

Oracle® Enterprise Manager

Cloud Control Introduction

12c Release 5 (12.1.0.5)

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Glossary

Index

Preface

This manual introduces Oracle Enterprise Manager. It provides a brief overview of the system architecture and describes the key features of the product. The manual also details new features in this release.

Note that later versions of this and other Enterprise Manager books may be available on the Oracle Technology Network:

<http://www.oracle.com/technology/documentation/oem.html>

Audience

This manual is intended for all users of Oracle Enterprise Manager.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at

<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Structure

The book consists of the following chapters:

Chapter 1, "Overview of Oracle Enterprise Manager Cloud Control 12c"

Presents the Enterprise Manager Cloud Control architecture and briefly describes the key features of the product.

Chapter 2, "New Features In Oracle Enterprise Manager Cloud Control 12c"

Highlights the new features available in Oracle Enterprise Manager Cloud Control 12c.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Overview of Oracle Enterprise Manager Cloud Control 12c

This chapter provides an overview of Enterprise Manager Cloud Control 12c and helps you understand its architecture and the various core components that are integrated within the product. It contains the following sections:

- [About Enterprise Manager Cloud Control 12c](#)
- [Enterprise Manager Cloud Control 12c Architecture](#)
- [Enterprise Manager Management Focus Areas](#)

See Also: For detailed information about Oracle Enterprise Manager Cloud Control, see the *Oracle Enterprise Manager Cloud Control Documentation* web site:

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

For a list of videos on using Oracle Enterprise Manager Cloud Control, see the *Oracle Enterprise Manager Screenwatches* web site:

<http://www.oracle.com/technetwork/oem/em12c-screenwatches-512013.html>

1.1 About Enterprise Manager Cloud Control 12c

Oracle Enterprise Manager is Oracle's integrated enterprise information technology (IT) management product line, which provides the industry's only complete, integrated, and business-driven enterprise cloud management solution. Oracle Enterprise Manager creates business value for IT by leveraging the built-in management capabilities of the Oracle stack for traditional and cloud environments, enabling customers to achieve unprecedented efficiency gains while dramatically increasing service levels.

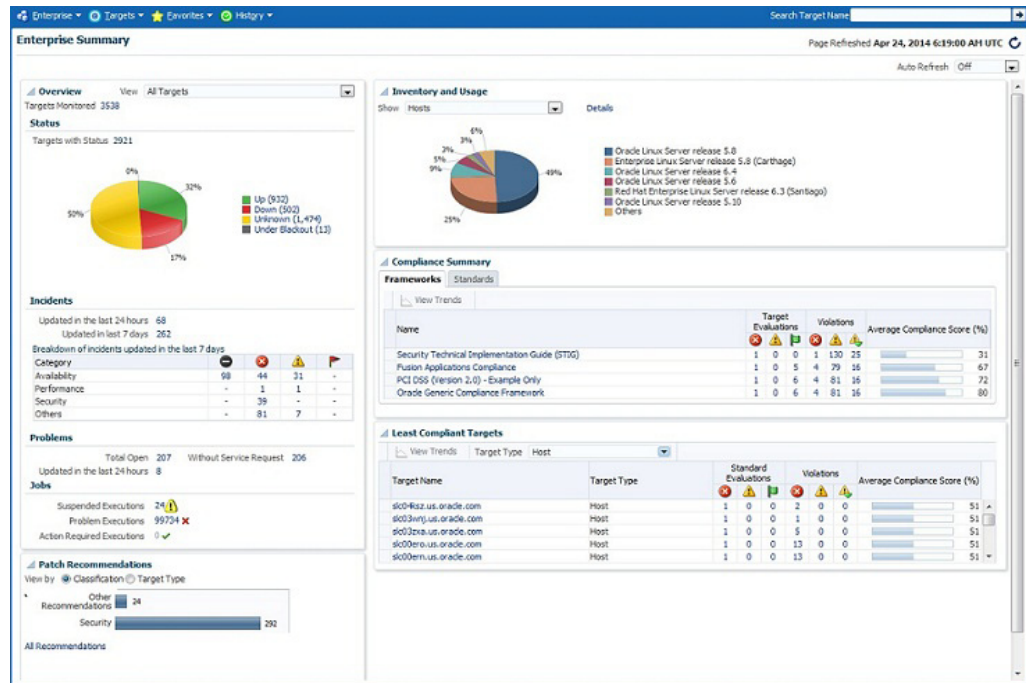
The key capabilities of Enterprise Manager include:

- A complete cloud lifecycle management solution enabling you to quickly set up, manage, and support enterprise clouds and traditional Oracle IT environments from applications to disk
- Maximum return on IT management investment through the best solutions for intelligent management of the Oracle stack and engineered systems with real-time integration of Oracle's knowledge base with each customer environment

- Best service levels for traditional and cloud applications through business-driven application management

Figure 1–1 illustrates how Enterprise Manager Cloud Control offers a solution that enables you to monitor and manage the complete Oracle IT infrastructure from a single console.

Figure 1–1 Enterprise Manager Cloud Control



For more information about Enterprise Manager Cloud Control, access the following URL:

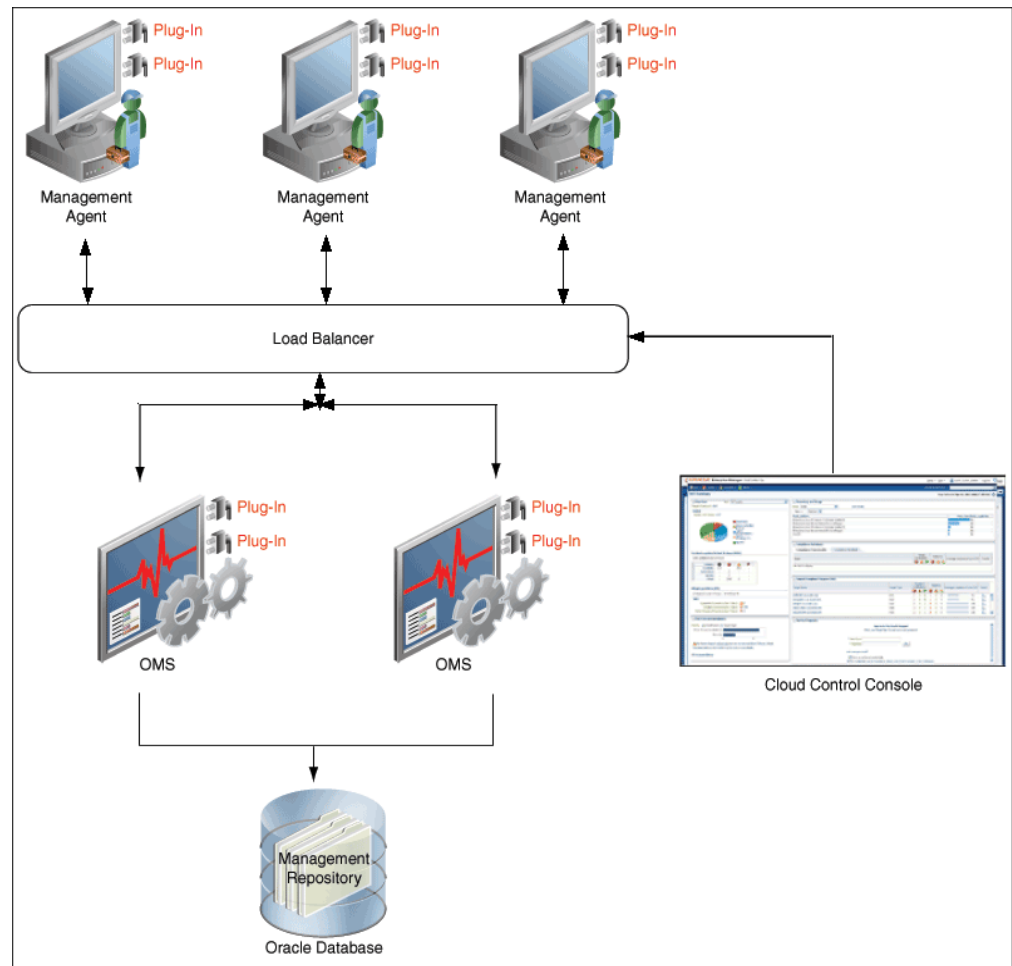
<http://www.oracle.com/us/products/enterprise-manager/index.html>

