Oracle® Banking Branch

SSL Configurations Setup Guide

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Contents

Preface

This guide details out the configurations for SSL on the Oracle Weblogic application server.

Audience

This guide is intended for the WebLogic admin or ops-web team who are responsible for installing the banking products of Oracle Financial Services Software Limited.

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.
italic	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.

List of Topics

This guide is organized into the following topics:

Table List of Topics

Topic	Description
Configure SSL on Oracle Weblogic	This topic details the configurations for SSL on the Oracle Weblogic application server.
About Choosing the Identity and Trust Stores	This topic describes the choice of identity and trust stores.
Obtaining the Identity Store	This topic provides instructions to obtain the identity store.
Configure Identity and Trust Stores for WebLogic	This topic provides instructions to configure the identity and trust stores for WebLogic.
Configure Weblogic Console	This topic provides instructions to enable SSL in the WebLogic admin server.
Configure SSL Mode	This topic provides instructions to configure the SSL mode in the node manager for the clustered environment.

Table (Cont.) List of Topics

Topic	Description
Set SSL Attributes for Managed Servers	This topic provides instructions to set SSL attributes for the managed servers.
Enable SSL in Oracle Banking Branch	This topic provides instructions to enable the SSL in the Oracle Banking Branch.
Testing Configuration	This topic provides instructions to test the application in SSL mode.

Related Resources

The related documents are as follows:

- *Configuration and Deployment Guide*
- *Oracle Banking Branch Installation Guide*

Screenshot Disclaimer

Personal information used in the interface or documents are dummy and does not exist in the real world. It is only for reference purposes.

1

Configure SSL on Oracle Weblogic

You can configure SSL in the Oracle WebLogic application server using identity and trust.

To setup SSL on the Oracle Weblogic application server:

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

> **Note:**
>
> For information on certificates and keypairs, refer to Certificates and Keypairs.

- Certificates and Keypairs
  Certificates are used for validating the authenticity of the server, and the keys are used to secure the certificates.

1.1 Certificates and Keypairs

Certificates are used for validating the authenticity of the server, and the keys are used to secure the certificates.

Certificates contain the name of the owner, certificate usage, duration of validity, resource location, or distinguished name (DN), which includes the common name (CN - website address or e-mail address depending on the usage) and the certificate ID of the person who certified (signs) this 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, GeoTrust, or InstantSSL.

SSL uses a pair of cryptographic keys - a *public key* and a *private key*. These keys are similar 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, the Oracle Weblogic server can authenticate itself to other parties.

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

There are two keystores to be managed by the Oracle Weblogic server to configure SSL. For information on the types of keystores, refer to the table below:

Table 1-1 Keystores

Keystore	Description
Identity Keystore	This keystore contains the key pairs and the Digital certificate. This can also contain certificates of intermediate CAs.
Trust Keystore	This keystore contains the trusted CA certificates.

2

About Choosing the Identity and Trust Stores

Oracle Financial Services Software Limited recommends that the choice of identity and trust stores be made upfront.

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 Software does not recommend choosing Demo Identity and Demo Trust for production environments.

It is recommended 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 Oracle WebLogic server and hence should be protected against unauthorized access. For more information on choosing trust stores, refer to the table below:

Table 2-1 Trust Stores

Trust Store	Description
Command Line Trust	If Command-Line Trust is chosen, it 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	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 it 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.
Custom Trust	One can also create custom trust stores containing the list of certificates of trusted CAs. For further details on identity and trust stores, refer to the Oracle WebLogic Server documentation on Securing Oracle WebLogic Server.

3

Obtaining the Identity Store

The identity store needs to be obtained as a part of the SSL configuration setup.

This topic contains the following subtopics:

- Create Identity Store with Self-Signed Certificates
  Self-signed certificates are acceptable for use in a testing or development environment. Oracle Financial Services Software Limited does not recommend the use of self-signed certificates in a production environment.
- Create Keystore
  You can create the keystore using the command to obtain the identity store.
- Creating Identity Store with Trusted Certificates Issued by CA
  You need to create the key pairs and generate a Certificate Signing Request (CSR) to obtain the identity store.
- Export Private Key as Certificate
  You need to export the private key as a certificate to obtain the identity store.
- Import as Trusted Certificate
  You can import the obtained certificates as trusted certificates using the command to obtain the identity store.

3.1 Create Identity Store with Self-Signed Certificates

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

You can create the self-signed certificate using the command. For creating a self-signed certificate, the `genkeypair` option provided by the `keytool` utility of Sun Java 6 needs to be utilized.

