within a range of 4443-65535, is assigned.

If you create instances using Configuration Wizard, then you must perform your own port management. The Configuration Wizard has no automatic port assignment capabilities.

For information about specifying ports when creating a new Oracle HTTP Server component, see [Creating an OHS Instance](#).

7.2 Defining the Admin Port

Automatic Admin port assignment occurs only if you use `ohs_createInstance()` or Fusion Middleware Control. The Admin port is used internally by Oracle HTTP Server to communicate with Node Manager. This port is configured in the `admin.conf` file.

If you create instances using Configuration Wizard, then you must perform your own Admin port management. The Configuration Wizard has no automatic port assignment capabilities.

If for any reason you need to use the default port for another purpose, you can reconfigure the Admin port by using the Configuration Wizard to update the domain and manually reset ports there.

7.3 Viewing Port Number Usage

This section describes how to view ports using Fusion Middleware Control or WLST.

- [Viewing Port Number Usage Using Fusion Middleware Control](#)
- [Viewing Port Number Usage Using WLST](#)

7.3.1 Viewing Port Number Usage Using Fusion Middleware Control

You can view how ports are assigned on the Fusion Middleware Control Port Usage detail page. To view the port number usage using Fusion Middleware Control, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Port Usage** from the Oracle HTTP Server menu.

The Port Usage detail page shows the component, the ports that are in use, the IP address the ports are bound to, and the protocol being used, as illustrated in the following figure:

Port in Use	IP Address	Component	Protocol
4443	ALL	ohs_1	HTTP
7777	ALL	ohs_1	HTTP
7779	127.0.0.1	ohs_1	HTTP

7.3.2 Viewing Port Number Usage Using WLST

If you are using Oracle HTTP Server in collocated mode, then you can use WLST commands to view the port number information on a given instance.

1. Launch WLST:

```
$ORACLE_HOME/oracle_common/common/bin/wlst.sh
```

2. Connect to the AdminServer.

3. Use the `editCustom()` command to navigate to the root of the `oracle.ohs` MBean. You can use the `editCustom()` command only when WLST is connected to the Administration Server. Use `cd` to navigate the hierarchy of management objects, then `get()` to get the value of the `Ports` parameter:

```
editCustom()
cd('oracle.ohs')
```

```
cd('oracle.ohs:type=OHSInstance,name=ohs1')
get('Ports')
```

WLST will return a value similar to the following:

```
array(java.lang.String,['7777', '4443', '127.0.0.1:9999'])
```

Note:

You can also `cd` into the directory of the master copy of the OHS config files and do a `grep` for the Listen directives.

7.4 Managing Ports

The ports used by Oracle HTTP Server can be set during and after installation. In addition, you can change the port numbers, as needed. This section describes how to create, edit, and delete ports using Fusion Middleware Control.

Caution:

The Oracle HTTP Server administration virtual host and its configuration, defined in the `admin.conf` file, must not be edited with the WebLogic Scripting Tool (WLST).

See Also:

Changing the Oracle HTTP Server Listen Ports in the *Administering Oracle Fusion Middleware*.

- [Creating Ports Using Fusion Middleware Control](#)
- [Editing Ports Using Fusion Middleware Control](#)

The screenshot shows the Fusion Middleware Control interface for the `ohs_1` component. The page title is "Ports Configuration". Below the title, there is a note: "All ports configured for this system component are shown. Some ports configured of type Admin cannot be edited or deleted." The interface includes a toolbar with "View", "Create...", "Edit...", and "Delete..." options. The main content is a table with the following data:

Port	Port Type	Host Name	IP Address	Protocol
7777	Listen	ANY	ANY	HTTP
4443	Listen	ANY	ANY	HTTP
7779	Admin	localhost.localdomain	127.0.0.1	HTTP

Note:

When deleting a port, if there is a virtual host configured to use the port you want to delete, you must first delete that virtual host before deleting the port.

7.4.1 Creating Ports Using Fusion Middleware Control

You create a port for an Oracle HTTP Server endpoint on the Fusion Middleware Control Create port page. To create ports using Fusion Middleware Control, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Administration** from the Oracle HTTP Server menu.
3. Select **Ports Configuration** from the Administration menu.
4. Click **Create**.

The screenshot shows the Fusion Middleware Control interface for Oracle HTTP Server. The top navigation bar includes the instance name 'ohs_1', a 'Change Center' link, and user information 'Logged in as weblogic'. Below the navigation bar, there are buttons for 'Start Up' and 'Shut Down...'. The main content area features an 'Information' section with a warning: 'All changes made in this page require a server restart to take effect.' Below this is the 'Create Port' section, which includes a description: 'Create a new port for this system component. Ports created can listen on local IP Address of associated host or any of available network interfaces. SSL for a port can be configured here :[Virtual Hosts](#)'. Under the 'Endpoint Attributes' section, the 'Port Type' is set to 'Listen'. The 'IP Address' dropdown menu is currently set to 'ANY'. The 'Port' field is empty and marked with an asterisk, indicating it is required.

5. Use the IP Address menu to select an IP address for the new port. Ports can listen on a local IP Address of an associated host or on any available network interfaces.

You can configure SSL for a port on the Virtual Hosts page, as described in [Configuring Virtual Hosts Using Fusion Middleware Control](#).

6. In **Port**, enter the port number.
7. Click **OK**.
8. Restart Oracle HTTP Server. For more information, see [Restarting Oracle HTTP Server Instances](#).

Note:

If you change the port or make other changes that affect the URL, such as changing the host name, enabling or disabling SSL, you need to re-register partner applications with the SSO server using the new URL. For more information, see [Registering Oracle HTTP Server mod_osso with OSSO Server](#).

7.4.2 Editing Ports Using Fusion Middleware Control

You can edit the values for existing ports on the Fusion Middleware Control Edit Port page. To edit the ports using Fusion Middleware Control, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Administration** from the Oracle HTTP Server menu.
3. Select **Ports Configuration** from the Administration menu.
4. Select the port for which you want to change the port number.

The Admin port cannot be edited by using Fusion Middleware Control. Although this is a port Oracle HTTP Server uses for its internal communication with the Node Manager, in most of the cases it does not need to be changed. If you really want to change it, manually edit the `DOMAIN_HOME/config/fmwconfig/components/OHS/componentName/admin.conf` file.

5. Click **Edit**.

The screenshot shows the Fusion Middleware Control interface for editing a port. At the top, there is a navigation bar with a menu icon, the instance name 'ohs_1', and buttons for 'Change Center', 'Start Up', and 'Shut Down...'. Below the navigation bar, there is an 'Information' section with a warning: 'All changes made in this page require a server restart to take effect.' The main heading is 'Edit Port : oracle.ohs:OHSInstance=ohs_1,name=4443,type=OHSInstance'. Below this, there is a description: 'Edit attributes of a port for this system component. Ports created can listen on local IP Address of associated host or a port can be configured here : [Virtual Hosts](#)'. The 'Endpoint Attributes' section is expanded, showing the following fields: 'Port Type' set to 'Listen', 'Endpoint Name' set to 'oracle.ohs:OHSInstance=ohs_1,name=4443,type=OHSInstance.PortConfig', 'IP Address' set to 'ANY' (with a dropdown arrow), and 'Port' set to '4443' (with an asterisk indicating it is a required field).

6. Edit the IP Address and/or Port number for the port.

You can be configure SSL for a port on the Virtual Hosts page, as described in [Configuring Virtual Hosts Using Fusion Middleware Control](#).

7. Click **OK**.
8. Restart Oracle HTTP Server. For more information, see [Restarting Oracle HTTP Server Instances](#) .

Note:

If you change the port or make other changes that affect the URL, such as changing the host name, enabling or disabling SSL, you need to re-register partner applications with the SSO server using the new URL.

7.4.3 Disabling a Listening Port in a Standalone Environment

While you can use Fusion Middleware Control to disable a listen port in a WebLogic Server environment, to do so in a standalone environment, you must directly update staging configuration file by commenting-out the line where port is exposed; for example:

```
#Listen slc01qtd.us.myCo.com:7777
```

Note:

Before attempting to edit any .conf file, you should familiarize yourself with the layout of the configuration file directories, mechanisms for editing the files, and learn more about the files themselves. For this information, see [Understanding Configuration Files](#).

7.5 Configuring Virtual Hosts

You can create virtual hosts to run more than one website (such as `www.company1.com` and `www.company2.com`) on a single machine. Virtual hosts can be *IP-based*, meaning that you have a different IP address for every website, or *name-based*, meaning that you have multiple names running on each IP address. The fact that they run on the same physical server is not apparent to the end user.

Caution:

The Oracle HTTP Server administration virtual host and its configuration, defined in the `admin.conf` file, must not be edited with the WebLogic Scripting Tool (WLST).

The current release of Oracle HTTP Server enables you to use IPv6 and IPv4 addresses as the virtual host name.

You can also configure multiple addresses for the same virtual host; that is, a virtual host can be configured to serve on multiple addresses. This allows requests to different addresses to be served with the same content from the same virtual host.

This section describes how to create and edit virtual hosts using Fusion Middleware Control.

- [Creating Virtual Hosts Using Fusion Middleware Control](#)
- [Configuring Virtual Hosts Using Fusion Middleware Control](#)

See Also:

For more information about virtual hosts, refer to the [Apache HTTP Server documentation](#).

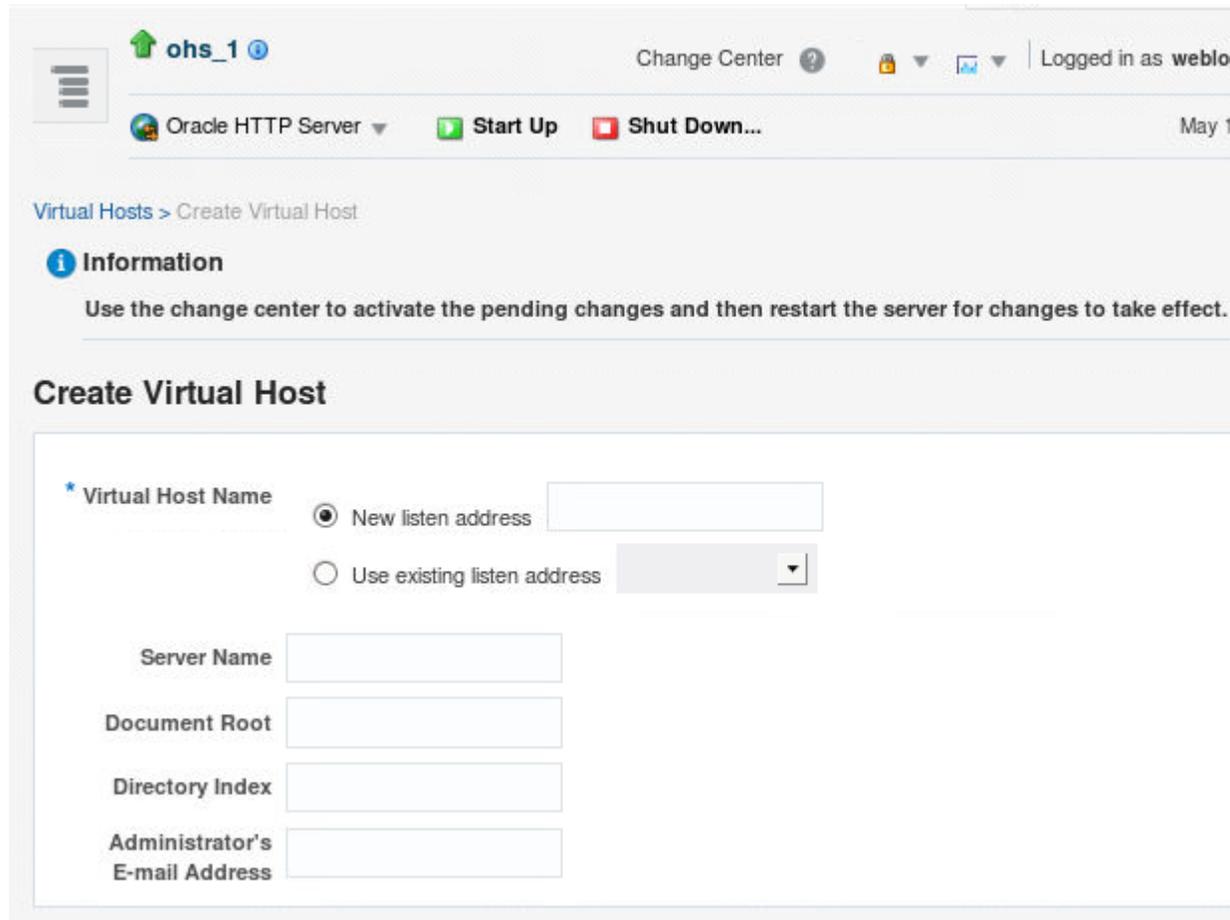
The screenshot shows the Oracle HTTP Server administration console. At the top, there is a navigation bar with a menu icon, the server name 'ohs_1', and a 'Change Center' button. Below the navigation bar, there are buttons for 'Oracle HTTP Server', 'Start Up', and 'Shut Down...'. The main content area has an 'Information' section with a message: 'Use the change center to activate the pending changes and then restart the server for changes to take effect.' Below this is the 'Virtual Hosts' section, which includes a description: 'Create virtual hosts to maintain more than one server on one computer, as differentiated by their apparent hostname, enable different Web sites simultaneously. You can select a virtual host row from the table and using the Configure menu specify the configuration for selected row.' At the bottom of the section, there are buttons for '+ Create', 'X Remove...', and 'Configure'. Below these buttons is a table with the following data:

	Name	Server Name	Ports	Protocol
	127.0.0.1:7779		7779	HTTP
	*:4443		4443	HTTP

7.5.1 Creating Virtual Hosts Using Fusion Middleware Control

You can create a virtual host for Oracle HTTP Server on the Fusion Middleware Control Create Virtual Hosts page. To create a virtual host using Fusion Middleware Control, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Administration** from the Oracle HTTP Server menu.
3. Select **Virtual Hosts** from the Administration menu.
4. Click **Create**.



5. Enter a name for the virtual host field and then choose whether to enter a new listen address or to use an existing listen address.
 - **New listen address**—use this option when you want to create a virtual host that maps to a specific hostname, IP address, or IPv6 address, for example `mymachine.com:8080`. This will create the following VirtualHost directive:
- **Use existing listen address**—use this option when you want to create a virtual host using an existing listen port and the one that maps to all IP addresses. This will create following type VirtualHost directive:

```
<VirtualHost mymachine.com:8080>
```

```
<VirtualHost *:8080>
```

Note:

If you attempt to create a virtual host with a wildcard character, for example, `*:port` and no Listen directive exists for that port, then the virtual host creation will fail.

In this case, you must first add the Listen directive and then try to add the virtual host.

6. Enter the remaining attributes for the new virtual host.

- **Server Name**—the name of the server for Oracle HTTP Server
- **Document Root**— documentation root directory that forms the main document tree visible from the website
- **Directory Index**—the main (index) page that will be displayed when a client first accesses the website
- **Administrator's E-mail Address**—the e-mail address that the server will include in error messages sent to the client

7. Click **OK**.

8. Restart Oracle HTTP Server. See [Restarting Oracle HTTP Server Instances](#) .

Removing Unnecessary Listen Directives

Creating a virtual host by using Fusion Middleware Control also adds the Listen directive for the virtual host. However, virtual host creation will add unnecessary Listen directives in the following situations:

- A virtual host is being created for one host name and the Listen directive already exists for the different host name resolving to the same IP address.
- A virtual host is being created for one host name and the Listen directive already exists for the IP address that the host name resolves to.
- A virtual host is being created for multiple host names that resolve to the same IP address.

In these situations, Oracle HTTP Server will fail to start because there are multiple Listen directives for the same IP address. You must remove any extra Listen directives configured for the same IP address.

7.5.2 Configuring Virtual Hosts Using Fusion Middleware Control

You can use the options on the Configure menu of the Virtual Hosts page to specify Server, MIME, Log, SSL, and mod_wl_ohs configuration for a selected virtual host.

To configure a virtual host using Fusion Middleware Control, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Administration** from the Oracle HTTP Server menu.
3. Select **Virtual Hosts** from the Administration menu.
4. Highlight an existing virtual host in the table.
5. Click **Configure**.

The screenshot shows the Oracle HTTP Server Change Center interface for a server named 'ohs_1'. At the top, there are buttons for 'Oracle HTTP Server', 'Start Up', and 'Shut Down...'. Below this is an 'Information' section with a message: 'Use the change center to activate the pending changes and then restart the server for changes to take effect.' The main section is titled 'Virtual Hosts' and contains a table with columns for Name, Server, and Protocol. A 'Configure' dropdown menu is open over the table, showing options: Server Configuration, MIME Configuration, Log Configuration, SSL Configuration, and mod_wl_ohs Configuration. The table has two rows: one with '127.0.0.1:7779' and 'HTTP', and another with '*:4443' and 'HTTP'.

Name	Server	Protocol
127.0.0.1:7779		HTTP
*:4443		HTTP

6. Select one of the following options from the Configure menu to open its corresponding configuration page. The values on these pages apply only to the virtual host. If the fields are blank, the virtual host uses the values configured at the server level.
 - **Server Configuration:** Configure basic virtual host properties, such as document root directory, installed modules, and aliases. See [Specifying Server Properties Using Fusion Middleware Control](#).
 - **MIME Configuration:** Configure MIME settings, which are used by Oracle HTTP Server to interpret file types, encodings, and languages. [Configuring MIME Settings using Fusion Middleware Control](#).
 - **Log Configuration:** Configure access logs that will record all requests processed by the virtual host. The logs contain basic information about every HTTP transaction handled by the virtual host. See [Configuring Oracle HTTP Server Logs](#).
 - **SSL Configuration:** For instructions on configuring SSL using Fusion Middleware Control, see Enabling SSL for Oracle HTTP Server Virtual Hosts in the *Administering Oracle Fusion Middleware*.
 - **mod_wl_ohs Configuration:** Configure the mod_wl_ohs module to allow requests to be proxied from an Oracle HTTP Server to Oracle WebLogic Server. See [About Configuring the Oracle WebLogic Server Proxy Plug-In \(mod_wl_ohs\)](#).

7. Review the settings on each configuration page. If the settings are correct, click **OK** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Cancel** to return to the original settings.
8. Restart Oracle HTTP Server. See [Restarting Oracle HTTP Server Instances](#) .

Managing Oracle HTTP Server Logs

This chapter describes how to manage Oracle HTTP Server logs. It describes how to configure server logs, how to find information about the cause of an error and its corrective action, to view and manage log files to assist in monitoring system activity and to diagnose problems

Oracle HTTP Server generates log files containing messages that record all types of events, including startup and shutdown information, errors, warning messages, access information on HTTP requests, and additional information.