1.2 Enterprise Manager Cloud Control 12c Architecture

Although Enterprise Manager Cloud Control is viewed as a single entity, it is built with the following components:

- Oracle Management Agent
- Oracle Management Service
- Oracle Management Repository
- Oracle Management Plug-ins
- Enterprise Manager Cloud Control Console

Figure 1–2 shows a sample Enterprise Manager Cloud Control architecture and illustrates how these core components fit into the architecture.

Figure 1–2 Enterprise Manager Cloud Control Architecture

Note: In Figure 1–2, the load balancer and the multiple Oracle Management Services are depicted only to indicate how a sample Enterprise Manager Cloud Control architecture would look in a large organization. They are not a prerequisite or a requirement for an Enterprise Manager system installation. If you do not have a load balancer, then the Management Agents communicate directly with the Oracle Management Services.

The following sections describe the core components of Enterprise Manager Cloud Control.

Oracle Management Agent

Oracle Management Agent (Management Agent) is an integral software component that is deployed on each monitored host. It is responsible for monitoring all of the targets running on those hosts, communicating that information to the middle-tier Oracle Management Service, and managing and maintaining the hosts and its targets.

Oracle Management Service

Oracle Management Service is a Web-based application that orchestrates with the Management Agents and the Management Plug-ins to discover targets, monitor and

manage those targets, and store the collected information in a repository for future reference and analysis. Oracle Management Service also renders the user interface for Enterprise Manager Cloud Control. Oracle Management Services is deployed to the Oracle middleware home (middleware home), which is the parent directory that contains the Oracle WebLogic Server home, the Oracle Management Service home, the Management Agent home, the plug-in home, the Java Development Kit (JDK), the Oracle Management Service instance base directory, the Oracle Web tier directory, the Oracle common directory, and other relevant configuration files and directories. While deploying the Oracle Management Service, the Enterprise Manager Cloud Control Installation Wizard installs Oracle WebLogic Server if it does not already exist in your environment. As a result, an Oracle WebLogic Server administration console is also installed.

Oracle Management Repository

The Oracle Management Repository (Management Repository) is a storage location where all of the information collected by the Management Agent is stored. It consists of objects such as database jobs, packages, procedures, views, and tablespaces.

Technically, the Oracle Management Service uploads the monitoring data it receives from the Management Agents to the Management Repository. The Management Repository then organizes the data so that it can be retrieved by the Oracle Management Service and displayed in the Enterprise Manager Cloud Control console. Because data is stored in the Management Repository, it can be shared between any number of administrators accessing the Enterprise Manager Cloud Control.

At the time of installation, the Enterprise Manager Cloud Control Installation Wizard configures the Management Repository in your existing, certified database. The wizard, however, does not install a new database.

Oracle Management Plug-ins

The core Enterprise Manager Cloud Control features for managing and monitoring Oracle technologies, such as Oracle Database, Oracle Fusion Middleware, and Oracle Fusion Applications, are now provided through components known as *plug-ins* that can be downloaded and deployed using the new Self Update feature. This new “pluggable” framework enables Enterprise Manager Cloud Control to be updated with management support for the latest Oracle product releases, without having to wait for the next Enterprise Manager Cloud Control release to provide such functionality. For example, when a new version of Oracle Database is released, you can simply download and deploy the latest Oracle Database plug-in, which will include management support for the latest release.

Table 1–1 lists the default plug-ins that are installed on Oracle Management Service and the Management Agent by default with a new Enterprise Manager system. In addition to these default plug-ins, you can optionally install other plug-ins available in the software kit (DVD, downloaded software bundle, and so on). The installer offers a screen where you can select the optional plug-ins and install them.

Table 1–1 Management Plug-ins Installed by Default

Name	Description
Oracle Database	Enables you to monitor and manage Oracle Database and related targets such as Oracle Real Application Clusters (Oracle RAC), Oracle Automatic Storage Management (Oracle ASM), and so on.

Table 1–1 (Cont.) Management Plug-ins Installed by Default

Name	Description
Oracle Fusion Middleware	Enables you to monitor and manage Oracle Fusion Middleware products such as Oracle WebLogic Domain, Oracle WebLogic Cluster, Oracle WebLogic Server, Oracle SOA Suite, Oracle Web Tier, Oracle GlassFish and so on.
My Oracle Support	Enables you to log in to My Oracle Support from within the Enterprise Manager Cloud Control console, search the knowledge library for notes and documents, raise service requests, and create patch plans and templates for patching monitored targets.
Oracle Exadata	Enables you to monitor and manage Oracle Exadata targets.

Enterprise Manager Cloud Control Console

The Enterprise Manager Cloud Control console is the web-based user interface for Enterprise Manager Cloud Control. With the help of the console, you can monitor and administer your entire computing environment from one location on the network. All the systems and services including enterprise application systems, databases, hosts, middleware application servers, listeners, and so on, are easily managed from one central location.

EMCTL

EMCTL is a command-line tool used to execute certain tasks on Oracle Management Service (OMS) and Management Agents. You can use it for tasks such as starting or stopping OMS instances, setting properties on OMS instances, or getting a list of targets being monitored by a specific Management Agent. EMCTL commands are executed on a specific OMS or Management Agent

EM CLI

The Enterprise Manager Command Line Interface (EM CLI) tool enables you to access Enterprise Manager functionality through a command-line interface. It is accessible through classic programming language constructs, enabling tasks to be created and run either from the command-line or programatically. EM CLI enables you to access Enterprise Manager Cloud Control functionality from text-based consoles (shells and command-line windows) for a variety of operating systems. You can also perform tasks in bulk mode by creating Jython scripts that are passed in using the tool.

