Fusion Middleware in E-Business Suite 12.2

Presented by:
Varun Sai
Thiagarajan B
(Oracle Software Support, India)
November 08, 2014
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Agenda

1. Overview of Architecture & components
2. Installation and configuration management
3. Administration Tools
4. Managing FMW components and Troubleshooting
5. Best Practices for maximizing performance
Overview of Architecture and Components

The Change from 12.1 to 12.2
What is Fusion Middleware

Collection of standards-based software products for development of complete enterprise wide information systems.
Advantages of FMW

- Oracle WebLogic Server delivers best performance in the Middleware Technology Stack
- Real time mentoring and management of the application
- Consolidated Administration, Configuration and Deployment.
- Powerful Troubleshooting framework
- High Availability, scalability & Failover
- Robust Platform for integration with other Fusion applications like SOA, Business Intelligence etc
- Single integrated, modular, design tool to build a complete application improving productivity
FMW Terminologies

- **Java components**: Deployed Java EE Applications in WLS domain. Managed by Admin Interfaces
- **System Components**: Manageable process not deployed as Java Application. Managed by OPMN.
- **Domain**: Logically related group of Java components
- **Admin Server**: Central control entity for the configuration of entire domain

(cont ..)
**FMW Terminologies (cont ..)**

- **Managed Servers**: Host business applications, application components, Web services, and their associated resources.
- **Node Manager**: Perform common operations for Managed Servers, regardless of its location with respect to its Administration Server.
- **Oracle Instance**: Contains one or more system components, such as Oracle Web Cache, Oracle HTTP Server, or Oracle Internet Directory.
FMW Directory Structure in EBS 12.2
FMW Directory Structure in EBS 12.2 (cont.)

Important Directories and related configuration files

**EBS ORACLE_HOME**

Oracle_EBS-app1
- applications
  - EAR/WAR deployments
- deployment_plans
  - Default deployment plans
- shared_libs
  - FMW shared libraries

**Domain Directory**

User_projects
- domains
  - EBS_domain_<SID>
    - EBS 12.2 domain directory
  - config
    - Domain specific configuration (inc. config.xml)
  - servers
    - Server = JVM, specific configuration, logs etc
FMW Directory Structure in EBS 12.2 (cont..)

Important Directories and related configuration files

Domain Config Directory
<Domain_home>
  |- config
    |- config.xml  Central configuration file
    |- fmwconfig  FMW related configuration
    |- nodemanager  Node Manager password properties

Domain Server Directory
<Domain_Home>
  |- servers
    |- AdminServer
    |- forms-c4ws_server1
    |- forms_server1
    |- oacore_server1
      |- logs  Server and application logs (same per server)
    |- oafm_server1
FMW Directory Structure in EBS 12.2 (cont ..)

Important Directories and related configuration files

WebTier Instance Home
|- webtier
  |- instances
    |- EBS_web_<context> EBS OHS Home
      |- bin
        |- config
          |- OHS
            |- EBS_web_component Apache conf files
          |- OPMN
            |- opmn opmn.xml
    |- diagnostics
      |- logs
        |- OHS
          |- EBS_web_component Apache & OHS log files
        |- OPMN
          |- opmn OPMN logs
Installation and configuration management

12.2 Rapid Install FMW configuration scripts

- **adrunfmw.sh / adrunfmw.cmd**: Installs FMW Techstack and Weblogic Server.
- The **adProvisionEBS.pl**: Creates the Domain, Managed server and start services
  Executed 3 times in succession using the options below:
  1. **ebs-execute-ebsfmwlayout**: Deploy the EBS-specific file system in $FMW_HOME
  2. **ebs-execute-ac**: executes AutoConfig
  3. **ebs-deploy-alltech**: creates a new domain and a new OHS component
- The required parameter values for each option are retrieved from the context file.
- **Log files**
  Main Installation Log: $INST_TOP/logs/<MMDDHHMM>.log
  FMW Installation Logs: $APPL_TOP/admin/$CONTEXT_NAME/log/
  Refer: Troubleshooting Rapid Install for E-Business Suite Release 12.2 (Doc ID 1378579.1)
Changes in Autoconfig

Service Groups

New Service Groups added:

- **Web Administration service group**
  Contains WebLogic Administration server, enabled only on one of the Application tier nodes.

