Deployment Best Practices for Private Cloud

Fast Track to DBaaS and MWaaS

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October 1, 2014
Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Program Agenda - Best Practices for Private Cloud

**DBaaS/MWaaS**

1. Objectives
2. Design
3. Deploy
4. Manage
5. Optimize
6. Case Study: e-DBA
Total Cloud Control

- **Accelerated Automation for Broader Cloud Services**
- **Expanded Cloud Stack Management**
- **Superior Enterprise-Grade Management**

**Oracle Enterprise Manager 12c**

**Agile, Automated** | **Optimized, Efficient** | **Scalable, Secure**
Objectives

DBaaS/MWaaS Deployment Lifecycle

Optimize
How do I Optimize?
• Monitor Cloud Infrastructure
• Measure Service
• Meter and Chargeback/Showback

Design
What are the first steps to take?
• Identify right candidate Apps
• Standardize and Consolidate
• Capacity Planning
• Plan Access and Governance
• Design Service Catalog

Manage
How do I Manage the Cloud platform?
• Patch and Upgrade
• Platform Administration
• Maintain PaaS Infrastructure

Deploy
How do I Setup DBaaS/MWaaS in Fast track mode?
• Deploy Options
• Setup EM 12c and SSA Portal
• DBaaS/MWaaS deployment Steps
• Rapid Start Kit and REST APIs
• Snap Clone Setup
Designing Private Cloud Deployment
Design

Goals

• Identify Candidate Applications – align with business goals
  – New applications, UAT applications, Applications that need on-demand capacity

• Standardize and Consolidate
  – Standardize to Simplify job of Administrators, Consolidate to gain Efficiency
  – Standardize from
    • OS - AIX 6.1, 5.1, Linux 5.1, 5.2
    • DB Oracle Home 11.2.0.2.0, 11.2.0.4, 12.1.0.1/MW Home 10.3.6, 12.1.2
  – Consolidate to
    • Small –Linux 6.1 running 11.2.0.4 PSU 3 DB with 2 GB SGA/MW 12.1.2 with 1 GB Heap
    • Large –Linux 6.1 running 11.2.0.4 PSU 3 DB with 8 GB SGA/MW 12.1.2 with 4 GB Heap
Design **Goals**

- Planning DBaaS/MWaaS Infrastructure
  - Sizing – Calculate Required Infrastructure
    - CPU, Memory, Storage Requirement of all DB/MW in the Cloud
    - Buffer Requirement
  - Access Control
    - Prepare PaaS platform - Cloud Administrators should get required control
    - Minimal Privilege for End Users

- Design Service Catalog
  - Service Catalog is collection of standardized services offered to end users
  - Along with Resource Pools Helps Drive Standardization
## Design

### Service Catalog Example

<table>
<thead>
<tr>
<th>Service Catalog</th>
<th>DBService1</th>
<th>DBService2</th>
<th>DBService3</th>
<th>MWService1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Size</td>
<td>2 TB</td>
<td>200GB</td>
<td>200 GB</td>
<td>NA</td>
</tr>
<tr>
<td>Backup</td>
<td>weekly full, daily incremental level 0</td>
<td>weekly full, daily incremental level 0</td>
<td>weekly full, daily incremental level 0</td>
<td>NA</td>
</tr>
<tr>
<td>UAT Copies</td>
<td>7 SI</td>
<td>4 SI</td>
<td>2 RAC 2 node RAC</td>
<td>10</td>
</tr>
<tr>
<td>UAT Purpose</td>
<td>Functional</td>
<td>Functional</td>
<td>Load</td>
<td>Functional</td>
</tr>
<tr>
<td>Availability</td>
<td>95%</td>
<td>95%</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>Refresh Frequency</td>
<td>3 months</td>
<td>3 months</td>
<td>3 months</td>
<td>2 months</td>
</tr>
<tr>
<td>Provisioning Time</td>
<td>4 hours</td>
<td>1 hour</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

*Real World Customer Example*
Deploy and Configure

Configure For Best Practices
Deployment Options

DBaaS/MWaaS

• Self Service User Interface
• Rapid Start Kit for DBaaS
• Rest APIs

Rapid Start Cloud Setup
http://docs.oracle.com/cd/E24628_01/doc.121/e28814/cloud_rap.htm

Database as a Service REST APIs
docs.oracle.com/cd/E24628_01/doc.121/e28814/dbaas_api.htm

Middleware as a Service REST APIs
http://docs.oracle.com/cd/E24628_01/doc.121/e28814/jaas_api.htm
Deployment Flow

- **Ref FMW**
  - Host A
  - PaaS Zone 4
  - 12c WLS
  - Pool 4
  - Ref DB
  - Host A
  - PaaS Zone 1
  - 11.2.0.3 DB
  - Pool 1
  - Pool 2
  - Pool 5

- **Create Profile**
  - Create Service Catalog
  - Access Service catalog

- **Management Server**
  - Repository Database
  - Configure Quota and Request Settings
  - Roles/Users

- **Deploy**
  - Self Service Users
Deployment Steps
Setup EM12c and Self Service Portal