See the *Oracle Enterprise Manager Command Line Interface* book for details:

http://docs.oracle.com/cd/E24628_01/em.121/e17786/toc.htm

1.3 Enterprise Manager Management Focus Areas

This section provides brief descriptions of the following management focus areas:

- [Framework and Infrastructure](#)
- [Enterprise Monitoring](#)
- [Application Management](#)
- [Database Management](#)
- [Middleware Management](#)
- [Hardware and Virtualization Management](#)
- [Heterogeneous \(Non-Oracle\) Management](#)

- [Cloud Management](#)
- [Lifecycle Management](#)
- [Application Performance Management](#)
- [Application Quality Management](#)

1.3.1 Framework and Infrastructure

Oracle Enterprise Manager is a critical tool for data center management. It has a framework that is secure, scalable and highly available. With a next-generation user interface, it provides a rich, intuitive console that can be customized to suit different roles. Oracle Enterprise Manager framework also has advanced capabilities such as self-update where key components such as target plug-ins, compliance policies, and deployment procedures can be updated automatically as newer versions become available.

Oracle Enterprise Manager framework is enterprise-ready and is designed to manage and monitor critical business operations to ensure smooth running of enterprise data centers.

1.3.2 Enterprise Monitoring

World class enterprise monitoring is about monitoring the status of your infrastructure and applications, notifying the appropriate IT staff when incidents occur, and reporting on status, history, and trends to interested parties throughout IT and the business. Oracle Enterprise Manager provides rich monitoring features as a foundation for monitoring all components of your IT infrastructure (Oracle and non-Oracle) as well as the applications and services that are running on them. These features enable IT to proactively monitor and resolve issues by business priority, implement operational best practices for monitoring, and provide consistent, high quality service in support of business goals.

1.3.3 Application Management

Oracle provides advanced, out-of-the-box application management solutions for Oracle E-Business Suite, Siebel, Peoplesoft, JD Edwards, and Fusion Applications. They provide end-to-end, integrated application monitoring and management capabilities, resulting in improved availability, predictability, and reliability. Oracle Enterprise Manager's management capabilities include user experience management, performance management, change and configuration management, patching, provisioning, testing, integrated diagnostics, and automatic tuning.

Enterprise Manager also offers advanced management capabilities for managing custom applications, integrations, and extensions. Capabilities such as Business Transaction Management (BTM), JVM Diagnostics (JVMD) and others are presented in further detail in [Section 1.3.10, "Application Performance Management"](#).

1.3.4 Database Management

Oracle revolutionized the field of enterprise database management systems with the release of Oracle Database 10g by introducing the industry's first self-management capabilities built right into the database kernel. Today, after several releases and continuous improvement of this intelligent management infrastructure, Oracle Database provides the most extensive self-management capabilities in the industry, ranging from zero-overhead instrumentation to integrated self-healing and

business-driven management. Oracle's Database management capabilities make the lives of DBA's easier by providing a full-lifecycle solution encompassing the following:

- Change and configuration management
For more information about change and configuration management, see *Overview of Change Management for Databases* and *Overview of Configuration Management*.
- Patching and Upgrades
For more information about patching and upgrades, see *Patching Software Deployments*.
- Provisioning
For more information about provisioning, see *Overview of Database Provisioning*.
- Testing
For more information about testing, see the *Database Testing Guide*.
- Masking/subsetting
For more information about masking and subsetting, see *Masking Sensitive Data* and *Data Subsetting*.
- Performance management
For more information about performance management, see the *Database Performance Tuning Guide*.
- Automatic tuning
For more information about automatic tuning, see *Automatic SQL Tuning Advisor* and *Managing Diagnostic Data*.

In addition, Oracle Enterprise Manager Cloud Control provides the following database management capabilities:

- Provides problem detection and guided resolution workflows
- Enables you to perform day to day tasks from Enterprise Manager Cloud Control
- Enables you to run repetitive jobs from Enterprise Manager Cloud Control

1.3.5 Middleware Management

Oracle Enterprise Manager Cloud Control 12c provides a comprehensive management solution for Oracle WebLogic Server, Oracle Fusion Middleware, and non-Oracle middleware technologies. Oracle's offering encompasses out-of-the-box availability and performance monitoring, robust diagnostics, administration, and lifecycle management that includes configuration and compliance management as well as provisioning and patching across middleware software such as:

- WebLogic Server
- SOA Suite
- Coherence
- Identity Management
- WebCenter
- Web Tier
- Business Intelligence

- Exalogic Elastic Cloud
- Oracle GlassFish
- Non-Oracle Middleware (for example, JBoss Application Server and IBM WebSphere Application Server)

1.3.6 Hardware and Virtualization Management

Oracle Enterprise Manager provides an integrated and cost-effective solution for complete physical and virtual server lifecycle management. By delivering comprehensive provisioning, patching, monitoring, administration, and configuration management capabilities through a web-based user interface, Enterprise Manager significantly reduces the complexity and cost associated with managing Oracle VM, Linux, UNIX, and Windows operating system environments. In addition, enterprises using Oracle Sun hardware can obtain deep insight into their server, storage, and network infrastructure layers and manage thousands of systems in a scalable manner. Oracle Enterprise Manager helps customers to accelerate the adoption of virtualization and cloud computing to optimize IT resources, improve hardware utilization, streamline IT processes, and reduce costs. Oracle Enterprise Manager is integrated with OVM 3.0 and higher and Oracle Virtual Assembly Builder.

1.3.7 Heterogeneous (Non-Oracle) Management

Oracle Enterprise Manager, besides being the best suite of management products for Oracle technologies, also provides a comprehensive solution for the management of heterogeneous data centers (including Microsoft SQL Server and JBoss Application Server) through its rich collection of extensions known as plug-ins and connectors. The Self Update mechanism in Enterprise Manager 12c enables customers to download /import and deploy extensions built by Oracle, Oracle's numerous partners, and customers themselves. These extensions are built upon the same management framework that is used for Oracle products, and therefore provides the same level of stability and richness as the Oracle products.

For more information, see the Oracle Enterprise Manager 12c Extensibility Exchange page:

<http://www.oracle.com/goto/emextensibility>

1.3.8 Cloud Management

Enterprise cloud presents new management challenges. With a move to virtualization, a top benefit expected from private cloud adoption is cost savings through standardization for operational efficiency. However, without proper management capabilities, expected economic benefits of cloud computing will not be realized.

Oracle Enterprise Manager Cloud Control is Oracle's complete cloud lifecycle management solution. It is the industry's first complete solution including self-service provisioning balanced against centralized, policy-based resource management, integrated chargeback, and capacity planning, and complete visibility of the physical and virtual environment from applications to disk.

1.3.9 Lifecycle Management

Lifecycle Management is a comprehensive solution that helps database, system, and application administrators automate the processes required to manage the lifecycle of Oracle technology. It eliminates manual and time-consuming tasks related to discovery, initial provisioning, patching, configuration management, and ongoing

change management. In addition, the solution provides compliance frameworks for reporting and managing industry and regulatory compliance standards. Finally, all of the on-premise instrumentation can be connected in real-time to My Oracle Support for complete communication between Oracle and customers.

1.3.10 Application Performance Management

Enterprise Manager 12c provides a complete Application Performance Management (APM) solution for custom applications and Oracle applications (including E-Business Suite, Siebel, PeopleSoft, JD Edwards, and Fusion Applications). The APM solution is designed for both cloud and enterprise data center deployments and is supported on Oracle and non-Oracle platforms.

Oracle APM delivers Business Driven Application Management with end-to-end monitoring that includes:

- **User Experience Management:** Real user monitoring and synthetic transaction monitoring with Real User Experience Insight (RUEI) and Service Level Management (SLM) beacons, respectively.