This chapter includes the following sections:

- [Overview of Server Logs](#)
- [Configuring Oracle HTTP Server Logs](#)
- [Configuring the Log Level Using WLST](#)
- [Log Directives for Oracle HTTP Server](#)
- [Viewing Oracle HTTP Server Logs](#)
- [Recording ECID Information](#)
- [Terminating SSL Requests](#)

8.1 Overview of Server Logs

You can view Oracle Fusion Middleware log files using either Fusion Middleware Control or a text editor. The log files for Oracle HTTP Server are located in the following directory:

```
ORACLE_HOME/user_projects/domains/<base_domain>/servers/componentName/  
logs
```

Oracle HTTP Server has two types of logs:

- Error logs, which record server problems.
- Access logs, which record which components and applications are being accessed and by whom.

This section contains the following topics:

- [About Error Logs](#)
- [About Access Logs](#)
- [Configuring Log Rotation](#)

8.1.1 About Error Logs

Oracle HTTP Server enables you to choose the format in which you want to generate log messages. You can choose to generate log messages in the legacy Apache HTTP Server message format, or use Oracle Diagnostic Logging (ODL) to generate log messages in text or XML-formatted logs, which complies with Oracle standards for generating error log messages.

By default, Oracle HTTP Server error logs use ODL for generating diagnostic messages. It provides a common format for all diagnostic messages and log files, and a mechanism for correlating the diagnostic messages from various components across Oracle Fusion Middleware.

The default name of the error log file is `instance_name.log`.

Note:

ODL error logging cannot have separate log files for each virtual host. It can only be configured globally for all virtual hosts.

8.1.2 About Access Logs

Access logs record all requests processed by the server. The logs contain basic information about every HTTP transaction handled by the server. The access log contains the following information:

- Host name
- Remote log name
- Remote user and time
- Request
- Response code
- Number of transferred bytes

The default name of the access log file is `access_log`.

Access Log Format

You can specify the information to include in the access log, and the manner in which it is written. The default format is the Common Log Format (CLF).

```
LogFormat "%h %l %u %t %E \"%r\" %>s %b" common
```

The CLF format contains the following fields:

```
host ident remote_logname remote_usre date ECID request authuser status bytes
```

- `host`: This is the client domain name or its IP number. Use `%h` to specify the host field in the log.
- `ident`: If IdentityCheck is enabled and the client system runs `identd`, this is the client identity information. Use `%i` to specify the client identity field in the log.
- `remote_logname`: Remote log name (from `identd`, if supplied). Use `%l` to specify the remote log name in the log.

- `remote_user`: Remote user if the request was authenticated. Use `%u` to specify the remote user in the log.
- `date`: This is the date and time of the request in the day/month/year:hour:minute:second format. Use `%t` to specify date and time in the log.
- `ECID`: Capture ECID information. Use `%E` to capture ECID in the log. See also [Configuring Access Logs for ECID Information](#).
- `request`: This is the request line, in double quotes, from the client. Use `%r` to specify request in the log.
- `authuser`: This is the user ID for the authorized user. Use `%a` to specify the authorized user field in the log.
- `status`: This is the three-digit status code returned to the client. Use `%s` to specify the status in the log. If the request will be forwarded from another server, use `%>s` to specify the last server in the log.
- `bytes`: This is the number of bytes, excluding headers, returned to the client. Use `%b` to specify number of bytes in the log. Use `%i` to include the header in the log.

See Also:

[Access Log](#) in the Apache HTTP Server documentation.

8.1.3 Configuring Log Rotation

Oracle HTTP Server supports two types of log rotation policies: size-based and time-based. You can configure the Oracle HTTP Server logs to use either of the two rotation policies, by using `odl_rotatelogs` in `ORACLE_HOME/ohs/bin`. By default, Oracle HTTP Server uses `odl_rotatelogs` for both error and access logs.

`odl_rotatelogs` supports all the features of Apache HTTP Server's `rotatelogs` and the additional feature of log retention.

You can find information about the features and options provided by `rotatelogs` at the following URL:

<http://httpd.apache.org/docs/2.4/programs/rotatelogs.html>

The following is the general syntax of `odl_rotatelogs`:

```
odl_rotatelogs [-u:offset] logfile {size-|time-based-rotation-options}
```

`odl_rotatelogs` is meant to be used with the piped logfile feature. This feature allows error and access log files to be written through a pipe to another process, rather than directly to a file. This increases the flexibility of logging, without adding code to the main server. To write logs to a pipe, replace the filename with the pipe character `"|"`, followed by the name of the executable which should accept log entries on its standard input. For more information on the piped logfile feature, see the following URL:

<http://httpd.apache.org/docs/2.4/logs.html#piped>

Used with the piped logfile feature, the syntax of `odl_rotatelogs` becomes the following:

```
CustomLog " |${PRODUCT_HOME}/bin/odl_rotatelogs [-u:offset] logfile {size-|time-
based-rotation-options}" log_format
```

Whenever there is an input to `odl_rotatelogs`, it checks if the specified condition for rotation has been met. If so, it rotates the file. Otherwise it simply writes the content. If no input is provided, then it will do nothing.

[Table 8-1](#) describes the size- and time-based rotation options:

Table 8-1 Options for `odl_rotatelogs`

Option	Description
<code>-u</code>	The time (in seconds) to offset from UTC.
<code>logfile</code>	The path and name of the log file, followed by a hyphen (-) and then the timestamp format. The following are the common timestamp format strings: <ul style="list-style-type: none"> • <code>%m</code>: Month as a two-digit decimal number (01-12) • <code>%d</code>: Day of month as a two-digit decimal number (01-31) • <code>%Y</code>: Year as a four-digit decimal number • <code>%H</code>: Hour of the day as a two-digit decimal number (00-23) • <code>%M</code>: Minute as a two-digit decimal number (00-59) • <code>%S</code>: Second as a two-digit decimal number (00-59) It should not include formats that expand to include slashes.
<code>frequency</code>	The time (in seconds) between log file rotations.
<code>retentionTime</code>	The maximum time for which the rotated log files are retained.
<code>startTime</code>	The time when time-based rotation should start.
<code>maxFileSize</code>	The maximum size (in MB) of log files.
<code>allFileSize</code>	The total size (in MB) of files retained.

With time-based rotation, log rotation of Oracle HTTP Server using the `odl_rotatelogs` is calculated by default according to UTC time. For example, setting log rotation to 86400 (24 hours) rotates the logs every 12:00 midnight, UTC. If Oracle HTTP Server is running on a server in IST (Indian Standard Time) which is UTC+05:30, then the logs are rotated at 05:30 a.m.

As an alternative to using the `-u` option with the UTC offset, you can use the `-l` option provided by Apache. This option causes Oracle HTTP Server to use local time as the base for the interval. Using the `-l` option in an environment which changes the UTC offset (such as British Standard Time (BST) or Daylight Savings Time (DST)) can lead to unpredictable results.

8.1.3.1 Syntax and Examples for Time- and Size-Based Log Rotation

The following examples demonstrate the `odl_rotatelogs` syntax to set time- and size-based log rotation.

- Time-based rotation

Syntax:

```
odl_rotatelog u:offset logfile frequency retentionTime startTime
```

Example:

```
CustomLog "| odl_rotatelog u:-18000 /varlog/error.log-%Y-%m-%d 21600 172800  
2014-03-10T08:30:00" common
```

This configures log rotation to be performed for a location UTC-05:00 (18000 seconds, such as New York). The rotation will be performed every 21600 seconds (6 hours) starting from 8:30 a.m. on March 10, 2014, and it specifies that the rotated log files should be retained for 172800 seconds (2 days). The log format is `common`.

Syntax:

```
odl_rotatelog logfile frequency retentionTime startTime
```

Example:

```
CustomLog "| odl_rotatelog /varlog/error.log-%Y-%m-%d 21600 172800  
2014-03-10T08:30:00" common
```

This configures log rotation to be performed every 21600 seconds (6 hours) starting from 8:30 a.m. on March 10, 2014, and it specifies that the rotated log files should be retained for 172800 seconds (2 days). The log format is `common`.

- Size-based rotation

Syntax:

```
odl_rotatelog logfile maxFileSize allFileSize
```

Example:

This configures log rotation to be performed when the size of the log file reaches 10 MB, and it specifies the maximum size of all the rotated log files as 70 MB (up to 7 log files (=70/10) will be retained). The log format is `common`.

```
CustomLog "| odl_rotatelog /var/log/error.log-%Y-%m-%d 10M 70M" common
```

8.2 Configuring Oracle HTTP Server Logs

You can use Fusion Middleware Control to configure error and access logs. The following sections describe logging tasks that can be set from the Log Configuration page:

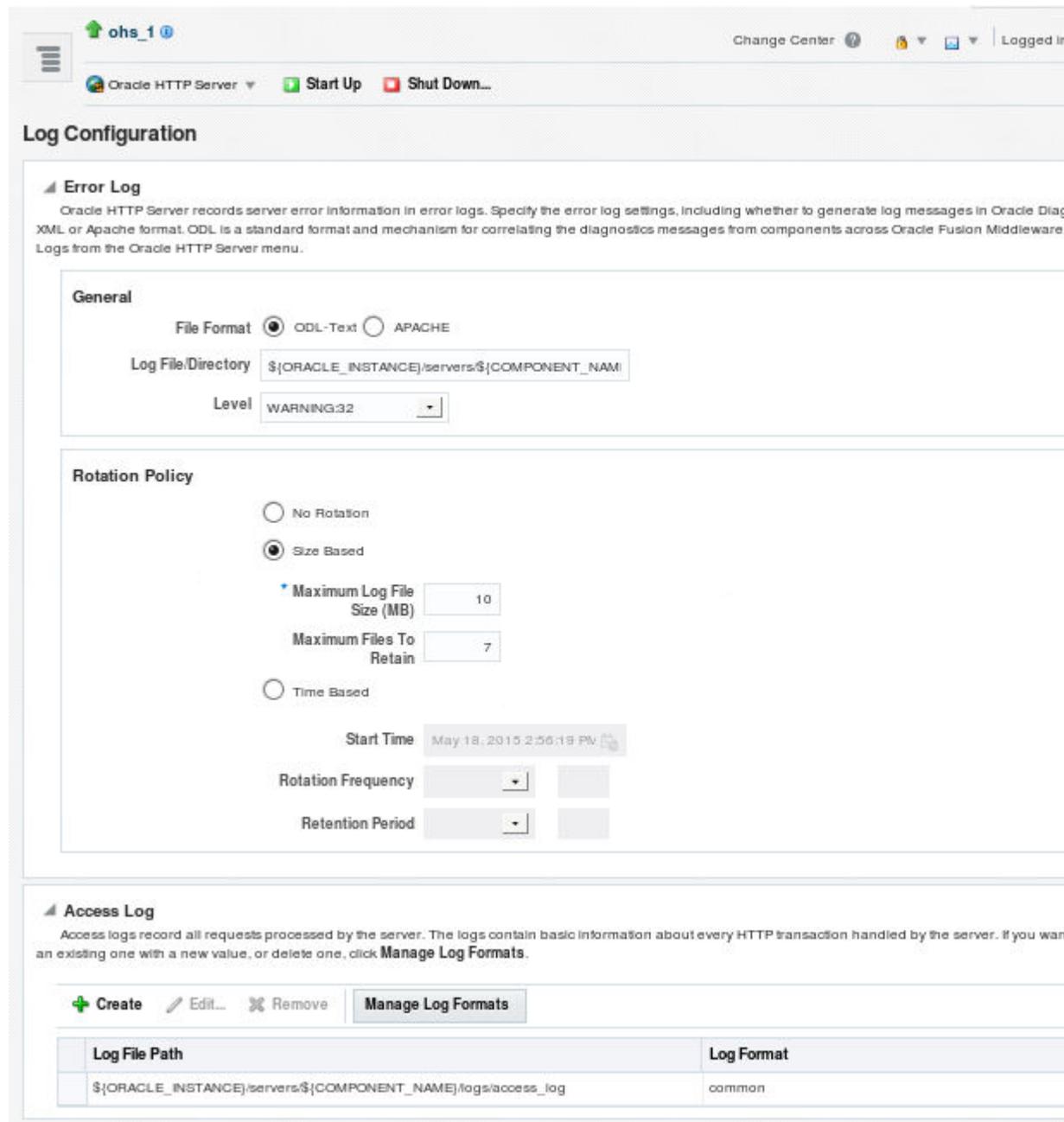
- [Configuring Error Logs Using Fusion Middleware Control](#)
- [Configuring Access Logs Using Fusion Middleware Control](#)
- [Configuring the Log File Creation Mode \(umask\) \(UNIX/Linux Only\)](#)

8.2.1 Configuring Error Logs Using Fusion Middleware Control

You configure error logs on the Fusion Middleware Control Log Configuration page. To configure an error log for Oracle HTTP Server using Fusion Middleware Control, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Log Configuration** from the **Administration** menu.

The Log Configuration page is displayed, as shown in the following figure.



3. The following error log configuration tasks can be set from this page:

- [Configuring the Error Log Format and Location](#)
- [Configuring the Error Log Level](#)
- [Configuring Error Log Rotation Policy](#)

8.2.1.1 Configuring the Error Log Format and Location

You can change the error log format and location on the Fusion Middleware Control Log Configuration page. By default, Oracle HTTP Server uses ODL-Text as the error

log format and creates the log file with the name `component_name.log` under the `DOMAIN_HOME/servers/component_name/logs` directory. To use a different format or log location, do the following:

1. From the Log Configuration page, navigate to the General section under the Error Log section.
2. Select the desired file format.
 - ODL-Text: the format of the diagnostic messages conform to an Oracle standard and are written in text format.
 - Apache: the format of the diagnostic messages conform to the legacy Apache HTTP Server message format.
3. Enter a path for the error log in the Log File/Directory field. This directory must exist before you enter it here.
4. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
5. Restart Oracle HTTP Server. See [Restarting Oracle HTTP Server Instances](#).

8.2.1.2 Configuring the Error Log Level

You can configure the amount and type of information written to log files by specifying the message type and level. Error log level for Oracle HTTP Server by default is configured to WARNING:32. To use a different error log level do the following:

1. From the Log Configuration page, navigate to the General section under the Error Log section.
2. Select a level for the logging from the Level menu. The higher the log level, the more information that is included in the log.
3. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
4. Restart Oracle HTTP Server. See [Restarting Oracle HTTP Server Instances](#).

Note:

The log levels are different for the Apache HTTP Server log format and ODL-Text format.

- For details on ODL log levels, refer to Setting the Level of Information Written to Log Files in *Administering Oracle Fusion Middleware*.
 - For details on Apache HTTP Server log levels, refer to the [LogLevel Directive](#) in the Apache HTTP Server documentation.
-

8.2.1.3 Configuring Error Log Rotation Policy

Log rotation policy for error logs can either be time-based, such as once a week, or sized-based, such as 120MB. By default, the error log file is rotated when it reaches 10

MB and a maximum of 7 error log files will be retained. To use a different rotation policy, do the following:

1. From the Log Configuration page, navigate to the General section under the Error Log section.
2. Select a rotation policy.
 - No Rotation: if you do not want to have the log file rotated ever.
 - Size Based: rotate the log file whenever it reaches a configured size. Set the maximum size for the log file in Maximum Log File Size (MB) field and the maximum number of error log files to retain in Maximum Files to Retain field.
 - Time Based: rotate the log file whenever configured time is reached. Set the start time, rotation frequency, and retention period.
3. Review the settings. If the settings are correct, click **Apply** to apply the changes. If the settings are incorrect, or you decide to not apply the changes, click **Revert** to return to the original settings.
4. Restart Oracle HTTP Server. See [Restarting Oracle HTTP Server Instances](#) .

8.2.2 Configuring Access Logs Using Fusion Middleware Control

You can configure an access log format and rotation policy for Oracle HTTP Server from the Fusion Middleware Control Log Configuration page.

The following access log configuration tasks can be set from this page:

- [Configuring the Access Log Format](#)
- [Configuring the Access Log File](#)

8.2.2.1 Configuring the Access Log Format

Log format specifies the information included in the access log file and the manner in which it is written. To add a new access log format or to edit or remove an existing format, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Log Configuration** from the Administration menu.
3. From the Log Configuration page, navigate to the Access Log section.
4. Click **Manage Log Formats**.

The Manage Custom Access Log Formats page is displayed, as shown in the following figure.

Log Configuration > Custom Access Log Formats

Manage Custom Access Log Formats

Use the following section to create, edit, or remove log formats for access logs.

+ Add Row **X Remove**

Log Format Name	Log Format Pattern
combined	%h %l %u %t \"%r\" %>s %b \"%[Referer]i\" \"%[User-Agent]i\"
common	%h %l %u %t \"%r\" %>s %b
combinedio	%h %l %u %t \"%r\" %>s %b \"%[Referer]i\" \"%[User-Agent]i\" %I %O

5. Select an existing format to change or remove, or click **Add Row** to create a new format.
6. If you choose to create a new format, then enter the new log format in the **Log Format Name** field and the log format in the **Log Format Pattern** field.

See Also:

Refer to the [Apache HTTP Server documentation](#) for information about log format directives.

7. Click **OK** to save the new format.

8.2.2.2 Configuring the Access Log File

You can configure rotation policy for the access log on the Fusion Middleware Control Create or Edit Access Log page. To configure an access log for file Oracle HTTP Server, do the following:

1. Navigate to the Oracle HTTP Server home page.
2. Select **Log Configuration** from the Administration menu.
3. From the Log Configuration page, navigate to the Access Log section.
4. Click **Create** to create a new access log, or select a row from the table and click **Edit** button to edit an existing access log file.

The Create or Edit Access Log page is displayed.

5. Enter the path for the access log in the Log File Path field. This directory must exist before you enter it.
6. Select an existing access log format from the Log Format menu.
7. Select a rotation policy.
 - No Rotation: if you do not want to have the log file rotated ever.
 - Size Based: rotate the log file whenever it reaches a configured size. Set the maximum size for the log file in Maximum Log File Size (MB) field and the maximum number of error log files to retain in Maximum Files to Retain field.
 - Time Based: rotate the log file whenever configured time is reached. Set the start time, rotation frequency, and retention period.
8. Click **OK** to continue.

You can create multiple access log files.

8.2.3 Configuring the Log File Creation Mode (umask) (UNIX/Linux Only)

Set the value of default file mode creation mask (`umask`) before starting the Oracle HTTP Server instance. The value that you set for `umask` determines the file permissions for the files created by Oracle HTTP Server instance such as the error log, access log, and so on. If `umask` is not set explicitly, then a value of `0027` is used by default.