1. Install EM12c with required Plug-ins
2. Configure Resource Pools
3. Configure Load Balancer
4. Configure Quota and Policies
5. Configure Service Catalog
6. Configure Metering and Chargeback
EM12c Setup

**Required plug-ins**

- Install EM12c with following Plug-ins
  - Oracle Database
  - Oracle Fusion Middleware
  - Oracle Cloud Framework
  - Oracle Cloud Application
  - Oracle Storage Management Framework (Only when Snap Clone based Solution)

**Recommended Readings**

MoS Note 1900943.1
https://support.oracle.com/epmos/faces/DocumentDisplay?id=1900943.1
MoS Note 1549855.1
https://support.oracle.com/epmos/faces/DocumentDisplay?id=1549855.1
Configure Resource Pools

**Standardize using Pools**

- **PaaS Infrastructure Zone**
  - One Host can be part of Only One Zone

- **Pool**
  - Homogeneous collection of OH/DB/CDB w.r.t. PaaS Infra Zone, Platform, Database/FMW Configuration and Version
    - Targets within same member of a pool should share the same downtime

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**Delivering Database as a Service (DBaaS) using Oracle Enterprise Manager 12c**

Configure Load Balancer (Recommended)

**MWaaS**

- Using this option one can configure Oracle HTTP Server/Oracle Traffic Director/any Third Party Load Balancer

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**Load Balancer Configuration: ohs_lb**

<table>
<thead>
<tr>
<th>Load Balancer Type</th>
<th>Description</th>
<th>Load Balancer Host</th>
<th>Routing Protocol</th>
<th>Routing Port (HTTP)</th>
<th>Routing Port (HTTPS)</th>
<th>Monitoring Agent</th>
<th>Component Name</th>
<th>Instance Home</th>
<th>Targets</th>
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<td>slick01twb.us.oracle.com</td>
<td>HTTP/HTTPS</td>
<td>7777</td>
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<td>ohs</td>
<td>/scratch/PSS_OHS/instance_home</td>
<td>Name</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td>AIME (SYSSMAN)</td>
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<td></td>
<td>MW_Pool</td>
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</table>
Configure Quota and Policy

**Quota Management**

- Applies to only Databases/MWs provisioned through Self Service Portal
- Although defined for Role, Quota applies to each user assigned to that role
  - Impacts adding users to a role
- User is having multiple SSA roles
  - Quota for a resource is max of individual Quota for Resource for each SSA role
- Counts Databases/MW instances provisioned
  - Down instances as well
  - Still using Resources
Configure Quota and Policy

**DBaaS Placement Policy**

- **Workload Management**
  - Enable Resource Manager for SCaaS/PDBaaS
    - Manages the CPU resource and ensures that SSA user will not exceed allocated value
  - Specify Workloads Associated with Service Requests

- **Enable CPU_COUNT init.ora parameter for**
  - Snap Clone/ RMAN backup/DBCA template based profile
    - Ensures that database will NOT use CPUs more than given CPU_COUNT

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**Database Pools**

**Create New Pool: Policies**

**Placement Constraints**

Placements policy constraints allow the self service administrator to set maximum ceilings for resource utilization. This might enforce more conservative limits, whereas a development database pool might enforce more liberal limits.

- Maximum Number of Database Services
- Workloads associated with the service requests
- Maximum CPU allocation never exceeds (%)
- Maximum memory allocation never exceeds (%)

**Resource Manager Settings**

- Enable Resource Manager for CPU
  - TIP: The service instance will be provisioned on the best member that satisfies the placement constraints.
Configure Quota and Policy

**MWaaS Placement Policy**

- MWaaS Placement Policy Parameters are part of Service Template
  - Expected Memory Consumption
  - Expected CPU Utilization
  - Distribute Java Servers on Available Hosts

![Placement Parameters Table](image-url)

- **Expected Memory Consumption (For Use By Placement Logic):** 0.25
- **Expected CPU Utilization (For Use By Placement Logic):** 10
- **Distribute Java Servers on Available Hosts?**
  - Yes
  - No

Parameters that affect how and where the managed servers are provisioned.

- Memory required by each additional instance in GB.
- CPU required by each additional instance in percentage.

Choose 'Yes' if the Java Servers in a service instance are to be uniformly distributed on available hosts for high availability. Choose 'No' for the maximum number of Java Servers possible to be provisioned on a host first before provisioning on other available hosts.
Configure Service Catalog

Create Profiles

- Captures Source Database/MW Information
  - Configuration/Metadata
  - Data

- DB/MW Profile Options
  - Snapshots
  - RMAN Backups
  - Database Template
  - Export Schema Objects
  - Clone DB
  - Weblogic Domain Provisioning Profile
  - RMAN Backups
  - Database Template
  - Export Schema Objects
  - Clone DB
Configure Service Catalog
Create Service Template