There are two ways to monitor Web site user experience: using real traffic from real customers or using synthetic traffic (traffic artificially created by software to mimic the load that the Web site would be expected to receive). RUEI supports monitor of both of these ways. SLM beacons are components within the monitored environment that send out synthetic traffic. Typically, they test the performance and availability of business-critical services in the infrastructure as part of SLM.

- **Business Transaction Management:** Monitor and trace transactions and transaction instances. Monitor business metrics included in transaction content.
- **Java monitoring and diagnostics:** Zero-overhead, production Java diagnostics for Oracle and non-Oracle platforms. Trace transactions from Java to Oracle Database and back.
- **Discovery and topology:** Multi-layer discovery of infrastructure and application topology.
- **Application Performance Analytics:** Rich reporting and analytic capabilities on real user activities and transaction monitoring data.

1.3.11 Application Quality Management

Oracle's Application Quality Management products provide a complete testing solution for Oracle Database, Oracle Packaged Applications, and custom Web applications.

- **Application Testing:** Application Testing Suite's Test Management, Functional Testing, and Load Testing capabilities ensure the quality of web-based applications including Oracle e-Business Suite, Fusion, Siebel, PeopleSoft, Hyperion, and J.D. Edwards.
- **Infrastructure Testing:** Application Replay and Real Application Testing enable realistic, production-scale testing of the application and database infrastructure. They use real, production workloads to generate load against applications or databases under test and do not require any script development or maintenance. With Application Replay or Real Application Testing you can reduce your testing time by more than 80%. They provide the most efficient, optimized and highest quality testing for validating application and database infrastructure changes.

- Test Data Management: Oracle Test Data Management and Data Masking provide efficient, automated, and secure test system creation capabilities for Oracle and non-Oracle databases, with out-of-the-box templates for Oracle packaged applications.

New Features In Oracle Enterprise Manager Cloud Control 12c

This chapter provides an overview of the new features available in Oracle Enterprise Manager Cloud Control 12c. It covers new features in Oracle Enterprise Manager Cloud Control releases 12.1.0.1, 12.1.0.2, 12.1.0.3, 12.1.0.4, and 12.1.0.5. It lists new features specifically associated with the base Oracle Enterprise Manager platform which includes the Cloud Control console, Oracle Management Service, and Oracle Management Agents. The latest Plug-in and Connector releases are also highlighted.

This document contains the following section:

- [What's New in Enterprise Manager Cloud Control 12c Release 5 \(12.1.0.5\)](#)
- [Framework and Infrastructure](#)
- [Services Management](#)
- [Enterprise Monitoring and Incident Management Features](#)
- [Fusion Application Management](#)
- [Database Management](#)
- [Middleware Management](#)
- [Exadata Management](#)
- [Siebel Management](#)
- [Extensibility](#)
- [Cloud Management](#)
- [Lifecycle Management](#)
- [Application Performance Management](#)
- [Oracle Enterprise Manager Cloud Control Mobile](#)
- [My Oracle Support Integration](#)
- [Big Data Appliance Management](#)
- [Engineered Systems Health Checks](#)
- [Oracle Storage Management Framework](#)
- [Audit Vault and Database Firewall](#)

See Also: For detailed information about Oracle Enterprise Manager Cloud Control, see the *Oracle Enterprise Manager Cloud Control Documentation* web site:

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

For a list of videos on using Oracle Enterprise Manager Cloud Control, see the *Oracle Enterprise Manager Screenwatches* web site:

<http://www.oracle.com/technetwork/oem/em12c-screenwatches-512013.html>

2.1 What's New in Enterprise Manager Cloud Control 12c Release 5 (12.1.0.5)

- Oracle Cloud Management (Hybrid Cloud)
 - [Oracle Cloud Management \(Hybrid Cloud\)](#)
- Database Management Features
 - [Database Plug-in 12.1.0.8 Features](#)
- Middleware Management Features
 - [Fusion Middleware Plug-in 12.1.0.8 Features](#)
- Cloud Management Features
 - [Cloud Management Plug-in 12.1.0.10 Features](#)
 - [Chargeback and Consolidation Planner Plug-in 12.1.0.7 Features](#)
 - [Virtual Infrastructure Plug-in 12.1.0.2](#)

2.2 Oracle Cloud Management (Hybrid Cloud)

Note: This enhancement is new in Enterprise Manager Cloud Control Release 5 (12.1.0.5).

Enterprise Manager Cloud Control now provides you with a single pane of glass for monitoring and managing both your on-premise and Oracle Cloud deployments, all from the same management console. By deploying Management Agents onto the Oracle Cloud virtual hosts serving your Oracle Cloud services, you are able to manage Oracle Cloud targets just as you would any other targets. The communication between Management Agents and your on-premise Oracle management service instances is secure from external interference. Support is provided for managing Oracle Database and Fusion Middleware PaaS targets, as well as JVM support for monitoring JVMs on your Oracle Cloud virtual hosts.

Oracle Cloud Management includes the following key features:

- Automated agent deployment and configuration
- Database and Java PaaS instances monitoring
- Incident management including notifications and ticketing integration

- Configuration management including Search and Inventory, comparison between on-premise and cloud instances, configuration history, and compliance
- Cloning between on-premise and Oracle Cloud
- One-off patching of Oracle Cloud database instances

2.3 Framework and Infrastructure

The Enterprise Manager Framework and Infrastructure component can be divided into the following groupings:

- [Robust and Extensible Architecture](#)
- [Cloud Control Console Enhancements](#)
- [Group and System Enhancements](#)
- [Reporting Enhancements](#)
- [Security](#)
- [Enterprise Manager Command Line Interface With Scripting Option](#)
- [EM CLI Tracking and Setup](#)
- [Support for Properties for Enterprise Manager Administrators](#)
- [Job System Enhancements](#)
- [Deployment Procedures](#)
- [Agent-Side Check Based Rule and Secure Technical Implementation Guide Compliance](#)
- [Plug-in Management](#)

2.3.1 Robust and Extensible Architecture

The sections below describe features that make the architecture robust and extensible.

2.3.1.1 Management Features Now Provided through Plug-ins

The core Enterprise Manager Cloud Control features for managing and monitoring Oracle technologies, such as Oracle Database, Oracle Fusion Middleware, and Oracle Applications, are now provided through plug-ins that can be downloaded and deployed using the new Self Update feature. In addition to target management, other vertical capabilities such as self-service and chargeback are provided through plug-ins. This new "pluggable" framework enables Enterprise Manager features to be updated without having to wait for the next Enterprise Manager release to provide such functionality. For example, when a new version of Oracle Database is released, you can simply download and deploy the latest Oracle Database Plug-in, which includes management support for the latest release.

2.3.1.2 Self Update

The Self Update feature enables you to expand Enterprise Manager's capabilities by updating Enterprise Manager components whenever new or updated features become available, including Management Agent software, plug-ins, monitoring templates, reports, and alerts.

Updated plug-ins are made available through the Enterprise Manager Store, an external site that is periodically checked by Enterprise Manager Cloud Control to obtain information about updates ready for download.