This section contains the following information:

- [Configure umask for an Oracle HTTP Server Instance in a Standalone Domain](#)
- [Configure umask for an Oracle HTTP Server Instance in a WebLogic Server Managed Domain](#)

8.2.3.1 Configure umask for an Oracle HTTP Server Instance in a Standalone Domain

To configure the default file mode creation mask in a standalone domain, set the `umask` property in the `ohs.plugins.nodemanager.properties` file under the staging location:

```
DOMAIN_HOME/config/fmwconfig/components/OHS/instanceName/ohs.plugins.nodemanager.properties
```

8.2.3.2 Configure umask for an Oracle HTTP Server Instance in a WebLogic Server Managed Domain

To configure the default file mode creation mask in a WebLogic Server (either Full-JRF or Restricted-JRF) domain, follow these steps:

1. Start the AdminServer and NodeManager for the domain, for example:

```
<Domain_HOME>/bin/startWebLogic.sh &
<DOMAIN_HOME>/bin/startNodeManager.sh &
```

2. Start WLST and connect to the AdminServer.

```
<ORACLE_HOME>/oracle_common/bin/wlst.sh
connect('userName', '<password>', '<adminServerURL>')
```

3. Navigate to the following MBean. Note that the ObjectName for this MBean is dependent on the name of Oracle HTTP Server instance. In this example, the name of Oracle HTTP Server instance is `ohs1`

```
editCustom()
cd('oracle.ohs')
cd('oracle.ohs:OHSInstance=ohs1,component=OHS,type=OHSInstance.NMProp')
```

4. Set the value of `umask` to the desired value.

```
startEdit()
set('Umask', '0022')
```

5. Save and activate the changes.

```
save()
activate()
```

8.3 Configuring the Log Level Using WLST

You can use WLST commands to set the `LogLevel` directive, which controls the verbosity of the error log.

Note:

For more information on the `LogLevel` directive, see the Apache documentation: <http://httpd.apache.org/docs/current/mod/core.html#loglevel>

Follow these steps to set the `LogLevel` directive using WLST commands.

1. Launch WLST.

```
$ORACLE_HOME/oracle_common/common/bin/wlst.sh
```

2. Connect to Administration Server.

```
connect('<user-name>', '<password>', '<host>:<port>')
```

3. Use the `editCustom()` command to navigate to the root of the `oracle.ohs` MBean. You can use the `editCustom()` command only when WLST is connected to the Administration Server. Use `cd` to navigate the hierarchy of management objects, in this case, `ohs1` under `oracle.ohs`. Use the `startEdit()` command to start an edit session.

```
editCustom()  
cd('oracle.ohs')  
cd('oracle.ohs:type=OHSInstance,name=ohs1')  
startEdit()
```

4. Use the `set` command to set the value of the log level attribute. The following example sets the global log level to `trace7`, the module `status` log level to `error`, and the module `env` log level to `warn` (warning).

```
set('LogLevel','trace7 status:error env:warn')
```

5. Save, then activate your changes. The edit lock associated with this edit session is released once the activation is completed.

```
save()  
activate()
```

8.4 Log Directives for Oracle HTTP Server

The following sections describe Oracle HTTP Server error and access log-related directives in the `httpd.conf` file.

- [Oracle Diagnostic Logging Directives](#)
- [Apache HTTP Server Log Directives](#)

8.4.1 Oracle Diagnostic Logging Directives

Oracle HTTP Server by default uses Oracle Diagnostic Logging (ODL) for generating diagnostic messages. The following directives are used to set up logging using ODL:

- [OraLogMode](#)
- [OraLogDir](#)
- [OraLogSeverity](#)
- [OraLogRotationParams](#)

8.4.1.1 OraLogMode

Enables you to choose the format in which you want to generate log messages. You can choose to generate log messages in the legacy Apache HTTP Server or ODL text format.

OraLogMode Apache | ODL-Text

Default value: ODL-Text

For example: OraLogMode ODL-Text

Note:

The Apache HTTP Server log directives `ErrorLog` and `LogLevel` are only effective when `OraLogMode` is set to `Apache`. When `OraLogMode` is set to `ODL-Text`, the `ErrorLog` and `LogLevel` directives are ignored.

8.4.1.2 OraLogDir

Specifies the path to the directory that contains all log files. This directory must exist.

This directive is used only when `OraLogMode` is set to `ODL-Text`. When `OraLogMode` is set to `Apache`, `OraLogDir` is ignored and `ErrorLog` is used instead.

`OraLogDir` <path>

Default value: `ORACLE_INSTANCE/servers/componentName/logs`

For example: `OraLogDir /tmp/logs`

8.4.1.3 OraLogSeverity

Enables you to set message severity. The message severity specified with this directive is interpreted as the lowest desired message severity, and all messages of that severity level and higher are logged.

This directive is used only when `OraLogMode` is set to `ODL-Text`. When `OraLogMode` is set to `Apache`, `OraLogSeverity` is ignored and `LogLevel` is used instead. In the following syntax, *short_module_identifierName* is the module name with the trailing `_module` omitted.

`OraLogSeverity` [*short_module_identifierName*] <msg_type>[:msg_level]

Default value: `WARNING:32`

For example: `OraLogSeverity mime NOTIFICATION:32`

msg_type

Message types can be specified in upper or lowercase, but appear in the message output in upper case. This parameter must be of one of the following values:

- INCIDENT_ERROR
- ERROR
- WARNING
- NOTIFICATION
- TRACE

msg_level

This parameter must be an integer in the range of 1–32, where 1 is the most severe, and 32 is the least severe. Using level 1 will result in fewer messages than using level 32.

8.4.1.4 OraLogRotationParams

Enables you to choose the rotation policy for an error log file. This directive is used only when `OraLogMode` is set to `ODL-Text`. When `OraLogMode` is set to `Apache`, `OraLogRotationParams` is ignored.

```
OraLogRotationParams <rotation_type> <rotation_policy>
```

Default value: `S 10:70`

For example: `OraLogRotationParams T 43200:604800
2009-05-08T10:53:29`

rotation_type

This parameter can either be `S` (for sized-based rotation) or `T` (for time-based rotation).

rotation_policy

When `rotation_type` is set to `S` (sized-based), set the `rotation_policy` parameter to:

```
maxFileSize:allFilesSize (in MB)
```

For example, when configured as `10:70`, the error log file is rotated whenever it reaches 10MB and a total of 70MB is allowed for all error log files (a maximum of $70/10=7$ error log files will be retained).

When `rotation_type` is set to `T` (time-based), set the `rotation_policy` parameter to:

```
frequency(in sec) retentionTime(in sec) startTime(in YYYY-MM-DDThh:mm:ss)
```

For example, when configured as `43200:604800 2009-05-08T10:53:29`, the error log is rotated every 43200 seconds (that is, 12 hours), rotated log files are retained for maximum of 604800 seconds (7 days) starting from May 5, 2009 at 10:53:29.

8.4.2 Apache HTTP Server Log Directives

Although Oracle HTTP Server uses `ODL` by default for error logs, you can configure the `OraLogMode` directive to `Apache` to generate error log messages in the legacy Apache HTTP Server message format. The following directives are discussed in this section:

- [ErrorLog](#)
- [LogLevel](#)
- [LogFormat](#)
- [CustomLog](#)

8.4.2.1 ErrorLog

The `ErrorLog` directive sets the name of the file where the server logs any errors it encounters. If the filepath is not absolute then it is assumed to be relative to the `ServerRoot`.

This directive is used only when `OraLogMode` is set to `Apache`. When `OraLogMode` is set to `ODL-Text`, `ErrorLog` is ignored and `OraLogDir` is used instead.

See Also:

For information about the Apache ErrorLog directive, see:

<http://httpd.apache.org/docs/current/mod/core.html#errorlog>

8.4.2.2 LogLevel

The `LogLevel` directive adjusts the verbosity of the messages recorded in the error logs.

This directive is used only when `OraLogMode` is set to `Apache`. When `OraLogMode` is set to `ODL-Text`, `LogLevel` is ignored and `OraLogSeverity` is used instead.

See Also:

For information about the [Apache HTTP Server LogLevel](#) directive see:

<http://httpd.apache.org/docs/current/mod/core.html#loglevel>

8.4.2.3 LogFormat

The `LogFormat` directive specifies the format of the access log file. By default, Oracle HTTP Server comes with the following four access log formats defined:

```
LogFormat "%h %l %u %t %E \"%r\" %>s %b" commonLogFormat "%h %l %u %t %E \"%r\" %>s  
%b \"%{Referer}i\" \"%{User-Agent}i\"" combinedLogFormat "%h %l %u %t %E \"%r\" %>s  
%b \"%{Referer}i\" \"%{User-Agent}i\" %I %O" combinedio
```

See Also:

For information about the Apache HTTP Server `LogFormat` directive, see:

http://httpd.apache.org/docs/current/mod/mod_log_config.html#logformat

8.4.2.4 CustomLog

Use the `CustomLog` directive to log requests to the server. A log format is specified and the logging can optionally be made conditional on request characteristics using environment variables. By default, the access log file is configured to use the common log format.

See Also:

For information about the Apache `CustomLog` directive, see:

http://httpd.apache.org/docs/current/mod/mod_log_config.html#customlog

8.5 Viewing Oracle HTTP Server Logs

There are mainly two types of log files for Oracle HTTP Server: error logs and access logs. The error log file is an important source of information for maintaining a well-performing server. The error log records all of the information about problem situations so that the system administrator can easily diagnose and fix the problems. The access log file contains basic information about every HTTP transaction that the server handles. You can use this information to generate statistical reports about the server's usage patterns.

See [Overview of Server Logs](#) for more information on error logs and access logs.

The methods for viewing Oracle HTTP Server logs are:

- [Viewing Logs Using Fusion Middleware Control](#)
- [Viewing Logs Using WLST](#)
- [Viewing Logs in a Text Editor](#)

8.5.1 Viewing Logs Using Fusion Middleware Control

To access the log messages for an Oracle HTTP Server instance:

1. Navigate to the Oracle HTTP Server home page.
2. Select the server instance for which you want to view log messages.
3. From the Oracle HTTP Server drop-down list, select **Logs**, then **View Log Messages**.

The Log Messages page opens.

For information about searching and viewing log files, see [Viewing Log Files and Their Messages Using Fusion Middleware Control](#) in *Administering Oracle Fusion Middleware*.

8.5.2 Viewing Logs Using WLST

To obtain and view server logs from the command line, you need to connect to Node Manager and issue the appropriate WebLogic Scripting Tool (WLST) command. These commands allow you to perform any of these functions:

- List server logs.
- Display the content of a specific log.

Note:

For more information on using WLST, see [Understanding the WebLogic Scripting Tool](#).

Before attempting this procedure:

Before attempting to access server metrics from the command line, ensure the following:

- The domain exists.
- The instance you want to start exists.
- Node Manager is running on the instance machine.

To use this procedure, the instance and Administration server can be running but do not need to be.

To view metrics using WLST:

Note:

For managed domains, this procedure will work on an Administration server running on either the Administration machine or on a remote machine, whether the instance is in a running state or a shutdown state. For standalone domains, the procedure will work only on a local machine; however the instance can be either in a running *or* shutdown state.

1. Launch WLST:

From Linux or UNIX:

```
$ORACLE_HOME/oracle_common/common/bin/wlst.sh
```

From Windows:

```
C:\ORACLE_HOME\oracle_common\common\bin\wlst.cmd
```

2. From the selected domain directory (for example, *ORACLE_HOME/user_projects/domains/domainName*), connect to Node Manager:

```
nmConnect('username', 'pwd', localhost, 5556, domainName)
```

3. Enter one of the following WLST commands, depending on what task you want to accomplish:

- `listLogs(nmConnected=1, ...)`
- `displayLogs(nmConnected=1, ...)`

For example:

```
listLogs(nmConnected=1, target='ohs1')
displayLogs(nmConnected=1, target='ohs1', tail=5)
```

8.5.3 Viewing Logs in a Text Editor

You can also use a text editor to view Oracle HTTP Server log files directly from the *DOMAIN_HOME* directory. By default, Oracle HTTP Server log files are located in the *DOMAIN_HOME/servers/component_name/logs* directory. Download a log file to your local client and view the log files using another tool.

8.6 Recording ECID Information

The following sections describe how to configure Oracle HTTP Server to record Execution Context ID (ECID) information in error logs and access logs.

- [About ECID Information](#)
- [Configuring Error Logs for ECID Information](#)
- [Configuring Access Logs for ECID Information](#)

8.6.1 About ECID Information

An ECID is a globally unique ID that can be attached to requests between Oracle components. The ECID enables you to track log messages pertaining to the same request when multiple requests are processed in parallel.

The Oracle HTTP Server module `mod_context` scans each incoming request for an ECID-Context key in the URI or cookie, or for the ECID-Context header. If found, then the value is used as the execution context if it is valid. If it is not, then `mod_context` creates a new execution context for the request and adds it as the value of the ECID-Context header.

8.6.2 Configuring Error Logs for ECID Information

ECID information is recorded as part of Oracle Diagnostic Logging (ODL). ODL is a method for reporting diagnostic messages which presents a common format for diagnostic messages and log files, and a method for correlating all diagnostic messages from various components.

To configure Oracle HTTP Server error logs to record ECID information, ensure that the `OraLogMode` directive in the `httpd.conf` file is set to the default value, `odl`. The `odl` value specifies standard Apache log format and ECID information for log records specifically associated with a request.

For more information on `OraLogMode` and other possible values for this directive, see [OraLogMode](#).

Note:

Oracle recommends that you enter the directives before any modules are loaded (`LoadModule` directive) in the `httpd.conf` file so that module-specific logging severities are in effect before modules have the opportunity to perform any logging.

8.6.3 Configuring Access Logs for ECID Information

By default, the `LogFormat` directive in the `httpd.conf` file is configured to capture ECID information:

```
LogFormat "%h %l %u %t %E \"%r\" %>s %b" common
```

If you want to add response time measured in microseconds, then add `%D` as follows:

```
LogFormat "%h %l %u %t %E %D \"%r\" %>s %b" common
```

If you want to suppress the capture of ECID information, then remove `%E` from the `LogFormat` directive:

```
LogFormat "%h %l %u %t \"%r\" %>s %b" common
```

8.7 Terminating SSL Requests

The following sections describe how to terminate requests using SSL before or within Oracle HTTP Server, where the `mod_wl_ohs` module forwards requests to WebLogic Server. Whether you terminate SSL before the request reaches Oracle HTTP Server or when the request is in the server, depends on your topology. A common reason to terminate SSL is for performance considerations when an internal network is otherwise protected with no risk of a third-party intercepting data within the communication. Another reason is when WebLogic Server is not configured to accept HTTPS requests.

- [About Terminating SSL at the Load Balancer](#)
- [About Terminating SSL at Oracle HTTP Server](#)

8.7.1 About Terminating SSL at the Load Balancer

If you are using another device such as a load balancer or a reverse proxy which terminates requests using SSL before reaching Oracle HTTP Server, then you must configure the server to treat the requests as if they were received through HTTPS. The server must also be configured to send HTTPS responses back to the client.

[Figure 8-1](#) illustrates an example where the request transmitted from the browser through HTTPS to WebLogic Server. The load balancer terminates SSL and transmits the request as HTTP. Oracle HTTP Server must be configured to treat the request as if it was received through HTTPS.

Figure 8-1 Terminating SSL Before Oracle HTTP Server



8.7.1.1 Terminating SSL at the Load Balancer

To instruct the Oracle HTTP Server to treat requests as if they were received through HTTPS, configure the `httpd.conf` file with the `SimulateHttps` directive in the `mod_certheaders` module.

For more information on `mod_certheaders` module, see [mod_certheaders Module—Enables Reverse Proxies](#).

Note:

This procedure is not necessary if SSL is configured on Oracle HTTP Server (that is, if you are directly accessing Oracle HTTP Server using HTTPS).

1. Configure the `httpd.conf` configuration file with the external name of the server and its port number, for example:

```
ServerName <www.company.com:port>
```

2. Configure the `httpd.conf` configuration file to load the `mod_certheaders` module, for example:

- On UNIX:

```
LoadModule certheaders_module libexec/mod_certheaders.so
```

- On Windows:

```
LoadModule certheaders_module modules/ApacheModuleCertHeaders.dll
AddModule mod_certheaders.c
```

Note:

Oracle recommends that the `AddModule` line should be included with other `AddModule` directives.

3. Configure the `SimulateHttps` directive at the bottom of the `httpd.conf` file to send HTTPS responses back to the client, for example:

```
# For use with other load balancers and front-end devices:
SimulateHttps On
```

4. Restart Oracle HTTP Server and test access to the server. Especially, test whether you can access static pages such as `https://host:port/index.html`

Test your configuration as a basic setup. If you are having issues, then you should troubleshoot from here to avoid overlapping with other potential issues, such as with virtual hosting.

5. Ideally, you may want to configure a `VirtualHost` in the `httpd.conf` file to handle all HTTPS requests. This separates the HTTPS requests from the HTTP requests as a more scalable approach. This may be more desirable in a multi-purpose site or if a load balancer or other device is in front of Oracle HTTP Server which is also handling both HTTP and HTTPS requests.

The following sample instructions load the `mod_certheaders` module, then creates a virtual host to handle only HTTPS requests.

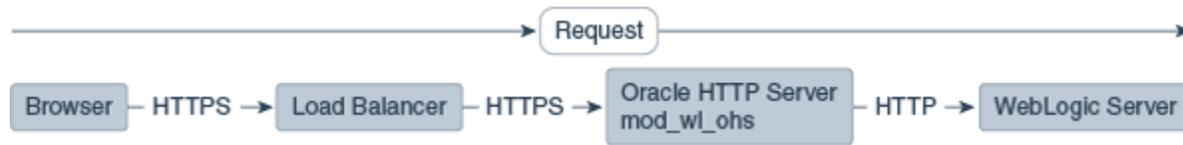
```
# Load correct module here or where other LoadModule lines exist:
LoadModule certheaders_module libexec/mod_certheaders.so
# This only handles https requests:
<VirtualHost <name>:<port>
    # Use name and port used in url:
    ServerName <www.company.com:port>
    SimulateHttps On
    # The rest of your desired configuration for this VirtualHost goes here
</VirtualHost>
```

6. Restart Oracle HTTP Server and test access to the server, First test a static page such as `https://host:port/index.html` and then your test your application.

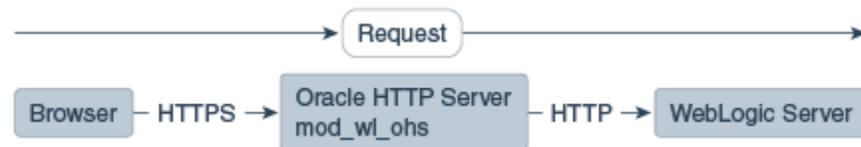
8.7.2 About Terminating SSL at Oracle HTTP Server

If SSL is configured in Oracle HTTP Server but not on Oracle WebLogic Server, then you can terminate SSL for requests sent by Oracle HTTP Server.

The following figures illustrate request flows, showing where HTTPS stops. In [Figure 8-2](#), an HTTPS request is sent from the browser. The load balancer transmits the HTTPS request to Oracle HTTP Server. SSL is terminated in Oracle HTTP Server and the HTTP request is sent to WebLogic Server.

Figure 8-2 Terminating SSL at Oracle HTTP Server—With Load Balancer

In [Figure 8-3](#) there is no load balancer and the HTTPS request is sent directly to Oracle HTTP Server. Again, SSL is terminated in Oracle HTTP Server and the HTTP request is sent to WebLogic Server.