To create a self-signed certificate:

Browse to the bin folder of JRE from the command prompt and type the following command.

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

> **Note:**
>
> The items highlighted in bold are placeholders and should be replaced with suitable values when running the command.

In the above command,

Table 3-1 Description of Placeholders and Attributes

Placeholder/Attribute	Description
`alias`	**`alias`** is 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`	**`keystore`** is used to specify the location of the JKS file. If no JKS file is present in the path provided, a JKS file will be created. The command will prompt for the following attributes of the certificate and keystore:
Keystore Password	Specify a password that will be 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 that will be 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 the Oracle Weblogic Server.
First and Last Name (CN)	Enter the domain name of the machine used to access Oracle Banking Branch, for instance, www.example.com
Name of your Organizational Unit	The name of the department or unit making the request, for example, BPD. Use this field to further identify the SSL Certificate you are creating, for example, by department or by the physical server.
Name of your Organization	The name of the organization making the certificate request, for example, Oracle Financial Services Software Limited. 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.

Note:

The key generation algorithm has been specified as RSA, and 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 the Oracle Weblogic Server.

For example:

The result of a sample execution of the command is listed below:

```
D:\Oracle\weblogic11g\jrockit_160_05_R27.6.2-20\bin>keytool - genkeypair -
alias selfcert -keyalg RSA -keysize 1024 -sigalg SHA1withRSA -validity 365
-keystore D:\keystores\AdminOBREMOKeyStore.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 Software Limited

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.oracle.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 Create Keystore

You can create the keystore using the command to obtain the identity store.

To create the keystore, use the comment given below:

```
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>
```

For example:

```
keytool -genkeypair -keystore AdminOBREMOKeyStore.jks -alias OBREMOCert -dname
"CN=ofss00001.in.oracle.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 Creating Identity Store with Trusted Certificates Issued by CA

You need to create the key pairs and generate a Certificate Signing Request (CSR) to obtain the identity store.

This topic contains the following subtopics:

- Create Public and Private Key Pair
  You need to create the public and private key pair using the command to obtain the identity store.
- Generate CSR
  To purchase an SSL certificate, one needs to generate a Certificate Signing Request (CSR) for the server where the certificate will be installed.

3.3.1 Create Public and Private Key Pair

You need to create the public and private key pair using the command to obtain the identity store.

Browse to the bin folder of JRE from the command prompt and type the following command.

> **Note:**
>
> The items highlighted in bold 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
```

In the above command,

Table 3-2 Description of Placeholders

Placeholder	Description
alias	**alias** is 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	**keyalg** is the key algorithm used to generate the public and private key pair. The RSA key algorithm is recommended.
keysize	**keysize** 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.

Table 3-2 (Cont.) Description of Placeholders

Placeholder	Description
`sigalg`	**`sigalg`** 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`	**`valdays`** is the number of days for which the certificate is to be considered valid. Consult with your CA on this period.
`keystore`	**`keystore`** is used to specify the location of the JKS file. If no JKS file is present in the path provided, a JKS file will be created.

The command will prompt for the following attributes of the certificate and keystore:

Table 3-3 Description of Attributes

Attribute	Description
Keystore Password	Specify a password that will be used to access the keystore. This password needs to be specified later when configuring the identity store in the Oracle Weblogic Server.
Key Password	Specify a password that will be 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 the Oracle Weblogic Server.
First and Last Name (CN)	Enter the domain name of the machine used to access Oracle Banking Branch, for instance, www.example.com
Name of your Organizational Unit	The name of the department or unit making the request, for example, BPD. Use this field to further identify the SSL Certificate you are creating, for example, by department or by the physical server.
Name of your Organization	The name of the organization making the certificate request, for example, Oracle Financial Services Software Limited. 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.

For example:

The result of a sample execution of the command is listed below:

```
D:\Oracle\weblogic11g\jrockit_160_05_R27.6.2-20\bin>keytool - genkeypair -alias
cvrhp0729 -keyalg RSA -keysize 1024 -sigalg SHA1withRSA -validity 365 -keystore
D:\keystores\AdminOBREMOKeyStore.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 Software Limited

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.oracle.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>
```

3.3.2 Generate CSR

To purchase an SSL certificate, one needs to generate a Certificate Signing Request (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.

> **Note:**
>
> 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
```

In the above command,

Table 3-4 Description of Placeholders

Placeholder	Description
alias	***alias*** is used to identify the public and private key pair. 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	***certreq_file*** is the file in which the CSR will be stored.
keystore	***keystore*** is the location of the keystore containing the public and private key pair.

