Middleware as a Service with Oracle Enterprise Manager 12c
EM Cloud Management Team
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

- Current Challenges
- Middleware as a Service (comprising Java PaaS)
- Implementation case studies
- Recap and Key Differentiators
Challenges in Middleware Consumption

**IT Admin**
- Sprawl of Middleware environments cause administrative and compliance challenges
- No tool to enforce usage of “golden image”
- High maintenance cost of home-grown, ad-hoc management solution

**Developers**
- Absence of self-service model with declarative SLA’s
- Lost productivity for environment setup (having to deal with IaaS concepts)
- Steep learning curve for middleware management
- Burden to manually scale out environments
Deploying Applications is time consuming

- Limited Automation
- No clear abstraction and separation between infrastructure, platform and applications

1 to 2 weeks

1-2 days 1-5 days 1-5 days 1 day 1-2 days Start
Competing Priorities at Odds

Developers Demand Flexibility **BUT** IT Requires Standardization

- Rapid development
- Choice of components and configurations

- Certified stacks and frameworks
- Known environments and patterns
- Standardized security, monitoring, management

Rapid Provisioning and Management

Performance, Scalability, Reliability

Security Best Practices

Increase H/W Utilization & Efficiency

Web
Desktop
Mobile
Office

Database
Web Services
Middleware
Tools
Frameworks
Middleware as a Service

- Middleware as a Service provides
  - A shared, consolidated platform to provision middleware services on
  - A self-service model of deploying and managing applications
  - Seamless integration with other services like Database as a Service (DBaaS)
  - Elasticity to scale out and scale back resources
  - Metering and Chargeback based on usage of the platform and underlying infrastructure
- Middleware as a Service needs to cater to various user personas
  - A Developer or a project owner requiring an application with/without database
  - QA requiring a full environment for testing
Traditional vs MWaaS Models

**Traditional App Deployment**  
*Admin driven*

- Specify and procure hardware
- Configure hardware
- Deploy hardware
- Deploy middleware and database
- Deploy app and configure settings
- Add hardware and reconfigure stack as demand grows

**Platform-as-a-Service Deployment**  
*End-user driven*

Self-Service Portal
- Request App Deployment
- Optimize resources on-demand
- Retire app when not needed
- User unaware of underlying infra

Self-Service Provisioning

Middleware  
Database  
OS/Machines

J2EE App
Middleware as a Service

Four Essential Components

• Consolidation
  • Ability to consolidate middleware workloads on common infrastructure

• Standardization
  • Ability to create standard middleware services without creating configuration sprawl

• Automation
  • Ability to provision middle instances in an agile and automated manner

• Showback/Chargeback
  • Ability to meter the usage
MWaaS Consolidation Models
For Conventional and Engineered Environments

Industry’s top choice for Conventional Systems

WebLogic Server MWaaS

Deploy/Run on Conventional Systems

Enhanced for Oracle VM based IaaS

WebLogic Server MWaaS

Deploy/Run on Conventional Systems

Optimized for Engineered Systems

WebLogic Server MWaaS

Deploy/Run on High Performance Engineered Systems
Consolidation with Flexibility

Rich Resource Model

- Infrastructure Zone: Collection of compute resources, physical or virtual
  - Organize resources by geography, organization, lifecycle, examples: Development vs. Production, East Coast vs. West Coast
- A PaaS Zone can contain Database Pools and/or Middleware Pools.
- A Database Pool is a collection of homogeneous (4 digit version)
  - Single Instance or RAC Oracle Homes (Database as a Service)
  - Single Instance or RAC Databases (for Schema as a Service)
- A Middleware Pool is a collection of homogeneous Fusion Middleware Oracle Homes

Cloud User

Application

PaaS cloud

Cloud Provider

PaaS Infrastructure Zone
(Physical or virtual servers)
MWaaS Standardization

Versions and Technologies

- Provides a resource pooling mechanism to pool together homogeneous set of platform resources
  - Versions
  - Technologies
- Enforces governance for resource consumption
  - Placement policies based on load and configuration
  - Quota, retirement policies
  - Access to WLS Admin Console & FMWCTL
- Provides a guided workflow to create a Service Catalog for providing middleware services
MWaaS Service Catalog
Guided workflow to publish services to the catalog

- Capture deployment profiles or assemblies
- Configure deployment procedures
- Publish as Service Template
Service Templates

- What bits to deploy?
- How to tailor the resource instance?
- How to deploy a new service instance?

