Enterprise Deployment Guide for Oracle SOA Suite 10.1.3.4 on Oracle WebLogic Server 9.2

Oracle Maximum Availability Architecture White Paper
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Maximum Availability Architecture

Oracle Best Practices For High Availability

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Forward-thinking architects and developers are addressing the complexity of their application and IT environments with Service-Oriented Architecture (SOA). SOA facilitates the development of enterprise applications as modular business services that can be easily integrated and reused, creating a truly flexible, adaptable IT infrastructure.

INTRODUCTION

The Maximum Availability Architecture (MAA) [1] is a best practices blueprint for achieving high availability and performance using Oracle technologies. This MAA white paper provides practical configuration and deployment techniques for Oracle Service Oriented Architecture (SOA) Suite configurations for Oracle Application Server 10.1.3.4 on Oracle WebLogic Server Version 9.2.

An enterprise deployment of Oracle SOA Suite is a reference configuration that is designed to support large-scale, mission-critical business software applications using Oracle SOA Suite components. The hardware and software in an Enterprise Deployment configuration delivers the following benefits:

High-quality service:

- The system workload is managed and balanced effectively.
- Applications continue to operate when resources are added or removed.
- System maintenance and unexpected failures cause minimal downtime.

Built-in security:

- All incoming network traffic is received by the load balancing router on a single, secure port and directed to internal IP addresses within the firewall.
- User accounts are provisioned and managed centrally.
- Security systems are integrated.
- Administrative access is isolated.

Efficient software provisioning and management:

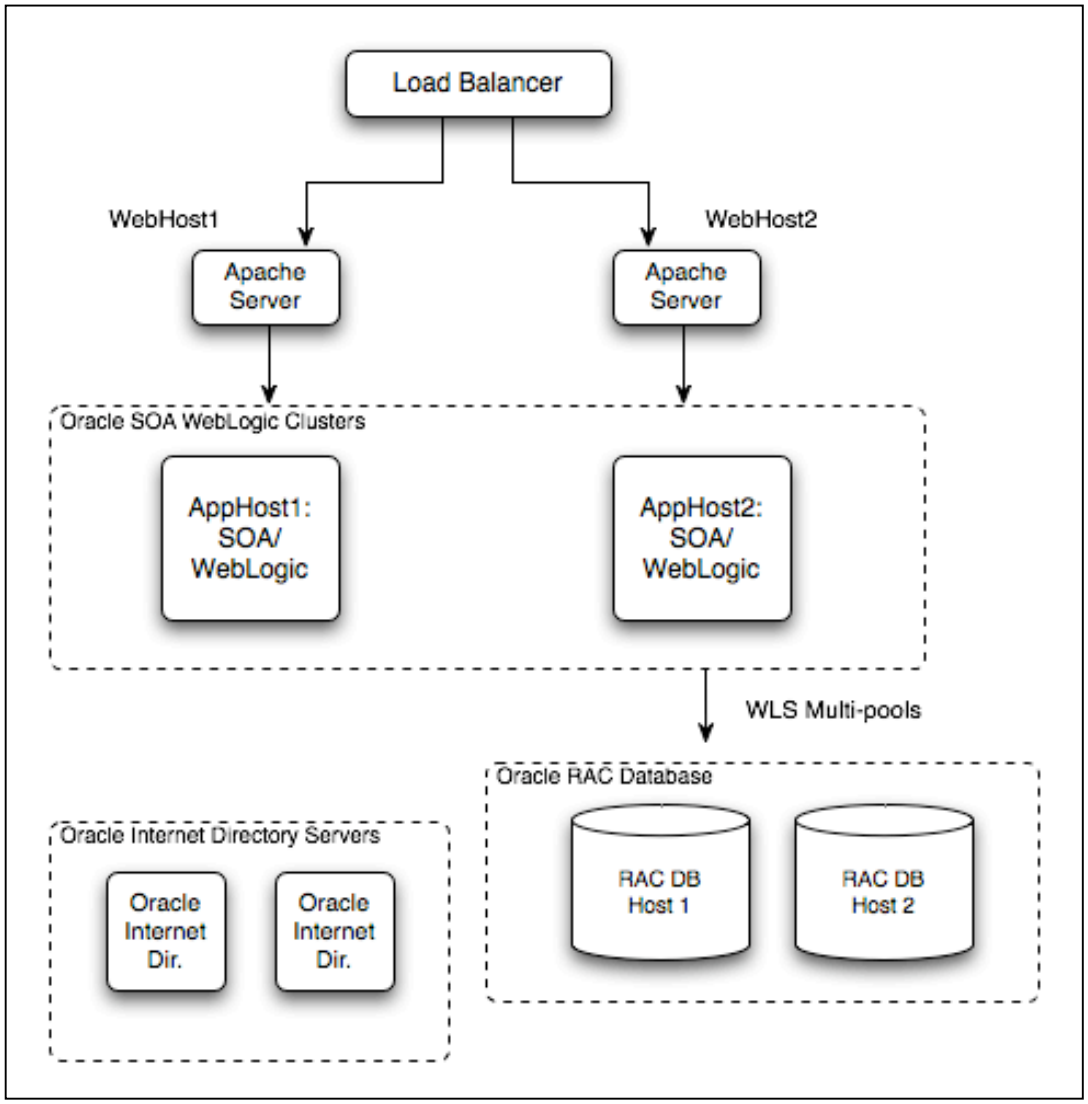
- Application distribution is simple.
- Systems are managed and monitored as one logical unit in a central console.
- Death detection and restart mechanisms ensure availability.

ENVIRONMENT

Figure 1 shows the basic Oracle SOA Suite environment in which a Load Balancer accepts requests and directs the requests to one of two Apache Servers, each

configured with the WebLogic Server plug-in. It is assumed in this document that requests from outside the network are Secure Sockets Layer (SSL) requests to an external virtual host name: soa.mycompany.com. Internal requests are non-SSL and directed to `soainternal.mycompany.com`.

Figure 1: The Oracle SOA Suite Environment



As shown in Figure 1, the following machines are used in this environment:

WebHost1

One of the two machines with an Apache Server 2.0 installed.

Requests are directed to the `APPHOST`*n*, members of the WebLogic Cluster

WebHost2

One of the two machines with an Apache Server 2.0 installed.

Requests are directed to the `APPHOSTn`, members of the WebLogic Cluster

AppHost1

One of two machines hosting the Oracle SOA Suite 10.1.3.4 applications.

`APPHOST1` is also where the WebLogic Administration Server resides.

One of the managed servers from each of the three Oracle SOA Suite Clusters resides on this machine.

AppHost2

One of two machines hosting the Oracle SOA Suite 10.1.3.4 applications.

One of the Managed Servers from each of the three Oracle SOA Suite Clusters resides on this machine.

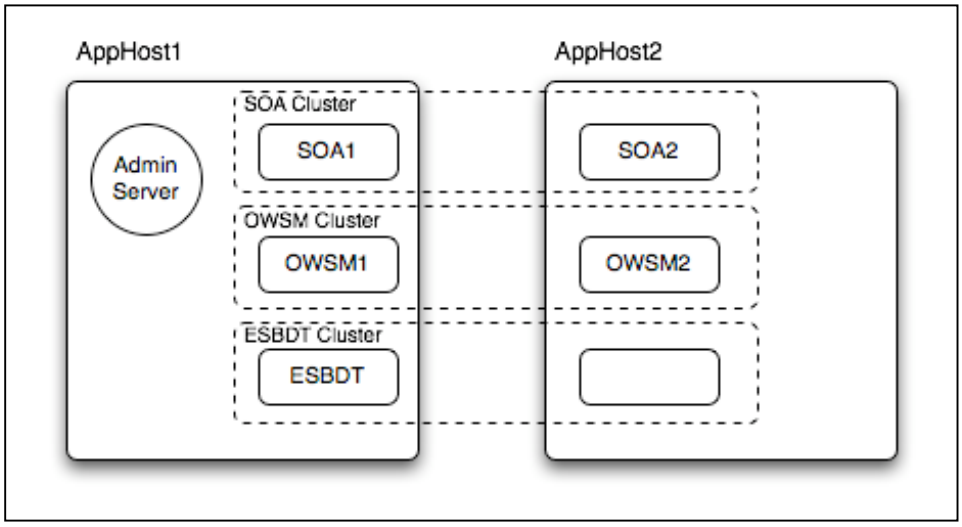
DBHost1,2

The two Oracle Database hosts that comprise the Oracle Real Applications Clusters (Oracle RAC) database.