For example,

The result of a sample execution of the command is listed below:

```
D:\Oracle\Weblogic11g\jrockit_160_05_R27.6.2-20\bin>keytool -certreq -alias
cvrhp0729 -file D:\keystores\certreq.csr -keystore
D:\keystores\AdminOBREMOKeyStore.jks

Enter keystore password:[Enter the password used to access the keystore]

Enter key password for <cvrhp0729>[Enter the password used to access the key in
the keystore]
```

3.4 Export Private Key as Certificate

You need to export the private key as a certificate to obtain the identity store.

To export the private key, use the comment given below:

```
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>
```

For example:

```
keytool -export -v -alias OBREMOCert -file AdminOBREMOCert.cer -keystore
AdminOBREMOKeyStore.jks -keypass Oracle123 -storepass Oracle123
```

If successful, the following message will be displayed:

```
Certificate stored in file < AdminOBREMOCert.cer>
```

- About Obtaining and Importing Trusted Certificate
  The Trusted Certificate needs to be obtained from the CA and imported into the identity store.

3.4.1 About Obtaining and Importing Trusted Certificate

The Trusted Certificate needs to be obtained from the CA and imported into the identity store.

Obtaining 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 to submit the CSR and obtain the certificate.

Importing Certificate into Identity 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. 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 is chosen (in the earlier step; see section 2 of this document). 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.

For information on importing the intermediate CA certificate and identity certificate, refer to the below topics:

- Import Intermediate CA Certificate
  You need to import the intermediate CA certificate into the identity keystore. 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.
- Import Identity Certificate
  You can import the identity certificate into the keystore using the command.

3.4.1.1 Import Intermediate CA Certificate

You need to import the intermediate CA certificate into the identity keystore. 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.

Execute the following command to import the intermediate CA certificate into the keystore:

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

In the above command,

Table 3-5 Description of Placeholders

Placeholder	Description
cert_file	*alias* is 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.
cert_file	*cert_file* is the location of the file containing the intermediate CA certificate in a PKCS#7 format (PEM or DER file).

Table 3-5 (Cont.) Description of Placeholders

Placeholder	Description
keystore	***keystore*** is the location of the keystore containing the public and private key pair.

> **Note:**
>
> 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.

A sample execution of the command is listed below:

```
D:\Oracle\weblogic11g\jrockit_160_05_R27.6.2-20\bin>keytool - importcert -alias
verisigntrialintermediateca -file

D:\keystores\VerisignIntermediateCA.cer -trustcacerts -keystore

D:\keystoreworkarea\AdminOBREMOKeyStore.jks

Enter keystore password:<Enter the password used to access the keystore>

Certificate was added to keystore
```

3.4.1.2 Import Identity Certificate

You can import the identity certificate into the keystore using the command.

Execute the following command to import the identity certificate into the keystore:

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

In the above command,

Table 3-6 Description of Placeholders

Placeholder	Description
alias	***alias*** is 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.
cert_file	***cert_file*** is the location of the file containing the PKCS#7 formatted reply from the CA, containing the signed certificate.
keystore	***keystore*** 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.

A sample execution of the command is listed below:

```
D:\Oracle\weblogic11g\jrockit_160_05_R27.6.2-20\bin>keytool - importcert -
alias cvrhp0729 -file D:\keystores\cvrhp0729.cer - trustcacerts -keystore

D:\keystoreworkarea\AdminOBREMOKeyStore.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
```

> **Note:**
>
> 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, specifically 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 the identity store, depending on factors including the trustworthiness of the CA, the necessity of transporting the trust store across the machine, among others.

3.5 Import as Trusted Certificate

You can import the obtained certificates as trusted certificates using the command to obtain the identity store.

To import as trusted certificate, execute the comment given below:

```
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>
```

For example,

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

4

Configure Identity and Trust Stores for WebLogic

You need to enable SSL on the Oracle Weblogic Server to configure the identity and trust stores.

Log in to the Admin Console of WebLogic Server.

To configure the identity and trust stores:

1. To enable SSL on Oracle Weblogic Server:
   a. On the Homepage, under the **Change Center** panel, click **Lock and Edit**.
   b. Expand **Servers** node.
   c. Select the name of the server for which you want to enable SSL.