DBaaS

MWaaS

Service Template Details: 11204 RAC DB - Gold Service

Configure

Zone and Pool details

Roles

Zone and Pool details

Roles

Service Template Details: ws_1036_template

Configuration

Name | Value | Description
Weblogic Username | weblogic | Username for the WebLogic Server
Weblogic Password | ***** | Password for the WebLogic Server. In case of virtual provisioning, ensure that password has at least one number or special character.
Re-enter WebLogic Password | ***** | Re-enter Password for the WebLogic Server
Topology | 1 | Enter 1 for single cluster, 0 for no cluster. For physical provisioning, it is auto populated based on the profile selected. For virtual provisioning, it is defaulted to 1. Please change based on the actual topology of the assembly.
Expose Weblogic and MW Co | 1 | Enter 1 for ‘Yes’, 0 for ‘No’
Enable Load Balancer | 0 | Enter 1 to enable, 0 to disable Load Balancer
Prescript for Service Instance Creation | | Prescript for Service Instance Creation
Postscript for Service Instance Creation | | Postscript for Service Instance Creation
Postscript for Service Instance Deletion | | Postscript for Service Instance Deletion

Configuration

Name | Value | Description
MWaaS_SSA | MWaaS_SSA_DEPLOY_ROLE | MWaaS_SSA_DEPLOY_ROLE
MWaaS_SSA | MWaaS_SSA_DEV_ROLE | MWaaS_SSA_DEV_ROLE

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Configure Chargeback

- Use PaaS Infrastructure Zones as Top level Target for Assigning Charge Plan and Cost Center
- All Child Instances inherits the plan of its nearest ancestor unless explicit Charge Plan and Cost Center are assigned
Rapid Start Kit

*Single Command Starter kit (DBaaS)*

- Create Cloud Admin, SSA Admin and SSA User custom roles
- Create Cloud Admin, SSA Admin and SSA Users
- Grant Quota to SSA User custom roles
- Setup Zones with Placement Policy Constraints
- Setup Pools with Placement Constraints
- Setup Service Template/Catalog and grant SSA User custom roles
Rapid Start Kit

Setup and Usage

- Location <MW Home>/plugins/oracle.sysman.ssa.oms.plugin_12.1.0.8.0/dbaas/setup
- Use dbaas/setup/exadata_cloud_setup.py for Exadata
- Use dbaas/setup/database_cloud_setup.py for other platforms

- Input files
  - cloud_boundary XML - defines the cloud topology of zones and pools along with host name and oracle home location
  - Cloud_input XML - defines users, roles, profiles, service templates, etc

- Invoke the script
  - emcli @database_cloud_setup.py -pdbaas -cloud_boundary=/tmp/boundary.xml -cloud_input=/tmp/inputs.xml
Snap Clone Architecture

Storage Management Framework (SMF) 12.1.0.4.0 - Best Practices & Troubleshooting Guide
https://support.oracle.com/epmos/faces/DocumentDisplay?id=1918255.1
Manage and Optimize
Management and Monitoring of Platform
Management of Platform

**Patch/Upgrade**

- All Provisioned Targets within a Resource Pool should be patched together
- SSA Admin Driven
- CPUs, PSUs, Bundle Patches and other Interim (one-off) Patches
  - Does not update DB release version information
  - Adopt the latest GI PSU patch
  - Use EM Patch Plan and apply PSU patch in rolling mode

**12c: Patching Recommendation Guide for DBaaS Pool(s)**
https://support.oracle.com/epmos/faces/DocumentDisplay?id=1625014.1
Monitor and Optimize Platform

**Monitor Resource Utilization Cloud/Zone**

References

• Documentation
  – Enterprise Manager 12c Cloud Administration Guide

• Screenwatches
  – Cloud Management EM 12c Screenwatches

• White papers
  – Oracle Cloud Management Pack for Oracle Database
  – Delivering DBaaS using Oracle Enterprise Manager 12c

• Blogs
  – Planning Database as a Service Implementation Project
  – What is EM 12c DBaaS Snap Clone?
  – Limit Self Service User Access to Database Self Service Portal
  – EM12c Release 4: Database as a Service Enhancements
  – Database as a Service: Glad that you asked these!
  – Steps to Fast Track your Database Cloud implementation on Exadata
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## Enterprise Manager Sessions – Monday, September 29th

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<td>Oracle Enterprise Manager: The Complete Solution and Oracle’s Best Kept Secrets</td>
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<td>Automatic Workload Repository Warehouse: Helping DBAs Make Sure History Never Repeats Itself</td>
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<td>Under the Hood: Diagnosing and Troubleshooting Oracle Enterprise Manager 12c Release 4</td>
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<td>Beyond the Basics: Making the Most of Oracle Enterprise Manager 12c Monitoring</td>
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<td>Best Practices for Maintaining and Supporting Oracle Enterprise Manager</td>
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<td>Best Practices for Managing Oracle WebLogic Server with Oracle Enterprise Manager 12c</td>
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<td>Private Database Clouds: A Standardized Service Catalog for Delivering DBaaS</td>
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<td>Database Software Currency: Using Oracle Enterprise Manager 12c Provisioning and Patching</td>
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## Enterprise Manager Sessions – Monday, September 29th