Enterprise Manager Cloud Control also provides support for plug-in and connector management. The ability to update plug-ins is particularly important because core Enterprise Manager features, such as Oracle Database management functionality, is now made available through plug-ins.

Specific updates authored by Oracle that are usually bundled with specific Cloud Control releases can be updated through Self Update. Some examples are Oracle authored Management Plug-ins and Deployment Procedures. In general, Oracle-supplied entities are read-only. You can create a copy and customize the copy according to your needs but you cannot modify the original Oracle-supplied entity.

2.3.1.3 Software Library

The Software Library is a staging area for updates to Oracle Enterprise Manager Cloud Control from the Enterprise Manager store (self-update), downloaded patches for monitored targets, and artifacts used for the life-cycle management of targets. Software Library enhancements for Enterprise Manager 12c are as follows:

- You can now associate multiple files with a single entity.
- You can now move all the revisions of an entity from one folder to another.
- You can now add notes (log information about the changes) and attachments (add/upload files) related to the entity.
- You can now access all of the entities belonging to different functional areas such as bare metal provisioning (BMP), virtualization, and so on from the Software Library console, because the entity management of various functional areas has been integrated into the Software Library console.
- You can now use any of the following storage options that have been newly introduced to store the entities:
 - **Referenced File Locations:** Referenced file locations enable you to leverage the organization's existing IT infrastructure (such as file servers, Web servers, or storage systems) for sourcing software binaries and scripts. These locations enable entities to refer to files without having to upload them explicitly to the Software Library storage. Referenced file locations support three storage options:
 - a. **HTTP:** An HTTP storage location represents a base URL which acts as the source of files that can be referenced.
 - b. **NFS:** An NFS storage location represents an exported file system directory on a server. The server is not required to be an Enterprise Manager host target.
 - c. **Agent:** An Agent storage location is similar to the Oracle Management Services (Oracle Management Service) Agent File System option, but can be any host monitored by an Enterprise Manager Agent. The Agent can be configured to serve the files located on that host.
 - **Management Agent File System:** A Management Agent file system location should be accessible to the Management Agent running on the host machine where the Oracle Management Service is deployed, and is recommended for multiple Oracle Management Service setup on Windows.

- You can now use the Migrate and Remove feature to migrate all of the entities from one storage location to another, and then delete (remove) the location that does not contain any entity files.
- You can now use the fine grained privileges to control user access to the different entities in the Software Library. Administrators by default do not have any Software Library privileges. It is the responsibility of the super administrator to grant access and privileges to an administrator. The following list describes the Software Library roles and their corresponding fine-grained privileges:
 - EM_PROVISIONING_DESIGNER (Designer): Create and view any Software Library entity
 - EM_PROVISIONING_OPERATOR (Operator): View any Software Library entity
 - EM_PATCH_OPERATOR (Operator): View any Software Library entity
- You can now use Grant and Revoke Privileges to grant users/roles certain privileges on the entities that you own.
- You can now edit, delete, and export entities that you own (user-owned entities). However, you can not edit, delete, or export the entities that are owned by Oracle (Oracle-owned entities)
- You can now use the Create Like option to create a clone of the Oracle-owned entity, and then edit the clone to suit your requirements.
- Enterprise Manager Command Line Interface (EM CLI) Verbs Available in the Software Library

There are now EM CLI verbs for Software Library that enable you to integrate the creation of generic components with in-house build processes.

The files generated as part of the build process must be uploaded to the Software Library storage without using the GUI console. The EM CLI verbs supported enable the addition of a storage location, creation of new folders and generic components, upload or referencing of files, update existing generic component entities, and various listing functions.

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

- Stage Operation

There is now an option in the Software Library console to stage files associated with an entity, from Software Library storage to another host target.

Users can now quickly ascertain whether a newly created entity can be staged to a site, in the process validating the storage location configuration and its associated credentials. Another use case is to extract large software files associated with an entity after it has been uploaded, possibly by other processes or subsystems.

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

- You can now view the list of deleted entities from the Software Library Console home page and perform the purge if required. A periodic purge job is also setup which will run daily to clean up the deleted entities.

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

- You can now save searches on the Advanced Search page.

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

- Plug-in developers can now extend the software library to define out-of-box types and subtypes, entities of these subtypes, and directives. These entities can be consumed in custom job types defined for the plug-in.

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

- The requirement to have view privilege on the credential used for configuring Oracle Management Service (OMS) Agent storage location has been removed.

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

- New EM CLI verbs to verify and print Software Library usage and to modify a Software Library OMS Agent storage location to change the associated OMS Host and the credential for accessing the location have been added. See the *Oracle Enterprise Manager Cloud Control Administrator's Guide* for more information.

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

2.3.1.4 Improved Loader and Redesigned Agent

The loader is the component of the Oracle Management Service that takes data from the agent and then uploads the data into the Management Repository. The loader has been redesigned to work synchronously with the agent, eliminating the need to have a temporary file staging area for data uploads. Loader resources are automatically partitioned to enable the more important data (target availability for example) from the more important targets (based on Lifecycle Status) to be processed at higher priority.

The agent has been redesigned and rewritten to be more robust, self-tuning, lightweight and capable of scaling to manage thousands of targets.

2.3.1.5 Simplified Management of Enterprise Manager Components

Many control operations for the agent are now available in the console. These include start, restart, shut down, secure, resecure, and update of agent properties. These operations can be done on a per agent basis or across many agents at a time, therefore making it easy to manage agents across your data center from a single location. In addition, software problems related to the Oracle Management Service and Management Agents are automatically detected and raised as problems which can be

managed in Incident Manager. In the Incident Manager, you can access the Enterprise Manager Support Workbench (Support Workbench) to package the relevant diagnostic information about the problem and open a Support service request (SR) to obtain help from Oracle, thereby reducing time to resolve any Enterprise Manager related problems.

2.3.1.5.1 Updated Management Repository Page

Note: This enhancement was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The updated Management Repository page provides details on the configuration and health of the Management Repository. This page enables Enterprise Manager administrators to quickly assess the status of the Management Repository database.

2.3.1.5.2 New Oracle Management Service Page

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

There is a new page to provide a list of all configured OMS instances and global properties such as Admin Server OMS, Server Load Balancer (SLB) configuration, and throughput by configured OMS.

This page provides Enterprise Manager administrators with a view of the OMS tier from a single place to assist in diagnosing Enterprise Manager issues such as SLB configuration problems or issues with a subset of configured OMS instances.

2.3.1.5.3 Consolidated Agent Management Page

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

The Consolidated Agent Management page now provides:

- Improved filtering and sorting of data
- More exposed columns to help administrators determine which agents and targets have problems
- The ability to drill down into agents that have metric collection problems and so on

2.3.1.5.4 Enterprise Manager Page Performance Page

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The Enterprise Manager Page Performance page provides statistics on Enterprise Manager page performance. The time spent in the repository, OMS, and browser/network is shown for each page and a diagnostics report is generated for pages taking longer than 30 seconds to load. This feature helps administrators assess

the overall performance of their Enterprise Manager deployment and enables them to identify individual pages that have performance issues.

