Oracle Enterprise Manager Middleware as a Service Overview

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Executive Overview

Organizations today need to innovate continuously. Primary business goal of all our customers is to bring in new offerings in market as early as possible. IT organizations are working closely with development teams these days to quickly provision and deploy resources so as to improve business agility. However, development team in a typical organization sees many challenges for rapid development. When it comes to provisioning of new resources, IT team finds it very difficult to setup and configure complex environment with multitier application resulting in very slow response to request from development team.

On the other hand IT team sees multiple challenges; they are always crippled with increasing demand. Also continuous changes in technology make their job more challenging.

As a result when we look at business impact, there is huge loss in productivity and lot of time is wasted in non-productive tasks. Time to market is increased substantially due to slow response. Also lots of resources are wasted resulting in low resource utilization.

Oracle Enterprise Manager 12c (12.1.0.5) offers solution for all these problems by automating entire provisioning cycle. It provides shared, consolidated platform to provision middleware services and complete automation to reduce provisioning time to just few minutes which otherwise takes 3-4 weeks. Based on where organization stands on its cloud journey, Oracle Enterprise Manager can help organization to discover and monitor middleware estate including Oracle WebLogic Server, SOA, Service Bus, Oracle WebCenter and non-Oracle JVMs to standardize offering through service catalogue to help organization consolidate middleware resources and avoid configuration sprawl; and to automate provisioning to offer middleware as a service with quota management and governance for end users. Finally, the rich set of Rest API's help organizations to orchestrate service catalogue and integrate with complex work flow.

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Introduction

Oracle Enterprise Manager is the complete data center management solution catering to all cloud management needs in a data center. It provides foundation features to manage complete Oracle RED STACK – storage, servers, virtualization management software, OS, databases, middleware and applications. With EM 12c (12.1.0.5), it now provides single pane of glass to manage on-premises and Oracle Cloud environments. It also provides complete cloud management capabilities including Self Service provisioning, Metering and Chargeback, Resource management and Capacity planning.

This paper gives an overview of Middleware as a service solution that helps organizations consolidate, standardize, provision, discover and manage entire middleware estate.

Challenges in organizations

Due to highly competitive environment, organization today needs to innovate continuously. Primary business goal of all our customers is to bring in new offerings in market as early as possible. IT organizations are working closely with DevOps teams these days to quickly provision and deploy resources so as to improve business agility. However, various teams in organization including development, QA and IT operations see many challenges to improve business agility like –

- Slow response from IT: Development team in a typical organization see this as biggest challenge. There is slow response from IT team when it comes to provisioning of new resources. It is very difficult to setup and configure complex environment with multi-tier applications.

- Lock down of resources: IT teams struggles with resource constraints always. A typical project team extends allocation of resources for various reasons like new projects, extended scope or delayed projects. As a result IT team always sees a challenge while provisioning new resources due to high demand. They also need to keep learning new skills to keep pace with technological advances.

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- Delayed deployments due to multiple roles and people: This is the biggest pain point of organizations today. There are many people with different roles involved in the provisioning cycle. Typically, servers compute or VM's are provided by system administrators, storage is provided by storage administrators, databases are installed by database administrators, WebLogic instances and web-servers are created by middleware administrators, load balancer is installed and configured by network administrator. So to deploy a typical Java EE application rapidly, it is not sufficient to get just resources but all these administrators need to work with each other to their own bit.

Oracle Enterprise Manager Approach – Middleware as a Service (MWaaS)

MWaaS extends the Oracle Private Cloud Management solution by automating the lifecycle of a middleware and allowing users to request WebLogic services through self-service portal. With this solution, IT Managers no longer have to perform mundane administrative tasks for provisioning middleware. Middleware users can get instantaneous access to new WebLogic services through the Self Service Portal.

MWaaS in Oracle Enterprise Manager extends the capabilities of the Private Cloud by:

- Increasing Quality of Service: IT organizations are not only trying to drive down costs, they are also looking at solutions that will simultaneously improve quality of service in terms of performance, availability and security. Cloud consumers inherently benefit from the high availability characteristics built into the Private Cloud. Organizations can also enforce a unified identity and security infrastructure as part of standardized provisioning. Thus, instead of bolting on security policies, these policies and compliance regulations are part of the provisioning process.

- Enabling Faster Deployment: Building the Private Cloud infrastructure using standard building block components (for example, servers, CPUs, storage, and network), configurations, and tools enables a streamlined, automated, and simplified deployment process.

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- Providing Resource Elasticity: The ability to grow and shrink the capacity of a given middleware, both in terms of storage size and compute power allows the applications meet the dynamic nature of business workloads.

- Rapid Provisioning: Middleware in a cloud can be rapidly provisioned, often by way of a self-service infrastructure, providing agility in application deployment. This reduces overall time in deploying production applications, development platforms or creating test bed configurations.

- IT Accountability: Through quota and chargeback mechanism, IT can have control over usage of Middleware licenses and resources by consuming departments and lines of business.

