

Oracle® Banking Cash Management

SSL Setup Guide



Release 14.7.4.0.0

G11288-01

June 2024

The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

ORACLE®

Copyright © 2020, 2024, Oracle and/or its affiliates.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software, software documentation, data (as defined in the Federal Acquisition Regulation), or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software," "commercial computer software documentation," or "limited rights data" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle®, Java, MySQL, and NetSuite are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

Contents

1	Configure SSL on Oracle WebLogic	
1.1	Setup SSL on Oracle Weblogic	1-1
1.2	Certificates and Keypairs	1-1
2	Choose the Identity and Trust Stores	
3	Obtain the Identity Store	
3.1	Create Identity Store with Self-Signed Certificates	3-1
3.2	Keystore Creation	3-3
3.3	Create Identity Store with Trusted Certificates Issued by CA	3-3
3.5	Import Trust Certificate	3-6
3.4	Export Private Key as Certificate	3-6
3.4.1	Obtain Trusted Certificate from CA	3-7
3.4.2	Convert .crt and .key file to PKC12 file	3-7
3.4.3	Import Certificate into Identity Store	3-7
4	Configure Identity and Trust Stores for Weblogic	
4.1	Enable SSL on Oracle WebLogic Server	4-1
4.2	Configure Identity and Trust Stores	4-1
5	Configure Weblogic Console	
6	Configure SSL Mode in Node Manager for Clustered Environment	
7	Set SSL Attributes for Managed Servers	

8 Test Configuration

Index

Preface

- [Purpose](#)
- [Audience](#)
- [Documentation Accessibility](#)
- [Diversity and Inclusion](#)
- [Related Resources](#)
- [Conventions](#)
- [Acronyms and Abbreviations](#)

Purpose

This guide provides the information about the configurations of SSL for OracleWebLogic application server.

Audience

This guide is intended for WebLogic admin or ops-web team who are responsible for installing the OFSS banking products.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

Related Resources

The related documents are as follows:

- *Oracle Banking Cash Management Services Installation Guide*

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.

Acronyms and Abbreviations

The list of the acronyms and abbreviations used in this guide are as follows:

Table Acronyms and Abbreviations

Abbreviation	Description
CSR	Certificate Signing Request

1

Configure SSL on Oracle WebLogic

This topic provides the information about the configurations for SSL on Oracle Weblogic application server.

- [Setup SSL on Oracle Weblogic](#)
This topic provides the systematic instructions to setup the SSL on Oracle WebLogic.
- [Certificates and Keypairs](#)
This topic provides the information about the certificates and keypairs.

1.1 Setup SSL on Oracle Weblogic

This topic provides the systematic instructions to setup the SSL on Oracle WebLogic.

1. Obtain an identity (private key and digital certificates) and trust (certificates of trusted certificate authorities) for Oracle WebLogic application server.
2. Store the identity and trust.
The private keys and trust CA certificates are stored in keystores.
3. Configure the identity and trust the keystores for Oracle WebLogic application server in the administration console.
4. Set SSL attributes for the private key alias and password in Oracle WebLogic administration console.

1.2 Certificates and Keypairs

This topic provides the information about the certificates and keypairs.

The certificates are used for validating the authenticity of the server. Certificates contains the name of the owner, certificate usage, duration of validity, resource location, or distinguished name (DN), which includes the common name (CN - web site address or e-mail address depending of the usage) and the certificate ID of the person who certified (signs) these information. It also contains the public key and a hash to ensure that the certificate has not been tampered with. A certificate is insecure until it is signed. Signed certificates cannot be modified.

A certificate can be self-signed or obtained from a reputable certificate authority such as Verisign, Inc., Entrust.net, Thawte, Digicert Inc., GeoTrust or InstantSSL.

The SSL uses a public key and a private key cryptographickeys. These keys are similar in nature and can be used alternatively. What one key encrypts can be decrypted by the other key of the pair. The private key is kept secret, while the public key is distributed using the certificate.

A keytool stores the keys and certificates in a keystore. The default keystore implementation implements it as a file. It protects private keys with a password. The different entities (key pairs and the certificates) are distinguished by a unique **alias**. Through its keystore, Oracle WebLogic server can authenticate itself to other parties.

In Java, a keystore is a **java.security.KeyStore** instance that the user can create and manipulate using the keytool utility provided with the Java Runtime.

There are two keystores to be managed by Oracle Weblogic server to configure SSL:

1. **Identity Keystore:** contains the key pairs and the Digital certificate. This can also contain certificates of intermediate CAs.
2. **Trust Keystore:** contains the trusted CA certificates.

2

Choose the Identity and Trust Stores

This topic provides the information for choosing the identity and trust stores.

Oracle Financial Services Software recommends that the choice of Identity and Trust stores be made up front. Oracle WebLogic server supports the following combinations of Identity and Trust stores:

- Custom Identity and Command Line Trust
- Custom Identity and Custom Trust
- Custom Identity and Java Standard Trust
- Demo Identity and Demo Trust

Oracle Financial Services does not recommend choosing Demo Identity and Demo Trust for production environments.