2.3.1.6 Target Prioritization

Each target now has a lifecycle status target property which can be set to one of the following values: mission critical, production, staging, test, or development. This target property is used to specify the priority by which data from the target should be handled. When Enterprise Manager is under a heavy load, targets where the value of the lifecycle property is mission critical or production are treated with higher priority than targets where the value of the lifecycle property is staging, test, or development. Setting the priorities of your most important targets ensures that even as your data center grows and the number of managed targets grows, your most important targets continue to be treated at high priority.

If the target property is not specified, Enterprise Manager assumes that the target is in the staging status.

2.3.1.7 Simplified OMS Disaster Recovery

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

Note: Standby OMS instances using a standby Weblogic Server (WLS) domain are deprecated in Enterprise Manager Cloud Control Release 3 (12.1.0.3) For more information, see My Oracle Support note 1563541.

OMS Disaster Recovery now uses standard Fusion Middleware procedures for disaster recovery. The new disaster recovery solution requires that all primary OMS instances are installed on replicated storage which is automatically kept in sync across primary and standby sites by underlying storage technology. Doing this simplifies the management of the disaster recovery site because standby OMS instances are no longer required to be manually updated following operations such as OMS patch applications, plug-in updates, or upgrades.

2.3.2 Cloud Control Console Enhancements

The Cloud Control console user interface has undergone major changes to enhance usability and tailor your Enterprise Manager experience to your job role. The first time you log in, you can select from a cross-section of pages to be your default home page. For example, if your main interest is incidents, you can select Incident Manager as your home page. The new interface includes global menus that are accessible from anywhere within Enterprise Manager. The Favorites menu offers the equivalent of browser bookmarks, providing immediate navigation to the pages you access most and the History menu provides quick access to the ten most recently accessed targets. A global search capability enables you to not only drill down to all target data, but also to comb through the knowledge base, the bug database, and user documentation.

With home page personalization you can customize the layout and data displayed in target home pages, such as the WebLogic Server home page, to suit your specific needs. The changes you make are persisted for either the target instance, or the user

currently logged in, or both, enabling you to create customized consoles for monitoring various target types. Specifically, you can:

- Customize the layout of regions on a page
- Add a region to or remove a region from a page
- Specify the data displayed within each region
- Select the view that best meets your needs from a set of predefined home page layouts

2.3.3 Group and System Enhancements

The Group home page continues to provide an overview of the status and health of members of the group and a central way to launch operations on the groups, such as submit jobs, start blackouts, and so forth. The group home page can be customized to match your job responsibility or areas of interest. Regions can be added, removed, or re-organized within the home page. In addition, target type filters on the group home page itself are provided to enable focused target management. For example, changing the target type filter to Database Instance changes all regions of the group home page to only show information related to the databases in the group. Additional database-specific regions are also provided, such as the database loadmap and the database high availability regions.

Systems are a set of infrastructure targets that work together to host an application. Enterprise Manager supports a richer set of associations between members of a system (Stored On Database, Cluster Contains, Authenticated By, and so forth) to more accurately depict the relationship and dependencies between members of a system. This enables better impact analysis of changes made or operations performed on members of a system. Enterprise Manager offers out-of-box systems for well-known Oracle systems including database systems. Generic Systems, which are user-defined systems, now support target availability based on user-specified criteria: you must specify that at least one key member must be running or all key members must be running for the system to be considered running. Doing this enables you to proactively monitor the availability of the system based on its key members.

2.3.3.1 Dynamic Groups

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

Dynamic Groups enable the creation of groups based on membership criteria. Membership criteria is based on target properties such as target type, lifecycle status, department, target version, and so on. Targets whose properties match the criteria of a dynamic group are automatically added to the dynamic group.

Dynamic Groups facilitate easier management of groups. Administrators will only have to define the group membership criteria once and Enterprise Manager automatically adds or removes the targets to or from the appropriate dynamic group.

2.3.3.2 System Dashboard Enhancements

Note: These enhancements are new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

The System Dashboard enables you to proactively monitor the status and overall health of targets in a group or system. The color coded interface is designed to highlight problem areas and the summary table of open incidents enables you to view and manage these incidents. The System Dashboard has been enhanced to support more frequent refresh intervals (every 30 seconds) and the ability for administrators to stop and resume the refresh of the dashboard. A more frequent refresh interval is critical for data centers that require near real time monitoring of target status and incidents.

2.3.3.3 Incident Management Actions in System Dashboard

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Administrators can now perform incident management actions on incidents in a group or system from within the System Dashboard. These actions include assigning an owner, acknowledging an incident, setting incident priority, adding comments for other administrators, clearing manually-clearable incidents, and so forth. Because these actions are available from the System Dashboard, IT staff are able to more quickly respond to and manage incidents in the data center.

2.3.4 Reporting Enhancements

Integration is provided with Oracle Business Intelligence (BI) Publisher, an enterprise reporting solution that lets you author, manage, and deliver your highly formatted documents, such as operational reports, electronic funds transfer documents, government PDF forms, shipping labels, checks, sales and marketing letters, and much more. Built on open standards, Oracle BI Publisher (BI Publisher) also permits the creation of custom reporting applications that can leverage an existing infrastructure. Reports can be designed using familiar desktop products and viewed online or scheduled for delivery to a wide range of destinations.

2.3.4.1 BI Publisher 11.1.1.7 Integration

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Oracle BI Publisher 11g (11.1.1.7) is now installed by default with Enterprise Manager. However, it is not configured by default. To configure it post installation, follow the instructions in *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*:

http://docs.oracle.com/cd/E24628_01/install.121/e24089/toc.htm

2.3.4.2 Integrated Installation of Business Information Publisher with Enterprise Manager 12c

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Enterprise Manager now ships with and installs a compact installation of BI Publisher with Oracle Management Service by default. The installation or upgrade process installs and configures BI Publisher for use with Enterprise Manager with no manual intervention required. However, a post installation configuration step must be performed to configure the BI Publisher server. This step is documented in the Oracle *Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*:

http://docs.oracle.com/cd/E24628_01/install.121/e24089/toc.htm

BI Publisher is a powerful and robust reporting environment and the future direction for Enterprise Manager reporting. You no longer need to download, install, and configure BI Publisher separately to work with Enterprise Manager. Doing this saves maintenance and configuration time and you have access to the rich reporting environment immediately after installation.

2.3.5 Security

The sections below describe new security features and enhancements in the release.

2.3.5.1 Authentication Enhancements

Support for LDAP authentication and Kerberos strong authentication for Enterprise Manager administrators is now supported. Integration with Oracle Access Manager (OAM) is also supported. This enables data centers to comply with corporate security standards that they may have in place.

Nonpassword credentials are supported for host and database target authentication. Specifically, SSH key-based authentication is supported for host access and Kerberos tickets are supported for database authentication. Both enable you to take advantage of strong authentication mechanisms for target access.

2.3.5.1.1 LDAP Integration Enhancements LDAP user attributes can now be mapped to Enterprise Manager user attributes. This feature enables information about a user in LDAP, such as email address, line of business, cost center, and so forth to be automatically carried over to the corresponding Enterprise Manager user account when the user is created. This seamless, automated transmission of user information from LDAP streamlines the Enterprise Manager user creation process and provides a richer business context to Enterprise Manager user accounts. Another benefit of this feature is that when the user adds new targets, the targets automatically inherit the same properties as the user. If these properties are used as administration group or dynamic group criteria, then the targets are automatically added to the appropriate administration and dynamic groups. Doing this further helps automate target setup.