In Figure 2, the Application environment is configured as follows:

- Three WebLogic Clusters are configured to host the Oracle SOA Suite applications:
    - OracleSOACluster hosts the BPEL and ESB run-time applications.
    - OracleOWSMCluster hosts the Oracle Web Services Manager, Gateways and Policy Manager
    - OracleESBDT Cluster hosts the ESB Design Time application
- WebLogic Server Multi-pools are configured to support the Oracle RAC data sources

Figure 2: The Application Environment



REQUIRED SOFTWARE

Configuring and deploying an Enterprise Deployment of Oracle Application Server 10.1.3.4 requires the following software:

- Oracle Database 10*g* release 10.2.0.3 or higher or Oracle Database 11g release 11.1.0.6 or higher
- Oracle Patch 6265268 is required when using Oracle Database 11g
- Oracle WebLogic Server 9.2 MP3
- Oracle Application Server SOA Suite 10*g* Release 3 (10.1.3)
- Oracle Application Server Patch Set 10.1.3.4 (Patch 7272722)
- OPatch Version 10.1.0.0.0 (Patch 6880880)
- Oracle SOA Suite 10.1.3.4 Patch for WebLogic Server (Patch 7490612)
- Hot Pluggability Patch for Oracle SOA Suite on 10.1.3.4 on WebLogic 9.2 (Patch 7337034)Apache HTTP Server 2.2.x

OVERVIEW

The goal of this white paper is to provide the steps to deploy Oracle Application Server SOA Suite 10.1.3.4 in an Enterprise Deployment configuration using Oracle WebLogic Server 9.2 as the platform.

High Level Configuration and Deployment Steps

The following list summarizes the steps you perform to configure and deploy an Enterprise Deployment:

1. Create and configure a domain that spans multiple machines.
2. Configure the environment to support Oracle SOA Suite 10.1.3.4.
3. Deploy the Oracle SOA Suite 10.1.3.4 applications.
4. Install and configure multiple Apache Servers.
5. Configure a load balancer.
6. Configure failover at different tiers.

This document also provides the steps for configuring the Enterprise Deployment environment with an external authentication provider—Oracle Internet Directory (OID).

Port Planning

The following table outlines the network ports assumed throughout this document. You can use alternative ports for any specified in the table. In that case, ensure you make the alternative substitutions correctly and consistently throughout the procedures in this document.

Function	Hosts	Port
Administration Server Listening Port	Apphost1	8001
SOA Managed Server Listening Port	Apphost1,2	9700
OWSM Managed Server Listening Port	Apphost1,2	9701
ESBDT Managed Server Listening Port	Apphost1,2	9702
SOA Cluster Multicast Port	Apphost1,2	8001
OWSM Cluster Multicast Port	Apphost1,2	8002
ESBDT Cluster Multicast Port	Apphost1,2	8003
Database Port	DBhost1,2	1521
Apache Server Listening Port	Webhost1,2	80

Network Setup for the Load Balancer

Set up the load balancer using the following guidelines:

- Configure the load balancer to balance requests between `WEBHOST1` and `WEBHOST2` for virtual hosts https://soa.mycompany.com and http://soainternal.mycompany.com/.
- Enable monitoring for the Apache Server instances on `WEBHOST1` and `WEBHOST2`. Simple HTTP Monitoring should be sufficient to ensure that the Apache server is running and serving requests.
- Enable filtering to separate out external access to:

  https://soa.mycompany.com/em/*
  https://soa.mycompany.com/esbdt/*
  https://soa.mycompany.com/BPELConsole/*
  https://soa.mycompany.com/ccore/*

- Configure Network Address Translation (NAT) for `soainternal.mycompany.com`, so it is inaccessible externally.

INSTALLATION

This section provides instructions for the following installation topics:

- Installing the data tier
- Installing Oracle SOA Suite Schema

Installing the Data Tier

The data tier installation requires an Oracle database to use as a repository. The database should have the following characteristics:

- Use an Oracle RAC database to ensure that the maximum amount of availability is achieved.
- Run Oracle Database 10*g* Release 10.2.0.3 or higher.
- Optionally, use Automatic Storage Management (ASM) to store data.

  When using ASM, install ASM into its own Oracle Home and configure two disk groups:

  - Configure one disk group for the database files.
  - Configure one disk group for the flash recovery area.

  When using ASM, it is recommended that you use Oracle Managed Files.
- The database should be in archive log mode to facilitate backup and recovery.
- Optionally, enable Flashback Database.
- Create the Oracle Database with an ALT32UTF8 character set.
- Database block size of 8K.
- Set Oracle Database initialization parameters as shown in the following table:

Parameter	Value
`AQ_TM_PROCESSES`	10
`DML_LOCKS`	200
`JOB_QUEUE_PROCESSES`	10
`OPEN_CURSORS`	400
`SESSION_MAX_OPEN_FILES`	50
`SESSIONS`	400
`PROCESSES`	250

- Ensure that your database instance has been prepared for XA data sources. See the Enable XA on Database Server topic at the Using Third-Party JDBC XA Drivers with WebLogic Server Web site.

Note: If you are installing the Oracle SOA Suite Schemas in a configuration running Oracle Database 11*g*, perform the following additional steps:

1. In the database home, create a symbolic link linking $ORACLE_HOME/jdbc/lib/ojdbc5.jar to $ORACLE_HOME/jdbc/lib/ojdbc14.jar

   Creating symbolic links will enable the Repository Creation script (`IRCA.sh`) to run.

2. Copy the Oracle SOA Suite 10.1.3.1 software to disk and apply Oracle Patch 6265268. Ensure you follow the instructions in the Patch Readme.

Installing the Oracle SOA Suite Schema

Oracle Application Server Version 10.1.3 provides a set of SQL scripts that you can use to install the necessary Oracle SOA Suite schemas into the database:

1. Run the script `irca.sh` located in the directory `install/soa_scripts/irca` on the Oracle SOA Suite Installation media.

   The script requests the connection information for the target database. For example: `racnode1-vip 1521 orcl.us.oracle.com`

2. After the script has run, schemas will be installed for the users `ORABPEL`, `ORAESB`, and `ORAWSM`. Take note of the passwords specified for each user because you must supply these passwords during the Oracle SOA Suite 10.1.3.4 for WebLogic installation.

CONFIGURATION

Configure the Application Server APPHOST1

This section walks you through the steps to install the WebLogic Cluster on `APPHOST1`, and configure the Apache Server on `WEBHOST1`. This is the first vertical tier.

The "Configuring the Application Server APPHOST2" Section later in this white paper outlines the procedures for extending the environment by adding `APPHOST2` and `WEBHOST2`. This general procedure can be used to continue to add Application Hosts and Web Hosts, scaling out the environment horizontally.

Install Required Software

The examples provided in this section use the values shown in the following table. These examples are specific to our MAA installation and should be changed appropriately to reflect your environment.