It is recommend to separate the identity and trust stores, since each WebLogic server tends to have its own identity but might have the same set of trust CA certificates. Trust stores are usually copied across Oracle WebLogic servers, to standardize trust rules; it is acceptable to copy trust stores since they contain public keys and certificates of CAs. Unlike trust stores, identity stores contain private keys of the OracleWebLogic server, and hence should be protected against unauthorized access.

Command Line Trust, if choosen requires the trust store to be specified as a command line argument in the Weblogic Server startup script. No additional configuration of the trust store is required in the Weblogic Server Administration Console.

Java Standard Trust would rely on the cacerts files provided by the Java Runtime. This file contains the list of trust CA certificates that ship with the Java Runtime, and is located in the 'JAVA_HOME/jre/lib/security' directory. It is highly recommended to change the default Java standard trust store password, and the default access permission of the file. Certificates of most commercial CAs are already present in the Java Standard Trust store. Therefore, it is recommended to use the Java Standard Trust store whenever possible. The rest of the document will assume the use of Java Standard Trust, since most CA certificates are already present in it.

One can also create custom trust stores containing the list of certificates of trusted CAs. For further details on identity and trust stores, please refer the Oracle WebLogic Server documentation on Securing Oracle WebLogic Server.

3

Obtain the Identity Store

This topic provides the information for obtaining the identity store.

- [Create Identity Store with Self-Signed Certificates](#)
This topic provides the information to create the identity store with self-signed certificates.
- [Keystore Creation](#)
This topic provides the information to create the keystore.
- [Create Identity Store with Trusted Certificates Issued by CA](#)
This topic provides the information to create Identity Store with Trusted Certificates Issued by CA.
- [Export Private Key as Certificate](#)
This topic provides the information to export private key as certificate.
- [Import Trust Certificate](#)
This topic provides the information to import as trusted certificate.

3.1 Create Identity Store with Self-Signed Certificates

This topic provides the information to create the identity store with self-signed certificates.

Self-signed certificates are acceptable for use in a testing or development environment. Oracle Financial Services does not recommend the use of self-signed certificates in a production environment

To create a self-signed certificate, the `genkeypair` option provided by the `keytool` utility of Sun Java 6 needs to be utilized.

Create Self-Signed Certificate

Browse to the `bin` folder of JRE from the command prompt and type the following command. The items highlighted are placeholders, and should be replaced with suitable values when running the command.

```
keytool -genkeypair -alias alias -keyalg RSA -keysize 1024 -sigalg  
SHA1withRSA -validity 365 -keystore keystore
```

Table 3-1 Keyword Description

Keyword	Description
alias	Used to identify the public and private key pair created. This alias is required later when configuring the SSL attributes for the managed servers in Oracle Weblogic Server.
keystore	It is used to specify the location of the JKS file. If no JKS file is present in the path provided, one will be created.

The command prompts for the following attributes of the certificate and keystore:

Table 3-2 Attributes Details

Attributes	Description
Keystore Password	Specify a password used to access the Keystore. This password needs to be specified later when configuring the identity store in Oracle Weblogic Server.
Key Password	Specify a password used to access the private key stored in the Keystore. This password needs to be specified later, when configuring the SSL attributes of the managed server(s) in Oracle Weblogic Server.
First and Last Name (CN)	Enter the domain name of the machine used to access Oracle Banking Virtual Account Management. For example, www.example.com.
Name of your Organizational Unit	The name of the department or unit making the request. For example, BDP. Use this field to further identify the SSL Certificate for creating. For example, by department or by physical server.
Name of your Organization	The name of the organization making the certificate request. For example, Oracle Financial Services. It is recommended to use the company or organization's formal name, and this name entered here must match the name found in official records.
Name of your City or Locality	The city in which your organization is physically located. For example, Mumbai.
Name of your State or Province	The state/province in which your organization is physically located. For example, Maharashtra.
Two-letter Country Code for this Unit	The country in which your organization is physically located. For example, US, UK, IN, etc.

The key generation algorithm has been specified as RSA, the key size as 1024 bits, the signature algorithm as SHA1withRSA, and the validity days as 365. These can be changed to suitable values if the need arises. For further details, please refer to the documentation of the keytool utility in the JDK utilized by Oracle WebLogic Server.

The sample execution command is listed as follows:

```
D:\Sample\weblogic11g\jrockit_160_05_R27.6.2-20\bin>keytool -genkeypair -
alias selfcert -keyalg RSA -keysize 1024 -sigalg SHA1withRSA -validity 365 -
keystore D:\keystores\AdminOBVAMKeyStore.jks
Enter keystore password: <Enter a password to protect the keystore>
Re-enter new password: <Confirm the password keyed above>
What is your first and last
name? [Unknown]:
cvrhp0729.oracle.com
What is the name of your organizational
unit? [Unknown]: BPD
What is the name of your
organization? [Unknown]: Oracle
Financial Services
What is the name of your City or
Locality? [Unknown]: Mumbai
What is the name of your State or Province?
[Unknown]: Maharashtra
What is the two-letter country code for this
unit? [Unknown]: IN
```

```
Is CN=cvrhp0729.i-flex.com, OU=BPD, O=Oracle Financial Services, L=Mumbai,
ST=Maharashtra, C=IN correct?
[no]: yes
Enter key password for <selfcert>
RETURN if same as keystore password): <Enter a password to protect the key>
Re-enter new password: <Confirm the password keyed above>
```