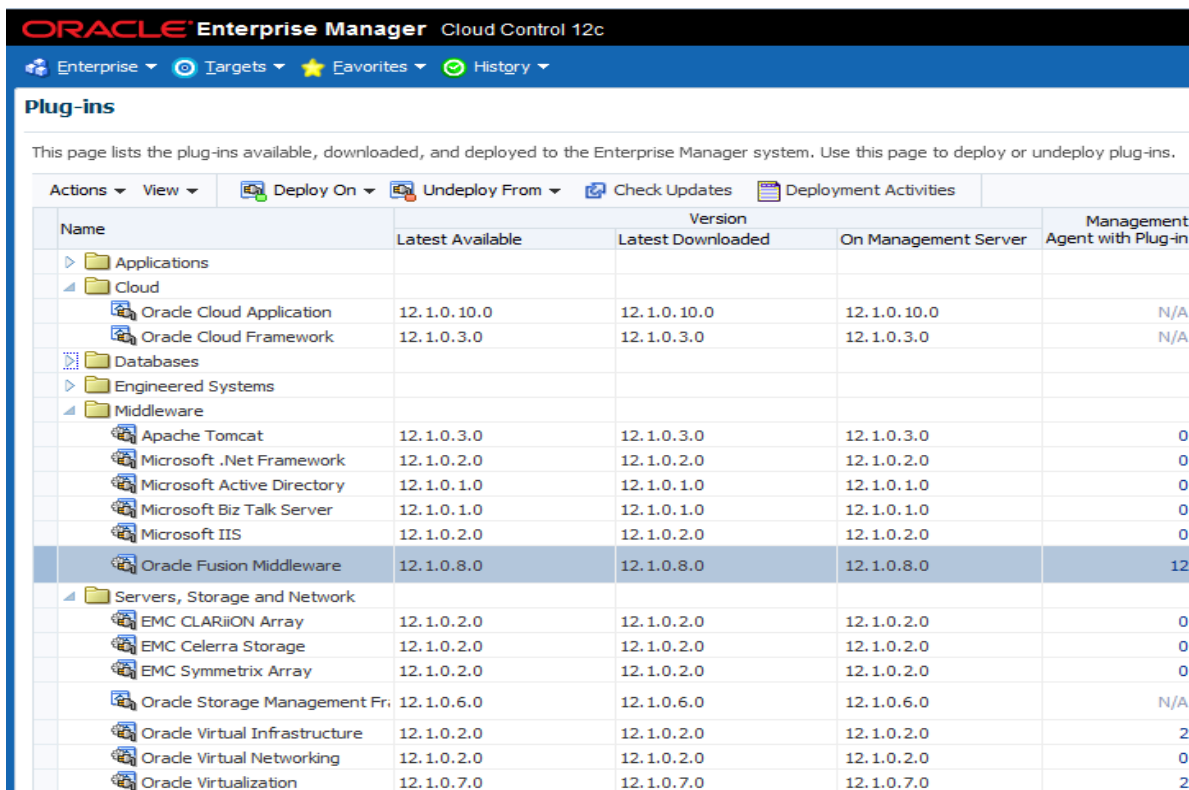To enable MWaaS, Oracle Enterprise manager uses many building blocks:

- Infrastructure Zone – the collection of hosts/compute resources which can be physical or virtual. A zone can be defined at geography level like east coast zone, west coast zone etc; or at org level like zone for finance or HR; or at lifecycle like zone for development, testing, pre-production etc.

- Resource Pool – the homogenous collection of fusion middleware homes where new domains will be provisioned.

- Service templates – define service catalogue with a list of standardized service definitions for self service users. Service templates provide standardized service definitions through combination of three parts –

  ○ Deployment Artifacts – indicate what bits to deploy. For SOA, Service Bus or WebCenter, it contains binaries, Oracle Home and domain configuration.

  ○ Configuration Parameters – indicate user defined configurations for tuning, for example a typical SOA instance can be configured with small, medium or large heap sizes. Such tuning configuration can be bundled with service templates.

  ○ Provisioning logic – constitute scripts which will provision all these bits.

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All these parts are bundled in service template and offered to the end users. When an end user requests a new instance, the new instance is created with these bits and deployed on pre-configured zone where resources are pooled together.

Oracle Cloud Management Pack for Oracle Middleware

Oracle Cloud Management Pack for Oracle Middleware delivers capabilities spanning the entire middleware cloud lifecycle. It lets cloud administrators identify pooled resources, configure role-based access, define the service catalog, and the related chargeback plans. It allows cloud users to request middleware services, and consume them on-demand. It also allows users to scale-up and down their platforms to adapt the changes in workload. Finally, it enables both parties to understand the costs of the service delivered, and establish accountability for consumption of resources.

The key benefit of a middleware cloud is to enable faster deployment of typical platforms by moving away from admin driven provisioning to end user driven.

ORACLE Enterprise Manager Cloud Control 12c

Enterprise ▾ Targets ▾ Favorites ▾ History ▾

Plug-ins

This page lists the plug-ins available, downloaded, and deployed to the Enterprise Manager system. Use this page to deploy or undeploy plug-ins.