Changes to existing Service Groups:

- **Root Service Group**
  Now comprises Node Manager and not Oracle Process Manager (OPMN).

- **Web Entry Point Services service**
  Contains HTTP Server managed by OPMN

- **Web Application services**
  Consist of Manager server applications oacore, oafm, forms and forms-c4ws.
FMW Service Control Scripts

- Located at $ADMIN_SCRIPTS_HOME.

- Various FMW Service Scripts are:
  - adopmnctl.sh <start/stop>
  - adnodemgrctl.sh <start/stop>
  - adadminsrvctl.sh <start/stop>
    Where [n] indicates the corresponding Managed server instance.

- adadminsrvctl.sh and adnodemgrctl.sh call the adProvisionEBS.pl script internally to manage all the EBS configuration.
Provisioning script

adProvisionEBS.pl:
This script is a wrapper that is used to call the Provisioning API `oracle.apps.ad.tools.configuration.EBSProvisioner` to provision the E-Business Suite.
Provisioning script (cont ..)

Sample options available:
- ebs-create-node/ebs-delete-node
- ebs-execute-ac
- ebs-enable-servicegroup
- ebs-enable-service/ebs-disable-service
- ebs-deploy-tech/ebs-delete-tech
- ebs-create-managedserver/ebs-delete-managedserver
- ebs-start-nm/ebs-stop-nm
- ebs-nmstart-adminsrv/ ebs-nmstop-adminsrv
- ebs-nmstart-managedsrv/ ebs-nmstop-managedsrv
- ebs-start-midtierservices/ebs-stop-midtierservices
- ebs-deploy-app/ebs-deploy-app/ebs-redeploy-app
Autoconfig Context variables for FMW

- **Admin Server**:  
  s_wls_admin_host, s_wls_admin_user, s_wls_adminport, s_adminservername, s_adminservertimeout, s_adminserverlog,  
  s_adminserverstatus, s_adminserverctrl

- **Managed Servers**:  
  - Managed Server Nodes: s_<msname>_nodes  
  - Managed Server Names: s_<msname>_managed_servers  
  - Ports: s_wls_<msname>port  
  - JVM parameters: s_<msname>_jvm_start_options  
    [ Where msname is oacore, forms, oafm and forms-c4ws ]

- **OHS configuration**: s_ohs_instance_loc, s_ohs_instance, s_ohs_component

- **Node managers**:  
  s_nmport, s_nmtype, s_nodemanagername, s_nodemanagertimeout, s_nodemanagerstatus, s_nodemanagerlog,  
  s_nodemanagerctrl, s_nm_jvm_startup_properties

- **Others**: s_fmw_home, s_apps_deployment_dir
System Configuration Syncing

- Not all configurations are managed by autoconfig in 12.2. Some are managed natively via FMW Control and WLS Admin Console.
- Couple of tools used to synchronize the configurations:
  
  **The SyncContext tool** : used for explicit synchronization of the context variables with the WLS configuration parameters.
  
  This tool can be run on all application tier nodes as follows:
  