3.2 Keystore Creation

This topic provides the information to create the keystore.

```
keytool -genkeypair -keystore <keystore_name.jks> -alias <alias_name> -dname
"CN=<hostname>, OU=<Organization Unit>, O=<Organization>, L=<Location>,
ST=<State>,
C=<Country_Code>" -keyalg <Key Algorithm> -sigalg <Signature Algorithm> -
keysize <key size>
-validity <Number of Days> -keypass <Private key Password> -storepass <Store
Password>
```

Example:

```
keytool -genkeypair -keystore AdminOBVAMKeyStore.jks -alias OBVAMCert -dname
"CN=ofss00001.in.example.com, OU=OFSS, O=OFSS, L=Chennai, ST=TN, C=IN" -
keyalg "RSA"
-sigalg "SHA1withRSA" -keysize 2048 -validity 3650 -keypass Password@123 -
storepass Password@123
```



Note:

CN=ofss00001.in.example.com is the Host Name of the weblogic server

3.3 Create Identity Store with Trusted Certificates Issued by CA

This topic provides the information to create Identity Store with Trusted Certificates Issued by CA.

Create Public and Private Key Pair

Browse to the bin folder of JRE from the command prompt and type the following command. The items highlighted are placeholders, and should be replaced with suitable values when running the command.

```
keytool -genkeypair -alias alias -keyalg keyalg -keysize keysize - sigalg
sigalg -validity valDays -keystore keystore
```

Table 3-3 Keyword Description

Keyword	Description
alias	Used to identify the public and private key pair created. This alias is required later when configuring the SSL attributes for the managed servers in Oracle Weblogic Server.
keyalg	It is a key algorithm used to generate the public and private key pair. The RSA key algorithm is recommended.
keysize	It is the size of the public and private key pairs generated. A key size of 1024 or more is recommended. Please consult with your CA on the key size support for different types of certificates.
sigalg	It is the algorithm used to generate the signature. This algorithm should be compatible with the key algorithm and should be one of the values specified in the Java Cryptography API Specification and Reference.
valdays	It is the number of days for which the certificate is to be considered valid. Please consult with your CA on this period.
keystore	It is used to specify the location of the JKS file. If no JKS file is present in the path provided, one will be created.

The command prompts for the following attributes of the certificate and keystore:

Table 3-4 Attribute Details

Attributes	Description
Keystore Password	Specify a password used to access the Keystore. This password needs to be specified later, when configuring the identity store in Kafka server.
Key Password	Specify a password used to access the private key stored in the Keystore. This password needs to be specified later, when configuring the SSL attributes of the managed server(s) in Oracle Weblogic Server.
First and Last Name (CN)	Enter the domain name of the machine used to access Oracle Banking Virtual Account Management. For example, www.example.com.
Name of your Organizational Unit	The name of the department or unit making the request. For example, BDP. Use this field to further identify the SSL Certificate for creating. For example, by department or by physical server.
Name of your Organization	The name of the organization making the certificate request. For example, Oracle Financial Services. It is recommended to use the company or organization's formal name, and this name entered here must match the name found in official records.
Name of your City or Locality	The city in which your organization is physically located. For example, Mumbai.
Name of your State or Province	The state/province in which your organization is physically located. For example, Maharashtra.
Two-letter Country Code for this Unit	The country in which your organization is physically located. For example, US, UK, IN, etc.

The sample execution of the command is listed below:

```
D:\Oracle\weblogic11g\jrocket_160_05_R27.6.2-20\bin>keytool -genkeypair -
alias cvrhp0729 -keyalg RSA -keysize 1024 -sigalg SHA1withRSA -validity 365 -
keystore
D:\keystores\AdminOBVAMKeyStore.jks
Enter keystore password: <Enter a password to protect the keystore>
Re-enter new password: <Confirm the password keyed above>
What is your first and last name?
  [Unknown]: cvrhp0729.i-flex.com
What is the name of your organizational unit?
  [Unknown]: BPD
What is the name of your organization?
  [Unknown]: Oracle Financial Services
What is the name of your City or Locality?
  [Unknown]: Mumbai
What is the name of your State or Province?
  [Unknown]: Maharashtra
What is the two-letter country code for this unit?
  [Unknown]: IN
Is CN=cvrhp0729.i-flex.com, OU=BPD, O=Oracle Financial Services, L=Mumbai,
ST=Maharashtra, C=IN correct? [no]: yes
Enter key password for <cvrhp0729>
RETURN if same as keystore password): <Enter a password to protect the key>
Re-enter new password: <Confirm the password keyed above>
```

Generate CSR

To purchase an SSL certificate, the user must generate the CSR for the server where the certificate will be installed.

A CSR is generated from the server and is the server's unique **fingerprint**. The CSR includes the server's public key, which enables server authentication and secure communication. If the keystore file or the password is lost and a new one is generated, the SSL certificate and the private key will no longer match. A new SSL Certificate will have to be requested.

The CSR is created by running the following command in the bin directory of the JRE:

```
keytool -certreq -alias alias -file certreq_file -keystore keystore
```

Table 3-5 Keyword Description

Keyword	Description
alias	Used to identify the public and private key pair created. The private key associated with the alias will be utilized to create the CSR. Specify the alias of the key pair created in the previous step.
certreq_file	It is the file in which the CSR will be stored.
keystore	It is the location of the keystore containing the public and private key pair.