Variable	Value	Comments
`SOA_HOME`	/u01/app/oracle/product/10.1.3/soa	The `ORACLE_HOME` of the SOA

Variable	Value	Comments
		10.1.3.4 installation
BEA_HOME	/u01/app/oracle/product/WLS9.2	The location of the WebLogic Server 9.2 installation
ADMIN_SERVER_PORT	8001	Listener Port for the Administration Server
DOMAIN_NAME	SOADomain	Name of the WebLogic Domain
DB_URL	References DB Hosts dbhost1 and dbhost2, DB port 1521 and DB service name of orclsoa	Address of the database installation

The following list summarizes the installation tasks you will perform on APPHOST1:

- Install Oracle SOA Suite Basic 10.1.3.4
- Install Oracle WebLogic Server 9.2
- Install Oracle SOA Suite10.1.3.4 for WebLogic Server Scripts

Install Oracle SOA Suite Basic 10.1.3.4

The 10.1.3.4 Release of Oracle Application Server is a patch set release. Perform the following steps on APPHOST1 to install Oracle SOA Suite 10.1.3.4:

- **Install Oracle SOA Suite Basic 10.1.3.1.0**

  1. Start the Oracle SOA Suite Installer.
  2. Select **Perform a BASIC installation**. Enter the directory where the Application Server installation will occur, the AS Instance name and administration password. The location of the Oracle SOA Suite installation is referred to in this document as SOA_HOME.
  3. When prompted for the Database information, input the connection information for only one of the Oracle RAC nodes. You will reconfigure this later to support Oracle RAC.
  4. Enter the username/password of a Database user with DBA privileges. Enter the passwords of the ORABPEL, ORAESB and ORAWSM users from the installation of IRCA previously.

- **Apply the Oracle SOA Suite 10.1.3.4 Patch set**

  Applying the patch set also involves upgrading the BPEL and ESB schemas.

  1. Patch the BPEL schema by running the SQL*Plus script upgrade_10131_10134_oracle.sql located in the install/soa_schema_upgrade/bpel/scripts directory of the installation media. This script will be run as the ORABPEL user
  2. Patch the ESB schema by running the SQL*Plus script upgrade_10131_10134_oracle.sql located in

`install/soa_schema_upgrade/esb/sql` directory of the installation media. This script will be run as the `ORAESB` user

3. Start the Installer to install the Oracle SOA Suite 10.1.3.4 Patch
4. Select the location of the Version 10.1.3 installation.
5. Enter the OC4JADMIN password.

   The Installer will upgrade the 10.1.3 installation to a 10.1.3.4 installation.
6. Validate that the upgrade to 10.1.3.4 was successful.
7. Shut down the Oracle SOA Suite applications by running the following: `$SOA_HOME/opmn/bin/opmnctl shutdown`

Install Oracle OPatch Version 10.1.0.0.0

1. Download the Opatch utility from Metalink by searching for the patch number 6880880. This is the Opatch download placeholder patch number
2. Install the Oracle OPatch utility version 10.1.0.0 by following the instructions in the Opatch readme file provided with the patch number 6880880. This Opatch version is required to prevent an error message regarding incorrect port IDs when installing the hot pluggability patch in the next section

Install Oracle Patch 7337034

1. Download Oracle Patch 7337034 (SOASuite 10.1.3.4 On Weblogic 9.2 - Changes for Hot pluggability) from Oracle *Metalink* and unzip the files on **`APPHOST1`**. The patch creates a directory named 7337034.
2. Install Patch 7337034 by following the instructions in the Readme.txt file that comes with the patch.

Install Oracle WebLogic Server 9.2 MP3

Perform a default installation of Oracle WebLogic Server 9.2 into its own home. This location is referred to in this document as `BEA_HOME`. Perform the following steps on `APPHOST1`

1. Start the BEA WebLogic Server 9.2 Installer.
2. Choose a directory for the BEA installation. This will be `BEA_HOME`.
3. Accept the default directory location for WebLogic Server (`$BEA_HOME/weblogic92`). This will be `$WL_HOME`.
4. Choose '**`Custom`**' for the Installation type. Select **`Weblogic Plugins`** directory as part of the installation.
5. Choose only **`WebLogic Server`**. WebLogic Workshop is not required.

Install Oracle SOA Suite10.1.3.4 for WebLogic Server Scripts

To complete the installation requires a set of files created by Oracle for installing Oracle SOA Suite 10.1.3.4 on WebLogic Server.

Download and unzip the files that you can obtain from Oracle *MetaLink* (patch 7490612) on `APPHOST1`. The patch creates a directory named `WeblogicSOA10134HA`.

Set up the WebLogic Domain

The following list summarizes the set-up tasks you will perform on `APPHOST1`:

- Modify the SOADomain.properties file
- Run the setupDomain.sh script
- Modify the `SOANode.properties` file
- Run the `addNode.sh` script to add the first cluster and managed server

Modify the `SOADomain.properties` File

Edit the `WeblogicSOA10134HA/SOADomain`.properties file using the following variables:

Variable	Comments
`CREATE_NEW_DOMAIN`	Ensure that this value is set to 'YES'
`JAVA_HOME`	JAVA path of WebLogic. Set this to the `JRockit` directory under `BEA_HOME`. In our example: `/u01/app/oracle/product/WLS9.2/jrockit_150_12`
`DB_URL`	Set this to a URL of the form: `jdbc:oracle:thin:@APPHOST1:1521:orclsoa` This will only be used to seed the data required for Oracle Web Services Manager (OWSM)
`SOA_CLUSTER_NAME`	Set to `OracleSOACluster`
`BEA_HOME`	Set to the location of the WebLogic software. In our example: `/u01/app/oracle/product/WLS9.2`
`WL_HOME`	Set to the value of `BEA_HOME/weblogic92`
`APPS_HOME`	Set to the value of `BEA_HOME/user_projects/apps`
`SOA_HOME`	Set to the Oracle 10.1.3.4 SOA Home. In our example: `/u01/app/oracle/product/10.1.3/soa`
`DB_BPEL_PASSWORD`	Set to the password of the Oracle BPEL database account: `orabpel`.
`DB_ESB_PASSWORD`	Set to the password of the Oracle ESB database account: `oraesb`.
`DB_OWSM_PASSWORD`	Set to the password of the Oracle OWSM database account: `orawsm`.

Note: The Deploy properties at the end of the file will be modified later.

Run the `setupDomain.sh` Script

Set the `BEA_HOME` and `JAVA_HOME` environment variables on the command line. The variables should be set to the same values specified in the `SOADomain.properties` file. For example (in the Bourne shell):

```
$ export BEA_HOME=/u01/app/oracle/product/WLS9.2
$ export JAVA_HOME=/u01/app/oracle/product/WLS9.2/jrockit_150_12
```

Run the `setupDomain.sh` script in the `WeblogicSOA10134HA` directory. All of the scripts in this directory should be run locally, within this directory.

The `setupDomain.sh` script prompts you for the WebLogic admin password. The default WebLogic administrator username is `weblogic`. This document uses `weblogic` as the admin password throughout.

This script performs the following tasks:

1. Create a domain named `SOADomain.`
2. Start the Administration Server.
3. Create a SOA Group and add the administration user to it.
4. Create the SOA Cluster and configure the default Cluster properties.
5. Shuts down the Administration Server.

Modify the `SOANode.properties` File

Edit the `WeblogicSOA10134HA/SOANode.properties` file.

Most variables are set the same as in the `SOADomain.properties` file. The exceptions are shown in the following table:

Variable	Comments
`MACHINE_NAME`	This is the logical name of the first machine. The examples in this document set it to `OracleSOAMachine1`.
`MACHINE_ADDRESS`	This is the physical host name of the first machine. `APPHOST1`.
`SOA_SERVER_NAME`	The logical name of the Managed Server on this machine. The examples in this document use `OracleSOAServer1.`
`SOA_SERVER_PORT`	The port at which BPEL and ESB are installed. We will set this to 9700 in this paper.

Run the addNode.sh Script to Add the First Cluster and Managed Server

Run the `WeblogicSOA10134HA/addNode.sh` script, which uses the values in `SOANode.properties` to perform the following tasks:

1. Create and configure a Machine named `MACHINE_NAME` with a physical host name of `APPHOST1`
2. Create and configure a Managed Server named `SOA_SERVER_NAME`. The configuration includes setting the JVM initialization parameters and the Classpath.
3. Add the new Managed Server to the cluster `SOA_CLUSTER_NAME`

Back up the file now for use later:

```
$ cp SOANode.properties SOANode1.properties
```

Add Additional Clusters to the Domain

At this point, the configuration consists of one cluster: `OracleSOACluster`. Perform the following instructions to add two more clusters:

1. Start the Admin Server:

   ```
   $BEA_HOME/user_projects/domains/SOADomain/bin/startWebLogic.sh &
   ```

2. Connect to the admin console at `http://apphost1:8001/console`.
3. Login using the admin username and password (for example: `weblogic/weblogic`)
4. Perform the following tasks using the Oracle WebLogic Server Administration Console:

   a. In the **Environment** → **Clusters** screen, choose **New** to create a new cluster. The `Create a New Cluster` page is displayed.