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<td>Set Up Oracle Real User Experience Insight 12c to Monitor Oracle WebLogic Applications’ UX</td>
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<td>Oracle Management Pack Plus for Identity Management Best Practices and Lessons Learned</td>
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<td>Oracle Data Integrator: Product Update and Future Strategy</td>
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<td>Consolidating to Database as a Service with Oracle Real Application Testing</td>
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<td>Full Visibility into Oracle WebLogic/Java Diagnostics with Oracle Enterprise Manager 12c</td>
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<td>Why Database as a Service Will Be a Breakaway Technology at Société Générale</td>
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<td>Advanced Management with Oracle Application Management Suite for Oracle E-Business Suite</td>
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<td>Maximizing Reliability of Oracle Business Intelligence Enterprise Edition and Oracle Exalytics</td>
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<td>GEN8250</td>
<td>General Session: Drive the Future of Self-Service IT with Oracle Enterprise Manager</td>
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<td>CON5748</td>
<td>Create a DBaaS Catalog in an Hour with a PaaS-Ready Infrastructure</td>
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<td>Best Practices for Deploying a DBaaS in a Private Cloud Model</td>
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<td>Solving Data Skew in Oracle Business Applications with Oracle’s Flash-Optimized SAN Storage</td>
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<td>Future Now: Advanced Database Management for Today’s DBA</td>
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<td>CON4045</td>
<td>Provision Oracle Fusion Middleware Faster with Oracle Enterprise Manager 12c</td>
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<td>CON5875</td>
<td>Using Oracle Enterprise Manager to Deliver Multitenant DBaaS on Oracle Exadata: Lessons Learned</td>
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<td>CON8450</td>
<td>SQL (and PL/SQL) Tuning Experts Panel</td>
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## Enterprise Manager Sessions – Wednesday, October 1\textsuperscript{st}

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<td>Oracle Infrastructure Systems Management with Oracle Enterprise Manager and Ops Center</td>
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<td>CON7961</td>
<td>Streamline Utility IT Operations with Oracle Enterprise Manager</td>
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<td>Database Time-Based Performance Tuning: From Theory to Practice</td>
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<td>Management of Oracle SOA Suite and Oracle Service Bus with Oracle Enterprise Manager 12c</td>
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<td>CON8121</td>
<td>Databases to Oracle Exadata: The Saga Continues for Oracle Enterprise Manager – Based Patching</td>
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<td>CON3182</td>
<td>Deployment of Oracle Exadata and Oracle Exalogic Increases Business Efficiency</td>
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<td>Behind the Scenes of Managing the Engineered Systems Showcase</td>
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## Enterprise Manager Sessions – Wednesday, October 1st

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<td>Oracle Enterprise Manager 12c: Maximize ROI via a Single Pane of Glass Across a Data Center</td>
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<td>CON8247</td>
<td>DBA’s New Best Friend for Mistake-Free Administration: Oracle Real Application Testing</td>
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<td>CON8245</td>
<td>Tips for Successful Oracle Exadata Management with Oracle Enterprise Manager 12c</td>
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<td>CON8451</td>
<td>Next-Generation Testing with Oracle Application Testing Suite</td>
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<td>Middleware as a Service: Converged Solution for Administrators and DevOps</td>
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<td>CON8134</td>
<td>Zero to Manageability in One Hour: Build a Solid Foundation for Oracle Enterprise Manager 12c</td>
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<td>CON8185</td>
<td>Use Oracle Enterprise Manager in a Box to Easily Manage the Enterprise</td>
<td>2:00 PM - 2:45 PM</td>
<td>Moscone North - 131</td>
</tr>
<tr>
<td>CON8130</td>
<td>Deployment Best Practices for Private Cloud: Fast Track to DBaaS and MWaaS</td>
<td>2:00 PM - 2:45 PM</td>
<td>Moscone South - 301</td>
</tr>
<tr>
<td>CON8248</td>
<td>Trouble-Free Upgrade to Oracle Database 12c with Oracle Real Application Testing</td>
<td>2:00 PM - 2:45 PM</td>
<td>Moscone South - 303</td>
</tr>
<tr>
<td>CON8016</td>
<td>DBaaS 2.0: Rapid Provisioning, Richer Services, Integrated Testing, and More</td>
<td>3:30 PM – 4:15 PM</td>
<td>Moscone South - 301</td>
</tr>
<tr>
<td>CON7726</td>
<td>Oracle Exadata Database Machine Administration and Monitoring Made Easy</td>
<td>4:45 PM – 5:30 PM</td>
<td>Moscone South - 104</td>
</tr>
<tr>
<td>CON8260</td>
<td>Database as a Service (DBaaS) Cookbook: Strategies and Tips for Successful Deployment</td>
<td>4:45 PM – 5:30 PM</td>
<td>Moscone South - 301</td>
</tr>
</tbody>
</table>
# Enterprise Manager Sessions – Thursday, October 2nd