The sample execution command is listed below:

```
D:\Oracle\Weblogic11g\jrocket_160_05_R27.6.2-20\bin>keytool -certreq -alias
cvrhp0729 -file D:\keystores\certreq.csr -keystore
D:\keystores\AdminOBVAMKeyStore.jks
Enter keystore password: <Enter a password to protect the keystore>
Enter key password for <cvrhp0729>[Enter the password used to access the key
in the keystore]
```

3.5 Import Trust Certificate

This topic provides the information to import as trusted certificate.

```
keytool -import -v -trustcacerts -alias rootcacert -file
<export_certificate_file_name_with_location.cer>
-keystore <keystore_name.jks> > -keypass <Private key Password> -storepass
<Store Password>
```

Example:

```
keytool -import -v -trustcacerts -alias rootcacert -file AdminOBVAMCert.cer
-keystore AdminOBVAMKeyStore.jks -keypass Oracle123 -storepass Oracle123
```

3.4 Export Private Key as Certificate

This topic provides the information to export private key as certificate.

```
keytool -export -v -alias <alias_name> -file
<export_certificate_file_name_with_location.cer>
-keystore <keystore_name.jks> > -keypass <Private key Password> -storepass
<Store Password>
```

Example:

```
keytool -export -v -alias OBVAMCert -file AdminOBVAMCert.cer -keystore
AdminOBVAMKeyStore.jks
-keypass Oracle123 -storepass Oracle123
```

If successful, the following message is displayed:

Certificate stored in file < AdminOBVAMCert.cer>

- [Obtain Trusted Certificate from CA](#)
This topic provides the information to obtain the trusted certificate from CA.
- [Convert .crt and .key file to PKC12 file](#)
This topic provides the systematic instruction to convert .crt and .key file to PKC12 file.
- [Import Certificate into Identity Store](#)
This topic provides information to import the certificate into identify store.

3.4.1 Obtain Trusted Certificate from CA

This topic provides the information to obtain the trusted certificate from CA.

The processes of obtaining a trusted certificate vary from one CA to another. The CA might perform additional offline verification. Consult the CA issuing the certificate for details on the process to be followed for submission of the CSR and for obtaining the certificate.

3.4.2 Convert .crt and .key file to PKC12 file

This topic provides the systematic instruction to convert .crt and .key file to PKC12 file.

1. Once CA signed certificate is generated, you will be notified on email to download it from the portal, once zip is downloaded from portal it will contain .crt & .key file for requested server.
2. Convert this .crt and .key file to PKC12 file using openssl command (openssl.exe file could be found under Git installation directory. In my case, "C:\Program Files\Git\usr\bin\openssl.exe")

Sample command:

```
openssl pkcs12 -export -in <crt_file> -inkey <key_file> -out <p12_file>  
-name <alias_name>
```

Sample command with values:

```
openssl pkcs12 -export -in whf00pfl.in.example.com.crt -inkey  
whf00pfl.in.example.com.key -out whf00pfl.in.example.com.p12 -name  
whf00pfl.in.example.com
```

3. Import PKCS12 file into Java Keystore using the keytool (keytool can be found under \$JAVA_HOME/bin)

Sample Command:

```
keytool -importkeystore -deststorepass <password> -destkeystore  
<jks_file> -srckeystore <p12_file> -srcstoretype PKCS12
```

Sample command with values:

```
keytool -importkeystore -deststorepass Oracle@123 -destkeystore  
whf00pfl_keystore.jks -srckeystore whf00pfl.in.example.com.p12 -  
srcstoretype PKCS12
```

3.4.3 Import Certificate into Identity Store

This topic provides information to import the certificate into identify store.

Store the certificate obtained from the CA in the previous step, in a file, preferably in PEM format. Other formats like the p7b file format would require conversion to the PEM format. Details on performing the conversion are not listed here.

 **Note:**

Refer to the **Oracle WebLogic Server** documentation on Securing Oracle WebLogic Server for details on converting a Microsoft p7b file to the PEM format.

The command to be executed for importing a certificate into the identity store depend on whether the trust store chosen (Refer to section **Choose the Identity and Trust Stores**). It is highly recommended to verify the trust path when importing a certificate into the identity store. The commands provided below assume the use of the Java Standard Trust store.

1. Import the public certificate into the keystore using the private key alias. Then do the actual import of the certificate:

Sample command:

```
keytool -importcert -v -alias <alias_name> -file  
<consolidate_certs_file> -keystore <keystore path> -keypass <Password>  
-storepass <Password>
```

Sample command with values:

```
keytool -importcert -v -alias whf00pfl.in.example.com -file  
consolidate_cert.pem -keystore whf00pfl_keystore.jks -keypass  
Oracle@123 -storepass Oracle@123
```

2. To confirm your keystore is created correctly, you can look at the keystore using the following command:

Sample command:

```
keytool -list -v -keystore <keystore path> -storepass <Password>
```

Sample command with values:

```
keytool -list -v -keystore whf00pfl_keystore.jks -storepass Oracle@123
```

Import the Intermediate CA Certificate

Most Certificate Authorities do not use the root CA certificates to issue identity certificates for use by customers. Instead, Intermediate CAs issue identity certificates in response to the submitted CSRs.