   If the **New** button is not available, select **Lock & Edit** from the `Change Center` box.

   b. Create the following Clusters:

Name	Multicast Address	Multicast Port
`OracleOWSMCluster`	239.192.0.1	8002
`OracleESBDTCluster`	239.192.0.1	8003

   Note: Ensure that all of the machines in the cluster are multicast-enabled. The multicast addresses and ports may be subject to network requirements. Contact your Network Administrator. The only requirement here is that each cluster be at a unique Address/Port combination.

   c. Click **Activate** to save the changes in the `Change Center`.

Configure Managed Servers for Each New Cluster

This section describes how to create a Managed Server for each of the two new clusters.

The following list summarizes the configuration tasks you will perform:

- Edit the SOANode.properties File for the OWSM Cluster
- Edit the SOANode.properties File for the ESBDT Cluster

Edit the `SOANode.properties` File for the OWSM Cluster

1. Set the variables in the `SOANode.properties` file as shown in the following table:

Variable	Comments
SOA_CLUSTER_NAME	Set this to 'OracleOWSMCluster'
MACHINE_NAME	This is the logical name of the first machine. The examples in this discussion set it to OracleOWSMMachine1.
MACHINE_ADDRESS	This is the physical host name of the first machine. APPHOST1.
SOA_SERVER_NAME	The logical name of the Managed Server on this machine. The examples in this discussion use OracleOWSMServer1.
SOA_SERVER_PORT	9701 for OWSM

2. Run the WeblogicSOA10134HA/addNode.sh script.
3. Supply the WebLogic admin username and password, when you are prompted by the script.

Edit the SOANode.properties File for the ESBDT Cluster

1. Set the variables in the SOANode.properties file as shown in the following table:

Variable	Comments
SOA_CLUSTER_NAME	Set this to 'OracleESBDTCluster'
MACHINE_NAME	The logical name of the first machine. The examples in this discussion set it to OracleESBDTMachine1.
MACHINE_ADDRESS	This is the physical host name of the first machine: APPHOST1.
SOA_SERVER_NAME	The logical name of the Managed Server on this machine. The examples in this discussion use OracleESBDTServer1
SOA_SERVER_PORT	9702 for ESBDT

2. Run the WeblogicSOA10134HA/addNode.sh script.
3. Supply the WebLogic admin username and password, when you are prompted by the script.

Create and Configure Cluster JDBC Resources

This section describes how to create the Cluster JDBC Resources manually:

1. Modify the scripts to create all the individual data sources required, one data source for each Oracle RAC node.
2. Create Multi-data sources, which include the previously created single data sources.

3. The following list summarizes the configuration tasks you will perform on Machine 1 (`APPHOST1`):
   1. Create and assign JDBC Resources
   2. Create multidata sources
   3. Configure connection pool timeouts for all data sources
   4. Validate all Oracle Database connections

Create and Assign JDBC Resources

1. Copy `WeblogicSOA10134HA/wl_scripts/createJDBCResourcesHA.py` to `createJDBCResourcesNode1.py` and `createJDBCResourcesNode2.py`
2. Edit the following lines in `createJDBCResourcesNode1.py`

```
dsName1 = "BPELServerDataSource1"
dsJndiName1 = "jdbc/BPELServerDataSource1"
dsName2 = "BPELServerDataSourceWorkflow1"
dsJndiName2 = "jdbc/BPELServerDataSourceWorkflow1"
dsName3 = "esbaqds1"
dsJndiName3 = "jdbc/esbaqdatasource1"
dsName4 = "esbds1"
dsJndiName4 = "jdbc/esb1"

DB_URL='jdbc:oracle:thin:@DBHOST1:1521:orclsoa1'

DRIVER_TYPE='oracle.jdbc.xa.client.OracleXADataSource'
DB_BPEL_PASSWORD='orabpel'
DB_ESB_PASSWORD='oraesb'
```

3. Comment the assignment lines:

```
#soaJDBCSystemResource1.addTarget(soaServerTarger)
#soaJDBCSystemResource2.addTarget(soaServerTarger)
#soaJDBCSystemResource3.addTarget(soaServerTarger)
#soaJDBCSystemResource4.addTarget(soaServerTarger)
```

4. Edit `createJDBCResourcesNode2.py` similarly to the method described for steps 2 and 3. Except, in this case, `dsNamex` and `dsJndiNamex` should end with 2. For the `DB_URL,` use the hostname and SID of the second Oracle RAC node:

```
dsName1 = "BPELServerDataSource2"
dsJndiName1 = "jdbc/BPELServerDataSource2"
dsName2 = "BPELServerDataSourceWorkflow2"
dsJndiName2 = "jdbc/BPELServerDataSourceWorkflow2"
dsName3 = "esbaqds2"
dsJndiName3 = "jdbc/esbaqdatasource2"
dsName4 = "esbds2"
dsJndiName4 = "jdbc/esb2"
```

```
DB_URL='jdbc:oracle:thin:@DBHOST2:1521:orclsoa2'
DRIVER_TYPE='oracle.jdbc.xa.client.OracleXADataSource'
DB_BPEL_PASSWORD='orabpel'
DB_ESB_PASSWORD='oraesb'
```

5. Comment the assignment lines:

```
#soaJDBCSystemResource1.addTarget(soaServerTarger)
#soaJDBCSystemResource2.addTarget(soaServerTarger)
#soaJDBCSystemResource3.addTarget(soaServerTarger)
#soaJDBCSystemResource4.addTarget(soaServerTarger)
```

6. Run both scripts from the WebLogic Scripting Tool (WLST) command line.

   Perform the following steps:

   a. Start WLST:

   ```
   $BEA_HOME/wlserver_10.3/common/bin/wlst.sh
   ```

   b. Connect to the Administration Server:

   ```
   wls:/offline> connect()
   Please enter your username [weblogic] :weblogic
   Please enter your password [weblogic] :
   Please enter your server URL [t3://localhost:7001] :t3://APPHOST1:8001
   Successfully connected to Admin Server
   wls:/wc_domain/serverConfig>
   ```

   c. Run the Data Source creation scripts. For example:

```
wlst> execfile('WeblogicSOA10134HA/wl_scripts/createJDBCResourcesNode1.py')
wlst> execfile('WeblogicSOA10134HA/wl_scripts/createJDBCResourcesNode2.py')
```

Create Multidata Sources

This section uses the created JDBC data sources to create JDBC Multi Data sources appropriate for the Oracle RAC database. Perform the following steps:

1. Connect to the Oracle WebLogic Server Administration Console using a web browser and create 4 JDBC Multi Data sources:
2. In the Admin panel, go to **Services** **JDBC**.
3. Click **Lock & Edit** and choose to create a New Multi-data source.
4. Create the data sources, as described in the following table:

Multi Data Source Name	JNDI Name	Algorithm Type	Driver	Data Sources
`BPELServerDataSource`	`jdbc/BPELServerDataSource`	Load Balance	XA	BPELServerDataSource1 BPELServerDataSource2
`BPELServerDataSourceWorkflow`	`jdbc/BPELServerDataSourceWorkflow`	Load Balance	Non XA	BPELServerDatasourceWorkflow1 BPELServerDatasourceWorkflow2

esbaqds	jdbc/esbaqdata source	Load Balance	Non XA	esbaqds1 esbaqds2
esbs	jdbc/esb	Load Balance	XA	esb1 esb2

Note: Ensure each Multidata source is available to all servers in each of the clusters barring admin. Using the Oracle WebLogic Server Administration Console, ensure that each of the individual JDBC Data Sources (for example, esbaqds1) is also assigned to All servers in the cluster for each cluster listed in Clusters.