Actions ▾ View ▾   Deploy On ▾   Undeploy From ▾   Check Updates   Deployment Activities

Name	Version			Management Agent with Plug-in
	Latest Available	Latest Downloaded	On Management Server	
▷ 📁 Applications				
◢ 📁 Cloud				
Oracle Cloud Application	12.1.0.10.0	12.1.0.10.0	12.1.0.10.0	N/A
Oracle Cloud Framework	12.1.0.3.0	12.1.0.3.0	12.1.0.3.0	N/A
▷ 📁 Databases				
▷ 📁 Engineered Systems				
◢ 📁 Middleware				
Apache Tomcat	12.1.0.3.0	12.1.0.3.0	12.1.0.3.0	0
Microsoft .Net Framework	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0	0
Microsoft Active Directory	12.1.0.1.0	12.1.0.1.0	12.1.0.1.0	0
Microsoft Biz Talk Server	12.1.0.1.0	12.1.0.1.0	12.1.0.1.0	0
Microsoft IIS	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0	0
Oracle Fusion Middleware	12.1.0.8.0	12.1.0.8.0	12.1.0.8.0	12
◢ 📁 Servers, Storage and Network				
EMC CLARiiON Array	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0	0
EMC Celerra Storage	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0	0
EMC Symmetrix Array	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0	0
Oracle Storage Management Fr	12.1.0.6.0	12.1.0.6.0	12.1.0.6.0	N/A
Oracle Virtual Infrastructure	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0	2
Oracle Virtual Networking	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0	0
Oracle Virtualization	12.1.0.7.0	12.1.0.7.0	12.1.0.7.0	2

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Oracle Enterprise Manager allows administrators to:

- Allocate computing resources to internal line of businesses

- Establish placement policies

- Pool resources for middleware or database

- Standardize and automate deployment processes

- Publish established templates to service catalog

- Setup role-based access and privileges

- Set user quotas to limit over-consumption

- Log middleware instance messages

- Establish policy for retirement

- Enable metering and optional chargeback on consumed resources.

Cloud Management Self Service Portal

For the end users, Oracle Cloud Management Pack for Oracle Middleware provides an out-of-the-box Self Service Portal. Cloud users are presented with a Graphical User Interface to provision middleware services without the need for deep technical knowledge on the hardware and software infrastructure. Self Service Portal enables cloud users to:

- Monitor resource allocation

- Request and provision middleware services

- Monitor performance of provisioned WebLogic instances

- Control availability of provisioned middleware through simple STARTUP / SHUTDOWN push buttons

- Perform push button retirement of middleware services that will no longer be used

- Deploy and undeploy Java EE applications

- Configure Java EE resources such as data sources

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- Perform on-demand scale-up and scale-down for WebLogic cluster

- Access log messages for the service instance

Oracle Enterprise Manager provides solutions for following major middleware products:

- WebLogic as a service (WLaaS): Cloning, Provisioning and Self Service capabilities for Oracle's middleware flagship product, WebLogic Server.

- SOA as a service (SOAaaS): Cloning, Provisioning and Self Service capabilities for Oracle's popular SOA suite.

- JVM as a service (JVMaaS): A customizable way to clone and provision non-Oracle JVMs including Tomcat and JBoss application server

We will now have a closer look at these features.

WebLogic as a service

Self Service provisioning

With the Self Service Portal, cloud users can request a middleware instance through a simple interview process, monitor resource consumptions, and manage the middleware through an intuitive graphical user interface.
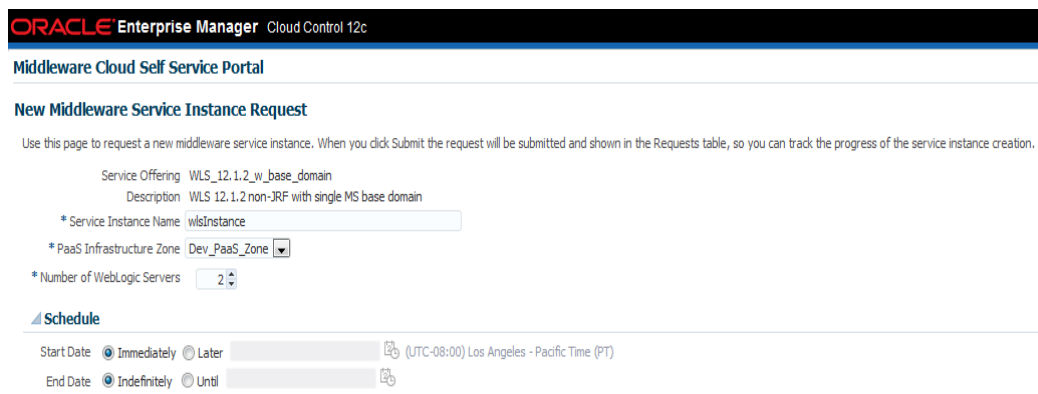
Users can logon to the Self Service Portal and provision the middleware instances they need, without the need for deep technical knowledge on the inner working of the middleware management system. The user can then define the time when the middleware will be retired automatically.

Starting from Oracle Enterprise Manager 12cPS4 (12.1.0.5.0), the user can also provision JRF based WebLogic domain using Self Service Portal. This will be highly useful to deploy ADF applications or deploy other Oracle middleware products on top of the provisioned WebLogic instances. which have the dependency of JRF library.