  ```bash
  $ perl <AD_TOP>/bin/adSyncContext.pl contextfile=<CONTEXT_FILE>
  
  The Node Manager and WebLogic Admin Server must be running during this execution.
  
  **The adRegisterWLSListeners.pl script** : background process, listens for changes to WLS configuration parameters in order to facilitate synchronization with relevant context variables.
  
  - Does not listen changes to the HTTP Server configuration parameters.
  
  - Starts/ Stops automatically when WebLogic Administration Server is started/ shut down.
  
  - On Windows start the tool manually
Administration Tools

- WebLogic Administration Console
- Enterprise Manager 11g FMW Control
- WLST (WebLogic Scripting Tool)
WebLogic Administration Console

- Web browser-based, graphical user interface to manage an Oracle WebLogic Server domain
- Accessed using URL:  http://[hostname]:[Admin Server port]/console
  [ Admin Server Port changes based on whether fs1 or fs2 is Run edition ]
- Use the Administration Console to:
  - Configure, start, and stop WebLogic Server instances
  - Configure WebLogic Server clusters
  - Configure WebLogic Server services, such as database connectivity (JDBC) and messaging (JMS)
  - Configure security parameters, including managing users, groups, and roles
  - Configure and deploy your applications
  - Monitor server and application performance
  - View server and domain log files
  - View application deployment descriptors
  - Edit selected run-time application deployment descriptor elements
WebLogic Adminisntartion Console (cont. ..)
WebLogic Administration Console (cont..)

A server is an instance of WebLogic Server that runs in its own Java Virtual Machine (JVM) and has its own configuration. This page summarizes each server that has been configured in the current WebLogic Server domain.

Customize this table

Servers (Filtered - More Columns Exist)

Click the New, Clone, or Edit button in the Change Center to activate all the buttons on this page.

<table>
<thead>
<tr>
<th>Name</th>
<th>Cluster</th>
<th>Machine</th>
<th>State</th>
<th>Health</th>
<th>Listen Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>AdminServer(admin)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>forms-c4ws_server1</td>
<td>forms-c4ws_cluster1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>forms_server1</td>
<td>forms_cluster1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>oacore_server1</td>
<td>oacore_cluster1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ofsm_server1</td>
<td>ofsm_cluster1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Enterprise Manager 11g FMW Control

- Web application used to monitor and administer a farm
- A farm is a collection of components managed by Fusion Middleware Control.
- Contains Oracle WebLogic Server domains, one Administration Server, one or more Managed Servers, clusters, and one or more Oracle instances
- You access Fusion Middleware Control using the below URL:
  
  http://hostname.domain:port/em

The Port number can be obtained from s_wls_adminport context variable and also listed in the file: DOMAIN_HOME/config/config.xml.
Enterprise Manager 11g FMW Control
Differences b/w FMW control and WLS console

• WLS console is mainly used for managing java components
  – Create /Clone/ Cluster/Start/Stop Managed servers.
  – Manage Datasources and connection pools
  – Deploy java EE applications
  – Change passwords.
  – View and Manage Log files related to WLS
  – Change Ports for Weblogic server and Java components.

• FMW control is mainly used for managing System components.
  – Manage Oracle HTTP Server, Oracle Web Cache, Start and stop components, Start and stop applications
  – Deploy/Monitor SOA Composite applications like SOA, BPEL etc
  – Start and Stop managed Servers
  – Deploy Java EE applications.
  – View and Manage most of the Log files.
  – Change Ports for System components
WLST (WebLogic Scripting Tool)

- Command-line scripting environment based on the Java scripting interpreter, Jython.
- Use to create, manage, and monitor WebLogic Server domains.
- Invoke WLST interactively from the WLS home as below:
  ```
  java weblogic.WLST
  connect('username', 'password', 'localhost:7001')
  ```
- Online mode – equivalent to the WLS Admin Console, Connected to a running server
- Offline mode – when Domain not running
  Invoked in
  - Interactive Mode - interactively, on the command line
  - Script Mode - in batches, supplied in a file