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

2.3.5.2 Improved Credential Management

Credentials are used to control access to managed targets. The use and management of credentials has been improved and simplified. Credentials now have their own lifecycle. Administrators can create, update, and delete credentials as separate entities apart from the features that use them. Credentials are also maintained in a centralized credential store. Features that use them refer to these credentials by reference; this means that any change in the credential will automatically be available to all features that use the credentials.

As an Enterprise Manager administrator, you can now create and share Named Credentials with other administrators without disclosing the sensitive content of the credentials. This enables more junior administrators who may not have access to the higher privileged credentials to use these credentials when managing targets. Named Credentials also significantly reduces the number of credentials that need to be created, reducing the time and effort needed to manage the credentials. Finally, the ability to create Named Credentials is protected by an Enterprise Manager privilege therefore enabling data centers to further control management of credentials.

2.3.5.3 Fine-grained Privileges and Out-of-Box Roles

Enterprise Manager includes more than 200 new granular privileges to control access to targets, objects and other resources, enabling administrators to better segregate their duties. There are also more than 20 new out-of-box roles containing the relevant privileges for different types of Enterprise Manager administrators. For example, consider the provisioning designer and provisioning operator job responsibilities. The former has greater responsibilities (creates components in the Software Library) than the latter (submits deployments). The out-of-box Provisioning Designer and Provisioning Operator roles are correspondingly defined with the appropriate privileges to support their different responsibilities.

2.3.5.4 Administrator Entitlement Summary Page

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

The Entitlement summary page provides information about secure resources owned by an administrator as well as roles and privileges that have been granted to that administrator. This summary enables administrators to easily find out if they have sufficient privileges required to perform management tasks using Enterprise Manager.

2.3.5.5 Auditing

Enterprise Manager continues to increase the set of audited actions. These include: creation and use of named credentials, user login/logout, privilege granting/revoking, monitoring template changes, database start/stop, and so forth. You can now view and search audit data in the Enterprise Manager console. Also, a built-in externalization service is available to purge audit data from the repository and export it to a file system, thereby enabling administrators to control the repository size without loss of audit data. Also, a built-in externalization service is available to purge audit data from the repository and export it to a file system, thereby enabling administrators to control the repository size without loss of audit data. Because infrastructure changes are now audited by default, you should back up audit data.

2.3.5.5.1 Auditing Enhancements Enterprise Manager infrastructure changes are automatically audited out-of-box. These changes include self-update download activities, plug-in deployment and undeployment, and OMS configuration tasks such as external authentication configuration. Auditing these actions provides better accountability of changes that impact the entire Enterprise Manager framework. Also, the audit search capability has been further enhanced. You can now search for a subset of audited operations, filter to see operations from specific client types (browser or EM CLI), search for operations for specific client hosts, and so forth. This enhancement provides easier and more efficient ways for audit officers to locate specific operations of interest.

For more information, see the "Configuring and Managing Audit" section of the *Oracle Enterprise Manager Cloud Control Security Guide*:

http://docs.oracle.com/cd/E24628_01/doc.121/e36415/sec_features.htm#CJAIEIDD

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

2.3.5.6 Better Support for Changing WebLogic Server Demonstration Certificates

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

The WebLogic Servers that are installed as part of the Enterprise Manager infrastructure are configured, out-of-box, with a demonstration certificate. Oracle recommends that you replace these certificates with production quality certificates for non-development environments to enable more secure communications between components of the Enterprise Manager framework. You can now replace and configure a new certificate using `emctl secure WLS`.

2.3.5.7 Security Console

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The Enterprise Manager Security Console consolidates critical details of your Enterprise Manager Security configuration into a single location where you can view, analyze, and optimize security for your managed environment. The Security Console is categorized into the following security areas:

- **Pluggable authentication:** Besides providing information about the various pluggable authentication schemes generally supported by Enterprise Manager, you can also view the current authentication scheme and related user authentication configurations in your Enterprise Manager.
- **Fine-grained Access Control:** Explains the privileges and roles and how they provide various levels of access control to different applications, groups, services, and targets within Enterprise Manager.
- **Secure Communication:** Provides current status on secured components within Enterprise Manager, along with their certificate issuers and details.
- **Credentials Management:** Displays information relating to credential and administrator usage statistics.
- **Comprehensive Auditing:** Displays the current auditable operations and whether they have been configured for external backup to disk. Statistics on various auditable operations are also displayed.
- **Active User Session Count:** Session management information is displayed, such as session timeout, maximum, and active sessions for each user count.

This Security Console consolidates all of the security related aspects of Enterprise Manager in one location. It also provides best practices, based on analysis on how best

to configure certain security components of the product, such as removing and storing a backup of the encryption key from the repository, enabling auditing operations, and ensuring that you have configured external back up of enabled auditing data.

2.3.5.8 SSH Key Credential Support in Preferred Credentials

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Enterprise Manager now provides out of box support for the use of SSH key credentials to be available and used as preferred credentials. SSH key credential sets are used to authenticate against various targets. The introduction of SSH key credential sets is useful when a username and password credential is unknown or when considering alternative security options. SSH keys use encryption methods which provide more confidentiality and integrity of data over an otherwise insecure network. Providing this support out of the box eliminates the requirement for the administrator to create a custom SSH key credential.

2.3.5.9 Global Preferred Credentials

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Preferred credentials enable an administrator to use a credential set to login to a target without being prompted for a login to that target. Preferred credentials simplify target management.

As well as user preferred credentials, Enterprise Manager is introducing global (scoped) preferred credentials. User preferred credentials are set by an administrator to apply to a specific target or target type. Global preferred credentials refer to the preferred credentials set by an administrator (with required privileges) to apply to all users for a specific target or to apply to all users for a target type.

The User Preferred Credentials page displays a table listing the search hierarchy used in determining which preferred credential is used by the system. A user's preferences (preferred credentials), if set, always overrides global preferences (global scoped preferred credentials).

2.3.5.10 Private Roles

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

There are certain sensitive privileges which Enterprise Manager does not make available to super administrators, for example, full credential privilege and full job privilege. Enterprise Manager considers these privileges particularly sensitive and powerful, which is the reason for not granting these privileges to roles. Granting these privileges to roles would also make them available to other administrators.

To accommodate the granting of such privileges Enterprise Manager is introducing the concept of private roles. Private roles enable administrators with specific privileges to grant these otherwise ungrantable privileges to other administrators. Private roles

enable named credentials to be assigned to roles. System roles define all roles accessible to all administrators with the `manage_system_role` privilege. Private roles are managed by administrators with the `create_role` privilege.

A private role can be granted to other administrators and roles through the Cloud Control console UI. Private roles can also be granted through the EM CLI using the EM CLI `create_role` and `grant_privs` verbs. Private roles enable an administrator to grant such sensitive privileges as full job and full credential privileges to other administrators and to roles.