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Create a new instance from Self Service Portal

From Middleware Self Service Portal, the user can select template set by administrator role. On single page you can request a new WebLogic instance. For JRF based domains this page also has separate filed to enter database details with JRF database schema.

Administrators can control how long user keeps this instance by making mandatory for the user to enter an end date for the request. Oracle Enterprise Manager runs a deployment procedure to retire WebLogic instance as soon as the end date is reached. Thus resources are released and available in the pool for other usages. .

Once domain is created successfully it appears under Services section on Middleware Self Service Portal.

Instance management and configuration

From instance home page, the users can start/stop instance, monitor performance, and check currently deployed applications and data sources. The users can also customize this page to add additional matrices to monitor. Under certain unavoidable conditions the users need to extend the end date for the instance. This can be achieved using Set End Date option.

ORACLE Enterprise Manager Cloud Control 12c
Setup ▾ | MWAAS_USER 1 ▾

Enterprise ▾ | Targets ▾ | Favorites ▾ | History ▾
Search Target Name

Middleware Cloud Self Service Portal
Page Refreshed Jul 6, 2015 11:02:02 PM PDT

Middleware Cloud Self Service Portal > Middleware Service Instance: Riddles_Dev

Middleware Service Instance: Riddles_Dev

Middleware Service Instance ▾

Set End Date
Start
Stop
Scale Up
Scale Down
Select Metrics
Restore Default Charts
Log Messages

2015 11:10:57 PM
WebLogic Servers ⬆ 1
Memory (GB) 0.44
Service Type WebLogic
Owner MWAAS_USER 1

1.2_w_base_domain

Availability

06   09   12 PM   03   06   09

0.4
0.2
0.0
Managed_Server_1: CPU Usage (%)

300
200
100
0
Managed_Server_1: Heap Usage (MB)

12 AM   03   06   09   12 PM   03   06   09
July 06 2015

Response and Load

0
Cluster_1: Request Processing Time (ms)

0
Cluster_1: Requests (per minute)

12 AM   03   06   09   12 PM   03   06   09
July 06 2015

Deployments

Applications

View ▾ | Deploy | Delete | Redeploy | Start | Stop

Name	Status	Test	Active Sessions	Request Processing Time (ms)	Requests (per minute)
AussieTripperApp	⬆	🔧	0	0	0.00

Applications 1

Libraries

View ▾ | Deploy | Delete | Redeploy

Name	Status
No libraries found	

Libraries 0

Data Sources

View ▾ | Create | Edit | Delete | Test Connection

Name	Database Service	JNDI Name	User	URL
testDS		testDS/testDS	sysman	jdbc:oracle:thin:@...

Data Sources 1

Requests

View ▾ | Reschedule | Delete | Search | Name

Name	Status	Type	Submission
Riddles_Dev_CreateDS#4101	✔	Create Data Source	Jun 24, 20
Riddles_Dev_DeployApp#4081	✔	Deploy Application	Jun 24, 20
Riddles_Dev_Create#3281	✔	Create WebLogic Instance	Jun 23, 20

Scale up or Scale down instance

The user can also scale up/down WebLogic instance based on the performance or schedule. Enterprise manager collects many parameters like CPU Usage, heap usage, requests per minute and pending requests. Enterprise manager also gives user a capability to scale up WebLogic service. The scale up/down operation can be Policy driven based on monitoring parameters mentioned above or schedule driven based on time.

The scheduled policies can be used to scale-up or down resources or start/stop platforms on a periodic basis. The performance polices allow metric-based resource scheduling. For example, an user may choose to shut down the platform if the CPU utilization falls below 5% to save on unnecessary resource usage and costs. This scalability also takes into account SLA requirements from service end users such as high-availability and IT requirements such as hardware resource utilization. When a load balancer is configured for the service instance, any elastic behavior will be seamlessly propagated to the load balancer.

Thus, Oracle Enterprise Manager enables optimization of resources in an auto-pilot mode.
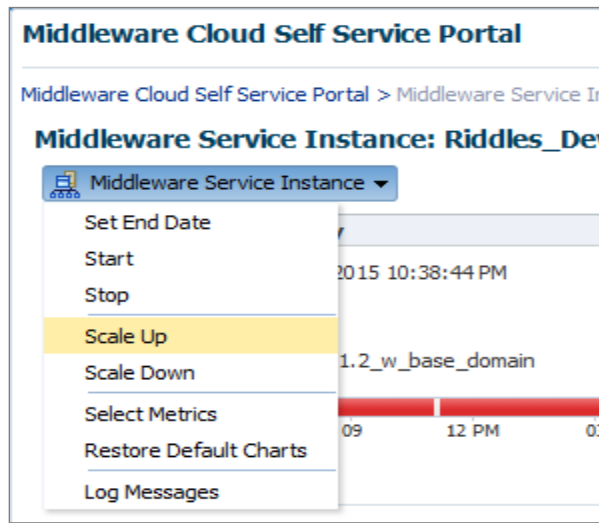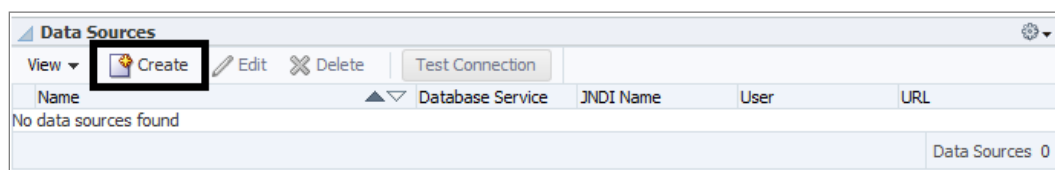
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Deploy application to new instance