EM Service Catalog

Service Template

Deployment Artifacts

Provisioning Logic

Configuration Parameters
Placement Algorithm

**GOAL:** Find suitable hosts to create the requested instance without affecting neighboring instances

- **Average Load:** Avg. CPU and Memory utilization over the last 7 days
- **Current Population:** No. of WLS instances on a host
- **Placement Policy Constraint Limits:** Max limit on CPU & Memory utilization or number of instances
- **Estimated Resource Usage:** Memory usage post instance creation

First/Best Match

Host1  Host2
MWaaS Automation
Self-service provisioning and service lifecycle management

• Out-of-box console for Self-Service Provisioning
  • Can cater to WLS administrators, Developers, QA
• Agile, push button method for handling
  • Provisioning simple vanilla WLS domains for developers
  • Cloning fully configured WLS domains for intense testing
  • Enabling load-balancer for HA
  • Scaling up and down WLS clusters
• REST admin APIs for external integration and orchestration
Out-of-box Provisioning Mechanism
Flexibility to be deployed on any infrastructure

On physical hosts or 3rd party hypervisors
- Deployment Procedures + Middleware Profiles
- Customize Profiles for creating different services

On Oracle VM based infrastructure
- Assemblies + Deployment Plans
- Create new or leverage Oracle supplied Assemblies
Cloud self-service portal
Out-of-the-box, Customizable

- Unified self-service environment
  - DBaaS & MWaaS
- Comprehensive capabilities
  - Service provisioning
  - Service lifecycle operations
  - Resource configuration monitoring
  - Pre and post scripts, e.g. for load-balancer configuration
  - DBaaS-MWaaS integration
  - On-demand scaling-up/down
  - Optional access to Weblogic Console
- RESTful API support
## Comprehensive Self-Service APIs

MWaaS operations can be integrated with higher level orchestration

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud</td>
<td>A cloud represents the user's starting view of all accessible resources</td>
<td>GET, PUT, DELETE</td>
</tr>
<tr>
<td>Service Family Type</td>
<td>A Service family type is a category of services that are offered by the cloud. For example, IaaS, DBaaS, MWaaS, etc. These categories are predefined.</td>
<td>GET, PUT, DELETE</td>
</tr>
<tr>
<td>PaaS Zone</td>
<td>A PaaS Zone represents a logical boundary where the resources may reside to support deployment of database services</td>
<td>GET, PUT, DELETE</td>
</tr>
<tr>
<td>Software Pool</td>
<td>A Middleware Pool represents a set of homogeneous Fusion Middleware Home's.</td>
<td>GET, PUT, DELETE</td>
</tr>
<tr>
<td>MWaaS Service Instance</td>
<td>A MWaaS Service instance is a WLS domain provisioned based on the Service Template details.</td>
<td>GET, PUT, DELETE</td>
</tr>
</tbody>
</table>
Orchestrating it all together
Cloud APIs and Blueprints

- Cloud operations are enabled through RESTful APIs that can be orchestrated through
  - 3rd party orchestrators
  - EM 12c Blueprints
- Blueprints orchestrate multi-layered cloud services to create an application
  - Analogous to AWS CloudFormation
  - Promotes use of proven, standard system topologies/configurations
  - Users get consistency, reproducibility, fewer errors
  - Graphical representation for better usability
  - Released to the community via OTN
MWaaS Showback/Chargeback

IT Accountability

- Flexible metering and chargeback based on:
  - Configuration and monitoring information
  - Host and Managed Server level
- Automated rollup using LDAP hierarchy
- Out-of-box reporting for business users (via BI Publisher)
- APIs for integration with billing systems
Establishing Chargeback/Showback