  - Embedded Mode - embedded in Java code (eg AD control scripts)
WLST (WebLogic Scripting Tool)

- The WLS command-line tools are useful:
  - For automating common administration activities
  - As an alternative to the Administration Console
  - When graphical tools are not supported

- Do not use the WLST script in the WebLogic Server home as the environment and classpath settings will not be set properly for specific components.

- For managing Oracle HTTP Server invoke WLST from
  
  `<ORACLE_HOME for HTTP>/common/bin/wlst.sh`

- For managing System Components invoke WLST from
  
  `<ORACLE_HOME_for_component>/common/bin/wlst.sh`
Fusion Middleware in E-Business Suite 12.2
Managing, Troubleshooting, & Best Practices
Agenda

1. Managing HTTP Server Configurations
2. Managing Managed Server Configurations
3. Fusion Middleware Diagnostics Framework (FMWDFW)
4. Fusion Middleware Logging
5. Best Practices for maximizing performance
Managing HTTP Server Configurations

Role of Autoconfig

• AutoConfig manages only initial setup of HTTP Server configuration
• Later, it can optionally be used to manage and customize a limited set of configuration files like those related to SSL & DMZ setup
• Recommendation is to use native FMW tools to manage HTTP Server configuration post-installation
• When updating seeded HTTP configuration:
  – Must be updated in both Context File as well as Configuration files
Managing HTTP Server Configurations

Updating seeded configuration

• On the Run Edition File System:
  – Edit the relevant parameter from the Oracle Enterprise Manager console
  – Run the following command on all application tier nodes:
    $ perl <AD_TOP>/bin/adSyncContext.pl contextfile=<CONTEXT_FILE>
    **Important**: Node Manager and WebLogic Admin Server must be running during execution of the adSyncContext.pl script
  – Run AutoConfig on all application tier nodes
Managing HTTP Server Configurations

EM Console > Oracle HTTP Server > Administration
Managing Managed Server Configurations

Updating Managed Server Configuration

• The basic configurations are maintained in their respective deployment plans located at `<EBS_ORACLE_HOME>/deployment_plans/<managed server>/plan.xml`

• Delivered as an AutoConfig template, containing limited set of context variables located at `$FND_TOP/admin/template`

  Ex: oacore_plan_FMW_xml.tmp

• AutoConfig only updates the plan.xml file if any context variables used in the deployment plan have been customized.

• Most of the other parameters are updated via WLS Admin Console
Managing Managed Server Configurations

Change Management Feature

Change Center
View changes and restarts
Click the Lock & Edit button to modify, add or delete tests in this domain.

Lock & Edit
Release Configuration

Domain Structure
EBL_domain_ATSYS
- Environments
- Deployments
- Services
- Security Realms
- Interoperability
- Diagnostics

How do I...
- Create a deployment plan
- Update a deployment plan
- Start and stop a deployed Enterprise application
- Configure an Enterprise application
- Target an Enterprise application to a server

System Status

Oracle Confidential – Internal/Restricted/Highly Restricted
Managing Managed Server Configurations

Additional Steps Needed on Multi-Node Systems

• For multi-node system, manually update the deployment plans on the other nodes

• Configuration changes made via WLS Console need to be synchronized with other nodes

• Follow the steps below to synchronize the deployment plans on the other nodes.
  – Edit the relevant deployment plan to enter the new configuration value
  – Save the deployment plan
  – Restart the managed server
Managing Managed Server Configurations

Managing Classpath and JVM arguments – WLS Console

Node Manager is a WebLogic Server utility that you can use to start, suspend, shut down, and restart servers in normal or unexpected conditions. Use this page to configure the startup:

- **Java Home:** `/ud1/oracle/ATGIVIS/fzi/EBSSapps/common/libJdk64`
- **Java Vendor:** `Linux`
- **BEA Home:** `null`
- **Root Directory:** `null`

**Class Path:**
```
```

**Arguments:**
```
-Xmx1024m\n-Xms512m\n-Xms512m\n-Djava.security.policy=/orul/oracle/ATGIVIS/fzi/FMW_HOME/ud1\nserver_10.3/server/lib/weblogic.policy\n-Djava.security.policy=/orul/oracle/ATGIVIS/fzi/FMW_HOME/ud1\nserver_10.3/server/lib/weblogic.policy\n-Dweblogic.security.model=false\n-Dweblogic.security.model=false\n-Dweblogic.security.model=false\n-Dweblogic.security.model=false\n```
Managing Managed Server Configurations