Once domain is provisioned, the ready user can use it for developing, deploying or testing the applications. The user can deploy application from WebLogic Domain home page on Oracle Enterprise Manager. Alternately, the user can also connect to WebLogic Admin Console to deploy and manage the applications; or use WLST script as well.
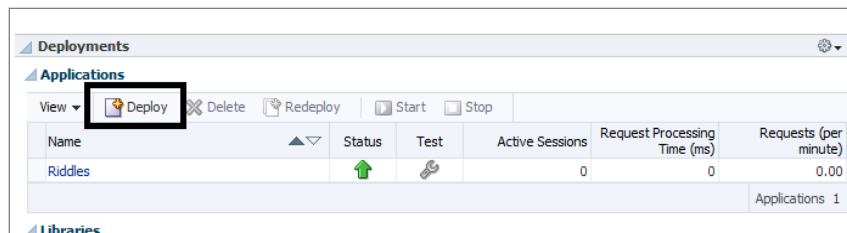

Create a new data source

An application may require a data source. Oracle Enterprise Manager also provides the capability to create new data source from WebLogic Domain home page on Enterprise Manager. Alternately, user can also create new data source using WebLogic Admin Console or WLST script.

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Chargeback data

As a self-service user, you can look at a report of your current usage and what charges you have incurred.
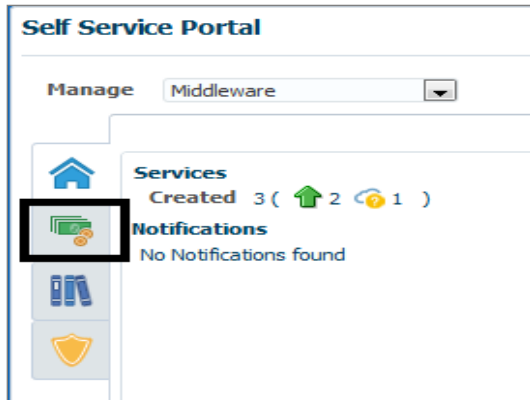
On this chargeback tab you can setup criterion to check charges for your account.
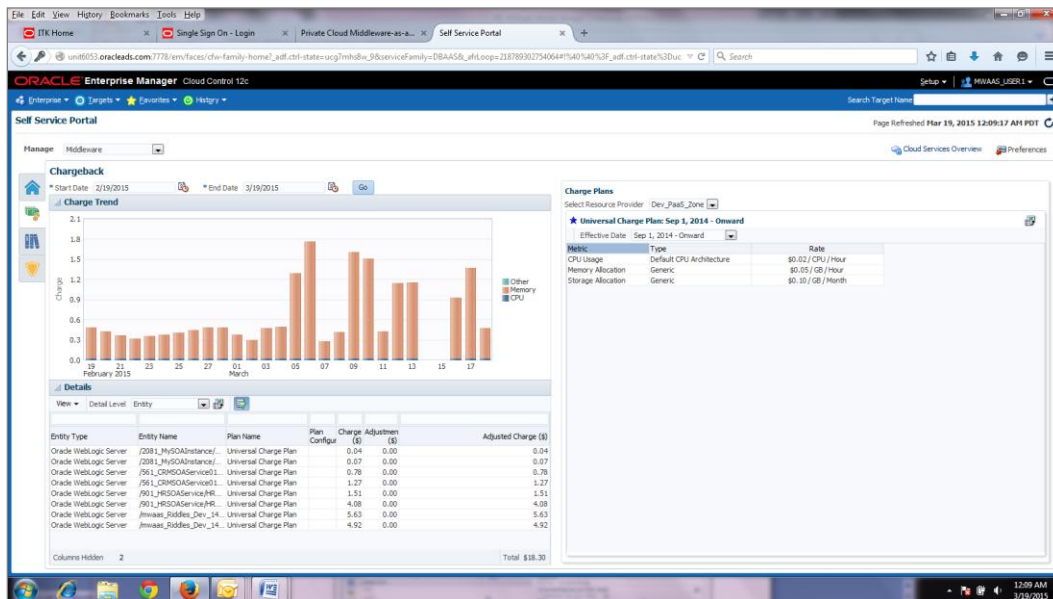
Policies and Elasticity