If the Intermediate CA certificate is absent in the Java Standard Trust store, the trust path for the certificate will be incomplete for the certificate, resulting in warnings issued by WebLogic Server during runtime. To avoid this, the intermediate CA certificate should be imported into the identity keystore. Although the intermediate CA certificate can be imported into the Java Standard Trust store, this is not recommended unless the intermediate CA can be trusted. The following command must be executed to import the intermediate CA certificate into the keystore.

```
keytool -importcert -alias alias -file cert_file -trustcacerts -keystore  
keystore
```

Table 3-6 Keyword Description

Keyword	Description
alias	Used to identify the public and private key pair. Specify the alias of the key pair used to create the CSR in the earlier step.
certreq_file	It is the location of the file containing the intermediate CA certificate in a PKCS#7 format (PEM or DER file).
keystore	It is the location of the keystore containing the public and private key pair.

The trustcacerts flag is used to consider other certificates (higher intermediaries and the root CA) in the chain of trust. If no chain of trust is established during verification, the certificate will be displayed and one would be prompted to verify it. It is recommended that due diligence be observed, when the prompt is displayed to verify a certificate when a chain of trust is absent.

The sample execution command is listed below:

```
D:\Sample\weblogic11g\jrocket_160_05_R27.6.2-20\bin>keytool - importcert -
alias verisigntrialintermediateca -file
D:\keystores\VerisignIntermediateCA.cer -trustcacerts -keystore
D:\keystoreworkarea\AdminOBVAMKeyStore.jks
Enter keystore password:<Enter the password used to access the keystore>
Certificate was added to keystore
```

Import the Identity Certificate

The following command should be executed to import the identity certificate into the keystore.

```
keytool -importcert -alias alias -file cert_file -trustcacerts -keystore
keystore
```

Table 3-7 Keyword Description

Keyword	Description
alias	Used to identify the public and private key pair. Specify the alias of the key pair used to create the CSR in the earlier step.
certreq_file	It is the location of the file containing the PKCS#7 formatted reply from the CA, containing the signed certificate.
keystore	It is the location of the keystore containing the public and private key pair.

The trustcacerts flag is used to consider other certificates (intermediate CAs and the root CA) in the chain of trust. If no chain of trust is established during verification, the certificate will be displayed and one would be prompted to verify it. It is recommended that due diligence be observed, when the prompt is displayed to verify a certificate when a chain of trust is absent.

The sample execution command is listed below:

```
D:\Oracle\weblogic11g\jrocket_160_05_R27.6.2-20\bin>keytool - importcert -
alias cvrhp0729 -file
```

```
D:\keystores\cvrhp0729.cer - trustcacerts -keystore
D:\keystoreworkarea\AdminOBVAMKeyStore.jks
Enter keystore password: <Enter the password used to access the keystore>
Enter key password for <cvrhp0729>: <Enter the password used to access the
private key>
Certificate reply was installed in keystore
```

The previous set of commands assumed the presence of the appropriate root CA certificate (in the chain of trust) in the Java Standard Trust store, i.e. in the cacerts file. If the CA issuing the identity certificate (for the WebLogic Server) does not have the root CA certificate in the Java Standard Trust store, one can opt to import the root CA certificate into cacerts, or into the identity store, depending on factors including trustworthiness of the CA, necessity of transporting the trust store across machine, among others.

4

Configure Identity and Trust Stores for Weblogic

This topic provides the information to configure Identity and Trust Stores for Weblogic.

- [Enable SSL on Oracle WebLogic Server](#)
This topic provides the systematic instructions to enable the SSL on Oracle WebLogic Server.
- [Configure Identity and Trust Stores](#)
This topic provides the systematic instructions to configure the identity and trust store for WebLogic.

4.1 Enable SSL on Oracle WebLogic Server

This topic provides the systematic instructions to enable the SSL on Oracle WebLogic Server.

Login to the **Oracle WebLogic Admin Console** to configure SSL.

1. Under **Change Center**, click **Lock & Edit**.
2. Expand **Servers** node.
3. Select the name of the server for which you want to enable SSL.
Example: example server
4. Navigate to **Configuration** and select **General** tab.
5. Select the **SSL Listen Port Enabled** option and specify the SSL listen port.
6. In **Listen Address** field, specify the hostname of the machine in which the application server is installed.

4.2 Configure Identity and Trust Stores

This topic provides the systematic instructions to configure the identity and trust store for WebLogic.

Login in to the **Oracle WebLogic Admin Console**.

1. Under **Change Center**, click **Lock & Edit**.
2. Expand **Servers** node.
3. Select the name of the server to configure the keystores.
Example: exampleserver
4. Go to **Configuration** and select **Keystores** tab.
5. In the filed **Keystores**, select the method for storing and managing private keys/digital certificate pairs and trusted CA certificates.

This choice should match the one made in [Choose the Identity and Trust Stores](#) section of this document.