Figure 8-3 Terminating SSL at Oracle HTTP Server—Without Load Balancer

8.7.2.1 Terminating SSL at Oracle HTTP Server

To instruct the Oracle HTTP Server to treat requests as if they were received through HTTPS, configure the `WLSProxySSL` directive in the `mod_wl_ohs.conf` file and ensure that the `SecureProxy` directive is **not** configured.

1. Configure the `mod_wl_ohs.conf` file to add the `WLSProxySSL` directive for the location of your non-SSL configured managed servers, for example:

```
WLSProxySSL ON
```

2. If using a load balancer or other device in front of Oracle HTTP Server (which is also using SSL), you might need to configure the `WLSProxySSLPassThrough` directive instead, depending on if it already sets `WL-Proxy-SSL`, for example:

```
WLSProxySSLPassThrough ON
```

For more information, see your load balancer documentation. For more information on `WLSProxySSLPassThrough`, see [Parameters for Oracle WebLogic Server Proxy Plug-Ins in *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*](#).

3. Ensure that the `SecureProxy` directive is **not** configured, as it will interfere with the intended communication between the components. This directive is to be used only when SSL is used throughout. The `SecureProxy` directive is commented out in the following example:

```
# To configure SSL throughout (all the way to WLS):
# SecureProxy ON
# WLSWallet "<Path to Wallet>"
```

4. Restart Oracle HTTP Server and test access to a Java application, for example:

```
https://host:port/path/application_name.
```

Managing Application Security

This chapter contains an overview of Oracle HTTP Server security features and provides configuration information for setting up a secure website.

This chapter includes the following sections:

- [About Oracle HTTP Server Security](#)
- [Classes of Users and Their Privileges](#)
- [Resources Protected](#)
- [Authentication, Authorization and Access Control](#)
- [Implementing SSL](#)
- [Using mod_security](#)
- [Using Trust Flags](#)

9.1 About Oracle HTTP Server Security

Security can be organized into the three categories of authentication, authorization, and confidentiality. Oracle HTTP Server provides support for all three of these categories. It is based on the Apache HTTP Server, and its security infrastructure is primarily provided by the Apache modules, `mod_auth_basic`, `mod_authn_file`, `mod_auth_user`, and `mod_authz_groupfile`, and WebGate. The `mod_auth_basic`, `mod_authn_file`, `mod_auth_user`, and `mod_authz_groupfile` modules provide authentication based on user name and password pairs, while `mod_authz_host` controls access to the server based on the characteristics of a request, such as host name or IP address, `mod_ossll` provides confidentiality and authentication with X.509 client certificates over SSL.

Oracle HTTP Server provides access control, authentication, and authorization methods that you can configure with access control directives in the `httpd.conf` file. When URL requests arrive at Oracle HTTP Server, they are processed in a sequence of steps determined by server defaults and configuration parameters. The steps for handling URL requests are implemented through a module or plug-in architecture that is common to many Web listeners.

9.2 Classes of Users and Their Privileges

Oracle HTTP Server authorizes and authenticates users before allowing them to access, or modify resources on the server. The following are three classes of users that access the server using Oracle HTTP Server, and their privileges:

- Users who access the server without providing any authentication. They have access to unprotected resources only.

- Users who have been authenticated and potentially authorized by modules within Oracle HTTP Server. This includes users authenticated by Apache HTTP Server modules like `mod_auth_basic`, `mod_authn_file`, `mod_auth_user`, and `mod_authz_groupfile` modules and Oracle's `mod_ossl`. Such users have access to URLs defined in `http.conf` file.

See Also:

[Authentication, Authorization and Access Control](#).

- Users who have been authenticated through Oracle Access Manager. These users have access to resources allowed by Single Sign-On.

See Also:

Securing Applications with Oracle Platform Security Services

9.3 Resources Protected

You can configure Oracle HTTP Server to protect all resources that it manages. You are responsible for configuring any protection that your resources require.

9.4 Authentication, Authorization and Access Control

Oracle HTTP Server provides user authentication and authorization at two stages: access control, and then user authentication and authorization.

- [Access Control](#) (stage one): This is based on the details of the incoming HTTP request and its headers, such as IP addresses or host names.
- [User Authentication and Authorization](#) (stage two): This is based on different criteria depending on the HTTP server configuration. You can configure the server to authenticate users with user name and password pairs that are checked against a list of known users and passwords. You can also configure the server to use single sign-on authentication for Web applications or X.509 client certificates over SSL.

9.4.1 Access Control

Access control refers to any means of controlling access to any resource.

See Also:

Refer to the [Apache HTTP Server documentation](#) for more information on how to configure access control to resources.

9.4.2 User Authentication and Authorization

Authentication is any process by which you verify that someone is who they claim they are. Authorization is any process by which someone is allowed to be where they want to go, or to have information that they want to have. You can authenticate users with either Apache HTTP Server modules or with WebGate.

- [Authenticating Users with Apache HTTP Server Modules](#)

- [Authenticating Users with WebGate](#)

9.4.2.1 Authenticating Users with Apache HTTP Server Modules

The Apache HTTP Server authentication directives can be used to verify that users are who they claim to be.

See Also:

For more information on how to authenticate users, see the [Apache HTTP Server documentation](#) on "Authentication and Authorization" at:

<http://httpd.apache.org/docs/2.4/howto/auth.html>

9.4.2.2 Authenticating Users with WebGate

WebGate enables single sign-on (SSO) for Oracle HTTP Server. WebGate examines incoming requests and determines whether the requested resource is protected, and if so, retrieves the session information for the user.

Through WebGate, Oracle HTTP Server becomes an SSO partner application enabled to use SSO to authenticate users, obtain their identity by using Oracle Single Sign-On, and to make user identities available to web applications accessed through Oracle HTTP Server.

By using WebGate, web applications can register URLs that require SSO authentication. WebGate detects which requests received by Oracle HTTP Server require SSO authentication, and redirects them to the SSO server. Once the SSO server authenticates the user, it passes the user's authenticated identity back to WebGate in a secure token. WebGate retrieves the user's identity from the token and propagates it to applications accessed through Oracle HTTP Server, including applications running in Oracle WebLogic Server and CGIs and static files handled by Oracle HTTP Server.

See Also:

Securing Applications with Oracle Platform Security Services

9.4.3 Support for FMW Audit Framework

Oracle HTTP Server supports authentication and authorization auditing by using the FMW Common Audit Framework. As part of enabling auditing, Oracle HTTP Server supports a directive called `OraAuditEnable`, which defaults to `On`. When it is enabled, audit events enabled in `auditconfig.xml` will be recorded in an audit log. By default, no audit events are enabled in `auditconfig.xml`.

When `OraAuditEnable` is set to `Off`, auditing is disabled regardless of the settings in `auditconfig.xml`.

You can configure audit filters using Fusion Middleware Control or by editing `auditconfig.xml` directly.

See Also:

Overview of Audit Features in *Securing Applications with Oracle Platform Security Services*

9.4.3.1 Managing Audit Policies Using Fusion Middleware Control

Use the Audit Policies page in Fusion Middleware Control to assign audit policies to a selected Oracle HTTP Server instance.

1. Navigate to the Oracle HTTP Server Home Page.
2. Select the server instance to which you want to apply audit policies.
3. From the **Oracle HTTP Server** drop-down menu, select **Security**, then **Audit Policy**.

The Audit Policy page opens.

For more information on setting audit policies, see *Managing Audit Policies for Java Components with Fusion Middleware Control* in *Securing Applications with Oracle Platform Security Services*

9.5 Implementing SSL

Oracle HTTP Server secures communications by using a Secure Sockets Layer (SSL) protocol. SSL secures communication by providing message encryption, integrity, and authentication. The SSL standard allows the involved components (such as browsers and HTTP servers) to negotiate which encryption, authentication, and integrity mechanisms to use.

For details on how to implement SSL for Oracle HTTP Server, see *Configuring SSL for the Web Tier* in *Administering Oracle Fusion Middleware*. For information on using `mod_ossl`, Oracle's SSL module, see [mod_ossl Module—Enables Cryptography \(SSL\)](#). For information on `mod_ossl` directives, see [mod_ossl Module](#).

The `mod_wl_ohs` module also contains a configuration for SSL. For information, see *Using SSL with Plug-ins and Parameters for Web Server Plug-Ins* in *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*.

These sections describes SSL features that are supported for this release.

- [Global Server ID Support](#)
- [PKCS #11 Support](#)
- [SSL and Logging](#)

9.5.1 Global Server ID Support

This feature adds support SSL protocol features called variously "step-up", "server gated crypto" or "global server ID". "Step-up" is a feature that allows old, weak encryption browsers, to "step-up" so that public keys greater than 512-bits and bulk encryption keys greater than 64 bits can be used in the SSL protocol. This means that server X.509 certificates that contain public keys in excess of 512-bits and which contain "step-up" digital rights can now be used by Oracle Application Server. Such certificates are often called "128-bit" certificates, even though the certificate itself typically contains a 1024-bit certificate. The Verisign Secure Site Pro is an example of such a certificate which can now be used by Oracle Application Server.

Global Server ID functionality is provided by default, there is no configuration necessary.

9.5.2 PKCS #11 Support

Public-Key Cryptography Standards #11, or PKCS #11 for short, is a public key cryptography specification that outlines how systems use hardware security modules, which are basically "boxes" where cryptographic functions (encryption/decryption) are performed and where encryption keys are stored.

Oracle HTTP Server supports the option of having dedicated SSL hardware through nCipher. nCipher is a certified third-party accelerator that improves the performance of the PKI cryptography that SSL uses.

See Also:

- *Administering Oracle Fusion Middleware*
 - <http://www.ncipher.com>
-
-

9.5.3 SSL and Logging

SSL- and communication-related debugging can be set using the `SSLTraceLogLevel` directive. Here you can set different verbosity of log level according to your logging requirements. This directive generates SSL and communication logs. For more information, see [SSLTraceLogLevel Directive](#).

Note:

SSL logs will work when OHS logs is set for INFO or higher level.

9.6 Using mod_security

mod_security is an open-source module that you can use to detect and prevent intrusion attacks against Oracle HTTP Server; for example, you can specify a mod_security rule to screen all incoming requests and deny requests that match the conditions specified in the rule. The mod_security module (version 2.7.2) and its prerequisites are included in the Oracle HTTP Server installation as a shared object named mod_security2.so in the `ORACLE_HOME/ohs/modules` directory.

For more information on mod_security, see [Configuring the mod_security Module](#).

9.7 Using Trust Flags

Trust flags allow adequate roles to be assigned to certificates to facilitate operations like certificate chain validation and path building. By default, wallets do not support trust flags.

You can use the `orapki` utility to maintain trust flags in the certificates installed in an Oracle Wallet. You can create and convert wallets to support trust flags, create and maintain appropriate flags in each certificate, and so on. For more information on trust flags and instructions on how to incorporate them into your security strategy, see *Creating and Managing Trust Flags* in *Administering Oracle Fusion Middleware*.

Appendixes

This section contains the following appendixes and a glossary:

- [Oracle HTTP Server WLST Custom Commands](#)
- [Migrating to the mod_proxy_fcgi and mod_authnz_fcgi Modules](#)
- [Frequently Asked Questions](#)
- [Troubleshooting Oracle HTTP Server](#)
- [Configuration Files](#)
- [Property Files](#)
- [OHS Module Directives](#)

A.1 Oracle HTTP Server WLST Custom Commands

The following Oracle HTTP Server-specific WLST custom commands are provided for managing the server in WebLogic Server domains. Most are online commands, which require a connection between WLST and the administration server for the domain:

This appendix contains the following information:

- [Getting Help on Oracle HTTP Server WLST Custom Commands](#)
- [Names of WLST Custom Commands Have Changed](#)
- [Oracle HTTP Server Commands](#)

A.1.1 Getting Help on Oracle HTTP Server WLST Custom Commands

Online help is available for Oracle HTTP Server WLST custom commands. To get online help, enter `help('manageohs')` from the WLST command line and it will display all the of the WLST custom commands for Oracle HTTP Server.

To get help for specific WLST custom commands, enter `help('custom_command_name')` from the WLST command line, for example:

```
help( 'ohs_createInstance' )
```

A.1.2 Names of WLST Custom Commands Have Changed

For ease of use and greater visibility, the names of the following Oracle HTTP Server WLST custom commands have been changed in the current release. Instead of incorporating "OHS" in the command name, the command is now prefixed with "ohs_". For example, the `createOHSInstance` command becomes `ohs_createInstance`. The old command names are deprecated. They will be accepted by WLST in the current release, but you should avoid using them. If you use

one of the old command names, you will receive a message saying that the name is deprecated and containing a pointer to the new command.

The following table lists the old and new command names.

Table A-1 Old and New Names of Oracle HTTP Server WLST Custom Commands

Old Name (deprecated)	New Name
<code>addOHSAdminProperties</code>	<code>ohs_addAdminProperties</code>
<code>addOHSNMProperties</code>	<code>ohs_addNMProperties</code>
<code>createOHSInstance</code>	<code>ohs_createInstance</code>
<code>deleteOHSInstance</code>	<code>ohs_deleteInstance</code>

A.1.3 Oracle HTTP Server Commands

You should use the `ohs_createInstance` and `ohs_deleteInstance` commands to create and delete Oracle HTTP Server instances instead of using the Configuration Wizard. These custom commands perform additional error checking and, in the case of instance creation, automatic port assignment.

Use the WLST custom commands listed in [Table A-2](#) to manage Oracle HTTP Server instances in WebLogic Server domains.

Table A-2 Oracle HTTP Server Commands

Use this command...	To...	Use with WLST...
ohs_addAdminProperties	Add the <code>LogLevel</code> property to Oracle HTTP Server Administration server property file.	Online
ohs_addNMProperties	Add a property to the Oracle HTTP Server Node Manager plug-in property file.	Online
ohs_createInstance	Create a new instance of Oracle HTTP Server.	Online
ohs_deleteInstance	Delete the specified Oracle HTTP Server instance.	Online
ohs_exportKeyStore	Exports the <code>keyStore</code> to the specified Oracle HTTP Server instance.	Online
ohs_postUpgrade	Import the contents of wallet for all of the Oracle HTTP Server instances (valid for those Oracle HTTP Server instances which have been upgraded from a previous version) in the domain to the KSS database.	Online
ohs_updateInstances	Creates a keystore in the KSS database in the case where Oracle HTTP Server instances were created using Configuration Wizard.	Online

A.1.3.1 `ohs_addAdminProperties`

Use with WLST: Online

Description

The `ohs_addAdminProperties` command adds the `LogLevel` property to Oracle HTTP Server Administration server property file (`ohs_admin.properties`); `LogLevel` is the only parameter `ohs_addAdminProperties` currently supports. This command is available when WLST is connected to an Administration Server instance.

Syntax

```
ohs_addAdminProperties(logLevel = 'value')
```

Argument	Description
LogLevel	<p>The granularity of information written to the log. The default is <code>INFO</code>; other values accepted are:</p> <ul style="list-style-type: none"> • ALL • CONFIG • FINE • FINER • FINEST • OFF • SEVERE • WARNING

Example

This example creates a log file with log level is set to `FINEST`.

```
ohs_addAdminProperties(logLevel = 'FINEST')
```

A.1.3.2 ohs_addNMProperties

Use with WLST: Online

Description

The `ohs_addNMProperties` command adds a property to the Oracle HTTP Server Node Manager plug-in property file (`ohs_nm.properties`). This command is available when WLST is connected to an Administration Server instance.

Syntax

```
ohs_addNMProperties(logLevel = 'value', machine='node-manager-machine-name')
```

Argument	Description
LogLevel	<p>The granularity of information written to the log. The default is <code>INFO</code>; other values accepted are:</p> <ul style="list-style-type: none"> • ALL • CONFIG • FINE • FINER • FINEST • OFF • SEVERE • WARNING
machine	The name of the machine on which Node Manager is running.

Example

This example creates a log file with name `ohs_nm.log` under the path `<domain_dir>/system_components/OHS` with log level is set to `FINEST` on the target machine, `my_NM_machine`. The user need not restart Node Manager.

```
ohs_addNMPproperties(logLevel = 'FINEST', machine = 'my_NM_machine')
```

A.1.3.3 ohs_createInstance

Use with WLST: Online

Description

The `ohs_createInstance` command creates a new instance of Oracle HTTP Server, allowing critical configuration such as listening ports to be specified explicitly or assigned automatically.

Syntax

```
ohs_createInstance(instanceName='xxx', machine='yyy', serverName='zzz', ...)
```

Argument	Definition
<code>instanceName</code>	The name of the managed instance being created.
<code>machine</code>	The existing machine entry for the instance. This name (often <code><hostName>.myCorp.com</code>) is set during creation of the WebLogic Server Domain. If you forget the name, you can check <code>\$ORACLE_INSTANCE/config/config.xml</code> and look for the <code><machine></code> block. Alternately, in WLST you can find the machine name by running: <pre>serverConfig() cd('Machines') ls()</pre>
<code>listenPort</code>	(Optional) The port number of the non-SSL server. If this value is not specified, a port is automatically assigned. Listen ports typically begin at 7777 and go up from there.
<code>sslPort</code>	(Optional) The port number of the SSL virtual host. If this value is not specified, a port is automatically assigned. SSL ports typically start at 4443 and go up from there.
<code>adminPort</code>	(Optional) The port number used for communication with Node Manager. If this value is not specified, a port is automatically assigned. Administration ports typically begin at 9999 and go up from there.
<code>serverName</code>	(Optional) The value of the <code>ServerName</code> directive of the non-SSL server. If this value is not specified, the host name of the machine and the listen port will be used to construct the value.

Example

The following example creates an Oracle HTTP Server instance called `ohs1` that runs on the machine `abc03.myCorp.com`:

```
ohs_createInstance(instanceName='ohs1', machine='abc03.myCorp.com')
```

A.1.3.4 ohs_deleteInstance

Use with WLST: Online

Description

The `ohs_deleteInstance` command deletes a specified Oracle HTTP Server instance. The instance must be stopped before you can delete it. This command will return an error if the instance is in the UNKNOWN or RUNNING state.

Syntax

```
ohs_deleteInstance(instanceName='xxx')
```

`instanceName` is the name of the Oracle HTTP Server instance.

Example

The following example deletes the Oracle HTTP Server instance `ohs1`.

```
ohs_deleteInstance(instanceName='ohs1')
```

A.1.3.5 ohs_exportKeyStore

Use with WLST: Online

Description

The `ohs_exportKeyStore` command exports the keystore to the specified Oracle HTTP Server instance location. This command is available when WLST is connected to an Administration Server instance. For more information on how to use this command, see [Exporting the Keystore to an Oracle HTTP Server Instance Using WLST](#).