Middleware or DB Specific Metering Rules

• Associate cost of each resource, beyond just CPU and Memory
• Example: Java services
  • # Nodes
  • # User Requests
• Account for fixed costs (license costs, management, power, etc.) in chargeback plans
• Vary based on configuration of service
Chargeback Reporting
Tailored for different user types

Chargeback Administrator
• Rollup based on LDAP hierarchy
• Summary and Trending reports for Usage and Charge
• Drilldowns

Self-Service Portal User
• Charge Trend reports broken down by resource
• Selectable detail levels
• Charge Plan configuration

Line of Business User
• Integrate with BI Publisher
• Generate Reports in variety of formats
• Excel, Word, HTML, PowerPoint, PDF
• Email or FTP reports
Administrative Operations

Ongoing Monitoring of Cloud Resources

- Manage PaaS Zones and software pools
- Track service instances, templates, and middleware clusters
- Drill down into individual resources for deeper monitoring
- Monitor new requests and debug job failures
Total Cloud Operations Control
Systems, Infrastructure & Apps, Managed from a single console

App-to-Disk Monitoring
- Monitoring across Applications, Middleware, Databases, Systems
- SLAs, and end-to-end transaction tracking
- Deep Diagnostics

Cloud Support Console
- View, manage, diagnose and resolve problems
- Incident lifecycle operations
- Accelerated resolution with My Oracle Support

Configuration Management
- Auto-discovery and dependency tracking
- Track and manage configuration drift
- Change detection and auditing

Cloud Downtime Management
- Blackout periods for maintenance
- Integrates with My Oracle Support for advisories, health checks, etc.
- Patch Advisories for Database, Middleware, Linux and Solaris

ORACLE
Proof of Value: 10X Faster Provisioning
Multi-Customer Study By Crimson Consulting

“With Oracle Enterprise Manager 12c we cut the time required to provision our RAC systems in half.”
Oracle DBA, telecommunications firm

“Standardized builds based on Enterprise Manager templates are a massive plus…you get fewer errors, lower downtime, fewer infrastructure issues, and faster application development.”
Oracle DBA, broadcast and telecommunications firm

“I can give a set of business resources to a business segment and they can be responsible for the capacity that they stand up.”
Infrastructure team manager, computer tech firm

<table>
<thead>
<tr>
<th>Provisioning Time</th>
<th>Before EM12c (hrs)</th>
<th>With EM12c (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBaaS</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>DBaaS + MWaaS</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>Full App Stack</td>
<td>300</td>
<td>200</td>
</tr>
</tbody>
</table>
Oracle Cloud: A Case Study

Self-service Java Application Deployment
- Deploy/Redeploy/Un-deploy
- Start/Stop
- Debug - View Application Logs

Java Service Instance and Application Monitoring
Meeting the needs of a truly Enterprise scale Cloud

- 338055 targets
- 6737 hosts
- 2200 database instances on 876 clusters and 35 Exadata machines
- 50096 J2EE apps on 25098 Weblogic servers
- 32894 jobs per week
- 55 Compliance Standards
- 125,983,703 page views per day
# Enterprise Manager 12c: Cloud Management Recap

## Cloud Orchestration Blueprints

### IaaS
- Single VM template provisioning
- Multi-tier app (assembly) provisioning
- Policy driven resource scale out and scale back
- Live migration and power management
- Host and VM level chargeback
- Certification of Oracle VM 3.2.3

### DBaaS
- Self-Service provisioning of seed databases
- Integrated database lifecycle management
- Chargeback for database services
- Schema-as-a-Service
- Snap Clone
- Full Clone using RMAN

### Java-aaS
- Self-Service provisioning of Java applications
- Application level scale out and scale back
- Java Application lifecycle management
- Chargeback for Java Services

### TaaS
- Orchestration of test processes
- Self-service provisioning of test environments
- Rich monitoring and advanced diagnostics
- Chargeback and Metering

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* As of 12c Rel 3
Key Differentiators

• Truly Infrastructure independent MWaaS
• The most complete and enterprise ready MWaaS solution
• Integrated with industry’s leading DBaaS solution
• The most comprehensive Cloud Lifecycle Management solution - all the way from initial provisioning to sunsetting
Q&A
Hardware and Software

Engineered to Work Together