Oracle Enterprise Manager allows user to set policies for scale up and scale down. The user can scale up/down based on many parameters.
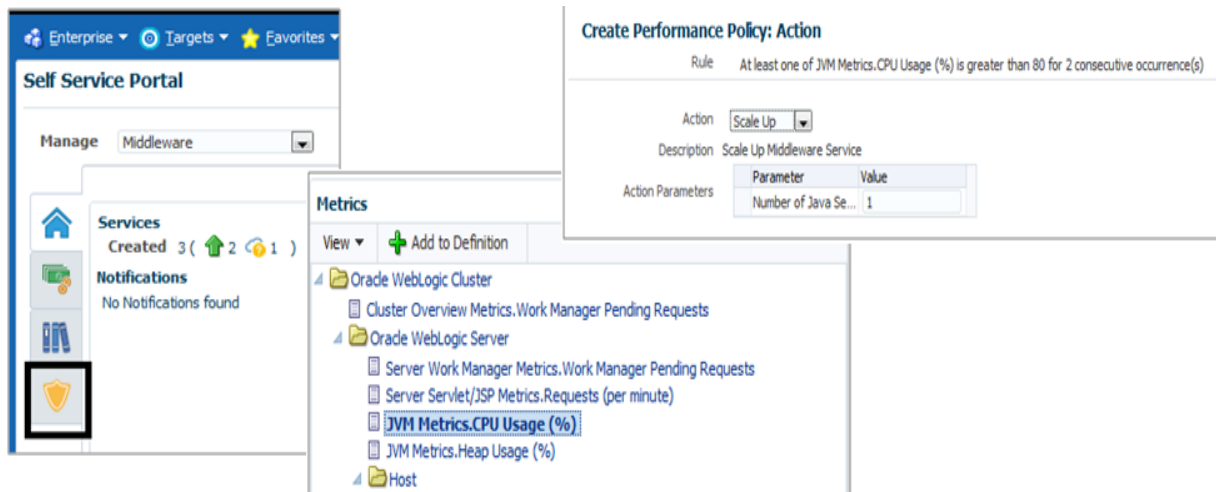
Here we see an example of scale up policy based on "JVM CPU Usage %". The user can configure scale up if CPU Usage goes beyond 80%. Oracle Enterprise Manager provides many matrices which can be used to setup policies.

SOA as a service

With the Self Service Portal, the cloud users can request a fully functional SOA instance through a simple interview process, monitor resource consumptions, and manage the SOA instance through an intuitive graphical user interface.

The users can logon to the Self Service Portal and provision the instance they need without the need for deep technical knowledge on the inner working of the middleware management system. The user can then define the time when the instance will be retired automatically.

Self Service Provisioning

Oracle Enterprise Manager Cloud Control 12*c* (12.1.0.5) provides capability for:

- Security configuration for named credentials, roles and accounts for cloud management

- Customizing SOA instance creation procedures to your environment and business requirements

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- Creating PaaS zones

- Setting up SOA pools

- Cloud governance; quota limits and chargeback for cloud management roles

- Creating a SOA profile based on production instance.

- Defining service templates for SOA instance creation through Self Service Portal.

When the users clone application from one to other environment, many things change on destination infrastructure e.g ports and hosts. Oracle Enterprise Manager 12c has intelligence to reconfigure and rewire various components based on destination infrastructure. The users can configure SOA Tokens while creating profile and change values for SOA tokens as suited to destination environment.

Scale up or Scale down instance
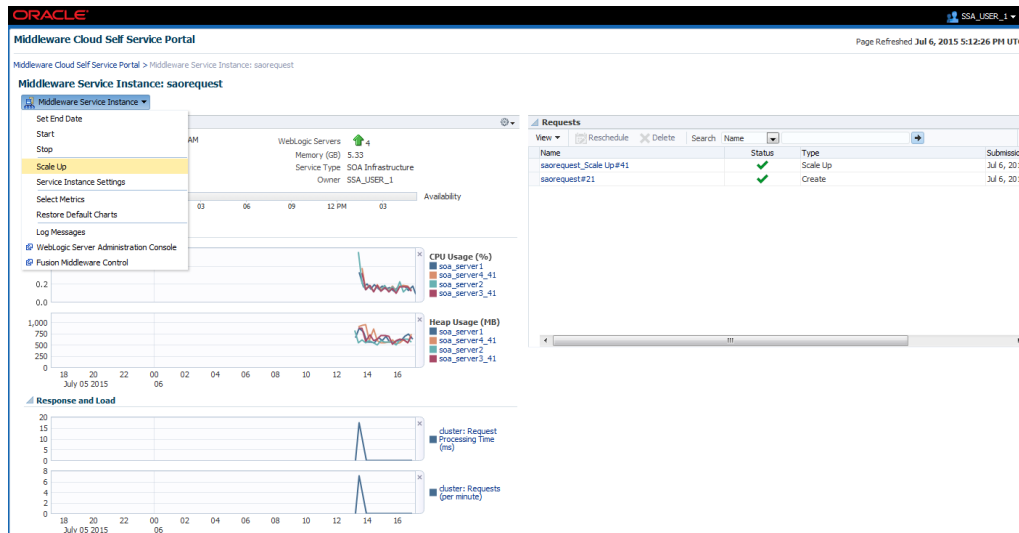
JVM as a service

In some cases, the customers may use other third-party application server than WebLogic Server or they may have a mixed environment. Oracle Enterprise Manager 12c (12.1.0.5) release, provides the capability to create JVM as a Service on other application servers such as Tomcat, JBoss and others. The user can provision JVM as their requirements using standardized templates for JVMaaS.