Syntax

```
ohs_exportKeyStore(keyStoreName='<keyStoreName>', instanceName = '<instanceName>')
```

Argument	Description
<code>keyStoreName</code>	The name of the keystore.
<code>instanceName</code>	The name of the Oracle HTTP Server instance.

Naming Conventions for Keystores

The keystore name (`keyStoreName`) must start with the string: `<instanceName>_.`

For example, presume that the keystore must be exported to an Oracle HTTP Server instance named `ohs1`. Then the names of all of the keystores that must be exported to `ohs1` must start with `ohs1_.`

If this syntax is not followed while creating the keystore, then the export of the keystore might not be successful.

Example

This example exports the keystore `ohs1_myKeystore` to the Oracle HTTP Server instance `ohs1`.

```
ohs_exportKeyStore(keyStoreName='ohs1_myKeystore', instanceName = 'ohs1')
```

A.1.3.6 ohs_postUpgrade

Use with WLST: Online

Description

Use the `ohs_postUpgrade` command after you have upgraded from a previous version of Oracle HTTP Server to release 12c (12.2.1).

Prior to release 12c (12.2.1), Oracle HTTP Server instances/components used wallets without KSS integration. If you use the Upgrade Assistant to upgrade to 12c (12.2.1), the existing wallet contents must be imported to the KSS database for further management.

The `ohs_postUpgrade` command parses across all of the Oracle HTTP Server instances in the domain and imports their wallets to the KSS database if an entry does not already exist in the database for the same keystore name. This command is available only when WLST is connected to an Administration Server instance. For more information on using this command, see [Upgrading from Earlier Releases of Oracle HTTP Server](#) and [Importing Wallets to the KSS Database after an Upgrade Using WLST](#).

Syntax

```
ohs_postUpgrade()
```

This command does not take any arguments.

Example

```
ohs_postUpgrade()
```

A.1.3.7 ohs_updateInstances

Use with WLST: Online

Description

The `ohs_updateInstances` command is available only when WLST is connected to an Administration Server instance. It will parse across all of the Oracle HTTP Server instances in the domain and perform the following tasks:

- Create a new keystore with the name `<instanceName>_default` if one does not exist.
- Put a demonstration certificate, `demoCASignedCertificate`, in the newly created keystore.
- Export the keystore to the instance location.

This command is to be used after an Oracle HTTP Server instance is created using Configuration Wizard in collocated mode only. For more information on using this command, see [Associating Oracle HTTP Server Instances With a Keystore Using WLST](#).

Syntax

```
ohs_updateInstances()
```

This command does not take any arguments.

Example

```
ohs_updateInstances()
```

A.2 Migrating to the mod_proxy_fcgi and mod_authnz_fcgi Modules

This appendix provides instructions on how to migrate from using the mod_fastcgi module to the mod_proxy_fcgi and mod_authnz_fcgi modules.

The mod_fastcgi module was deprecated in the previous release and has been replaced in the current release by the mod_proxy_fcgi and mod_authnz_fcgi modules. The mod_proxy_fcgi module uses mod_proxy to provide FastCGI support. The mod_authnz_fcgi module allows FastCGI authorizer applications to authenticate users and authorize access to resources.

Complete the following tasks to migrate from the mod_fastcgi module to the mod_proxy_fcgi and mod_authnz_fcgi modules.

- [Task 1: Replace LoadModule Directives in httpd.conf File](#)
- [Task 2: Delete mod_fastcgi Configuration Directives From the httpd.conf File](#)
- [Task 3: Configure mod_proxy_fcgi to Act as a Reverse Proxy to an External FastCGI Server](#)
- [Task 4: Setup an External FastCGI Server](#)
- [Task 5: Setup mod_authnz_fcgi to Work with FastCGI Authorizer Applications.](#)

A.2.1 Task 1: Replace LoadModule Directives in httpd.conf File

Edit the httpd.conf file to comment out the LoadModule lines for mod_fastcgi and mod_fcgi. Add LoadModule lines for mod_proxy, mod_proxy_fcgi, and mod_authnz_fcgi, for example:

```
# LoadModule fastcgi_module modules/mod_fastcgi.so
# LoadModule fcgi_module modules/mod_fcgi.so
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_fcgi_module modules/mod_proxy_fcgi
LoadModule authnz_fcgi_module modules/mod_authnz_fcgi
```

A.2.2 Task 2: Delete mod_fastcgi Configuration Directives From the httpd.conf File

Delete any of the following mod_fastcgi configuration directives that appear in the httpd.conf file. For more information on these directives, see the following URL

https://docs.oracle.com/cd/B31017_01/web.1013/q20204/mod_fastcgi.html

- FastCgiServer
- FastCgiConfig
- FastCgiExternalServer
- FastCgiIpcDir
- FastCgiWrapper
- FastCgiAuthenticator
- FastCgiAuthenticatorAuthoritative
- FastCgiAuthorizer

- FastCgiAuthorizerAuthoritative
- FastCgiAccessChecker
- FastCgiAccessCheckerAuthoritative

A.2.3 Task 3: Configure mod_proxy_fcgi to Act as a Reverse Proxy to an External FastCGI Server

The mod_proxy_fcgi module does not have configuration directives. Instead, it uses the directives set on the mod_proxy module. Unlike the mod_fcgid and mod_fastcgi modules, the mod_proxy_fcgi module has no provision for starting the application process. The purpose of mod_proxy_fcgi is to move this functionality outside of the web server for faster performance. So, mod_proxy_fcgi simply will act as a reverse proxy to an external FastCGI server.

For examples of using mod_proxy_fcgi, see the following URL:

http://httpd.apache.org/docs/trunk/mod/mod_proxy_fcgi.html

For information on the directives available for mod_proxy, including reverse proxy examples, see the following URL:

http://httpd.apache.org/docs/trunk/mod/mod_proxy.html

Another way to setup the mod_proxy_fcgi module to act as a reverse proxy to a FastCGI server is to force a request to be handled as a reverse-proxy request. To do this, you must create a suitable Handler pass-through (also known as "Access via Handler"). For more information on how to set up a Handler pass-through, see the following URL:

http://httpd.apache.org/docs/trunk/mod/mod_proxy.html#handler

A.2.4 Task 4: Setup an External FastCGI Server

An external FastCGI server enables you to run FastCGI scripts external to the web server or even on a remote machine. The following list provides information on some available FastCGI server solutions:

- fcgistar, a utility for starting FastCGI programs. This solution is provided by Apache httpd 2.4. It only works on UNIX systems. For more information on fcgistar, see the following URL:

<http://httpd.apache.org/docs/trunk/programs/fcgistar.html>

- PHP-FPM, an alternative PHP FastCGI implementation. This solution is included with PHP release 5.3.3 and later. For more information on PHP-FPM, see the following URL:

<http://php.net/manual/en/install.fpm.configuration.php>

- spawn-fcgi, a utility for spawning remote and local FastCGI processes. For more information on spawn-fcgi, see the following URL:

<http://redmine.lighttpd.net/projects/spawn-fcgi/wiki/WikiStart>

A.2.5 Task 5: Setup mod_authnz_fcgi to Work with FastCGI Authorizer Applications.

The mod_authnz_fcgi module allows FastCGI authorizer applications to authenticate users and authorize access to resources. It supports generic FastCGI authorizers which

participate in a single phase for authentication and authorization, and Apache httpd-specific authenticators and authorizers. FastCGI authorizers can authenticate using user id and password, such as for Basic authentication, or can authenticate using arbitrary mechanisms. For more information on using mod_authnz_fcgi, see the following URL:

http://httpd.apache.org/docs/trunk/mod/mod_authnz_fcgi.html

A.3 Frequently Asked Questions

This appendix provides answers to frequently asked questions about Oracle HTTP Server (OHS). It includes the following topics:

- [How Do I Create Application-Specific Error Pages?](#)
- [What Type of Virtual Hosts Are Supported for HTTP and HTTPS?](#)
- [Can I Use Different Language and Character Set Versions of Document?](#)
- [Can I Apply Apache HTTP Server Security Patches to Oracle HTTP Server?](#)
- [Can I Upgrade the Apache HTTP Server Version of Oracle HTTP Server?](#)
- [Can I Compress Output From Oracle HTTP Server?](#)
- [How Do I Create a Namespace That Works Through Firewalls and Clusters?](#)
- [How Can I Enhance Website Security?](#)
- [Why is REDIRECT_ERROR_NOTES not set for "File Not Found" errors?](#)
- [How can I hide information about the Web Server Vendor and Version](#)
- [Can I Start OHS by Using apachectl or Other Command-Line Tool?](#)
- [How Do I Configure Oracle HTTP Server to Listen at Port 80?](#)
- [How Do I Terminate Requests Using SSL Within Oracle HTTP Server?](#)
- [How Do I Configure End-to-End SSL Within Oracle HTTP Server?](#)
- [Can Oracle HTTP Server Front-End Oracle WebLogic Server?](#)
- [What is the Difference Between Oracle WebLogic Server Domains and Standalone Domains?](#)
- [Can Oracle HTTP Server Cache the Response Data?](#)
- [How Do I Configure a Virtual Server-Specific Access Log?](#)

Documentation from the Apache Software Foundation is referenced when applicable.

Note:

Readers using this guide in PDF or hard copy formats will be unable to access third-party documentation, which Oracle provides in HTML format only. To access the third-party documentation referenced in this guide, use the HTML version of this guide and click the hyperlinks.

A.3.1 How Do I Create Application-Specific Error Pages?

Oracle HTTP Server has a default content handler for dealing with errors. You can use the `ErrorDocument` directive to override the defaults.

See Also:

[Apache HTTP Server documentation on the `ErrorDocument` directive](#) at:

<http://httpd.apache.org/docs/current/mod/core.html#errordocument>

A.3.2 What Type of Virtual Hosts Are Supported for HTTP and HTTPS?

(Apache 2.4 required)

For HTTP, Oracle HTTP Server supports both name-based and IP-based virtual hosts. Name-based virtual hosts are virtual hosts that share a common listening address (IP plus port combination), but route requests based on a match between the Host header sent by the client and the `ServerName` directive set within the `VirtualHost`. IP-based virtual hosts are virtual hosts that have distinct listening addresses. IP-based virtual hosts route requests based on the address they were received on.

For HTTPS, only IP-based virtual hosts are possible with Oracle HTTP Server. This is because for name-based virtual hosts, the request must be read and inspected to determine which virtual host processes the request. If HTTPS is used, an SSL handshake must be performed before the request can be read. To perform the SSL handshake, a server certificate must be provided. To have a meaningful server certificate, the host name in the certificate must match the host name the client requested, which implies a unique server certificate per virtual host. However, because the server cannot know which virtual host to route the request to until it has read the request, and it can't properly read the request unless it knows which server certificate to provide, there is no way to make name-based virtual hosting work with HTTPS.

A.3.3 Can I Use Different Language and Character Set Versions of Document?

Yes, you can use multiviews, a general name given to the Apache HTTP Server's ability to provide language and character-specific document variants in response to a request.

See Also:

[Multiviews](#) option in the Apache HTTP Server documentation on Content Negotiation, at:

<http://httpd.apache.org/docs/current/content-negotiation.html>

A.3.4 Can I Apply Apache HTTP Server Security Patches to Oracle HTTP Server?

No, you cannot apply the Apache HTTP Server security patches to Oracle HTTP Server for the following reasons:

- Oracle tests and appropriately modifies security patches before releasing them to Oracle HTTP Server users.
- In many cases, the Apache HTTP Server alerts, such as OpenSSL alerts, may not be applicable because Oracle has removed those components from the stack.

The latest security related fixes to Oracle HTTP Server are performed through the Oracle Critical Patch Update (CPU). For more details, refer to Oracle's [Critical Patch Updates and Security Alerts](#) Web page.

Note:

After applying a CPU, the Apache HTTP Server-based version may stay the same, but the vulnerability will be fixed. There are third-party security detection tools that can check the version, but do not check the vulnerability itself.

A.3.5 Can I Upgrade the Apache HTTP Server Version of Oracle HTTP Server?

No, you cannot upgrade only the Apache HTTP Server version inside Oracle HTTP Server. Oracle provides a newer version of Apache HTTP Server that Oracle HTTP Server is based on, which is part of either a patch update or the next major or minor release of Oracle Fusion Middleware.

A.3.6 Can I Compress Output From Oracle HTTP Server?

In general, Oracle recommends using `mod_deflate`, which is included with Oracle HTTP Server. For more information pertaining to `mod_deflate`, see http://httpd.apache.org/docs/current/mod/mod_deflate.html

A.3.7 How Do I Create a Namespace That Works Through Firewalls and Clusters?

The general idea is that all servers in a distributed website should use a single URL namespace. Every server serves some part of that namespace, and can redirect or proxy requests for URLs that it does not serve to a server that is closer to that URL. For example, your namespaces could be the following:

```
/app1/login.html
/app1/catalog.html
/app1/dologin.jsp
/app2/orderForm.html
/apps/placeOrder.jsp
```

You could initially map these name spaces to two Web servers by putting `app1` on `server1` and `app2` on `server2`. The configuration for `server1` might look like the following:

```
Redirect permanent /app2 http://server2/app2
Alias /app1 /myApps/application1
<Directory /myApps/application1>
    ...
</Directory>
```

The configuration for `Server2` is complementary.

If you decide to partition the namespace by content type (HTML on `server1`, and JSP on `server2`), then you can change server configuration and move files around, but you

do not have to make changes to the application itself. The resulting configuration of server1 might look like the following:

```
RedirectMatch permanent (.*) \.jsp$ http://server2/$1.jsp
AliasMatch ^/app(.*) \.html$ /myPages/application$1.html
<DirectoryMatch "/myPages/application\d">
    ...
</DirectoryMatch>
```

The amount of actual redirection can be minimized by configuring a hardware load balancer like F5 system BIG-IP to send requests to server1 or server2 based on the URL.

A.3.8 How Can I Enhance Website Security?

The following are some general guidelines for securing your web site.

- Use a commercial firewall between your ISP and your Web server.
- Use switched Ethernet to limit the amount of traffic a compromised server can detect. Use additional firewalls between Web server machines and highly sensitive internal servers running the database and enterprise applications.
- Remove unnecessary network services such as RPC, Finger, and telnet from your server.
- Always validate all input from Web forms and output from your applications. Be sure to validate encodings, long input strings and input that contains non-printable characters, HTML tags, or javascript tags.
- Encrypt the contents of cookies when it is relevant.
- Check often for security patches for all your system and application software, and install them as soon as possible. Only accept patches from Oracle or your Oracle support representative.
- When it is relevant, use an intrusion detection package to monitor for defaced Web pages, viruses, and presence of rootkits. If possible, mount system executables and Web content on read-only file systems.
- Consider using Pen testing or other relevant security testing on your application. Consider configuring web security using the appropriate custom mod_security rules to protect your application. For more information on mod_security, see [Configuring the mod_security Module](#) and [Using mod_security](#).
- Remove unneeded content from the httpd.conf file. For more information, see [Removing Access to Unneeded Content](#).
- Take precautions to protect your web pages from clickjacking attempts. There is a lot of helpful information available on the internet. For more information on clickjacking, see the Security Best Practices section in "Security Vulnerability FAQ for Oracle Database and Fusion Middleware Products (Doc ID 1074055.1)".

A.3.9 Why is REDIRECT_ERROR_NOTES not set for "File Not Found" errors?

The REDIRECT_ERROR_NOTES CGI environment variable is not set for "File Not Found" errors in Oracle HTTP Server because compatibility with Apache HTTP Server does not make that information available to CGI and other applications for this condition.

A.3.10 How can I hide information about the Web Server Vendor and Version

Specify `ServerSignature Off` to remove this information from web server generated responses. Specify `ServerTokens Custom some-server-string` to disguise the web server software when Oracle HTTP Server generates the web Server response header. (When a backend server generates the response, the server response header may come from the backend server depending on the proxy mechanism.)

Note:

`ServerTokens Custom some-server-string` is a replacement for the `ServerHeader Off` setting in Oracle HTTP Server 10g.

A.3.11 Can I Start OHS by Using `apachectl` or Other Command-Line Tool?

Oracle HTTP Server 12c (12.2.1) process management is handled by Node Manager. You can use the `startComponent` command to start Oracle HTTP Server without using WLST or Fusion Middleware Control directly. For more information, see [Starting Oracle HTTP Server Instances from the Command Line](#).

A.3.12 How Do I Configure Oracle HTTP Server to Listen at Port 80?

By default, Oracle HTTP Server is not able to bind to ports on UNIX in the reserved range (typically less than 1024). You can enable Oracle HTTP Server to listen on a port in the reserved range (for example, the default port 80) by following the instructions in [Starting Oracle HTTP Server Instances on a Privileged Port \(UNIX Only\)](#).

A.3.13 How Do I Terminate Requests Using SSL Within Oracle HTTP Server?

You can terminate requests using SSL before or within Oracle HTTP Server, where the `mod_wl_ohs` module forwards requests to WebLogic Server. Whether you terminate SSL before the request reaches Oracle HTTP Server or when the request is in the server, depends on your topology. For more information, see [Terminating SSL at the Load Balancer](#) and [Terminating SSL at Oracle HTTP Server](#).

A.3.14 How Do I Configure End-to-End SSL Within Oracle HTTP Server?

Support for Secure Sockets Layer (SSL) is provided by the Oracle WebLogic Server Proxy Plug-In. You can use the SSL protocol to protect the connection between the plug-in and Oracle WebLogic Server. The SSL protocol provides confidentiality and integrity to the data passed between the plug-in and WebLogic Server. See [Use SSL with Plug-Ins](#) in *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2* for information on setting up SSL libraries and for setting up one-way or two-way SSL communications between the web server and Oracle WebLogic Server.

If you will be configuring SSL in Oracle HTTP Server but not on Oracle WebLogic Server, then you can terminate SSL for requests sent by Oracle HTTP Server. For information on configuring this scenario, see [Terminating SSL at Oracle HTTP Server](#).

A.3.15 Can Oracle HTTP Server Front-End Oracle WebLogic Server?

Oracle HTTP Server is the web server component for Oracle Fusion Middleware. The server uses the WebLogic Management Framework to provide a simple, consistent and distributed environment for administering Oracle HTTP Server, Oracle WebLogic

Server, and the rest of the Fusion Middleware stack. It acts as the HTTP front-end by hosting the static content from within and by using its built-in Oracle WebLogic Server Proxy Plug-In (`mod_wl_ohs` module) to route dynamic content requests to WebLogic-managed servers.

For information about the topologies you into which you can install Oracle HTTP Server, see [Oracle HTTP Server 12c \(12.2.1\) Topologies](#).

A.3.16 What is the Difference Between Oracle WebLogic Server Domains and Standalone Domains?

Oracle HTTP Server can be installed in either a standalone, a Full-JRF, or a Restricted-JRF domain. A standalone domain is a container for system components, such as Oracle HTTP Server. It is ideal for a DMZ environment because it has the least overhead. A standalone domain has a directory structure similar to an Oracle WebLogic Server Domain, but it does not contain an Administration Server, or Managed Servers, or any management support. It can contain one or more instances of system components of the same type, such as Oracle HTTP Server, or a mix of system component types.