<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON2561</td>
<td>You’ve Got It; Flaunt It: Oracle Enterprise Manager Cloud Control Extensibility</td>
<td>9:30 AM - 10:15 AM</td>
<td>Marriott Marquis - Golden Gate C3</td>
</tr>
<tr>
<td>CON7940</td>
<td>Building an On-Premises Java Cloud: Oracle WebLogic Server and Oracle Enterprise Manager</td>
<td>9:30 AM - 10:15 AM</td>
<td>Moscone South - 200</td>
</tr>
<tr>
<td>CON8243</td>
<td>Oracle Enterprise Manager 12c Security Cookbook: Best Practices for Large Data Centers</td>
<td>9:30 AM - 10:15 AM</td>
<td>Moscone South - 300</td>
</tr>
<tr>
<td>CON3028</td>
<td>Enterprise Architecture Approach to Developing a DBaaS Private Cloud at Boeing</td>
<td>9:30 AM - 10:15 AM</td>
<td>Moscone South - 301</td>
</tr>
<tr>
<td>CON8184</td>
<td>What’s New and Best Practices for Oracle Data Masking and Subsetting</td>
<td>9:30 AM - 10:15 AM</td>
<td>Moscone South - 306</td>
</tr>
<tr>
<td>CON5451</td>
<td>Highly Available, Highly Scalable: Oracle Enterprise Manager 12c for Large Enterprises</td>
<td>10:45 AM - 11:30 AM</td>
<td>Marriott Marquis - Golden Gate C3</td>
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<tr>
<td>CON4114</td>
<td>Advanced Diagnostics and Monitoring with Oracle Enterprise Manager 12c</td>
<td>10:45 AM - 11:30 AM</td>
<td>Moscone South - 301</td>
</tr>
</tbody>
</table>
# Enterprise Manager Sessions – Thursday, October 2nd

<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
<th>Time</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>CON2699</td>
<td>Oracle Exadata’s Exachk and Oracle Enterprise Manager 12c: Keeping Up with Oracle Exadata</td>
<td>10:45 AM - 11:30 AM</td>
<td>Moscone South - 310</td>
</tr>
<tr>
<td>CON4448</td>
<td>PDBaaS with Oracle Enterprise Manager 12c</td>
<td>12:00 PM - 12:45 PM</td>
<td>Marriott Marquis - Golden Gate C3</td>
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<tr>
<td>CON10038</td>
<td>Customer Panel: Private Cloud Consolidation, Standardization, and Automation</td>
<td>12:00 PM - 12:45 PM</td>
<td>Moscone South - 301</td>
</tr>
<tr>
<td>CON8244</td>
<td>Manage the Manager: Tips on How to Best Manage Oracle Enterprise Manager 12c</td>
<td>1:15 PM - 2:00 PM</td>
<td>Marriott Marquis - Golden Gate C3</td>
</tr>
<tr>
<td>CON8015</td>
<td>Security Compliance and Data Governance: Dual Problems, Single Solution</td>
<td>1:15 PM - 2:00 PM</td>
<td>Moscone South - 301</td>
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<tr>
<td>CON7718</td>
<td>Managing and Monitoring Oracle GoldenGate</td>
<td>1:15 PM - 2:00 PM</td>
<td>Moscone South - 302</td>
</tr>
<tr>
<td>CON7697</td>
<td>Oracle Enterprise Manager 12c Cloud Control for Managing Oracle E-Business Suite 12.2</td>
<td>1:15 PM - 2:00 PM</td>
<td>Moscone West - 2018</td>
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<tr>
<td>CON6083</td>
<td>Real-World Operation Excellence with Oracle Enterprise Manager 12c: Taking It to the Next Level</td>
<td>2:30 PM - 3:15 PM</td>
<td>Marriott Marquis - Golden Gate C3</td>
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<tr>
<td>CON8493</td>
<td>Odyssey of DBaaS: A UBS Story</td>
<td>2:30 PM - 3:15 PM</td>
<td>Moscone South - 301</td>
</tr>
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</table>
## Enterprise Manager Demos

<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
<th>Location</th>
<th>Area</th>
<th>Demopod #</th>
</tr>
</thead>
<tbody>
<tr>
<td>3943</td>
<td>Application and Infrastructure Testing</td>
<td>Moscone West, Lower Left</td>
<td>Applications</td>
<td>WLL-020</td>
</tr>
<tr>
<td>3962</td>
<td>Automatic Application and SQL Tuning</td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-106</td>
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<tr>
<td>3946</td>
<td>Automatic Fault Diagnostics</td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-101</td>
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<tr>
<td>3963</td>
<td>Automatic Performance Diagnostics</td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-103</td>
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<tr>
<td>3944</td>
<td>Automatic Workload Repository Warehouse</td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-111</td>
</tr>
<tr>
<td>3948</td>
<td>Automation and Storage Savings with Database as a Service and Snap Clone</td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-102</td>
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<tr>
<td>3921</td>
<td>Complete Data Center Monitoring with Oracle Enterprise Manager 12c</td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-112</td>
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<tr>
<td>3947</td>
<td>Complete Database Lifecycle Management</td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-107</td>
</tr>
<tr>
<td>3881</td>
<td>End User Monitoring and Diagnostics with Oracle Enterprise Manager 12c</td>
<td>Moscone South, Left</td>
<td>Middleware</td>
<td>SLM-109</td>
</tr>
<tr>
<td>4028</td>
<td>Identity Management Monitoring with Enterprise Manager 12c</td>
<td>Moscone South, Left</td>
<td>Middleware</td>
<td>SLM-141</td>
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</tbody>
</table>
## Enterprise Manager Demos