5. Ensure that the individual data sources have the default value set shown in the following table:

XA Data Sources	Non-XA Data Sources
The driver used is **oracle.jdbc.xa.client.OracleXADataSource**	The driver used is **oracle.jdbc.OracleDriver**
The following connection property should be set: <property> <name>oracle.net.CONNECT_TIMEOUT</name> <value>10000</value> </property>	**Same**
initial-capacity = **0**	**Same**
connection-creation-retry-frequency-seconds = **10**	**Same**
test-frequency-seconds = **300**	**Same**
test-connections-on-reserve = **true**	**Same**
test-table-name = **SQL SELECT 1 FROM DUAL**	**Same**
seconds-to-trust-an-idle-pool-connection = **0**	**Same**
global-transactions-protocol = **TwoPhaseCommit**	global-transactions-protocol = **None**
keep-xa-conn-till-tx-complete = **true**	**NA**
xa-retry-duration-seconds = **300**	**NA**
xa-retry-interval-seconds = **60**	**NA**

6. Activate the changes.

Configure Connection Pool Checks for All Data Sources

Applications will get an exception when the connection retrieved from the connection pool turns out to be a stale connection. To reduce the chances of stale connections, check a connection to be a valid connection when getting it from the pool.

To configure connection checking for all of the (Regular and Multidata sources) data sources, perform the following steps:

1. Select the DataSource.
2. Select **Configuration Connection Pool.**
3. At the bottom of the page, click **Advanced.**
4. Check that **Test Connections on Reserve** is enabled.
5. Set the **Test Table name** to "`SQL SELECT 1 FROM DUAL`".
6. Set the **Test Frequency** to 300 for single data sources, and set it to 5 for multidata sources.
7. Set the **Connection Creation Retry Frequency** to 10.

Validate All Oracle Database Connections

To test all of the database connections perform the following steps:

1. Select a data source and choose **Monitor- Test.**
2. Validate all of the database connections in this way.
3. Diagnose and resolve any database connection issues before continuing.

Configure Node APPHOST1

The following list summarizes the configuration tasks you will perform to configure node `APPHOST1`:

- Change the configure script
- Run the confignode.sh script

Change the Configure Script

Edit the file `WeblogicSOA10134HA/build.xml` and remove the target `checkForDBConn` from the target `configNodeOnLinux`. After making these changes, the resulting `BUILD.XML` file should read similar to the following example:

```
…
<target name="configNodeOnLinux"
depends="validateNode,checkForBeaDir,checkForJdkDir,checkForSoaDir,check
ForWlDir,checkIfDomainExists,copyFilesToSOA,setBPELServerValues,setESBS
erverValues,configureOWSM_lnx,applySecurityGroupsToApps,copyFilesToWLS
,copyFilesToJROCKIT">
…
```

Run the confignode.sh Script

Ensure that the `SOANode.properties` file has values that are appropriate for `APPHOST1`.

If the SOANode.properties file was backed up earlier on APPHOST1, restore it using the following command:

```
$ cp SOANode1.properties SOANode.properties
```

Run the WeblogicSOA10134HA/configNode.sh script.

Among other things, this script copies a number of files from the SOA_HOME directory to the WebLogic Server domain.

Update the SOA Database

Update ESB and BPEL tables in the database to properly set up the connections between ESBDT and SOA.

1. Edit the file WebLogicSOA10134HA/ESB_data.aq.sql

   Replace <*SOA_SERVER_PORT*> with the port of the SOA_SERVER. For example, in this case the server port is 9700.

   Replace *'localhost'* with the hostname where ESBDT resides. In this case, APPHOST1.

2. Execute the database scripts, as follows:

   a. Connect to the Database as ORAESB and execute the script ESB_data.aq.sql

   b. Connect to the database as ORABPEL and execute the script BPEL_data.sql

Application Deployment

The following list summarizes the configuration tasks you will perform to deploy applications:

- Edit the OWSM database connections
- Edit the OWSM Component Locations
- Deploy BPEL, ESBRT to Oracle SOA Suite cluster
- Deploy ESBDT to ESBDT cluster
- Deploy OWSM to OWSM cluster

Edit the OWSM Database Connections

Modify the following files in the SOA_HOME/owsm/config directory:

```
ccore/ui-config-installer.properties
coreman/monitor-config-installer.properties
gateway/gateway-config-installer.properties
policymanager/policymanager-config-installer.properties
```

For each of these files, replace the thin jdbc URL connection string with a string similar to the following example (using your own hostnames and service name):

```
jdbc:oracle:thin:@(DESCRIPTION=(LOAD_BALANCE=on)(ADDRESS=(PROTOCOL
=TCP)(HOST=DBHOST1)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)(HOST=D
BHOST2)(PORT=1521))(CONNECT_DATA=(SERVICE_NAME=orclsoa)))
```

Edit the OWSM Component Locations

Modify the following files and properties in the `SOA_HOME/owsm/config` directory:

ccore/ui-config-installer.properties
- Set ui.pm.server.httpHost to APPHOST1
- Set ui.pm.server.httpPort to 9701
- Set ui.corda.externalPort to 9701

clientagent/clientagent-config-installer.properties
- Set agent.policymanagerURL to http://APPHOST1:9701/policymanager

gateway/gateway-config-installer.properties
- Set gateway.policymanagerURL to http://APPHOST1:9701/policymanager

serveragent/serveragent-config-installer.properties
- Set agent.policymanagerURL to http://APPHOST1:9701/policymanager

For maximum availability, you can change the hosts and ports to match the Load Balancer host and port.

Deploy BPEL, ESBRT to Oracle SOA Suite Cluster

1. Edit the file `WeblogicSOA10134HA/deploySOAAppsForHA.py` and add the following to the beginning of the file, immediately after the `StartEdit()` command:

```
DEPLOY_BPELPM='Y'
DEPLOY_ESBDT='N'
DEPLOY_ESBRT='Y'
DEPLOY_RULES='Y'
DEPLOY_OWSM='N'
DEPLOY_ADAPTERS='Y'
APPS_HOME='/u01/app/oracle/product/WLS9.2/user_projects/apps'
SOA_CLUSTER_NAME='OracleSOACluster'
SECURITY_MODEL='DDOnly'
```

2. Start the `wlst shell` and connect to the Admin Server.
3. Execute the `deploySOAAppsHA.py` script, as follows:

```
wls:/SOADomain/serverConfig>
execfile('WL_SOA_Installables/wl_scripts/deploySOAAppsForHA.py')
```

Deploy ESBDT to ESBDT Cluster

1. Change the following properties in the `WeblogicSOA10134HA/deploySOAAppsForHA.py` file to the following values:

```
DEPLOY_BPELPM='N'
DEPLOY_ESBDT='Y'
DEPLOY_ESBRT='N'
DEPLOY_RULES='N'
DEPLOY_OWSM='N'
DEPLOY_ADAPTERS='N'
APPS_HOME='/u01/app/oracle/product/WLS9.2/user_projects/apps'
SOA_CLUSTER_NAME='OracleESBDTCluster'
SECURITY_MODEL='DDOnly'
```

2. Run the file again from the WLST command line.

Deploy OWSM to OWSM Cluster

1. Change the properties in the `WeblogicSOA10134HA/deploySOAAppsForHA.py` file to the following values::

```
DEPLOY_BPELPM='N'
DEPLOY_ESBDT='N'
DEPLOY_ESBRT='N'
DEPLOY_RULES='N'
DEPLOY_OWSM='Y'
DEPLOY_ADAPTERS='N'
APPS_HOME='/u01/app/oracle/product/WLS9.2/user_projects/apps'
SOA_CLUSTER_NAME='OracleOWSMCluster'
SECURITY_MODEL='DDOnly'
```

2. Run the file again from the WLST command line.

Start All Servers

Perform the following steps on `APPHOST1` to start servers:

1. Start the Administration Server:

```
$BEA_HOME/user_projects/domains/SOADomain/bin/startWebLogic.sh &
```

2. Start the Node Manager:

```
$BEA_HOME/weblogic92/server/bin/startNodeManager.sh &
```

3. On the Admin Console (http://APPHOST1:8001/console):

a. On the left-hand pane, click **Environment**

b. Click **Servers**

c. For each Server in the Server list, perform the following steps:

- Click the Server Name
- Click the Control Tab
- Click **Start Server**

Validation

The URLs listed in the following table should be accessible now:

Admin Console	http://apphost1:8001/console
BPEL Console	http://apphost1:9700/BPELConsole
OWSM	http://apphost1:9701/ccore/Login.jsp
WorkList App	http://apphost1:9700/integration/worklistapp
RULE AUTHOR	http://apphost1:9700/ruleauthor
ESB	http://apphost1:9702/esb

Configure the Application Server APPHOST2

The following list summarizes the steps you will perform to configure APPHOST2:

- Prepare the Second Machine
- Add additional Managed Servers to clusters for this node
- Configure APPHOST2
- Start All Servers
- Validation

Prepare the Second Machine

1. Pack up the Domain on the Machine:

   a. Run the script `WeblogicSOA10134HA/packDomain.sh`.