WebLogic Server Domains support all WebLogic Management Framework tools. An Oracle WebLogic Server domain can be either Full-JRF or Restricted JRF. A WebLogic Server Domain in Full-JRF mode contains a WebLogic Administration Server, zero or more WebLogic Managed Servers, and zero or more System Component Instances (for example, an Oracle HTTP Server instance). This type of domain provides enhanced management capabilities through the Fusion Middleware Control and WebLogic Management Framework present throughout the system. A WebLogic Server Domain can span multiple physical machines, and it is centrally managed by the administration server. Because of these properties, a WebLogic Server Domain provides the best integration between your System Components and Java EE Components.

The Restricted-JRF domain is a new feature of the 12.2.1 release; its purpose is to simplify Oracle HTTP Server administration by using the WebLogic server domain. A Restricted-JRF Oracle WebLogic Server domain is similar to a Full-JRF domain except that a connection to an external database is not required. All of the Oracle HTTP Server functionality through Fusion MiddleWare Control and WLST is still available, with the exception of cross component wiring.

For more details on each of these domains, see [Domain Types](#).

A.3.17 Can Oracle HTTP Server Cache the Response Data?

Oracle HTTP Server now includes the Apache `mod_cache` and `mod_cache_disk` modules to cache response data.

For more information, on `mod_cache` and `mod_cache_disk`, see `mod_cache` in the Apache documentation:

http://httpd.apache.org/docs/2.4/mod/mod_cache.html

A.3.18 How Do I Configure a Virtual Server-Specific Access Log?

Within every `VirtualHost` directive, you can use the Apache `LogFormat` and `CustomLog` directives to configure Virtual Host-specific access log format and log files. For more information, see [LogFormat](#) and [CustomLog](#).

A.4 Troubleshooting Oracle HTTP Server

This appendix describes common problems that you might encounter when using Oracle HTTP Server (OHS), and explains how to solve them. It includes the following topics:

- [Oracle HTTP Server Unable to Start Due to Port Conflict](#)
- [System Overloaded by Number of httpd Processes](#)
- [Permission Denied When Starting Oracle HTTP Server On a Port Below 1024](#)
- [Using Log Files to Locate Errors](#)
- [Recovering an OHS Instance on a Remote Host](#)
- [Oracle HTTP Server Performance Issues](#)
- [Out of DMS Shared Memory](#)
- [Performance Issues with Instances Created on Shared File Systems](#)
- [Node Manager 12c \(12.1.2\) OHS Throws Java Exception on AIX](#)
- [Oracle HTTP Server Fails to Start due to Certificates Signed Using the MD5 Algorithm](#)

A.4.1 Oracle HTTP Server Unable to Start Due to Port Conflict

You can get the following error if Oracle HTTP Server cannot start due to port conflict:

```
[VirtualHost: main] (98)Address already in use: make_sock: could not bind to address [::]:7777
```

Solution

Determine what process is already using that port, and then either change the IP:port address of Oracle HTTP Server or the port of the conflicting process.

Note:

If the OHS instance was created with the config Wizard, there is no automated port management. It is possible to create multiple instances using the same Listen port.

A.4.2 System Overloaded by Number of httpd Processes

When too many httpd processes run on a system, the response time degrades because there are insufficient resources for normal processing.

Solution

Lower the value of `MaxRequestWorkers` to a value the machine can accommodate.

A.4.3 Permission Denied When Starting Oracle HTTP Server On a Port Below 1024

You will get the following error if you try to start Oracle HTTP Server on a port below 1024:

```
[VirtualHost: main] (13)Permission denied: make_sock: could not bind to address [::]:443
```

Oracle HTTP Server will not start on ports below 1024 because root privileges are needed to bind these ports.

Solution

Follow the steps in [Starting Oracle HTTP Server Instances on a Privileged Port \(UNIX Only\)](#) to start Oracle HTTP Server on a Privileged Port.

A.4.4 Using Log Files to Locate Errors

You can use the following log files to help locate errors:

- [Rewrite Log](#)
- [Script Log](#)
- [Error Log](#)

A.4.4.1 Rewrite Log

This log file is necessary for debugging when mod_rewrite is used. The log file produces a detailed analysis of how the rewriting engine transforms requests. The value of the LogLevel directive controls the level of detail.

A.4.4.2 Script Log

This log file enables you to record the input to and output from the CGI scripts. This should only be used in testing, and not for production servers.

See Also:

[ScriptLog](#) in the Apache HTTP Server documentation at:

http://httpd.apache.org/docs/current/mod/mod_cgi.html#scriptlog

A.4.4.3 Error Log

This log file records overall server problems. Refer to [Managing Oracle HTTP Server Logs](#) for details on configuring and viewing error logs.

A.4.5 Recovering an OHS Instance on a Remote Host

If you need to recover an Oracle HTTP Server instance that is installed on a remote host (that is, a host with just managed servers but no Administration Server), you must use tar and untar; pack.sh and unpack.sh do not work in this scenario.

A.4.6 Oracle HTTP Server Performance Issues

The following are performance issues, along with their solutions, that you might encounter when running Oracle HTTP Server:

- [Special Runtime Files Reside on a Network File System](#)
- [UNIX Sockets on a Network File System](#)

- [DocumentRoot on a Slow File System](#)

A.4.6.1 Special Runtime Files Reside on a Network File System

Oracle HTTP Server uses locks for its internal processing, which in turn use lock files. These files are created dynamically when the lock is created and are accessed every time the lock is taken or released. If these files reside on a slower file system (for example, network file system), then there could be severe performance degradation. To counter this issue:

On Linux:

In `httpd.conf`, change `Mutex fnctl:fileloc` default to `Mutex sysvsem` default where `fileloc` is the value of the directive `LockFile` (two places).

On Solaris:

In `httpd.conf`, change `Mutex fnctl:fileloc` default to `Mutex pthread` default where `fileloc` is the value of the directive `LockFile` (two places).

A.4.6.2 UNIX Sockets on a Network File System

The `mod_cgid` module is not enabled by default. If enabled, this module uses UNIX sockets internally. If UNIX sockets reside on a slower file system (for example, network file system), a severe performance degradation could be observed. You can set the following directive to avoid the issue:

- If `mod_cgid` is enabled, use the `ScriptSock` directive to place `mod_cgid`'s UNIX socket on a local filesystem.

A.4.6.3 DocumentRoot on a Slow File System

If you are using `mod_wl_ohs` to route the requests to back-end WLS server/cluster, and the `DocumentRoot` is on a slower file system (for example, network file system), then every request that `mod_wl_ohs` routes to the backend server can experience performance issues. This can be overcome by setting `WLSRequest` to `ON` instead of `SetHandler weblogic-handler`.

A.4.7 Out of DMS Shared Memory

In some extreme configurations, you might see the following message in the OHS error log:

```
dms_fail_shm_expansion: out of DMS shared memory in pid XXX, disabling DMS; increase
DMSProcSharedMem directive from YYY
```

This is because of an incorrect calculation of required shared memory for OHS DMS. This can be resolved by setting `DMSProcSharedMem` to a larger value than the default of 4096. Continue setting `DMSProcSharedMem` 50% higher until the problem is resolved. The minimum value for `DMSProcSharedMem` is 256 and the maximum value is 65536.

In a configuration with a very large number of virtual hosts (hundreds or thousands), if the above workaround does not work, you can instead, set the environment variable `OHS_DMS_BLOCKSIZE` to a large enough value that Oracle HTTP Server starts without error. The value of this variable is in kilobytes and a value of 524288 is a good starting point. If the error persists, continue to increase the value by 50% until Oracle HTTP Server starts without error.

A.4.8 Performance Issues with Instances Created on Shared File Systems

If you encounter functional or performance issues when creating an Oracle HTTP Server instance on a shared filesystem, including NFS (Network File System), it might be due to filesystem accesses in the default configuration. In this case, you must update the `httpd.conf` file specific to your operating systems. For information on updating the this file, see [Updating Oracle HTTP Server Component Configurations on a Shared Filesystem](#).

A.4.9 Node Manager 12c (12.1.2) OHS Throws Java Exception on AIX

When running Oracle HTTP Server on AIX, if `ULIMIT` values of file handlers are small, Node Manager console/log throws "java.io.IOException: error=24, Too many open files" error on AIX.

Workaround

To resolve the issue, increase the `ULIMIT` values of file handlers as described here:

1. Log in as the root user.
2. Open `/etc/security/limits` file.
3. Edit the file and set the following values:
 - `nofiles=8192`
 - `nofiles_hard=65536`
4. Reboot the machine to enable the changes.

A.4.10 Oracle HTTP Server Fails to Start due to Certificates Signed Using the MD5 Algorithm

Oracle HTTP Server fails to start if the Oracle HTTP Server wallet contains a certificate or certificate request that is signed with the Message Digest 5 (MD5) algorithm.

- **Solution:** Replace the MD5 certificate with a Secure Hash Algorithm 2 (SHA-2) certificate.
- **Workaround:** To enable MD5 supported certificate, set the `ORACLE_SSL_ALLOW_MD5_CERT_SIGNATURES` environment variable in the `ohs.plugins.nodemanager.properties` file to `1`.

To set the environment variable in Oracle HTTP Server, see [Environment Variable Configuration Properties](#).

A.5 Configuration Files

The default Oracle HTTP Server configuration contains the files described in the following sections:

- [httpd.conf File](#)
- [ssl.conf File](#)
- [admin.conf File](#)

- [mod_wl_ohs.conf File](#)
- [mime.types File](#)
- [ohs.plugins.nodemanager.properties File](#)
- [magic File](#)
- [keystores/<wallet-directory> File](#)
- [auditconfig.xml File](#)
- [component-logs.xml File](#)
- [component_events.xml File](#)
- [Additional Reference](#)

For more information about the configuration files, see [Understanding Configuration Files](#).

A.5.1 httpd.conf File

The following table describes the httpd.conf file.

Description	Format	Primary feature configured
Top-level web server configuration file	Apache HTTP Server .conf file format	Various, including non-SSL listening socket

A.5.2 ssl.conf File

The following table describes the ssl.conf file.

Description	Format	Primary feature configured
Web server configuration file for SSL	Apache HTTP Server .conf file format	mod_ossll

A.5.3 admin.conf File

The following table describes the admin.conf file.

Description	Format	Primary feature configured
Web server configuration file for administration port	Apache HTTP Server .conf file format	mod_dms; administration port used for communication with node manager

Note:

Only the listen port and local address are intended for customer configuration.

A.5.4 mod_wl_ohs.conf File

The following table describes the mod_wl_ohs.conf file.

Description	Format	Primary feature configured
Web server configuration file for WebLogic plugin	Apache HTTP Server .conf file format	WebLogic plugin (mod_wl_ohs)

A.5.5 mime.types File

The following table describes the mime.types file.

Description	Format	Primary feature configured
Web server configuration file for mod_mime	mod_mime file format	Mime types used by mod_mime

A.5.6 ohs.plugins.nodemanager.properties File

The following table describes the ohs.plugins.nodemanager.properties file.

Description	Format	Primary feature configured
Configuration file for Oracle HTTP Server node manager plug-ins	Java property file format	Oracle HTTP Server plug-ins

A.5.7 magic File

The following table describes the magic file.

Description	Format	Primary feature configured
Optional, disabled web server configuration file for mod_mime_magic	mod_mime_magic file format	File content patterns used by mod_mime_magic

A.5.8 keystores/<wallet-directory> File

The following table describes the default keystores file.

Name example: keystores/default

Description	Format	Primary feature configured
Oracle wallet	Oracle wallet format	Oracle wallets for SSL/TLS communication

A.5.9 auditconfig.xml File

The following table describes the auditconfig.xml file.

Description	Format	Primary feature configured
Configuration of OHS auditing and logging	FMW audit framework audit configuration XML format	FMW audit framework auditing of Oracle HTTP Server operations

A.5.10 component-logs.xml File

The following table describes the component-logs.xml file.

Description	Format	Primary feature configured
Configuration of OHS log files for log collection	FMW log file configuration XML format	Log collection

A.5.11 component_events.xml File

The following table describes the component_event.xml file.

Description	Format	Primary feature configured
Static configuration of OHS audit event definitions	FMW audit framework component event XML format	FMW audit framework

Note:

This configuration file is not intended for modification by customers.

A.5.12 Additional Reference

For additional information, see the following documentation:

- Apache HTTP Server .conf file format:
<http://httpd.apache.org/docs/2.4/configuring.html>
- mod_mime file format:
http://httpd.apache.org/docs/2.4/mod/mod_mime.html
- mod_mime_magic file format:
http://httpd.apache.org/docs/2.2/mod/mod_mime_magic.html

A.6 Property Files

This appendix documents the property files used by Oracle HTTP Server. The files include:

- [ohs_admin.properties File](#)
- [ohs_nm.properties File](#)
- [ohs.plugins.nodemanager.properties File](#)

A.6.1 ohs_admin.properties File

The ohs_admin.properties file is a per domain file used to configure the Oracle HTTP Server administration server MBeans.

File path: *DOMAIN_HOME*/config/fmwconfig/components/OHS/ohs_admin.properties

Editable properties in this file are listed here:

Property	Description
LogLevel	The log level for the OHS plug-in. Accepted Values: <ul style="list-style-type: none">• SEVERE (highest value)• WARNING• INFO• CONFIG• FINE• FINER• FINEST (lowest value) Default: INFO

A.6.2 ohs_nm.properties File

The ohs_nm.properties file is a per domain file used to configure the Oracle HTTP Server plug-in.

File path: *DOMAIN_HOME*/config/fmwconfig/components/OHS/ohs_nm.properties

Property	Description
LogLevel	The log level for the OHS undemanding plug-in. Accepted values: <ul style="list-style-type: none">• SEVERE (highest value)• WARNING• INFO• CONFIG• FINE• FINER• FINEST (lowest value) Default: INFO

A.6.3 ohs.plugins.nodemanager.properties File

The ohs.plugins.nodemanager.properties file exists for each configured Oracle HTTP Server and contains configured parameters OHS process management.

File path: *DOMAIN_HOME*/config/fmwconfig/components/OHS/ohs1/ohs.plugins.nodemanager.properties

This section contains the following information:

- [Cross-platform Properties](#)
- [Environment Variable Configuration Properties](#)
- [Properties Specific to Oracle HTTP Server Instances Running on Linux and UNIX](#)

Note:

Any paths placed in Windows implementations of ohs.plugins.nodemanager.properties that include backslashes must have those backslashes escaped.

You must do this manually after upgrading from Oracle HTTP Server 11g where paths with backslashes were migrated from opmn.xml to ohs.plugins.nodemanager.properties.

For example:

```
environment.TMP = C:\Users\user\AppData\Local\Temp\1
```

Must be modified manually to:

```
environment.TMP = C:\\Users\\user\\AppData\\Local\\Temp\\1
```

A.6.3.1 Cross-platform Properties

The following table lists the cross-platform properties:

Property	Description
config-file	<p>The base filename of the initial Oracle HTTP Server configuration file. config-file accepts any valid .conf file in the instance configuration directory.</p> <p>Caution: The specified .conf file must include admin.conf in the same manner as the default httpd.conf.</p> <p>Default: httpd.conf</p>
command-line	<p>Extra arguments to add to the httpd invocation. command-line accepts any valid httpd command-line parameters.</p> <p>Caution: These must not conflict with the usual start, stop, and restart parameters. Using -D and symbol is the expected use of this property.</p> <p>Default: None</p>

Property	Description
<code>start-timeout</code>	The maximum number of seconds to wait for Oracle HTTP Server to start and initialize. <code>start-timeout</code> accepts any numeric value from 5 to 3600. Default: 120
<code>stop-timeout</code>	The maximum number of seconds to wait for the Oracle HTTP Server to terminate. <code>stop-timeout</code> accepts any numeric value from 5 to 3600. Default: 60
<code>restart-timeout</code>	The maximum number of seconds to wait for the Oracle HTTP Server to restart. <code>restart-timeout</code> accepts any numeric value from 5 to 3600. Default: 180
<code>ping-interval</code>	The number of seconds from the completion of one health check ping to the Oracle HTTP Server until the start of the next. A value of 0 disables pings. <code>ping-interval</code> accepts any numeric value from 0 to 3600. Default: 30
<code>ping-timeout</code>	The maximum number of seconds to wait for an Oracle HTTP Server health check ping to complete. <code>ping-timeout</code> accepts any numeric value from 5 to 3600. Default: 60

Example:

```
config-file = httpd.conf
command-line = -DSYMBOL
start-timeout = 120
stop-timeout = 60
restart-timeout = 180
ping-interval = 30
ping-timeout = 60
```

A.6.3.2 Environment Variable Configuration Properties

Additional environment variables for the OHS server may be specified using environment properties.

The environment property syntax is:

```
environment[.append][.<order>].<name> = <value>
```

Where:

- The optional `.append` will append the new `<value>` to any existing value for `<name>`. If `<name>` has not yet been defined, then `<value>` will be the new value.
- The optional `.<order>` value sets order for this definition's setting in the environment (the default is 0). The order determines when the configured variable is added to the process' environment (and its value evaluated). Environment properties with lower order values are processed before those with higher order values. The order value must be an integer with a value greater than or equal to 0.

- *<name>* is the environment variable name, which must begin with a letter or underscore, and consist of letters, numeric digits or underscores.
- *<value>* is the value of environment variable *<name>*. The value can reference other environment variable names, including its own.

The following special references may be included in the value:

- "\$:" for the path separator
- "\$/" for the file separator
- "\$\$" for '\$'

With the exception of these special characters, UNIX variable syntax references ("*\$name*" or "\${*name*}") and the Windows variable syntax reference ("%*name*%") are supported.

Each property name within the same property file must be unique (the behavior is not defined for multiple properties defined with the same name), thus the *.<order>* field is necessary to keep property names unique when multiple definitions are provided for the same environment variable *<name>*.

The following environment variables are set by the Oracle HTTP Server plug-in:

- SHELL: From 's environment, or defaults to /bin/sh, or cmd.exe for Windows
- ORA_NLS33: Set to \$ORACLE_HOME/nls/data
- NLS_LANG: From 's environment, otherwise default
- LANG: From 's environment, otherwise default
- LC_ALL: From 's environment, if set
- TZ: From 's environment, if set
- ORACLE_HOME: Full path to the Oracle home
- ORACLE_INSTANCE: Full path to the domain home
- INSTANCE_NAME: The name of the domain
- PRODUCT_HOME: The path to the OHS install: \$ORACLE_HOME/ohs
- PATH: Defaults to
 - On UNIX:


```
$PRODUCT_HOME/bin:$ORACLE_HOME/bin:
$ORACLE_HOME/jdk/bin:/bin:/usr/bin:/usr/local/bin
```
 - On Windows:


```
%PRODUCT_HOME%\bin;%ORACLE_HOME%\bin;
%ORACLE_HOME%\jdk\bin;%SystemRoot%;%SystemRoot%\system32
```

These variables apply to UNIX only:

- TNS_ADMIN: From 's environment, or \$ORACLE_HOME/network/admin

- LD_LIBRARY_PATH: \$PRODUCT_HOME/lib:\$ORACLE_HOME/lib:
\$ORACLE_HOME/jdk/lib
- LIBPATH: Same as LD_LIBRARY_PATH
- X_LD_LIBRARY_PATH_64: Same as LD_LIBRARY_PATH

These variables apply to Windows only:

- ComSpec: Defaults to %ComSpec% value from the system.
- SystemRoot: Defaults to %SystemRoot% value from the system.
- SystemDrive: Defaults to %SystemDrive% value from the system.