      For example, exampleserver.
   d. Navigate to **Configuration** and select the **General** tab.
   e. Select the option **SSL Listen Port Enabled** and specify the SSL listen port.
   f. In the **Listen Address** field, specify the hostname of the machine in which the application server is installed.
2. Configure identity and trust stores as follows:
   a. On the Homepage, under the **Change Center** panel, click **Lock and Edit**.
   b. Expand **Servers** node.
   c. Select the name of the server for which you want to configure the keystores.

      For example, exampleserver.
   d. Navigate to **Configuration** and select the **Keystores** tab.
   e. In the field **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 Section 2 of this document (Choosing the Identity and Trust Stores).
   f. In the **Identity** section, specify the following details:

Table 4-1 Identity Section - Field Description

Attribute	Description
Custom Identity Keystore File Name	Fully qualified path to the Identity keystore.
Custom Identity Keystore Type	Set this attribute to JKS (Java KeyStore), the type of the keystore. If left blank, it defaults to JKS.

Table 4-1 (Cont.) Identity Section - Field Description

Attribute	Description
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 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.

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

- If you choose **Java Standard Trust**, specify the **Password** used to access the trust store.
- If you choose **Custom Trust**, the following attributes have to be provided:

Table 4-2 Custom Trust - Field Description

Attribute	Description
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.
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 to write to the keystore. However, some keystores do not require the passphrase to read from the keystore. Oracle Weblogic.

The server only reads from the keystore. Hence, whether or not you define this property depends on the requirements of the keystore.

> **Note:**
>
> When identity and trust stores are of the JKS format, the passphrases are not required.

5

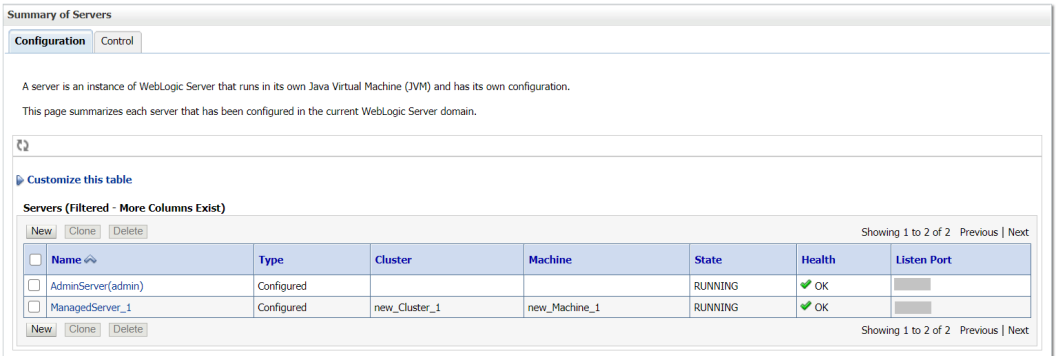
Configure Weblogic Console

After you create the domain, the SSL needs to be enabled in the WebLogic admin server.

To enable SSL in WebLogic admin server:

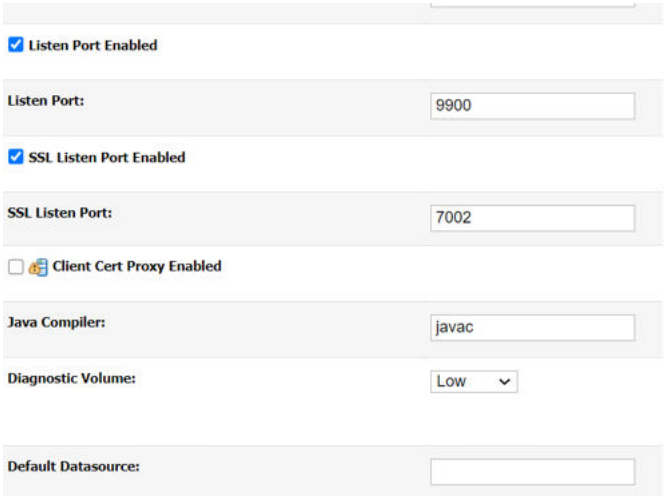
1. Select **Admin Server** to enable SSL options.

Figure 5-1 Enabling SSL Options



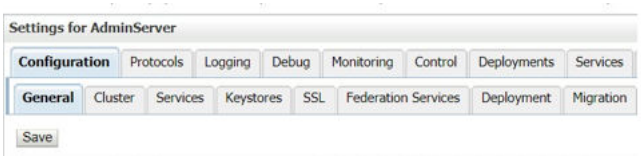
2. Do the below steps in the **General** tab:
   a. Select **SSL Listen Port Enabled**, **Client Cert Proxy Enabled**, and **Weblogic Plug-In Enabled**.