6. In the **Identity** section, provide the following details:
 - **Custom Identity Keystore File Name:** Fully qualified path to the Identity keystore.
 - **Custom Identity Keystore Type:** Set this attribute to JKS, the type of the keystore. If left blank, it is defaulted to JKS (Java KeyStore).
 - **Custom Identity Keystore PassPhrase:** The password you enter when reading or writing to the keystore. This attribute is optional or required depending on the type of keystore. All keystores require the passphrase in order to write to the keystore. However, some keystores do not require the passphrase to read from the keystore. Oracle Weblogic server only reads from the keystore. So whether or not you define this property depends on the requirements of the keystore.

7. In the **Trust** section, provide the following details:

If the user choose **Java Standard Trust**, specify the password used to access the trust store.

If the user choose **Custom Trust**, the following attributes have to be provided:

- **Custom Trust Keystore:** The fully qualified path to the trust keystore.
- **Custom Trust Keystore Type:** Set this attribute to JKS, the type of the keystore. If left blank, it defaults to JKS (Java KeyStore).
- **Custom Trust Keystore Passphrase:** The password you enter when reading or writing to the keystore. This attribute is optional or required depending on the type of keystore. All keystores require the passphrase in order to write to the keystore. However, some keystores do not require the passphrase to read from the keystore. Oracle Weblogic

Server only reads from the keystore. So, whether or not you define this property depends on the requirements of the keystore.

 **Note:**

If the identity and trust stores are in the JKS format, the passphrases are not required.

5

Configure Weblogic Console

This topic provides the systematic instructions to configure the Weblogic Console.

After domain creation, follow the below steps to enable SSL in Weblogic Admin server.

Login to the **Oracle Weblogic Server Admin Console**.

1. Select **Admin Server** to enable SSL Options.

Figure 5-1 Configuration

The screenshot displays the Oracle Weblogic Server Admin Console Configuration page. On the left, the 'Domain Structure' tree shows the hierarchy: platoinfra_domain > Environment > Servers. The 'Servers' folder is selected. The main content area shows a table of servers. The table has columns: Name, Type, Cluster, Machine, State, Health, and Listen Port. The 'AdminServer(admin)' server is highlighted in yellow and is in a 'RUNNING' state with 'OK' health. Other servers listed include WLS_CONFIG, WLS_DISCOVERY, WLS_GATEWAY, and WLS_ZIPKINUI, all in 'SHUTDOWN' states with 'Not reachable' health.

Name	Type	Cluster	Machine	State	Health	Listen Port
AdminServer(admin)	Configured			RUNNING	OK	7001
WLS_CONFIG	Configured	config_cluster	platoinfra_Machine	SHUTDOWN	Not reachable	7004
WLS_DISCOVERY	Configured	discovery_cluster	platoinfra_Machine	SHUTDOWN	Not reachable	7003
WLS_GATEWAY	Configured	gateway_cluster	platoinfra_Machine	SHUTDOWN	Not reachable	7006
WLS_ZIPKINUI	Configured	zipkinui_cluster	platoinfra_Machine	SHUTDOWN	Not reachable	7005

2. Click **General** tab.
3. Select **SSL Listen Port Enabled**, **Client Cert Proxy Enabled**, and **Weblogic Plug-In Enabled**.

Figure 5-2 General

Listen Port Enabled

Listen Port:

SSL Listen Port Enabled

SSL Listen Port:

Client Cert Proxy Enabled

Java Compiler:

Diagnostic Volume:

Default Datasource:

— Advanced —

Virtual Machine Name:

WebLogic Plug-In Enabled:

- Click **Save**.

Figure 5-3 Settings for AdminServer

✔ Settings updated successfully.

Settings for AdminServer

Configuration Protocols Logging Debug Monitoring Control Deployments Services Se

General Cluster Services **Keystores** SSL Federation Services Deployment Migration T

Save

- Click **Keystores** tab.

Figure 5-4 Keystores

Keystores ensure the secure storage and management of private keys and trusted certificate authorities (CAs). This page lets you manage the security of message transmissions.

Keystores: Custom Identity and Custom Trust

— Identity

Custom Identity Keystore:

Custom Identity Keystore Type:

Custom Identity Keystore Passphrase:

Confirm Custom Identity Keystore Passphrase:

— Trust

Custom Trust Keystore:

Custom Trust Keystore Type:

Custom Trust Keystore Passphrase:

Confirm Custom Trust Keystore Passphrase:

6. Specify **Custom Identity Keystore** and **Custom Trust Keystore** same as the **Keystore Name** created in above steps with full path.
7. Specify **Custom Identity Keystore Type** and **Custom Trust Keystore Type** as jks.
8. Specify **Custom Identity Keystore Passphrase**, **Confirm Custom Identity Keystore Passphrase**, **Custom Trust Keystore Passphrase** and **Confirm Custom Trust Keystore Passphrase** same as the **Store Password** entered in above steps.
9. Click **Save**.
10. Click **SSL** tab.

Figure 5-5 SSL

General Cluster Services Keystores **SSL** Federation Services Deployment Migration Tuning

Save

This page lets you view and define various Secure Sockets Layer (SSL) settings for this server instance. These se

Identity and Trust Locations: Keystores [Change](#)

Identity

Private Key Location: from Custom Identity Keystore

Private Key Alias:

Private Key Passphrase:

Confirm Private Key Passphrase:

Certificate Location: from Custom Identity Keystore

Trust

Trusted Certificate Authorities: from Custom Trust Keystore

Advanced

11. Specify **Private Key Alias** as same as the alias name entered in above steps.
12. Specify **Private Key Passphrase** and **Confirm Private Key Passphrase** as same as the **Private Key Password** entered in above steps.
13. Change the **Hostname Verification** to **None**.
14. Click **Save**.