Self Service Provisioning

Administrators can follow below steps to configure JVMaaS end-to-end for end users. End users can request for new instances using templates published by Administrators.

- Set up one or more PaaS Infrastructure zones.

- Create a Middleware Pool.

- Configure request settings.

- Define quotas for each self service user role.

- Create service templates

Oracle Enterprise Manager provides simple wizard driven process to setup JVMaaS. Below flow depicts this process.
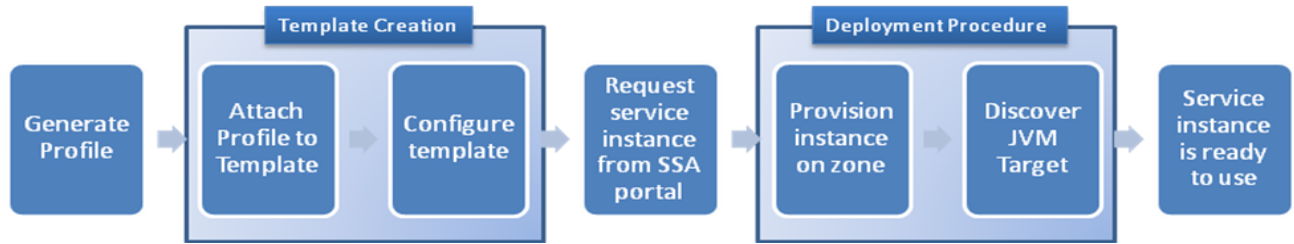
Once Service Instance is created by user, it appears on Self Service Portal.

On instance page the user can monitor various metrics for JVM by downloading JVMD agent which is flagship product from Oracle to monitor and diagnose JVM's.
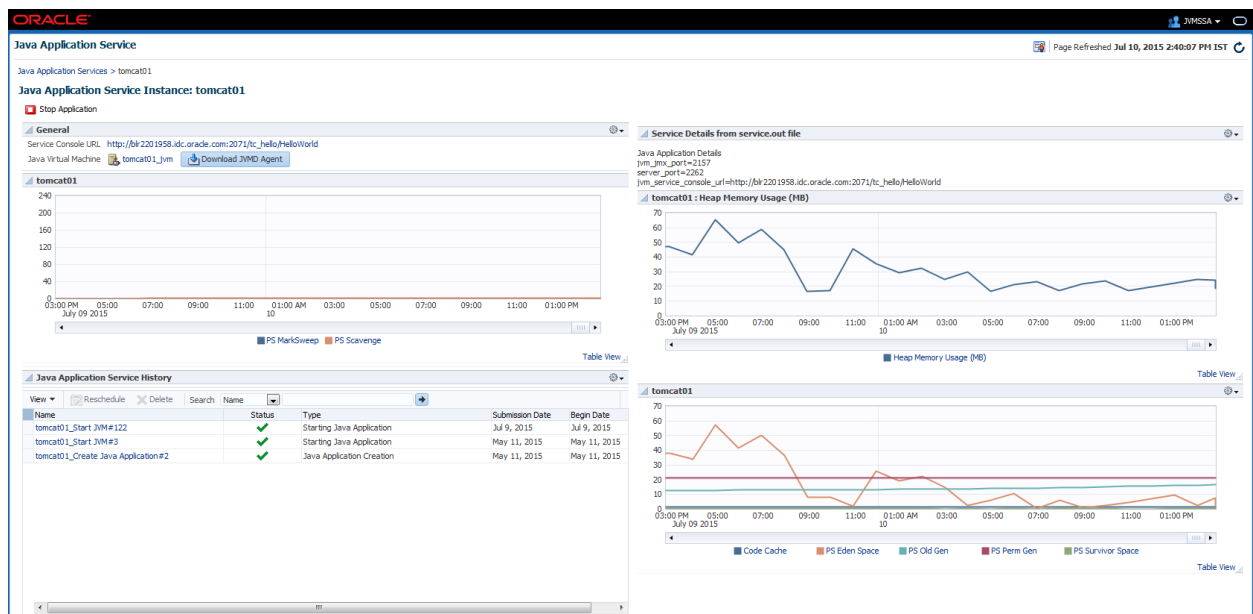
When JVMD is deployed, the user can perform JVM Performance Diagnostics or Live Thread Analysis.
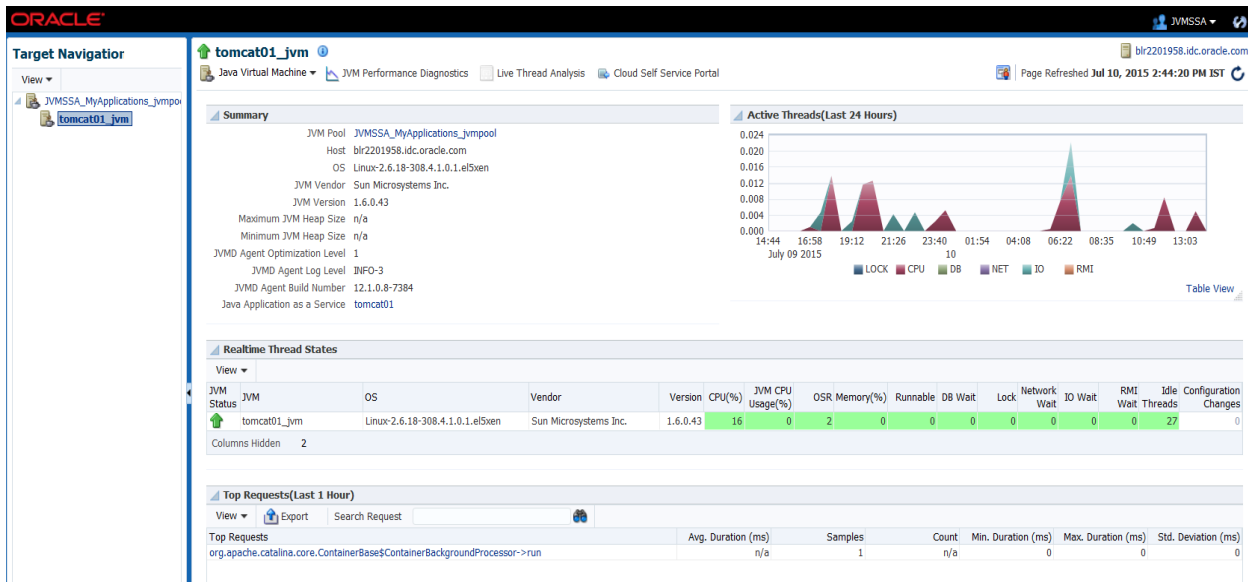
Oracle Enterprise Manager Hybrid Cloud