Example

On a UNIX like system with the web tier installed as /oracle and the environment variable "MODX_RUNTIME=special" set in the NodeManager's environment, the following definitions:

```
environment.MODX_RUNTIME = $MODX_RUNTIME
environment.1.MODX_ENV = Value A
environment.1.MODX_PATH = $PATH$/opt/modx/bin
environment.2.MODX_ENV = ${MODX_ENV}, Value B
environment.append.2.MODX_PATH = /var/modx/bin
MODX_ENV = Value A, Value B
MODX_PATH = /oracle/ohs/bin:/oracle/bin:/oracle/jdk/bin:/bin:/usr/bin: /usr/local/
bin:/opt/modx/bin:/var/modx/bin
```

would result in the following additional environment variables set for Oracle HTTP Server:

```
MODX_RUNTIME = special
```

A.6.3.3 Properties Specific to Oracle HTTP Server Instances Running on Linux and UNIX

These should only be configured for instances running on Linux or other UNIX like systems.

Property	Description
restart-mode	<p>Determines whether to use graceful or hard restart for the Oracle HTTP Server when configuration changes are activated.</p> <p>restart-mode accepts these values:</p> <ul style="list-style-type: none"> • restart • graceful <p>Default: graceful</p>
stop-mode	<p>Determines whether to use a graceful or hard stop when stopping Oracle HTTP Server.</p> <p>stop-mode accepts these values:</p> <ul style="list-style-type: none"> • stop • graceful-stop <p>Default: stop</p>

Property	Description
<code>mpm</code>	<p>Determines whether to use the prefork, worker, or event MPM for Oracle HTTP Server.</p> <p><code>mpm</code> accepts these values:</p> <ul style="list-style-type: none"> • <code>prefork</code> • <code>worker</code> • <code>event</code> <p>Default: <code>worker</code> for UNIX, <code>event</code> for Linux</p>
<code>allow-corefiles</code>	<p>Determines whether <code>ulimit</code> should be set to allow core files to be written for OHS server crashes.</p> <p><code>allow-corefiles</code> accepts these values:</p> <ul style="list-style-type: none"> • <code>yes</code> • <code>no</code> <p>Default: <code>no</code></p>

Example

```
restart-mode = graceful
stop-mode = stop
mpm = worker
allow-corefiles = no
```

A.7 OHS Module Directives

This appendix describes the directives available in the Oracle-developed modules supported by OHS. It contains these sections:

- [Note on `mod_wl_ohs` Module](#)
- [`mod_certheaders` Module](#)
- [`mod_ossll` Module](#)

A.7.1 Note on `mod_wl_ohs` Module

In addition to the modules and directives described in this appendix, Oracle HTTP Server also ships with the `mod_wl_ohs` module, generally referred to as the Oracle WebLogic Server Proxy Plug-In. For information on this module's directives, see Parameters for Web Server Plug-Ins in *Using Oracle WebLogic Server Proxy Plug-Ins 12.2.1.2*.

A.7.2 `mod_certheaders` Module

The `mod_certheaders` module accepts the following directives:

- [AddCertHeader Directive](#)
- [SimulateHttps Directive](#)

A.7.2.1 AddCertHeader Directive

Specify which headers should be translated to CGI environment variables. This can be achieved by using the `AddCertHeader` directive. This directive takes a single argument, which is the CGI environment variable that should be populated from a

HTTP header on incoming requests. For example, to populate the `SSL_CLIENT_CERT` CGI environment variable.

Category	Value
Syntax	<code>AddCertHeader <i>environment_variable</i></code>
Example	<code>AddCertHeader SSL_CLIENT_CERT</code>
Default	None

A.7.2.2 SimulateHttps Directive

You can use `mod_certheaders` to instruct Oracle HTTP Server to treat certain requests as if they were received through HTTPS even though they were received through HTTP. This is useful when Oracle HTTP Server is front-ended by a reverse proxy or load balancer, which acts as a termination point for SSL requests, and forwards the requests to Oracle HTTP Server through HTTPS.

Category	Value
Syntax	<code>SimulateHttps on off</code>
Example	<code>SimulateHttps on</code>
Default	<code>off</code>

A.7.3 mod_oss1 Module

To configure SSL for your Oracle HTTP Server, enter the `mod_oss1` module directives you want to use in the `ssl.conf` file.

The following sections describe these `mod_oss1` directives:

- [SSLCARevocationFile Directive](#)
- [SSLCARevocationPath Directive](#)
- [SSLCipherSuite Directive](#)
- [SSLEngine Directive](#)
- [SSLFIPS Directive](#)
- [SSLHonorCipherOrder Directive](#)
- [SSLInsecureRenegotiation Directive](#)
- [SSLOptions Directive](#)
- [SSLProtocol Directive](#)
- [SSLProxyCipherSuite Directive](#)
- [SSLProxyEngine Directive](#)
- [SSLProxyProtocol Directive](#)
- [SSLProxyWallet Directive](#)

- [SSLRequire Directive](#)
- [SSLRequireSSL Directive](#)
- [SSLSessionCache Directive](#)
- [SSLSessionCacheTimeout Directive](#)
- [SSLTraceLogLevel Directive](#)
- [SSLVerifyClient Directive](#)
- [SSLWallet Directive](#)

A.7.3.1 SSLCARevocationFile Directive

Specifies the file where you can assemble the Certificate Revocation Lists (CRLs) from CAs (Certificate Authorities) that you accept certificates from. These are used for client authentication. Such a file is the concatenation of various PEM-encoded CRL files in order of preference. This directive can be used alternatively or additionally to `SSLCARevocationPath`.

Category	Value
Syntax	<code>SSLCARevocationFile file_name</code>
Example	<code>SSLCARevocationFile \${ORACLE_INSTANCE}/config/fmwconfig/components/\${COMPONENT_TYPE}/instances/\${COMPONENT_NAME}/keystores/crl/ca_bundle.cr</code>
Default	None

A.7.3.2 SSLCARevocationPath Directive

Specifies the directory where PEM-encoded Certificate Revocation Lists (CRLs) are stored. These CRLs come from the CAs (Certificate Authorities) that you accept certificates from. If a client attempts to authenticate itself with a certificate that is on one of these CRLs, then the certificate is revoked and the client cannot authenticate itself with your server.

This directive must point to a directory that contains the hash value of the CRL. To see the commands that allow you to create the hashes, see `orapki` in *Administering Oracle Fusion Middleware*.

Category	Value
Syntax	<code>SSLCARevocationPath path/to/CRL_directory/</code>
Example	<code>SSLCARevocationPath \${ORACLE_INSTANCE}/config/fmwconfig/components/\${COMPONENT_TYPE}/instances/\${COMPONENT_NAME}/keystores/crl</code>
Default	None

A.7.3.3 SSLCipherSuite Directive

Specifies the SSL cipher suite that the client can use during the SSL handshake. This directive uses either a comma-separated or colon-separated cipher specification string to identify the cipher suite. Table 11–2 shows the tags you can use in the string to describe the cipher suite you want. SSLCipherSuite accepts the following prefixes:

- none: Adds the cipher to the list
- + : Adds the cipher to the list and places it in the correct location in the list
- - : Removes the cipher from the list (can be added later)
- ! : Removes the cipher from the list permanently

Tags are joined with prefixes to form a cipher specification string. Cipher suite tags are listed in [Table A-3](#).

Category	Value
Example	<pre>SSLCipherSuite ALL:!MD5</pre> <p>In this example, all ciphers are specified except MD5 strength ciphers.</p>
Syntax	<pre>SSLCipherSuite cipher-spec</pre>
Default	<pre>TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384,TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256,TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384,TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256,TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA,TLS_ECDHE_ECDSA_WITH_RC4_128_SHA,TLS_ECDHE_ECDSA_WITH_3DES_EDE_CBC_SHA,TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384,TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256,TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384,TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256,TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA,TLS_ECDHE_RSA_WITH_RC4_128_SHA,TLS_ECDHE_RSA_WITH_3DES_EDE_CBC_SHA,TLS_RSA_WITH_AES_256_GCM_SHA384,TLS_RSA_WITH_AES_128_GCM_SHA256,TLS_RSA_WITH_AES_256_CBC_SHA256,TLS_RSA_WITH_AES_128_CBC_SHA256,SSL_RSA_WITH_AES_256_CBC_SHA,SSL_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA,SSL_RSA_WITH_3DES_EDE_CBC_SHA</pre>

Table A-3 SSLCipher Suite Tags

Function	Tag	Meaning
Key exchange	kRSA	RSA key exchange
Key exchange	kECDHE	Elliptic curve Diffie–Hellman Exchange key exchange
Authentication	aRSA	RSA authentication
Encryption	3DES	Triple DES encoding
Encryption	RC4	RC4 encoding
Data Integrity	SHA	SHA hash function
Data Integrity	SHA256	SHA256 hash function

Table A-3 (Cont.) SSLCipher Suite Tags

Function	Tag	Meaning
Data Integrity	SHA384	SHA384 hash function
Aliases	TLSv1	All TLS version 1 ciphers
Aliases	TLSv1.1	All TLS version 1.1 ciphers
Aliases	TLSv1.2	All TLS version 1.2 ciphers
Aliases	MEDIUM	All ciphers with 128-bit encryption
Aliases	HIGH	All ciphers with encryption key size greater than 128 bits
Aliases	AES	All ciphers using AES encryption
Aliases	RSA	All ciphers using RSA for both authentication and key exchange
Aliases	ECDSA	All ciphers using Elliptic Curve Digital Signature Algorithm for authentication
Aliases	ECDHE	All ciphers using Elliptic curve Diffie-Hellman Exchange for key exchange
Aliases	AES-GCM	All ciphers that use Advanced Encryption Standard in Galois/Counter Mode (GCM) for encryption.

Table A-4 lists the Cipher Suites supported in Oracle Advanced Security 12c (12.2.1).

Note: When using `mod_oss1` on a Solaris Sparc platform, the underlying cryptographic libraries detect the Sparc T4 processor, and makes use of the on-core cryptography algorithms that accelerate cryptographic operations. No configuration is required to enable this feature. The following cryptographic algorithms are supported by the Oracle Sparc Enterprise T-series processors: RSA, 3DES, AES-CBC, AES-GCM, SHA1, SHA256, and SHA38.

Table A-4 Cipher Suites Supported in Oracle Advanced Security 12.2.1

Cipher Suite	Key Exchange	Authentication	Encryption	Data Integrity	TLS v1	TLS v1.1	TLS v1.2
SSL_RSA_WITH_RC4_128_SHA	RSA	RSA	RC4 (128)	SHA	Yes	Yes	Yes
SSL_RSA_WITH_3DES_EDE_CBC_SHA	RSA	RSA	3DES (168)	SHA	Yes	Yes	Yes
SSL_RSA_WITH_AES_128_CBC_SHA	RSA	RSA	AES (128)	SHA	Yes	Yes	Yes
SSL_RSA_WITH_AES_256_CBC_SHA	RSA	RSA	AES (256)	SHA	Yes	Yes	Yes

Table A-4 (Cont.) Cipher Suites Supported in Oracle Advanced Security 12.2.1

Cipher Suite	Key Exchange	Authentication	Encryption	Data Integrity	TLS v1	TLS v1.1	TLS v1.2
TLS_RSA_WITH_AES_128_CBC_SHA256	RSA	RSA	AES (128)	SHA256	No	No	Yes
TLS_RSA_WITH_AES_256_CBC_SHA256	RSA	RSA	AES (256)	SHA256	No	No	Yes
TLS_RSA_WITH_AES_128_GCM_SHA256	RSA	RSA	AES (128)	SHA256	No	No	Yes
TLS_RSA_WITH_AES_256_GCM_SHA384	RSA	RSA	AES (256)	SHA384	No	No	Yes
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	ECDHE	ECDSA	AES (128)	SHA	Yes	Yes	Yes
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA	ECDHE	ECDSA	AES (256)	SHA	Yes	Yes	Yes
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	ECDHE	ECDSA	AES (128)	SHA256	No	No	Yes
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	ECDHE	ECDSA	AES (256)	SHA384	No	No	Yes
TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	ECDHE	ECDSA	AES (128)	SHA256	No	No	Yes
TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	ECDHE	ECDSA	AES (256)	SHA384	No	No	Yes
TLS_ECDHE_RSA_WITH_RC4_128_SHA	Ephemeral ECDH with RSA signatures	RSA	RC4 (128)	SHA	Yes	Yes	Yes
TLS_ECDHE_RSA_WITH_3DES_EDE_CBC_SHA	Ephemeral ECDH with RSA signatures	RSA	3DES	SHA	Yes	Yes	Yes
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	Ephemeral ECDH with RSA signatures	RSA	AES (128)	SHA	Yes	Yes	Yes
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	Ephemeral ECDH with RSA signatures	RSA	AES (256)	SHA	Yes	Yes	Yes
TLS_ECDHE_ECDSA_WITH_RC4_128_SHA	Ephemeral ECDH with ECDSA signatures	ECDSA	RC4 (128)	SHA	Yes	Yes	Yes

Table A-4 (Cont.) Cipher Suites Supported in Oracle Advanced Security 12.2.1

Cipher Suite	Key Exchange	Authentication	Encryption	Data Integrity	TLS v1	TLS v1.1	TLS v1.2
TLS_ECDHE_ECDSA_WITH_3DES_EDE_CBC_SHA	Ephemeral ECDH with ECDSA signatures	ECDSA	3DES	SHA	Yes	Yes	Yes
TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	Ephemeral ECDH with RSA signatures	RSA	AES (256)	SHA384	No	No	Yes
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	Ephemeral ECDH with RSA signatures	RSA	AES (128)	SHA256	No	No	Yes
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	Ephemeral ECDH with RSA signatures	RSA	AES (256)	SHA384	No	No	Yes
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	Ephemeral ECDH with RSA signatures	RSA	AES (128)	SHA256	No	No	Yes

A.7.3.4 SSLEngine Directive

Toggles the usage of the SSL Protocol Engine. This is usually used inside a <VirtualHost> section to enable SSL for a particular virtual host. By default, the SSL Protocol Engine is disabled for both the main server and all configured virtual hosts.

Category	Value
Syntax	SSLEngine on off
Example	SSLEngine on
Default	off

A.7.3.5 SSLFIPS Directive

This directive toggles the usage of the SSL library FIPS_mode flag. It must be set in the global server context and should not be configured with conflicting settings (SSLFIPS on followed by SSLFIPS off or similar). The mode applies to all SSL library operations.

Category	Value
Syntax	SSLFIPS ON OFF

Category	Value
Example	SSLFIPS ON
Default	Off

Configuring an SSLFIPS change requires that the `SSLFIPS on/off` directive be set globally in `ssl.conf`. Virtual level configuration is disabled in SSLFIPS directive. Hence, setting SSLFIPS to virtual directive results in an error.

Note:

Note the following restriction on SSLFIPS:

- Enabling SSLFIPS mode in Oracle HTTP Server requires a wallet created with AES encrypted (`compat_v12`) headers. To create a new wallet or to convert an existing wallet with AES encryption, see these sections in `orapki` in *Administering Oracle Fusion Middleware*:

Creating and Viewing Oracle Wallets with `orapki`

Creating an Oracle Wallet with AES Encryption

Converting an Existing Wallet to Use AES Encryption

The following tables describe the cipher suites that work in SSLFIPS mode with various protocols. For instructions on how to implement these cipher suites, see [SSLCipherSuite Directive](#).

[Table A-5](#) lists the cipher suites which work in TLS 1.0, TLS1.1, and TLS 1.2 protocols in SSLFIPS mode.

Table A-5 Ciphers Which Work in All TLS Protocols in SSLFIPS Mode

Cipher Name	Cipher Works in These Protocols:
SSL_RSA_WITH_3DES_EDE_CBC_SHA	TLS 1.0, TLS1.1, and TLS 1.2
SSL_RSA_WITH_AES_128_CBC_SHA	TLS 1.0, TLS1.1, and TLS 1.2
SSL_RSA_WITH_AES_256_CBC_SHA	TLS 1.0, TLS1.1, and TLS 1.2

[Table A-6](#) lists the cipher suites and protocols that can be used in SSLFIPS mode.

Table A-6 Ciphers Which Work in FIPS Mode

Cipher Name	Cipher Works in These Protocols:
TLS_ECDHE_ECDSA_WITH_3DES_EDE_CBC_SHA	TLS 1.0 and later
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	TLS 1.0 and later
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA	TLS 1.0 and later

Table A-6 (Cont.) Ciphers Which Work in FIPS Mode

Cipher Name	Cipher Works in These Protocols:
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	TLS1.2 and later
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	TLS1.2 and later
TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	TLS1.2 and later
TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	TLS1.2 and later
TLS_RSA_WITH_AES_128_CBC_SHA256	TLS1.2 and later
TLS_RSA_WITH_AES_256_CBC_SHA256	TLS1.2 and later
TLS_RSA_WITH_AES_128_GCM_SHA256	TLS1.2 and later
TLS_RSA_WITH_AES_256_GCM_SHA384	TLS1.2 and later
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	TLS1.2 and later
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	TLS1.2 and later
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	TLS1.2 and later
TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	TLS1.2 and later
TLS_ECDHE_RSA_WITH_3DES_EDE_CBC_SHA	TLS 1.0 and later
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	TLS 1.0 and later
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	TLS 1.0 and later

Note:

- If SSLFIPS is set to ON, and a cipher that does not support FIPS is used at the server, then client requests that use that cipher fail.
- To use the TLS_ECDHE_ECDSA cipher suite, Oracle HTTP Server requires a wallet created with an ECC user certificate. The TLS_ECDHE_ECDSA cipher suite does not work with RSA certificates.
- To use the SSL_RSA/TLS_RSA/TLS_ECDHE_RSA cipher suite, Oracle HTTP Server requires a wallet created with an RSA user certificate. The SSL_RSA/TLS_RSA/TLS_ECDHE_RSA cipher suite does not work with ECC certificates.

For more information about how to configure ECC/RSA certificates in a wallet, see *Creating and Viewing Oracle Wallets with orapki* in *Administering Oracle Fusion Middleware*.

For instructions about how to implement these cipher suites and corresponding protocols, see [SSL Cipher Suite Directive](#) and [SSL Protocol](#).