Repeat the same steps for all the managed servers as well. The admin server and managed servers are SSL enabled.

15. Restart all the servers.

6

Configure SSL Mode in Node Manager for Clustered Environment

This topic provides the systematic instructions to configure the SSL model in node manager for clustered environment.

1. Edit the nodemanager.properties with SSL configurations and restart the node manager.

Figure 6-1 Node Manager Properties

```
LOGGIM1.C>
PropertiesVersion=12.2.1.3.0
AuthenticationEnabled=true
NodeManagerHome=D:\Oracle\Middleware\12cPs3\Oracle_home_new\user_projects\domains\platoinfra_domain\nodemanager
JavaHome=C:\PROGRA~1\Java\JDK16-1.0_1
LogLevel=INFO
DomainsFileEnabled=true
ListenAddress=localhost
NativeVersionEnabled=true
ListenPort=5556
LogToStderr=true
weblogic.StartScriptName=startWebLogic.cmd

SecureListener=true
ListenPort=5557
KeyStores=CustomIdentityAndCustomTrust
CustomIdentityKeystoreType=jks
CustomIdentityKeystoreFileName=C:\AdminOBLMKeyStore.jks
CustomIdentityKeystorePassPhrase=Oracle123
CustomIdentityPrivateKeyPassPhrase=Oracle123
CustomIdentityAlias=OBLMCert
CustomTrustKeystoreType=jks
CustomTrustKeystoreFileName=C:\AdminOBLMKeyStore.jks
CustomTrustKeystorePassPhrase=Oracle123

LogCount=1
QuitEnabled=false
LogAppend=true
weblogic.StopScriptEnabled=false
StateCheckInterval=500
CrashRecoveryEnabled=false
weblogic.StartScriptEnabled=true
LogFile=D:\Oracle\Middleware\12cPs3\Oracle_home_new\user_projects\domains\platoinfra_domain\nodemanager\nodemana
LogFormatter=weblogic.nodemanager.server.LogFormatter
ListenBacklog=50
```

2. Ensure the SSL configuration is performed in other artifacts, such as startNodeManager.cmd/.sh, startup.properties, config.xml(enable jsse).

7

Set SSL Attributes for Managed Servers

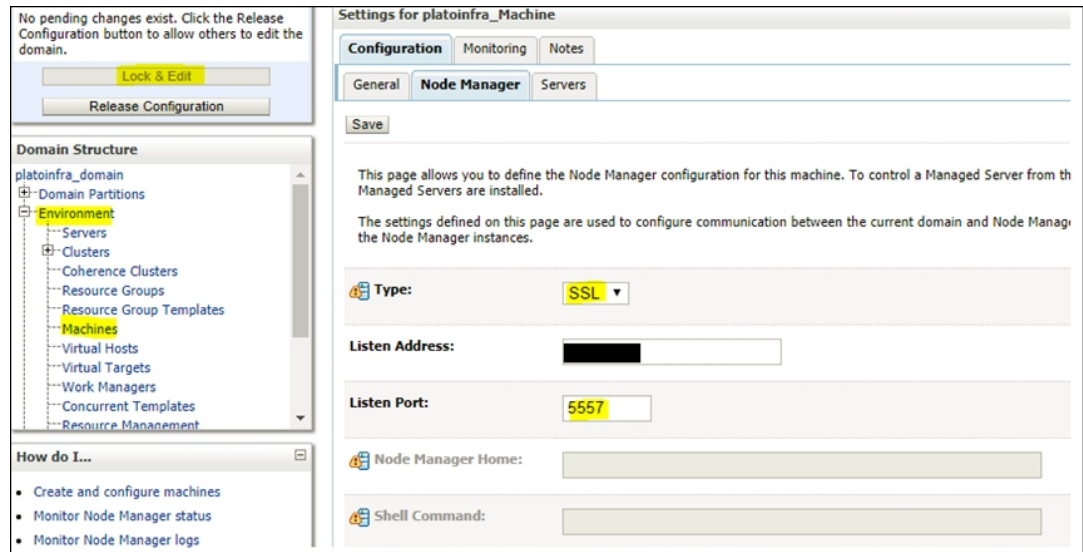
This topic provides the systematic instructions to set the SSL attributes for Managed Servers.

Set SSL Attributes for Private Key Alias and Password

Login to the **Oracle Weblogic Server Admin Console** to configure the private key alias and password.