   The script automatically uses the variables already defined in `SOADomain.properties` to pack up the necessary files into a jar file. After the script is run, a jar file is created in the `WeblogicSOA10134HA/template` directory, which holds the contents of the Domain.

   b. Create a tar file for this directory and copy the tar file to `Apphost2`:

   ```
   tar cvfz wls_scripts.tar.gz WeblogicSOA10134HA
   ```

2. Provision Machine 2 (APPHOST2)

   The second machine should also have the following installations:

- Oracle SOA Suite 10.1.3.4

  Follow the steps in the "Installing the Data Tier" Section earlier in this white paper to install Oracle SOA Suite 10.1.3.4 on `APPHOST2`. The directory path should be the same as the path used in the `APPHOST1` installation. The database connect information should be the same as that used in the `APPHOST1` installation.

  Note: It is not necessary to run neither the Oracle SOA Suite 10.1.3 schema installation scripts nor the upgrade scripts because the database already contains the necessary Version 10.1.3.4 schemas.

- Oracle WebLogic Server 9.2

  Install the Oracle WebLogic Server following the steps the "Installing the Data Tier" Section earlier in this white paper, and using the same directory path on `APPHOST2`.

3. Unpack the Domain on the Second Machine (APPHOST2)

   Copy over the necessary configuration files from `APPHOST1` to `APPHOST2` so that the Domain configuration that is already done is propagated.

   a. Copy the `wls_scripts.tar.gz` file from the same directory on `APPHOST1` to the same directory on `APPHOST2`.

   b. Restore the tar file using the following command:

   ```
   tar xvfz wls_scripts.tar.gz
   ```

   c. Run the script `WeblogicSOA10134HA/unpackDomain.sh`. on `APPHOST2`.

   This script unpacks the jar file in the `/template` directory and sets the entire necessary Domain configuration on `APPHOST2` for the `SOADomain`.

4. Add the second node to the WebLogic Domain by performing the following tasks on the administration node (`APPHOST1`):

   a. Edit the `SOANode.properties` file to change the `MACHINE_NAME`, `MACHINE_ADDRESS` and `SOA_SERVER_NAME` to match the second node. (**Note:** The Port will be the same. There is no port conflict because the second server will be running on a different machine.)

Variable	Description
`MACHINE_NAME`	The logical name of the second machine: `OracleSOAMachine2`
`MACHINE_ADDRESS`	The physical host name of the second machine: `APPHOST2`
`SOA_SERVER_NAME`	The logical name of the Managed Server on this machine: `OracleSOAServer2`

b. Run the `addNode.sh` script to add the second machine to the Domain.

c. Backup the `SOANode.properties` script for Node 2 (because the script will be used in a later step):

```
$ cp SOANode.properties SOANode2.properties
```

Add Additional Managed Servers to Clusters for this Node

Perform the following steps to create a Managed Server on `APPHOST2` for each of the two other clusters.

1. Edit the SOANode.properties file for the OWSM Cluster

   a. Edit the `SOANode.properties` file to set variables as shown in the following table:

Variable	Comments
`SOA_CLUSTER_NAME`	The name of the `OracleOWSMCluster`
`MACHINE_NAME`	This is the logical name of the second machine: `OracleOWSMMachine2`
`MACHINE_ADDRESS`	This is the physical host name of the second machine: `APPHOST2`
`SOA_SERVER_NAME`	The logical name of the Managed Server on this machine: `OracleOWSMServer2`
`SOA_SERVER_PORT`	9701 for OWSM

   b. Run the script `WeblogicSOA10134HA/addNode.sh`.

   c. Supply the WebLogic admin username and password when you are prompted by the script.

2. Edit the `SOANode.properties` file for the ESBDT Cluster

   a. Set the variables in the `SOANode.properties` file as shown in the following table:

Variable	Comments
`SOA_CLUSTER_NAME`	The Oracle SOA Suite cluster name: `OracleESBDTCluster`
`MACHINE_NAME`	This is the logical name of the second machine: `OracleESBDTMachine2`
`MACHINE_ADDRESS`	This is the physical host name of the second machine: `APPHOST2`.

SOA_SERVER_NAME	The logical name of the Managed Server on this machine: OracleESBDTServer2
SOA_SERVER_PORT	9702 for ESBDT

b. Run the script WeblogicSOA10134HA/addNode.sh.

c. Supply the WebLogic admin username and password when you are prompted by the script.

Configure APPHOST2

Perform the following steps on APPHOST2:

1. Run the confignode.sh script:

   a. Ensure that the SOANode.properties file has values which are appropriate for APPHOST2. That is, variables such as the MACHINE_ADDRESS should match the address of that machine.

   b. If the SOANode.properties file was backed up earlier on APPHOST2 it should be restored as follows:

      $ cp SOANode2.properties SOANode.properties

   c. Run the script WeblogicSOA10134HA/configNode.sh.

2. Edit the OWSM database connections.

   a. Modify the following files in the SOA_HOME/owsm/config directory:

      ccore/ui-config-installer.properties
      coreman/monitor-config-installer.properties
      gateway/gateway-config-installer.properties
      policymanager/policymanager-config-installer.properties

   b. For each of these files, the thin jdbc URL connection string should be replaced with a string similar to the following (using your own hostnames and service name):

      jdbc:oracle:thin:@(DESCRIPTION=(LOAD_BALANCE=on)(ADDRESS=(PROTOCOL=TCP)(HOST=DBHOST1)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)(HOST=DBHOST2)(PORT=1521))(CONNECT_DATA=(SERVICE_NAME=orclsoa)))

3. Edit the OWSM component configuration.

   Modify the following files and properties in the SOA_HOME/owsm/config directory:

   - In the ccore/ui-config-installer.properties file:
     Set ui.pm.server.httpHost to APPHOST2
     Set ui.pm.server.httpPort to 9701
     Set ui.corda.externalPort to 9701

- In the clientagent/clientagent-config-installer.properties file:
  Set `agent.policymanagerURL` to
  `http://APPHOST2:9701/policymanager`
- In the gateway/gateway-config-installer.properties file:
  Set `gateway.policymanagerURL` to
  `http://APPHOST2:9701/policymanager`
- In the serveragent/serveragent-config-installer.properties file:
  Set `agent.policymanagerURL` to
  `http://APPHOST2:9701/policymanager`

For maximum availability, you can change the hosts and ports to match the Load Balancer host and port.

Start All Servers

Perform the following steps on `APPHOST2`:

1. Start the Node Manager:

   $BEA_HOME/weblogic92/server/bin/startNodeManager.sh &

2. On the Admin Console (`http://APPHOST1:8001/console`):
   a. On the left-hand pane, click **Environment.**
   b. Click **Servers.**
   c. For each Server in the Server list:
      - Click the Server Name
      - Click the Control Tab
      - Click **Start Server**

Validation

The URLs shown in the following table should be accessible:

Admin Console	http://apphost1:8001/console
BPEL Console	http://apphost2:9700/BPELConsole
OWSM	http://apphost2:9701/ccore/Login.jsp
WorkList App	http://apphost2:9700/integration/worklistapp
RULE AUTHOR	http://apphost2:9700/ruleauthor
ESB	http://apphost2:9702/esb

Set Up the Web Tier WEBHOST1 and WEBHOST2

- Install and configure Apache

- Configure WLS plug-in
- Validation
- Configure WEBHOST2

Install and Configure Apache

Perform the following steps to install and configure Apache 2.x on `WEBHOST1`.