Figure 5-2 General Tab



   b. Click **Save**.

Figure 5-3 Settings for Admin Server



3. Do the below steps in the **Keystores** tab:
   a. In the **Keystores** tab, specify the details. For more information on fields, refer to the field description table.

Table 5-1 Keystores - Field Description

Field	Description
Custom Identity Keystore and **Custom Trust Keystore**	Specify the value as same as the Keystore Name created in the above steps with full path.
Custom Identity Keystore Type and **Custom Trust Keystore Type**	Specify the value as `jks`.
Custom Identity Keystore Passphrase, **Confirm Custom Identity Keystore Passphrase**, **Custom Trust Keystore Passphrase**, and **Confirm Custom Trust Keystore Passphrase**	Specify the value as same as the Store Password entered in the above steps.

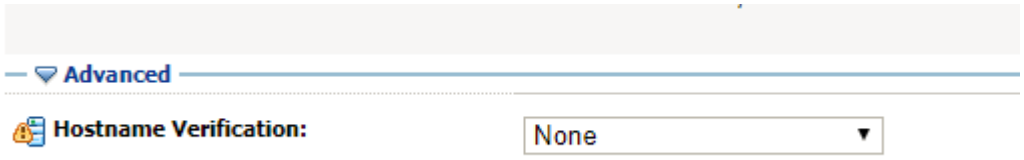
   b. Click **Save**.
4. Do the below steps in the **SSL** tab:
   a. In the **SSL** tab, specify the details. For more information on fields, refer to the field description table.

Table 5-2 SSL - Field Description

Field	Description
Private Key Alias	Specify the value as same as the alias name entered in the above steps.
Private Key Passphrase and **Confirm Private Key Passphrase**	Specify the value as same as the Private Key Password entered in the above steps.
Hostname Verification	Change the value to **None**.

   b. Click **Save**.

Figure 5-4 Hostname Verification



The screen with the Hostname Verification option is displayed.

c. Repeat steps (a) thru (d) for all the managed servers.

The admin server and managed servers are SSL enabled.

d. Restart all the servers.

6
Configure SSL Mode

You need to configure the SSL mode in node manager for the clustered environment.

To configure the SSL mode:

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

Figure 6-1 SSL Mode Configuration

The screen with SSL configurations is displayed.

2. Make sure that the SSL configuration is done in other artifacts, such as `startNodeManager.cmd/.sh`, `startup.properties`, `config.xml(enable jsse)`.

7

Set SSL Attributes for Managed Servers

You need to configure the SSL attributes of the private key alias and password for the managed servers.

Log in to the Homepage of the Oracle Weblogic Server Admin Console.

To configure the private key alias and password:

1. On the Homepage, under **Change Center**, click **Lock and Edit**.
2. Expand **Servers** node.
3. Select the name of the server for which you want to configure keystores.

   For example, exampleserver.
4. Navigate to **Configuration** and select the **SSL** tab.
5. Select **Keystores** from **Identity and Trust Locations**.
6. Under the **Identity** section, specify the following details:

Table 7-1 Identity Section - Field Description

Field	Description
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 is 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**.
9. Navigate to the **Controls** tab, check the appropriate server and click **Restart SSL**. Confirm when it prompts.