<table>
<thead>
<tr>
<th>ID</th>
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<th>Area</th>
<th>Demopod #</th>
</tr>
</thead>
<tbody>
<tr>
<td>3928</td>
<td><strong>Middleware PaaS in Private Cloud with Oracle Enterprise Manager 12c</strong></td>
<td>Moscone South, Left</td>
<td>Middleware</td>
<td>SLM-111</td>
</tr>
<tr>
<td>3925</td>
<td><strong>Oracle Applications and Business Intelligence Management with Oracle Enterprise Manager 12c</strong></td>
<td>Moscone West, Lower Left</td>
<td>Applications</td>
<td>WLL-023</td>
</tr>
<tr>
<td>3966</td>
<td><strong>Oracle Enterprise Manager Cloud Control 12c Overview</strong></td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-105</td>
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<tr>
<td>3949</td>
<td><strong>Oracle SuperCluster and Oracle VM for SPARC Management with Oracle Enterprise Manager Ops Center 12c</strong></td>
<td>Moscone South, Center</td>
<td>Systems, Servers, Virtualization</td>
<td>-SC-158</td>
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<tr>
<td>3942</td>
<td><strong>Oracle WebLogic Server and Oracle Coherence Management with Oracle Enterprise Manager 12c</strong></td>
<td>Moscone South, Left</td>
<td>Middleware</td>
<td>SLM-107</td>
</tr>
<tr>
<td>3945</td>
<td><strong>Risk-Free Database Administration with SQL Performance Analyzer and Database Replay</strong></td>
<td>Moscone South, Left</td>
<td>Database</td>
<td>SLD-108</td>
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<tr>
<td>3926</td>
<td><strong>SOA and Service Bus Management with Oracle Enterprise Manager 12c</strong></td>
<td>Moscone South, Left</td>
<td>Middleware</td>
<td>SLM-140</td>
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Enterprise Manager One Hour Hands-On Labs
Monday 9/29 at Hotel Nikko

<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
<th>Time</th>
<th>Room</th>
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<tbody>
<tr>
<td>HOL9508</td>
<td>Oracle Enterprise Manager Database as a Service: Automation for Broader Cloud Services</td>
<td>01:15 – 02:15</td>
<td>Hotel Nikko - Carmel</td>
</tr>
<tr>
<td>HOL9529</td>
<td>Rapidly Mass-Deploy Oracle Fusion Middleware with Oracle Enterprise Manager 12&lt;i&gt;c&lt;/i&gt; Provisioning</td>
<td>02:45 – 03:45</td>
<td>Hotel Nikko - Nikko Ballroom I</td>
</tr>
<tr>
<td>HOL9532</td>
<td>Achieving Standardization with Oracle Enterprise Manager Database Lifecycle Management</td>
<td>04:15 – 05:15</td>
<td>Hotel Nikko - Carmel</td>
</tr>
<tr>
<td>HOL9530</td>
<td>Risk-Free Database Consolidation for Private Clouds with Oracle Real Application Testing</td>
<td>05:45 – 06:45</td>
<td>Hotel Nikko - Carmel</td>
</tr>
<tr>
<td>ID</td>
<td>Title</td>
<td>Time</td>
<td>Room</td>
</tr>
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<td>-----------------------------------------------------------------------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>HOL9528</td>
<td>Private Cloud Self-Service, Oracle Fusion Middleware PaaS with Oracle Enterprise Manager 12c</td>
<td>03:45 – 04:45</td>
<td>Nikko Ballroom I</td>
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<tr>
<td>HOL9509</td>
<td>Oracle Enterprise Manager 12c: Oracle WebLogic Server and SOA Diagnostics and Administration</td>
<td>05:15 – 06:15</td>
<td>Nikko Ballroom I</td>
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<tr>
<td>HOL9508</td>
<td>Oracle Enterprise Manager Database as a Service: Automation for Broader Cloud Services</td>
<td>05:15 – 06:15</td>
<td>Carmel</td>
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<tr>
<td>HOL9484</td>
<td>Maximizing Oracle Database 12c Performance with Oracle Enterprise Manager</td>
<td>06:45 – 07:45</td>
<td>Carmel</td>
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</table>
Enterprise Manager One Hour Hands-On Labs
Wednesday 10/1 at Hotel Nikko