1. Untar the downloaded Apache tar bundle. Use a command similar to "tar xvf httpd-2.2.11.tar". This will create a directory called "httpd-2.2.11 from where you ran the tar command
2. Change directory to httpd-2.2.11 using the "cd httpd-2.2.11" command
3. Configure Apache using the `CONFIGURE` command:

   ```
   . /configure --prefix=/u01/app/oracle/product/apache2 --
   enable-mods shared=all"
   ```

   In this command:

   - `--prefix` is the directory where apache is installed
   - `--enable-mods-shared=all` adds all the modules that come with Apache as shared modules.

   This enables the dynamic loading of the shared modules.
4. Issue the `make` command to compile Apache.
5. Issue the `make install` command to install Apache.
6. By default, Apache is configured to listen on Port 80. To change the port, edit the "Listen" directive in the httpd.conf file located under the "`APACHE_HOME` /conf" directory, where `APACHE_HOME` is the directory where Apache is installed
7. Issue "apachectl –start" to start Apache. This command is located under the"`APACHE_HOME` /bin" directory, where `APACHE_HOME` is the directory where Apache is installed

Configure WLS Plug-in

Note that the plugins directory `WL_HOME/servers/plugins` will only be available if the plugins were selected during the Oracle WebLogic Server custom installation.

Perform the following steps:

1. Install the Apache HTTP Server Plug-in:

   Copy the `mod_wl_22.so` file to the `APACHE_HOME/modules` directory and add the following line to your `APACHE_HOME/conf/httpd.conf` file manually:

```
LoadModule weblogic_module     modules/mod_wl_20.so
```

2. Add an `Include for weblogic.conf`:

```
<IfModule mod_weblogic.c>      Include conf/weblogic.conf </IfModule>
```

3. Create the weblogic.conf file.

   In the `weblogic.conf` file, add the location of the `weblogic SOA` clusters. This enables Apache to route requests to the correct WebLogic Cluster. Add the following directives:

```
<Location /console>
  SetHandler weblogic-handler
WebLogicCluster apphost1.mycompany.com:8001
</Location>

<Location /ccore>
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9701,
apphost2.mycompany.com:9701
</Location>

<Location /BPELConsole>
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9700,
apphost2.mycompany.com:9700
</Location>

<Location /BPELAdmin>
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9700,
apphost2.mycompany.com:9700
</Location>

<Location /orabpel>
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9700,
apphost2.mycompany.com:9700
</Location>

<Location /integration>
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9700,
apphost2.mycompany.com:9700
</Location>
```

```
<Location /ruleauthor>
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9700,
apphost2.mycompany.com:9700
  </Location>

<Location /esb>
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9702,
apphost2.mycompany.com:9702
  </Location>

<Location /event>
  AcceptPathInfo On
  SetHandler weblogic-handler
  WebLogicCluster apphost1.mycompany.com:9700,
apphost2.mycompany.com:9700
 </Location>
```

4. Restart the Apache Server for the changes to take effect.

Validation

The URLs shown in the following table should be accessible, assuming your Apache server has been configured to listen on port 80:

BPEL Console	`http://webhost1/BPELConsole`
OWSM	`http://webhost1/ccore/Login.jsp`
WorkList App	`http://webhost1/integration/worklistapp`
RULE AUTHOR	`http://webhost1/ruleauthor`
ESB	`http://webhost1/esb`

Configure WEBHOST2

Repeat the steps in the previous section "Web Tier Setup on WEBHOST1 and WEBHOST2" to install and configure an Apache server with the `mod_wl_20` plug-in on `WEBHOST2`. Validate that the applications are available from `WEBHOST2` as well

Additional Clustering Configuration

- Configure Load Balancer to Route to Apache Hosts
- Validation

- Configure Collaxa-config Properties for BPEL Server
- Configure JGroups for BPEL
- Configure Server Migration for ESB
- Configure Share File Storage for transaction logs
- Additional Steps for cluster configuration

Configure Load Balancer to Route to Apache Hosts

Configure the Load Balancer manually to route among the available Apache servers.

Add the Virtual Host directives to Apache for the external addresses (where 9700 is the Apache Server listen address). For example:

```
...
Listen 9700
NameVirtualHost \*:9700
<VirtualHost \*:9700>
ServerName https://soa.mycompany.com:443
ServerAlias WEBHOSTn
UseCanonicalName Off
RewriteEngine On
RewriteOptions inherit
</VirtualHost>
.
Listen 9700
NameVirtualHost \*:9700
<VirtualHost \*:9700>
ServerName http://soainternal.mycompany.com:9700
ServerAlias WEBHOSTn
UseCanonicalName Off
RewriteEngine On
RewriteOptions inherit
</VirtualHost>
```

Validation

The following URLs should be accessible now, assuming the site name is `soa.mycompany.com`:

BPEL Console	https://soa.mycompany.com/BPELConsole
OWSM	https://soa.mycompany.com/ccore/Login.jsp
WorkList App	https://soa.mycompany.com/integration/worklistapp
RULE AUTHOR	https://soa.mycompany.com/ruleauthor
ESB	https://soa.mycompany.com/esb

Configure collaxa-config Properties for BPEL Server

1. Modify the `SOA_HOME/bpel/system/config/collaxa-config.xml` file on all machines.
2. Update the following properties in the `collaxa-config.xml` file:

Property	Value
bpelPlatform	`weblogic_8`
soapServerUrl	`https://Soa.mycompany.com`
soapCallbackURL	`https://Soa.mycompany.com`
enableCluster	`True`
clusterName	`http://Soainternal.mycompany.com:9700`

Configure JGroups for BPEL

Update the `$SOA_HOME/bpel/system/config/jgroups-protocol.xml` file on both the machines to set up JGroups between the BPEL instances. This is used for BPEL process and adapter state synchronization between BPEL instances.

Configure Server Migration for ESB

`ESBDT` should be running only one Managed Server in the ESBDT Cluster. To disable the ESBDT application on one node, perform these steps:

1. Login to the Admin Console
2. Go to **Deployments** □ **esbservices** □ **targets**
3. Unselect the Cluster target and only select **OracleESBDTServer1**

Because ESBDT is a singleton, it is highly recommended that you configure Server failover for the ESBDT Server. The steps for Automatic Server Migration are outlined in the Weblogic Server documentation available at

http://edocs.bea.com/wls/docs92/cluster/migration.html#wp1047680

In the database, modify the `DT_OC4J_HOST` and `DT_OC4J_PORT` parameter in `ESB_PARAMETER` (username: oraesb) table with hostName/port of the Managed Server hosting ESBDT.

Configure Share File Storage for Transaction Logs

All of the cluster members should have a persistent file store configured to enable Transaction Recovery Service migration for all JTA transactions. This file store should be at a location that is accessible to other members of the cluster.

To configure the location of the File store, perform the following steps:

1. Connect to the WebLogic Admin Console.
2. Select **Environment** → **Servers** in the Left Pane.
3. Select one of the Oracle SOA Suite Managed Servers.
4. Select **Configuration** → **Services**.
5. Enter the shared storage directory under Directory in Default Store.
6. Set the Synchronous Write Policy to Cache-Flush for Maximum Availability.
7. Save and activate the changes.
8. Repeat for the Oracle SOA Suite Servers on all the machines.

Additional Steps for Cluster Configuration

The previously downloaded scripts (from Oracle *MetaLink* Patch 7490612) also include documentation that you should follow to:

- Configure and Deploy Sample Applications
- Configure the ESB Slide Repository

Adding a Vertical Tier

The following discussions describe how to add more machines to expand the size of the SOA cluster:

- Add another Web Tier
- Add another Application Tier

Add Another Web Tier

Repeat the steps in "Web Tier Setup for WEBHOST1 and WEBHOST2" section earlier in this white paper to add additional machines to the Web tier on machine `WEBHOSTn`

Note: Ensure the Load Balancer is configured to route to the new Apache Server.