With Oracle Enterprise Manager 12CPS4 (12.1.0.5) release, the customers can simplifies the journey to the cloud. For the first time, the customers will be able to manage their hybrid cloud as one, from a single pane of glass. Oracle Enterprise Manager can manage, migrate, test and deploy middleware applications across hybrid clouds, with 100% reuse of existing management tools and practices. These enhancements will provide centralized visibility and control to Oracle customers on their cloud journey, while helping to ensure that their existing company-wide standards are applied across the estate.

Oracle Enterprise Manager now provides below hybrid cloud capabilities for those using Oracle Java Cloud Services:

- Single Pane of glass to monitor and manage Oracle Cloud JCS (WebLogic) instances and on-premises WebLogic instance through the single UI.

- Deploying the applications to both on-premises and on JCS WebLogic servers through the single UI.

- Cloning the WebLogic domains from JCS to on-premises environment.

- Lift-shifting the deployed Java EE applications from on-premises WebLogic domain to JCS WebLogic domain.

Conclusion

Oracle Cloud Management Pack for Oracle Middleware delivers capabilities spanning the entire middleware cloud lifecycle. It lets cloud administrators identify pooled resources, configure role-based access, define the service catalog, and the related chargeback plans. It allows cloud users to request middleware services, and consume them on-demand. It also allows the users to scale up and down their platforms to adapt to changes in workload. Finally, it enables the users to understand the costs of the service delivered, and establish accountability for consumption of resources.

The rich cloud management features from Oracle Enterprise Manager not only lend maturity to any private cloud design of an enterprise but it also lend the power of "copy exact" i.e. bringing the error free assembly line production and standardization into a incumbent majorly human driven process. Oracle Enterprise Manager 12c determines the most efficient way to utilize hardware computing resources after transparently considering many factors related to the resources referenced and the conditions specified in any self-service request. This automated setup of service catalog, intelligent placement of software resources, single click provisioning and cloning, scale up and scale down of instances followed by rich metering and chargeback go a long way in providing a predictive model around the on-demand consumption pattern of middleware in an enterprise class, private and hybrid cloud environment.

In nutshell, Oracle Enterprise Manager 12c offers most complete and comprehensive Middleware as Service functionality in the industry benefitting end users and IT. All these features are complemented by Oracle middleware product (WebLogic, SOA, WebCenter domains or JVM) lifecycle management features like configuration management, performance management, patch automation, etc which make the solution complete from a Middleware administrator's perspective. As we saw above, the end-to-end

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solution by Oracle Enterprise Manager 12c yields significant business benefits resulting in very high ROI.

Roadmap

Oracle Enterprise Manager supports below versions for Middleware as a Service.

WebLogic as a Service	SOA as a Service	JVM as a Service
11g (10.3.6)	11g (11.1.1.7.0, 11.1.1.8.0)	All versions and platforms.
12c (12.1.2.0.2, 12.1.2.0.3, 12.1.3.0.2)	12c (12.1.2.0.2, 12.1.2.0.3, 12.1.3.0.2)	

More Information

Collateral and screen watches can be found on OTN

http://www.oracle.com/technetwork/oem/cloud-mgmt/em-mwaas-2104697.html

Oracle Enterprise Manager Cloud Control Documentation

http://docs.oracle.com/cd/E24628_01/index.htm

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Integrated Cloud Applications & Platform Services

White Paper - Middleware as a Service Overview

Oracle is committed to developing practices and products that help protect the environment

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