<table>
<thead>
<tr>
<th>ID</th>
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<th>Time</th>
<th>Room</th>
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<tr>
<td>HOL9484</td>
<td>Maximizing Oracle Database 12c Performance with Oracle Enterprise Manager</td>
<td>02:45 – 03:45</td>
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<td>HOL9532</td>
<td>Achieving Standardization with Oracle Enterprise Manager Database Lifecycle Management</td>
<td>04:15 – 05:15</td>
<td>Carmel</td>
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<tr>
<td>ID</td>
<td>Title</td>
<td>Time</td>
<td>Room</td>
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<tr>
<td>HOL9484</td>
<td>Maximizing Oracle Database 12c Performance with Oracle Enterprise Manager</td>
<td>10:00 – 11:00</td>
<td>Carmel</td>
</tr>
<tr>
<td>HOL9509</td>
<td>Oracle Enterprise Manager 12c: Oracle WebLogic Server and SOA Diagnostics and Administration</td>
<td>11:30 – 12:30</td>
<td>Nikko Ballroom I</td>
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<tr>
<td>HOL9528</td>
<td>Private Cloud Self-Service, Oracle Fusion Middleware PaaS with Oracle Enterprise Manager 12c</td>
<td>01:00 – 02:00</td>
<td>Nikko Ballroom I</td>
</tr>
</tbody>
</table>
Hardware and Software
Engineered to Work Together
Application Deployment

1. Cloud Setup
   - Cloud/SSA Admin
   - Setup DBaaS/MWaaS

2. App Setup
   - Build App using Shared Components
   - Setup Self Service Portal
   - Setup Shared Components

Business Application

3. App Use
   - Use Application
   - Deploy using Self Service
   - App Owner

Current Application Deployment

- 11.2.0.3 DB with PSU2
- 10.3.6 WLS with PSU2
- App Code

- 11.2.0.2 DB with PSU1
- 12c WLS
- App Code

Application Code

- Oracle Fusion Middleware
- Oracle Database
- Operating System
- Hardware

Self Service Portal

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Path to Platform-as-a-Service

- **Traditional Silos**: Simple
- **Standardized Platform**: Efficient
- **Consolidated Platform**: Agile
- **Service Delivery Platform**: Service Catalog
  - Standardized Platform, Processes
  - Resource Pooling
  - Rapid Provisioning
  - Dynamic Resource Allocation
  - On-demand self-service
  - Rapid elasticity
  - Measured service
  - IT as Service Provider
Candidate Applications

Best Practice Approach

- Selection Criteria
  - Business Critical Application
    - UAT Instances
    - Provisioned and De-provisioned a lot
  - New Application
    - Dev/UAT Instances

- Things to Keep in Mind
  - Application’s technical readiness for cloud
    - Name-space conflicts (SCaaS)
    - Character Set, I/O Rate Requirement
  - Business Constraints like SLA, Security, Compliance Restrictions
Standardize and Consolidate

• Consider Standardization and Consolidation as you adopt Cloud For example
  • Standardize from
    – OS - AIX 6.1, 5.1, Linux 5.1, 5.2
    – DB Oracle Home 11.2.0.3, 11.2.0.2.0, 11.2.0.4, 12.1.0.1/MW Home 10.3.6, 12.1.2
  • Consolidate to
    – Small – Linux 6.1 running 11.2.0.4 PSU 3 DB with 2 GB SGA/MW 12.1.2 with 1 GB Heap
    – Large – Linux 6.1 running 11.2.0.4 PSU 3 DB with 8 GB SGA/MW 12.1.2 with 4 GB Heap

• Avoid Software Configuration Pollution – No 1 roadblock to PaaS
• Resource Pools and Service Catalog design helps Standardize and Consolidate

Additional Tools to help plan, test and validate Consolidation decisions
Use EM12c Consolidation Planner to generate Consolidation Recommendations
http://docs.oracle.com/cd/E24628_01/doc.121/e28814/consolid_plan.htm#EMCLO966
Use Oracle Real Application Testing to Test Consolidation Recommendations
http://docs.oracle.com/cd/E24628_01/server.121/e20852/toc.htm
## Consolidation Model

<table>
<thead>
<tr>
<th></th>
<th>Virtual Machines</th>
<th>Dedicated DB</th>
<th>Dedicated Schema</th>
<th>Pluggable DB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consolidation Density</strong></td>
<td>Low-Moderate</td>
<td>High</td>
<td>Highest</td>
<td>Highest</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>Very Complex (VM Sprawl)</td>
<td>Easy</td>
<td>Easy to Complex</td>
<td>Easiest</td>
</tr>
<tr>
<td><strong>Isolation</strong></td>
<td>Highest</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>Implementation and On-boarding</strong></td>
<td>Easy</td>
<td>Easy</td>
<td>Difficult</td>
<td>Easiest</td>
</tr>
<tr>
<td><strong>Application Suitability</strong></td>
<td>Not all workloads</td>
<td>All</td>
<td>Require app validation</td>
<td>All</td>
</tr>
</tbody>
</table>
Planning PaaS Infrastructure

Sizing

• Consider Aggregate amount of resources (Memory, Storage) available to SSA Admin and plan Quota accordingly
  – Database as Service
    • Application1 - 3 large databases each using 8GB Memory (SGA+PGA), 1000GB Storage and 6 CPUs
    • Application2 - 5 medium databases each using 4 GB Memory (SGA+PGA), 300GB storage and 2 CPUs
    • Head Room – 80% Memory, 80% CPU Utilization
  – Middleware as Service
    • Application1 - 3 large FMW instances each using 4GB Memory (HeapSize) and 6 CPUs
    • Application2 - 5 Medium FMW instances each using 2GB Memory (HeapSize) and 6 CPUs
    • Head Room – 80% Memory, 80% CPU Utilization
Planning PaaS Infrastructure