Figure 7-1 Settings for New Machine

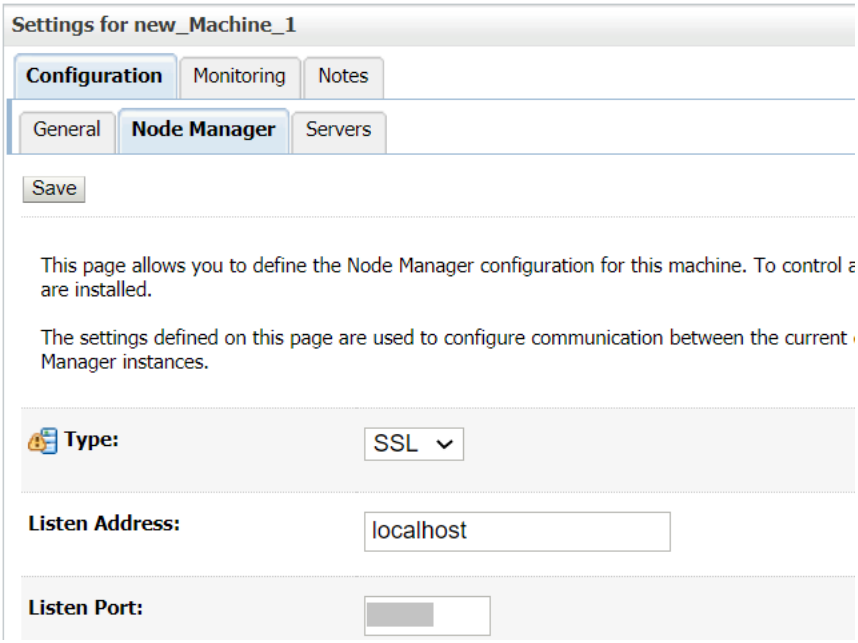


Figure 7-2 Settings for Servicing

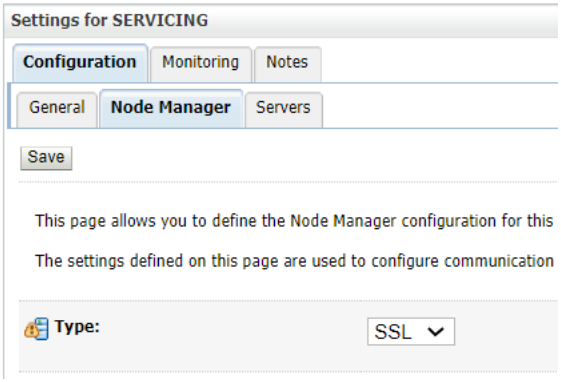
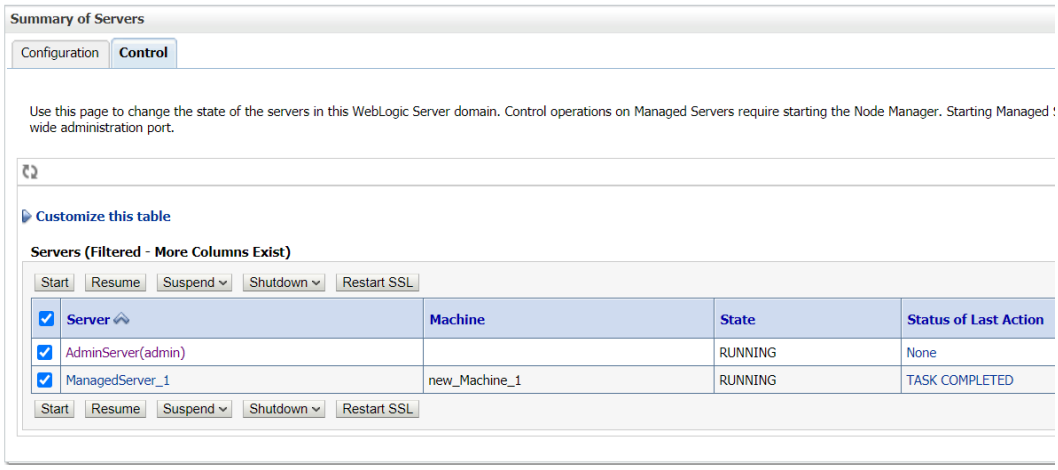


Figure 7-3 Summary of Servers



The screen with settings is displayed as shown in the above figures.

8
Enable SSL in Oracle Banking Branch

As part of enabling end to end SSL communication between services, following keys are added in almost all the services.

- `eureka.instance.prefer-ip-address`
- `eureka.instance.nonSecurePortEnabled`
- `eureka.instance.securePortEnabled`

In case you are planning to proceed with the current setup, execute the following scripts before deploying services other than `plato-config-service`.

- update properties set value = `'http://hostname:port/plato-discovery-service/eureka'` where value = `'https://hostname:port/plato-discovery-service/eureka'`
- update properties set value = `'true'` where key = `'eureka.instance.prefer-ip-address'`

  update properties set value = `'true'` where key = `'eureka.instance.nonSecurePortEnabled'`
- update properties set value = `'false'` where key = `'eureka.instance.securePortEnabled'`
- update properties set value = `'http'` where value = `'https';`

9
Testing Configuration

Once the Oracle WebLogic has been configured for SSL, you can deploy the application in the usual manner and test it in SSL mode.

After deployment, you can test the application in SSL mode.

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

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

> **Note:**
>
> It is recommended that the Retail Operations web application be accessed via the HTTPS channel, instead of the HTTP channel.