[Table A-7](#) lists the cipher suites that do not work in SSPFIPS mode.

Table A-7 Ciphers That Do Not Work in SSLFIPS Mode

Cipher Name	Description
TLS_ECDHE_ECDSA_WITH_RC4_128_SHA	Does not work in SSLFIPS mode in any protocol
SSL_RSA_WITH_RC4_128_SHA	Does not work in SSLFIPS mode in any protocol
TLS_ECDHE_RSA_WITH_RC4_128_SHA	Does not work in SSLFIPS mode in any protocol

A.7.3.6 SSLHonorCipherOrder Directive

When choosing a cipher during a handshake, normally the client's preference is used. If this directive is enabled, then the server's preference will be used instead.

Category	Value
Syntax	SSLHonorCipherOrder ON OFF
Example	SSLHonorCipherOrder ON
Default	OFF

The server's preference order can be configured using the SSLCipherSuite directive. When SSLHonorCipherOrder is set to ON, the value of SSLCipherSuite is treated as an ordered list of cipher values.

Cipher values that appear first in this list are preferred by the server over ciphers that appear later in the list.

Example:

```
SSLCipherSuite
TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384,TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256,TLS_E
CDHE_ECDSA_WITH_AES_256_CBC_SHA384,TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256
```

```
SSLHonorCipherOrder ON
```

In this case, the server will prefer TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 over all of the other ciphers configured in SSLCipherSuite directive as it appears first in the list and chooses this cipher for the SSL connection, if the client supports it.

A.7.3.7 SSLInsecureRenegotiation Directive

As originally specified, all versions of the SSL and TLS protocols (up to and including TLS/1.2) were vulnerable to a Man-in-the-Middle attack (CVE-2009-3555) during a renegotiation. This vulnerability allowed an attacker to "prefix" a chosen plaintext to the HTTP request as seen by the web server. A protocol extension was developed which fixed this vulnerability if supported by both client and server.

For more information on Man-in-the-Middle attack (CVE-2009-3555), see:

<https://web.nvd.nist.gov/view/vuln/detail?vulnId=CVE-2009-3555>

Default mode

When the directive `SSLInsecureRenegotiation` is not specified in the configuration, Oracle HTTP Server operates in compatibility mode.

In this mode, vulnerable peers that do not have Renegotiation Info/Signaling Cipher Suite Value (RI/SCSV) support are allowed to connect, but renegotiation is allowed only with those peers that have RI/SCSV support.

SSLInsecureRenegotiation ON

This option allows vulnerable peers that do not have RI/SCSV to perform renegotiation. Hence, this option must be used with caution, as it leaves the server vulnerable to the renegotiation attack described in CVE-2009-3555.

SSLInsecureRenegotiation OFF

If this option is used, only peers that support RI/SCSV will be allowed to negotiate and renegotiate a session. This is the most secure and recommended mode.

Category	Value
Syntax	<code>SSLInsecureRenegotiation ON OFF</code>
Example	<code>SSLInsecureRenegotiation ON</code>
Default	The default value is neither <code>ON</code> nor <code>OFF</code> . By default, Oracle HTTP Server operates in compatibility mode, as described under the heading Default mode .

To configure `SSLInsecureRenegotiation`, edit the `ssl.conf` file and set `SSLInsecureRenegotiation ON/OFF` globally or virtually to enable or disable insecure renegotiation.

A.7.3.8 SSLOptions Directive

Controls various runtime options on a per-directory basis. In general, if multiple options apply to a directory, the most comprehensive option is applied (options are not merged). However, if all of the options in an `SSLOptions` directive are preceded by a plus (+) or minus (-) symbol, then the options are merged. Options preceded by a plus are added to the options currently in force, and options preceded by a minus are removed from the options currently in force.

Accepted values are:

- `StdEnvVars`: Creates the standard set of CGI/SSI environment variables that are related to SSL. This is disabled by default because the extraction operation uses a lot of CPU time and usually has no application when serving static content. Typically, you only enable this for CGI/SSI requests.
- `ExportCertData`: Enables the following additional CGI/SSI variables:
 - `SSL_SERVER_CERT`
 - `SSL_CLIENT_CERT`
 - `SSL_CLIENT_CERT_CHAIN_n` (where `n = 0, 1, 2...`)

These variables contain the Privacy Enhanced Mail (PEM)-encoded X.509 certificates for the server and the client for the current HTTPS connection, and can be used by CGI scripts for deeper certificate checking. All other certificates of the

client certificate chain are provided. This option is "Off" by default because there is a performance cost associated with using it.

SSL_CLIENT_CERT_CHAIN_n variables are in the following order:

SSL_CLIENT_CERT_CHAIN_0 is the intermediate CA who signs

SSL_CLIENT_CERT. SSL_CLIENT_CERT_CHAIN_1 is the intermediate CA who signs SSL_CLIENT_CERT_CHAIN_0, and so forth, with SSL_CLIENT_ROOT_CERT as the root CA.

- **FakeBasicAuth**: Translates the subject distinguished name of the client X.509 certificate into an HTTP basic authorization user name. This means that the standard HTTP server authentication methods can be used for access control. No password is obtained from the user; the string 'password' is substituted.
- **StrictRequire**: Denies access when, according to [SSLRequireSSL Directive](#) or directives, access should be forbidden. Without **StrictRequire**, it is possible for a 'Satisfy any' directive setting to override the **SSLRequire** or **SSLRequireSSL** directive, allowing access if the client passes the host restriction or supplies a valid user name and password.

Thus, the combination of **SSLRequireSSL** or **SSLRequire** with **SSLOptions +StrictRequire** gives `mod_oss1` the ability to override a 'Satisfy any' directive in all cases.

- **CompatEnvVars**: Exports obsolete environment variables for backward compatibility to Apache SSL 1.x, `mod_ssl` 2.0.x, `Sioux` 1.0, and `Stronghold` 2.x. Use this to provide compatibility to existing CGI scripts.
- **OptRenegotiate**: This enables optimized SSL connection renegotiation handling when SSL directives are used in a per-directory context.

Category	Value
Syntax	<code>SSLOptions [+ -] StdEnvVars ExportCertData FakeBasicAuth StrictRequire CompatEnvVars OptRenegotiate</code>
Example	<code>SSLOptions -StdEnvVars</code>
Default	None

A.7.3.9 SSLProtocol Directive

Specifies SSL protocol(s) for `mod_oss1` to use when establishing the server environment. Clients can only connect with one of the specified protocols. Accepted values are:

- `TLSv1`
- `TLSv1.1`
- `TLSv1.2`
- `All`

Note:

SSLv3 is disabled in Release 12.2.1.

You can specify multiple values as a space-delimited list. In the syntax, the "-" and "+" symbols have the following meaning:

- + : Adds the protocol to the list
- - : Removes the protocol from the list

In the current release All is defined as +TLSv1 +TLSv1.1 +TLSv1.2.

Category	Value
Syntax	SSLProtocol [+ -] TLSv1 TLSv1.1 TLSv1.2 All
Example	SSLProtocol +TLSv1 +TLSv1.1 +TLSv1.2
Default	ALL

A.7.3.10 SSLProxyCipherSuite Directive

Specifies the SSL cipher suite that the proxy can use during the SSL handshake. This directive uses a colon-separated cipher specification string to identify the cipher suite. [Table A-3](#) shows the tags to use in the string to describe the cipher suite you want. SSLProxyCipherSuite accepts the following values:

- none: Adds the cipher to the list
- + : Adds the cipher to the list and places it in the correct location in the list
- - : Removes the cipher from the list (which can be added later)
- !: Removes the cipher from the list permanently

Tags are joined with prefixes to form a cipher specification string. Tags are joined together with prefixes to form a cipher specification string. The SSLProxyCipherSuite directive uses the same tags as the SSLCipherSuite directive. For a list of supported suite tags, see [Table A-3](#).

Category	Value
Example	SSLProxyCipherSuite ALL:!MD5 In this example, all ciphers are specified except MD5 strength ciphers.
Syntax	SSLProxyCipherSuite <i>cipher-spec</i>
Default	ALL:!ADH:+HIGH:+MEDIUM

The SSLProxyCipherSuite directive uses the same cipher suites as the SSLCipherSuite directive. For a list of the Cipher Suites supported in Oracle Advanced Security 12.2.1, see [Table A-4](#).

A.7.3.11 SSLProxyEngine Directive

Enables or disables the SSL/TLS protocol engine for proxy. SSLProxyEngine is usually used inside a <VirtualHost> section to enable SSL/TLS for proxy usage in a particular virtual host. By default, the SSL/TLS protocol engine is disabled for proxy both for the main server and all configured virtual hosts.

SSLProxyEngine should not be included in a virtual host that will be acting as a forward proxy (by using Proxy or ProxyRequest directives). SSLProxyEngine is not required to enable a forward proxy server to proxy SSL/TLS requests.

Category	Value
Syntax	SSLProxyEngine ON OFF
Example	SSLProxyEngine on
Default	Disable

A.7.3.12 SSLProxyProtocol Directive

Specifies SSL protocol(s) for mod_oss1 to use when establishing a proxy connection in the server environment. Proxies can only connect with one of the specified protocols. Accepted values are:

- TLSv1
- TLSv1.1
- TLSv1.2
- All

You can specify multiple values as a space-delimited list. In the syntax, the "-" and "+" symbols have the following meaning:

- + : Adds the protocol to the list
- - : Removes the protocol from the list

In the current release All is defined as +TLSv1 +TLSv1.1 +TLSv1.2.

Category	Value
Syntax	SSLProxyProtocol [+ -] TLSv1 TLSv1.1 TLSv1.2 All
Example	SSLProxyProtocol +TLSv1 +TLSv1.1 +TLSv1.2
Default	ALL

A.7.3.13 SSLProxyWallet Directive

Specifies the location of the wallet with its WRL, specified as a filepath, that a proxy connection needs to use.

Category	Value
Syntax	SSLProxyWallet <i>file:path to wallet</i>
Example	SSLProxyWallet "\${ORACLE_INSTANCE}/config/fmwconfig/components/\${COMPONENT_TYPE}/instances/\${COMPONENT_NAME}/keystores/proxy"
Default	None

A.7.3.14 SSLRequire Directive

Denies access unless an arbitrarily complex boolean expression is true.

Category	Value
Syntax	SSLRequire <i>expression</i> (see Understanding the Expression Variable)
Example	SSLRequire word ">=" word word "ge" word
Default	None

Understanding the Expression Variable

The *expression* variable must match the following syntax (given as a BNF grammar notation):

```

expr ::= "true" | "false"
      "!" expr
      expr "&&" expr
      expr "||" expr
      "(" expr ")"

comp ::= word "=" word | word "eq" word
word  "!=" word |word "ne" word
word  "<" word |word "lt" word
word  "<=" word |word "le" word
word  ">" word |word "gt" word
word  ">=" word |word "ge" word
word  "=~" regex
word  "!~" regex
wordlist ::= word
wordlist ", " word

word ::= digit
      cstring
      variable
      function

digit ::= [0-9]+

cstring ::= "... "

variable ::= "%{varname}"

```

[Table A-8](#) and [Table A-9](#) list standard and SSL variables. These are valid values for varname.

```
function ::= funcname "(" funcargs ")"
```

For funcname, the following function is available:

```
file(filename)
```

The file function takes one string argument, the filename, and expands to the contents of the file. This is useful for evaluating the file's contents against a regular expression.

Table A-8 lists the standard variables for [SSLRequire Directive](#) varname.

Table A-8 Standard Variables for SSLRequire Varname

Standard Variables	Standard Variables	Standard Variables
HTTP_USER_AGENT	PATH_INFO	AUTH_TYPE
HTTP_REFERER	QUERY_STRING	SERVER_SOFTWARE
HTTP_COOKIE	REMOTE_HOST	API_VERSION
HTTP_FORWARDED	REMOTE_IDENT	TIME_YEAR
HTTP_HOST	IS_SUBREQ	TIME_MON
HTTP_PROXY_CONNECTION	DOCUMENT_ROOT	TIME_DAY
HTTP_ACCEPT	SERVER_ADMIN	TIME_HOUR
HTTP:headername	SERVER_NAME	TIME_MIN
THE_REQUEST	SERVER_PORT	TIME_SEC
REQUEST_METHOD	SERVER_PROTOCOL	TIME_WDAY
REQUEST_SCHEME	REMOTE_ADDR	TIME
REQUEST_URI	REMOTE_USER	ENV:variablename
REQUEST_FILENAME		

Table A-9 lists the SSL variables for [SSLRequire Directive](#) varname.

Table A-9 SSL Variables for SSLRequire Varname

SSL Variables	SSL Variables	SSL Variables
HTTPS	SSL_PROTOCOL	SSL_CIPHER_ALGKEYSIZE
SSL_CIPHER	SSL_CIPHER_EXPORT	SSL_VERSION_INTERFACE
SSL_CIPHER_USEKEYSIZE	SSL_VERSION_LIBRARY	SSL_SESSION_ID
SSL_CLIENT_V_END	SSL_CLIENT_M_SERIAL	SSL_CLIENT_V_START
SSL_CLIENT_S_DN_ST	SSL_CLIENT_S_DN	SSL_CLIENT_S_DN_C
SSL_CLIENT_S_DN_CN	SSL_CLIENT_S_DN_O	SSL_CLIENT_S_DN_OU
SSL_CLIENT_S_DN_G	SSL_CLIENT_S_DN_T	SSL_CLIENT_S_DN_I
SSL_CLIENT_S_DN_UID	SSL_CLIENT_S_DN_S	SSL_CLIENT_S_DN_D

Table A-9 (Cont.) SSL Variables for SSLRequire Varname

SSL Variables	SSL Variables	SSL Variables
SSL_CLIENT_I_DN_C	SSL_CLIENT_S_DN_Email	SSL_CLIENT_I_DN
SSL_CLIENT_I_DN_O	SSL_CLIENT_I_DN_ST	SSL_CLIENT_I_DN_L
SSL_CLIENT_I_DN_T	SSL_CLIENT_I_DN_OU	SSL_CLIENT_I_DN_CN
SSL_CLIENT_I_DN_S	SSL_CLIENT_I_DN_I	SSL_CLIENT_I_DN_G
SSL_CLIENT_I_DN_Email	SSL_CLIENT_I_DN_D	SSL_CLIENT_I_DN_UID
SSL_CLIENT_CERT	SSL_CLIENT_CERT_CHAIN_n	SSL_CLIENT_ROOT_CERT
SSL_CLIENT_VERIFY	SSL_CLIENT_M_VERSION	SSL_SERVER_M_VERSION
SSL_SERVER_V_START	SSL_SERVER_V_END	SSL_SERVER_M_SERIAL
SSL_SERVER_S_DN_C	SSL_SERVER_S_DN_ST	SSL_SERVER_S_DN
SSL_SERVER_S_DN_OU	SSL_SERVER_S_DN_CN	SSL_SERVER_S_DN_O
SSL_SERVER_S_DN_I	SSL_SERVER_S_DN_G	SSL_SERVER_S_DN_T
SSL_SERVER_S_DN_D	SSL_SERVER_S_DN_UID	SSL_SERVER_S_DN_S
SSL_SERVER_I_DN	SSL_SERVER_I_DN_C	SSL_SERVER_S_DN_Email
SSL_SERVER_I_DN_L	SSL_SERVER_I_DN_O	SSL_SERVER_I_DN_ST
SSL_SERVER_I_DN_CN	SSL_SERVER_I_DN_T	SSL_SERVER_I_DN_OU
SSL_SERVER_I_DN_G	SSL_SERVER_I_DN_I	

A.7.3.15 SSLRequireSSL Directive

Denies access to clients not using SSL. This is a useful directive for absolute protection of a SSL-enabled virtual host or directories in which configuration errors could create security vulnerabilities.

Category	Value
Syntax	SSLRequireSSL
Example	SSLRequireSSL
Default	None

A.7.3.16 SSLSessionCache Directive

Specifies the global/interprocess session cache storage type. The cache provides an optional way to speed up parallel request processing. The accepted values are:

- none: disables the global/interprocess session cache. Produces no impact on functionality, but makes a major difference in performance.

- `nonenotnull`: This disables any global/inter-process Session Cache.
- `shmcb: /path/to/datafile[bytes]`: Uses a high-performance Shared Memory Cyclic Buffer (SHMCB) session cache to synchronize the local SSL memory caches of the server processes. Note: in this `shm` setting, no log files are created under `/path/to/datafile` on local disk.

Category	Value
Syntax	<code>SSLSessionCache none nonenotnull shmcb:/path/to/datafile[bytes]</code>
Examples	<code>SSLSessionCache "shmcb:\${ORACLE_INSTANCE}/servers/\${COMPONENT_NAME}/logs/ssl_scache(512000)"</code>
Default	<code>SSLSessionCache shmcb:/path/to/datafile[bytes]</code>

A.7.3.17 SSLSessionCacheTimeout Directive

Specifies the number of seconds before a SSL session in the session cache expires.

Category	Value
Syntax	<code>SSLSessionCacheTimeout <i>seconds</i></code>
Example	<code>SSLSessionCacheTimeout 120</code>
Default	300

A.7.3.18 SSLTraceLogLevel Directive

`SSLTraceLogLevel` adjusts the verbosity of the messages recorded in the Oracle Security library error logs. When a particular level is specified, messages from all other levels of higher significance will be reported as well. For example, when `SSLTraceLogLevel ssl` is set, messages with log levels of error, warn, user and debug will also be posted.

Note:

This directive can only be set globally in the `ssl.conf` file.

`SSLTraceLogLevel` accepts the following log levels:

- `none`: Oracle Security Trace disable
- `fatal`: Fatal error; system is unusable.
- `error`: Error conditions.
- `warn`: Warning conditions.
- `user`: Normal but significant condition.
- `debug`: Debug-level condition
- `ssl`: SSL level debugging

Category	Value
Syntax	SSLTraceLogLevel none fatal error warn user debug ssl
Example	SSLTraceLogLevel fatal
Default	None

A.7.3.19 SSLVerifyClient Directive

Specifies whether a client must present a certificate when connecting. The accepted values are:

- none: No client certificate is required
- optional: Client can present a valid certificate
- require: Client must present a valid certificate

Category	Value
Syntax	SSLVerifyClient none optional require
Example	SSLVerifyClient optional
Default	None

Note:

The level `optional_no_ca` included with `mod_ssl` (in which the client can present a valid certificate, but it need not be verifiable) is not supported in `mod_oss1`.

A.7.3.20 SSLWallet Directive

Specifies the location of the wallet with its WRL, specified as a filepath.

Category	Value
Syntax	SSLWallet <i>file:path to wallet directory</i> file:path may also be expressed simply as path.
Example	SSLWallet "\${ORACLE_INSTANCE}/config/fmwconfig/ components/\${COMPONENT_TYPE}/instances/\${COMPONENT_NAME}/ keystores/default"
Default	This is the default

Note: If the wallet has a certificate/certificate request signed with the MD5 algorithm, Oracle HTTP Server will fail to start.