**Access Control**

- Eliminate External Dependencies
  - External groups (network, storage, system) have different priorities
  - Prepare platform so that Cloud Administrators have full control over everything they need to provision a new service
    - Change Management Approval
    - Host or Hardware Administrators
    - Network Administrators
    - Security Administrators
    - System Administrators
    - Database/Middleware Administrators
  - Revoke access of platform from Cloud end users
Design Service Catalog

Service Definition
Define service tiers to simplify your offerings

Technical Service
Establish the technical footprint of each service tier

Service Model
Determine the individual services to be provisioned

Resource Model
Align services with homogeneous resource Pool

Bronze
Silver
Gold

- RAC
- Data Guard
- Backups

Small
Medium
Large

PDB
Database
Schema

11.2.0.4
11.2.0.4
12.1.0.1
10.2.0.5
11.2.0.4
## Designing Service Catalog

<table>
<thead>
<tr>
<th>Service Catalog</th>
<th>Bronze</th>
<th>Silver</th>
<th>Gold</th>
<th>Platinum</th>
<th>Diamond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>Best effort</td>
<td>95%</td>
<td>99.50%</td>
<td>99.90%</td>
<td>99.99%</td>
</tr>
<tr>
<td>Disaster Recovery (Extended Service)</td>
<td>RTO N/A</td>
<td>5 day</td>
<td>4 hours</td>
<td>2 hours</td>
<td>1 hour</td>
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<tr>
<td>RPO</td>
<td>N/A</td>
<td>1 day</td>
<td>1 hour</td>
<td>&lt; 1 min</td>
<td>&lt; 1 min</td>
</tr>
<tr>
<td>Database Configuration</td>
<td>&lt;= 1 hour</td>
<td>&lt;= 3 hours</td>
<td>&lt;=4 hours</td>
<td>&lt;=8 hours</td>
<td>&lt;=24 hours</td>
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<tr>
<td>DB Size</td>
<td>100GB</td>
<td>200GB</td>
<td>200GB</td>
<td>250GB</td>
<td>20TB</td>
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<tr>
<td>Alert and Response Time</td>
<td>Sev 1 &lt;=4 hours Sev 2 &lt;= 1 day</td>
<td>Sev 1 &lt;=1 hour Sev 2 &lt;= 4 hours</td>
<td>Sev 1 &lt;=15 mins Sev 2 &lt;= 4 hours</td>
<td>Sev 1 &lt;=15 mins Sev 2 &lt;= 2 hours</td>
<td>Sev 1 &lt;=15 mins Sev 2 &lt;= 1 hour</td>
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<tr>
<td>DB provisioning target time</td>
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<td>&lt;= 3 hours</td>
<td>&lt;=4 hours</td>
<td>&lt;=8 hours</td>
<td>&lt;=24 hours</td>
</tr>
<tr>
<td>Database Configuration</td>
<td>Single instance</td>
<td>RAC 1-node</td>
<td>2 Node RAC</td>
<td>2 Node RAC + SI Standby</td>
<td>3 Node RAC + RAC Remote Standby</td>
</tr>
<tr>
<td>Storage Mirroring</td>
<td>Dual</td>
<td>Dual</td>
<td>Triple</td>
<td>Triple</td>
<td>Triple</td>
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<tr>
<td>Database Version</td>
<td>11g, 12c</td>
<td>11g, 12c</td>
<td>11g, 12c</td>
<td>11g, 12c</td>
<td>11g, 12c</td>
</tr>
</tbody>
</table>
Snap Clone
Software Solution Architecture
Patch

• Patch Categories
  – Type ‘A’: CPUs, PSUs, Bundle Patches and other Interim (one-off) Patches
  – Type ‘B’: Patchsets
Patch

• Type 'A' Patching Best Practice HA Pool for Database, Schema and/or Pluggable Database
  – Adopt the latest GI PSU patch
  – It does not update database release version information
  – Use EM Patch Plan and apply PSU patch in rolling mode

• Type 'A' Patching Best Practice: SI Pool for Database, Schema and/or Pluggable Database
  – Adopt the latest Database PSU patch
  – Use EM Patch Plan and apply patch using In-Place Patching mode
Patch

• Type 'B' Patching : HA Pool for Database, Schema and/or Pluggable Database
  – Upgrade Oracle Cluster Database using Deployment Procedure
  – GI Home will get upgrade to new version
  – Oracle Home with new version will get provisioned

• Type 'B' Patching : SI Pool for Database, Schema and/or Pluggable Database
  – Upgrade Oracle Database Instance using Deployment Procedure
  – Oracle Home with new version will get provisioned
  – Listener will get started using upgraded version Oracle Home

• Type 'B' Patching – Post Action
  – SSA Admin creates a new Pool for upgraded version
  – SSA Admin creates new Profile and Service Templates for upgraded version