Add Another Application Tier

Repeat the steps described in the "Configure the Application Server APPHOST2" section earlier in this white paper to add an additional machine to the Application tier on machine `APPHOST`*n*. Note the following:

- All steps noted as being run on `APPHOST1` are still run on `APPHOST1`, which is the admin machine.
- Ensure that `SOA_SERVER_NAME` and `MACHINE_ADDRESS` variables are set are appropriate for the new machine.

SECURITY TIER

This section walks through the required steps for configuring Oracle Internet Directory (OID) as an external authentication provider for Oracle WebLogic Server. The following list summarizes the steps you will perform to configure OID:

- Install and configure Oracle Internet Directory (OID)
- Validate the Oracle Internet Directory (OID) Installation
- Setup application security using Oracle Internet Directory (OID) for Oracle WebLogic Server

Install and Configure Oracle Internet Directory (OID)

It is assumed that Oracle Internet Directory (OID) is already installed and running on other hosts, preferably a cluster of Oracle Internet Directory Servers. The `OIDHOST` in this case is the address of the Load Balancer, which provides access to the OID Cluster.

Validate the Oracle Internet Directory (OID) Installation

Configure Identity Service with OIDConfigure Identity Service 10.1.3.1.0 with 10.1.4 Oracle Internet Directory. See Section 2.1.3 in the *Oracle BPEL Process Manager Administrator's Guide 10g (10.1.3.1.0)* available at

`http://iasdocs/iasdl/101310_final/integrate.1013/b28982/service_config.htm#sthref280`

1. Ensure that the OracleAS instance (for example, `home`) is associated with OID.
2. Login to the Oracle Enterprise Manager 10*g* Application Server Control Console: `http:// hostname:port /em`. The Cluster Topology page is displayed.
3. Click the OC4J instance name in the Members section. The OC4J: home page is displayed.
4. Select the **Administration** tab.
5. Go to the Security section in the Task Name column.
6. Click the icon in the `Go To Task` column for Identity Management.

   If OID is not associated with this OC4J instance, click **Configure** to associate OID with the OracleAS instance.

   Configure Identity Management: Connect Information, as follows:

   - OID HOST: OID hostname
   - OID User DN: `cn=orcladmin`
   - Password: *xxxxxx*

- If you want to use SSL, provide the specific SSL port number of your OID instance. If not, specify the non-SSL port of your OID instance.
- Click **Next**.

7. If you want to associate Oracle Enterprise Manager 10g Application Server Console with OID, provide the appropriate details on this page. Click **Next**.
8. Click on the services for which you want to use OID as the security provider.
9. Click **Configure**.
10. Seed the users into Oracle Internet Directory, configure the identity service, and grant privileges to BPM roles.
11. Ensure that the `ORACLE_HOME` environment variable is set.
12. Run `ORACLE_HOME/bpel/system/services/install/ant-tasks/configure_oid.sh`.

    ```
    sh ./configure_oid.sh oid_admin_user oid_admin_passwd oid_nonssl_port
    ssl_enabled oid_realm_name seedAllUsers | seedRequiredUsers
    oc4j_admin_user oc4j_amin_passwd oc4j_container_name
    ```

    For example:

    ```
    sh ./configure_oid.sh orcladmin welcome1 389 false us seedAllUsers oc4jadmin
    welcome1 home
    ```

Set Up Application Security by Using Oracle Internet Directory (OID) for Oracle WebLogic Server 9.2

Note: See Section 2.5.1 Using Application Security in the Oracle BPEL Process Manager for Non-Oracle Application Servers Installation Guide 10g Release 3 (10.1.3.3) for UNIX and Microsoft Windows. This documentation is available at

http://download.oracle.com/docs/cd/E10291_01/doc.1013/e10538/weblogic.htm#BHCIAGFB

The following list summarizes the tasks you will perform in this section to set up application security:

- Create an Authentication Provider
- Configure LDAP in Oracle WebLogic Server
- Verify Installation from the Consoles

Create an Authentication Provider

1. Login to `http://WLS_ADMIN_SERVER:8001/console`, using `weblogic` as the username and password.
2. Select **Security Realms** □ **myrealm** □ **Providers** □ **Authentication**.

3. Click **Lock & Edit** in the Change Center pane to activate all the buttons on this page.
4. Click **New** to create a new authentication provider. The "Create a New Authentication Provider" page is displayed.
5. Enter a name of the authentication provider in the Name field (for example, `LDAP_1`) and select **LDAPAuthenticator** in the "Type" drop-down list.
6. Click **OK**. The Authentication Providers table displays the name of the LDAP provider (`LDAP_1`) that you created.

Configure LDAP in Oracle WebLogic Server

Perform the following steps to configure LDAP in Oracle WebLogic Server:

1. Edit the provider-specific attributes of the LDAPAuthenticator provider through the Oracle WebLogic Server Administration Console.
2. Log in to http://WLS_ADMIN_SERVER:8001/console, using `weblogic` as the username and password.
3. Select Security Realms myrealm Providers LDAP_1. The Settings of `LDAP_1` page is displayed.
4. Click **Provider Specific**.
5. Click **Lock & Edit** in the Change Center pane to activate all the buttons on this page.
6. Edit the following attributes in the "Provider Specific" page. The rest of the attributes in the Provider Specific page can be left with default values.
   - **Group Base DN:** cn=Groups,dc=us,dc=oracle,dc=com
   - **User Name Attribute:** uid
   - **Port:** 389
   - **User Base DN:** cn=Users,dc=us,dc=oracle,dc=com
   - **Principal:** cn=orcladmin
   - **Credential/Confirm Credential:** Password for cn=orcladmin
   - **Host:** OID host.
7. Click **Save**.

After you create the LDAP authentication provider, perform the following changes and restart the servers that are running under `SOADomain`:

- Select **Security Realms myrealm Providers DefaultAuthenticator** and change the Control Flag to `SUFFICIENT`.
- Select **Security Realms myrealm Providers LDAP_1** and change the Control Flag to `SUFFICIENT`.

Note: The Control Flag returns how the login sequence uses the Authentication provider. A `SUFFICIENT` value specifies that the `LoginModule?` does not need to succeed. If it does succeed, return control to the application. If it fails and other Authentication providers are configured, authentication proceeds down the `LoginModule` list. A `REQUIRED` value (default) specifies this `LoginModule` must succeed.

Users in LDAP server must be inside a `SoaGroup` group in the LDAP directory. Create a `SoaGroup` group in the LDAP directory under `cn=Groups, dc=us,dc=oracle,dc=com` and add the desired users to that group, otherwise the LDAP users cannot access applications inside the `SOADomain`. For example:

```
cn=SoaGroup,cn=Groups,dc=us,dc=oracle,dc=com
uniquemember:
cn=orcladmin
cn=bpeladmin,cn=users,dc=us,dc=oracle,dc=com
cn=oc4jadmin,cn=users,dc=us,dc=oracle,dc=com
cn=orcladmin,cn=users,dc=us,dc=oracle,dc=com
```

Ensure that `admin.user` and `admin.password` in `BPEL_HOME/bpel/utilities/ant-orabpel.properties` are updated with the credentials of a valid user from the LDAP Authenticator.

Verify Installation from the Consoles

- Oracle BPEL Process manager Console: http://hostname:9700/BPELConsole
- ESB Control: http://hostname:9700/esb/login.jsp
- Login using the OID user accounts – `bpeladmin`, `oc4jadmin`, `orcladmin` and WLS user account – `weblogic`

Note:

- The Oracle ESB Console is only certified to work with Internet Explorer 7 and lower releases.
- Tune the JTA Timeouts based on the requirement of your system.

Enterprise Deployment Guide for Oracle SOA Suite 10.1.3.4 On Oracle WebLogic Server 9.2
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