Managing Classpath and JVM arguments – Command Line

• In addition, these properties can also be set from the backend using adProvisionEBS.pl script as follows:

```bash
$ perl <AD_TOP>/patch/115/bin/adProvisionEBS.pl / ebs-set-managedsrvproperty -contextfile=<CONTEXT_FILE> / -managedsrvname=<MANAGED SERVER NAME> / -managedsrvclasspath="<COMPLETE MANAGED SERVER CLASSPATH/JVM ARGMENTS>"
```
Managing Managed Server Configurations

Customizing the Number of Instances

• By default, every application tier node contains only a single instance of the managed servers

• Managed server creation/deletion should be done only through the adProvisionEBS.pl and txkSetAppsConf.pl scripts

• WebLogic Administration Console should not be used

• Addition/deletion of managed servers needs to be done on the
  – Run Edition File System when there is no active ADOP cycle
Managing Managed Server Configurations

Adding a Managed Server Instance

• Execute the following command to add a new managed server
• This will create a managed server and add a new entry to the context file:

```
$ perl <AD_TOP>/patch/115/bin/adProvisionEBS.pl \ 
ebs-create-managedserver -contextfile=<CONTEXT_FILE> \ 
-managedsrvname=<MANAGED_SERVER_NAME> \ 
-servicetype=<SERVICE_TYPE> \ 
-managedsrvport=<MANAGED_SERVER_PORT> -logfile=<LOGFILE>
```

- Name must be of the form `<SERVICE_TYPE>_server<n>`, where n is an integer
- Managed Server port must be unique even across the Run and Patch edition
Managing Managed Server Configurations

Adding a Managed Server Instance (cont..)

- Add the newly added managed servers into the OHS configuration files mod_wl_ohs.conf and apps.conf using the below steps:

- Follow it on all application tier nodes participating in the same cluster:
  - Source the Run Edition File System
  - Execute the following command:
    ```
    $ perl <FND_TOP>/patch/115/bin/txkSetAppsConf.pl \
    -contextfile=<COMPLETE PATH TO CONTEXT_FILE> \ 
    -configoption=addMS -oacore=<host>.<domain>:<port> -oafm=<host>.<domain>:<port> \ 
    -forms=<host>.<domain>:<port> -formsc4ws=<host>.<domain>:<port>
    ```
  - Restart HTTP server using adapcctl.sh script
Managing Managed Server Configurations

Removing Managed Server Instance

- Process is similar to adding the managed server
- Done using the `adProvisionEBS.pl` and `txkSetAppsConf.pl` scripts
- Execute `adProvisionEBS.pl` with option `ebs-delete-managedserver`
- This will delete the managed server, and also update the respective context variables
- Run `txkSetAppsConf.pl`, Using the option `configoption=removeMS`
- This removes details of the deleted managed servers from the OHS configuration files `mod_wl_ohs.conf` and `apps.conf`
- Restart HTTP server using `adapcctl.sh` script
Managing Managed Server Configurations

Changing the Managed Server Ports

- Source the Run Edition File System.
- Execute the txkSetAppsConf.pl script with configoption=removeMS to delete references of the old port in mod_wl_ohs.conf and apps.conf files.
- Execute the txkSetAppsConf.pl script with configoption=addMS to add back the managed server entry in the OHS configuration files with the new port.
- For more details, Please refer to the below MOS document:
  Managing Configuration of Oracle HTTP Server and Web Application Services in Oracle E-Business Suite Release 12.2 (Doc ID 1905593.1)
Fusion Middleware Diagnostics Framework (FMWDFW)

Incident Detection

- Provides features designed to aid in detecting, diagnosing, and resolving problems.

- On detection of a critical error, FMWDFW will automatically capture a set of diagnostics and include them in an incident.

- Incidents are automatically detected in two ways:
  - *Incident detection log filter* - to detect critical errors.
  - *WLDF Watch and Notification component (FMWDFW)* - listens for a predefined notification type and creates Incidents

- FMWDFW provides option to enable additional logging or alter default collection settings and also allows to create new module.
Fusion Middleware Diagnostics Framework (FMWDFW)

Default Watch and Notification Module
Fusion Middleware Diagnostics Framework (FMWDFW)

Automatic Diagnostic Repository (ADR)

- Each incident is assigned a number to help with tracking and reporting
- Incident data is stored in the file-based Automatic Diagnostic Repository (ADR)
- Includes the diagnostic dumps and associated metadata
- Incidents can be packaged as a zip file, using the ADR Command Interpreter (ADRCI), and sent to Oracle for analysis
- For more details, Please refer to the below MOS document:

Using Oracle Fusion Middleware Diagnostic Framework With Oracle E-Business Suite Release 12.2 (Doc ID 1428056.1)
Best Practices for maximizing performance

Oacore JVM Configuration

- Default oacore JVM heap size is 512 MB (roughly supports 50 users)
- We recommend to configure 2 GB JVM Heap Space for oacore.
  - This can roughly support 150 to 200 users depending on usage.
- For higher user load additional oacore managed servers need to be created.
- We recommend to have 1 managed server per 2 CPU.
- For best response time results, use multiple managed instances.

Note: You should always size your systems based on tests using representative data and workloads for your own environment.
Best Practices for maximizing performance

Oacore JVM Configuration (cont..)
Best Practices for maximizing performance

Modifying the JVM properties for Adminserver

- When adding more managed servers, it is essential to increase the Admin Server memory, Else Adminserver will fail with OutofMemory error.

- Steps for modifying Adminserver memory:
  - Stop the Admin Server using adadminsrvctl.sh script
  - Modify s_nm_jvm_startup_properties context variable.
  - Default value is 512 MB.
  - Run AutoConfig on application nodes.
  - Start the Admin Server using adadminsrvctl.sh script.
Best Practices for maximizing performance

Tuning Tips for Heap Sizes

- Make sure adequate Physical memory available on the server when you tune heap space
- If this value is exceeded, the OS starts paging and performance degrades significantly.
- The Virtual Memory (VM) always uses more memory than the heap size.
- In production environments, if you find constant growth and shrink in heap space set the minimum heap size and the maximum heap size to the same value.
Recommended Performance Patches

- Below are the 3 critical connection leak bug fixes which improves performance and stability considerably:
  - 19782999:R12.FWK.C - R: CONNECTION LEAK IN OAERRORPAGE.JSP AND OAERRORDETAILPAGE.JSP
  - 19807163:R12.OAM.C - 1OFF:12.2.3:TRANSACTIONSCOPE - CONNECTION LEAK IN 12.2.3
  - 9494816:R12.FND.C - JDBC CONNECTION LEAK IN ORACLE.APPS.FND.COMMON.ERRORSTACK

- It is also recommended to apply the latest TXK and AD patches following the note: Applying the Latest AD and TXK Release Update Packs to Oracle E-Business Suite Release 12.2 (Doc ID 1617461.1)
Useful Documents

- **WLS 10.3.6 Documentation Library**
  
  [http://docs.oracle.com/cd/E23943_01/wls.htm](http://docs.oracle.com/cd/E23943_01/wls.htm)

- **EBS 12.2 Documentation Library**
  
  [http://docs.oracle.com/cd/E26401_01/index.htm](http://docs.oracle.com/cd/E26401_01/index.htm)

- **Some important 12.2 MOS Documents**
  - Useful 12.2 Documents For Customers And ATG Support Engineers (Doc ID 585889.1).
  - Managing Configuration of Oracle HTTP Server and Web Application Services in Oracle E-Business Suite Release 12.2 (Doc ID 1905593.1)
  - Using Oracle Fusion Middleware Diagnostic Framework With Oracle E-Business Suite Release 12.2 (Doc ID 1428056.1)
Useful Documents

Some important 12.2 MOS Documents (cont..)

- How To Detect a Connection Leak Using Diagnostic JDBC Dumps (Doc ID 1502054.1)
- 12.2 Ebusiness Suite - Collecting Fusion Middleware Log Files (Doc ID 1362900.1)
- Oracle Applications E-Business Suite 12.2 Fusion Middleware Log Files: Locate, View, and Control (Doc ID 1366187.1)
- Applying the Latest AD and TXK Release Update Packs to Oracle E-Business Suite Release 12.2 (Doc ID 1617461.1)
- Oracle E-Business Suite Release 12.2: Upgrade Sizing and Best Practices (Doc ID 1597531.1)
Q & A
Hardware and Software
Engineered to Work Together