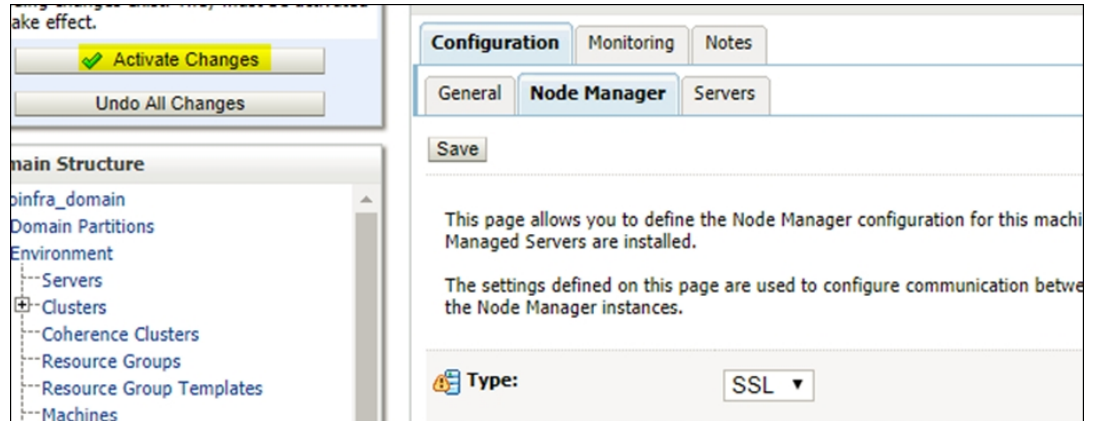
1. Under **Change Center**, click **Lock and Edit**.
2. Expand **Servers** node.
3. Select the name of the server to configure keystores.
Example: exampleserver
4. Navigate to **Configuration** and select **SSL** tab.

Figure 7-1 Configuration



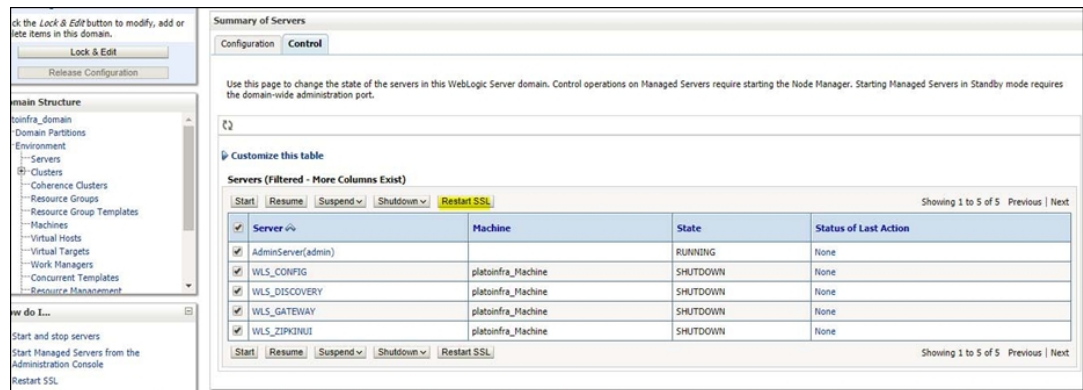
5. Select **Keystores** from **Identity and Trust Locations**.
6. Under **Identity** section, specify the following details:
 - **Private Key Alias:** Set this attribute to the alias name defined for the key pair when creating the key pair in the Identity keystore.
 - **Private Key Passphrase:** The password defined for the key pair (alias_password), at the time of its creation. Confirm the password.
7. Click **Save**.
8. Under **Change Center**, click **Activate Changes**.

Figure 7-2 Configuration - Activate Changes



- Navigate to **Controls** tab, check the appropriate server.

Figure 7-3 Summary of Servers



- Click **Restart SSL**, and confirm when it prompts.

8

Test Configuration

This topic provides the information to test the configuration.

Once the Oracle Weblogic has been configured for SSL, deploy the application in the usual manner. After deployment, the user can test the application in SSL mode.

To launch the application in SSL mode, the user need to enter the URL in the following format:

```
https://(Machine Name):(SSL_Listener_port_no)/(Context_root)
```

 **Note:**

It is recommended that the Oracle Banking Liquidity Management web application be accessed via the HTTPS channel, instead of the HTTP channel.

Index

C

Certificates and Keypairs, [1-1](#)
Choose the Identity and Trust Stores, [2-1](#)
Configure Identity and Trust Stores for Weblogic, [4-1](#)
Configure Identity and Trust Stores for WebLogic, [4-1](#)
Configure SSL Mode in Node Manager for Clustered Environment, [6-1](#)
Configure SSL on Oracle WebLogic, [1-1](#)
Configure Weblogic Console, [5-1](#)
Convert .crt and .key file to PKC12 file, [3-7](#)
Create Identity Store with Self-Signed Certificates, [3-1](#)
Create Identity Store with Trusted Certificates Issued by CA, [3-3](#)
Create Public and Private Key Pair, [3-3](#)
Create Self-Signed Certificate, [3-1](#)

E

Enable SSL on Oracle WebLogic Server, [4-1](#)
Export Private Key as Certificate, [3-6](#)

G

Generate CSR, [3-5](#)

I

Import Certificate into Identity Store, [3-7](#)
Import Trust Certificate, [3-6](#)

K

Keystore Creation, [3-3](#)

O

Obtain the Identity Store, [3-1](#)
Obtain Trusted Certificate from CA, [3-7](#)

S

Set SSL Attributes for Managed Servers, [7-1](#)
Setup SSL on Oracle Weblogic, [1-1](#)

T

Test Configuration, [8-1](#)