2.3.5.11 Default and Bulk Apply Privilege Delegation Template

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Enterprise Manager allows a default privilege delegation template setting to be applied to a newly discovered host. Enterprise Manager also allows a default privilege delegation template setting to be applied to multiple already discovered hosts. This ability prevents an administrator from having to apply a privilege delegation setting on a host by host basis, especially when the same privilege delegation setting is being applied to all host targets. This feature is particularly useful when many host targets have been simultaneously added to Enterprise Manager. This feature is also available through EM CLI by using the `set_default_privilege_delegation_setting` verb.

2.3.5.12 Fine Grained Aggregate Target Type Privilege Enhancement

Note: This feature was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

An aggregate target type is a target that has one or more member targets, for example groups, systems, and Real Application Cluster. Finer grained aggregate target privilege support enables an administrator to set a privilege on the aggregate target as a whole unit, on the aggregate itself, or on the members only. Prior to the introduction of finer grained aggregate target privilege support, an administrator had to set the privilege on the aggregate type as a whole. This feature provides greater flexibility and control for the aggregate target type owner. Granting of separate privileges to the aggregate and its members is available through the EM CLI using the EM CLI `grant_privs` verb, as well as through the Cloud Console UI.

For example, an administrator might want to grant the `VIEW` privilege at the aggregate group level and the `FULL` privilege to each member target within the group. The administrator owning the group might want to do this to prevent another administrator from deleting the whole group, while still granting that administrator the ability to fully administer or delete a member target.

2.3.6 Enterprise Manager Command Line Interface With Scripting Option

Jython is the scripting engine for EM CLI scripts. EM CLI With Scripting Option enables administrators to perform complex tasks with command line interface (CLI) verbs and Jython-based scripting support. Administrators can build complex scripts by using a rich set of programming constructs that support more sophisticated logic and comprehensive workflows. EM CLI With Scripting Option also supports a general-purpose verb list that enables administrators to retrieve data from any

repository view and perform actions on the data retrieved. For example, an administrator can create a script that will query a specific set of targets (such as all targets on a host) and then set their target properties so that they join the appropriate administration groups.

EM CLI With Scripting Option also supports an interactive interpreter where administrators can execute any CLI verb and immediately see the output of the verbs. This provides administrators with an easy way to perform adhoc operations in Enterprise Manager. The rich scripting support provided by EM CLI With Scripting Option will help data centers to automate a broader set of operational tasks and more complex workflows, thereby improving administrator efficiency.

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

2.3.7 EM CLI Tracking and Setup

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

The deployment of EM CLI clients is now tracked by registering the EM CLI client as part of the EM CLI setup. Select Command Line Interface from the Setup tab to view a list of installed EM CLIs.

Tracking the EM CLI installations enables better management of the EM CLI clients. For example, tracking information can be used to identify EM CLI binaries that need to be patched, identify EM CLI installations that need to be updated when a user password changes, or ensure that all EM CLI clients have been synced with the latest verbs from the OMS.

No autologin is the default setup for EM CLI clients. This means that the user must logon to Enterprise Manager for each EM CLI session. The autologin option is available if required.

2.3.8 Support for Properties for Enterprise Manager Administrators

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

An Enterprise Manager administrator can now be assigned the following new attributes or properties:

- Cost Center
- Line of Business
- Department
- Contact
- Location

New targets created by the administrator will automatically be assigned the same cost center, line of business, department, contact, and location.

This feature enables more operational context to be associated with the administrator. In addition, this feature also facilitates the setting of these properties to targets because targets that are added by the administrator are automatically assigned the same set of values for Cost Center, Line of Business, Department, Contact, and Location.

2.3.9 Job System Enhancements

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The following enhancements for EM CLI support are now available:

- Multitask jobs
- Ability to suspend and resume jobs
- Added filters in the delete_job and stop_job verbs
- Added timeout for the agent unreachability status that applies to agent-bound jobs. On timeout, the step is aborted.

2.3.10 Deployment Procedures

2.3.10.1 Enhanced Customization of Patching Procedures

Note: This enhancement was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

You now have a greater capability to customize Enterprise Manager generated deployment procedures. These customizations include the insertion of directives stored in the software library, host commands, and manual steps. This greater customization capability enables expanded usage and utility for businesses already benefiting from patch automation.

2.3.11 Agent-Side Check Based Rule and Secure Technical Implementation Guide Compliance

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

2.3.11.1 Manual Rules

Many industry and custom compliance standards contain checks which cannot be automated. These checks can now be included and accounted for in Enterprise Manager compliance tracking and reports. You can define manual rules which enable you to track and report on task compliance checks which cannot be automated. You must manually attest the completion of these tasks after association. The attestation can be permanent or expire at some defined future date.

2.3.11.2 Violation Suppression and Unsuppression

Users can now permanently or temporarily suppress a specific violation directly from the compliance results area. Suppressed violations no longer negatively effect the compliance score but remain active for reporting and accounting purposes.

Violation suppression allows for grace periods and properly approved exceptions of compliance checks. Grace periods enable administrators time to address issues without negatively impacting compliance cores. It is also common for the auditing process to allow for exceptions to checks with management approval.

2.3.11.3 Agent-Side Rules

Agent-side rules tightly and formally integrate the compliance framework with configuration extensions simplifying the process of creating and managing agent side compliance validation. This integration simplifies the creation process as well as the lifecycle by deploying and undeploying the associated configuration extension at target association and unassociation time.

Many customers already have home grown scripts and queries to manually validate compliance to their followed standards. These scripts and queries can now be easily and rapidly automated using the Enterprise Manager compliance framework by directly reusing these scripts in a configuration extension coupled with a compliance rule.

2.3.12 Plug-in Management

Note: This enhancement was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Multiple plug-ins can now be deployed from the Cloud Control console in a single operation. Plug-ins that require an OMS restart during deployment are also identified. This helps administrators plan for and reduce the number of OMS restarts when deploying plug-ins from the console.

2.4 Services Management

The following sections describe new services management features and enhancements in the release.

- [New Create Wizard for Services](#)
- [Support for REST and WADL for Web Service Beacon Tests](#)
- [Service Target Dashboard](#)
- [SLA Management Enhancements](#)
- [Oracle Cloud Management \(Hybrid Cloud\)](#)

2.4.1 New Create Wizard for Services

Note: This enhancement was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The new create wizard for Services splits the various creation scenarios into three processes:

- Create a test based service
- Create a system based service
- Create an aggregate service

These service creation processes contain the service model steps. All additional features such as promoting metrics, setting thresholds, creating tests and beacons and so forth have moved to administration menus to ensure that setting up services is simple and direct.

2.4.2 Support for REST and WADL for Web Service Beacon Tests

Note: This enhancement was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Web Service Beacon tests now support Web Application Description Language (WADL) based interface discovery and the invocation of RESTful web services.

2.4.3 Service Target Dashboard

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

With this new feature, administrators can quickly create "out of box" overviews of the health of related services. They can create templates that contain a group of services selected from the defined services in Enterprise Manager. Any Enterprise Manager user can use these defined dashboards to quickly correlate the health of services, the status of key metrics, incidents and related status of the service level agreements tied to the service.

2.4.4 SLA Management Enhancements

Enhancements to the SLA management framework in Enterprise Manager ensure that it is flexible enough to represent any SLA in your environment. This feature provides a hierarchical SLA framework where Service Level Indicators (SLIs) represent key metrics and Service Level Objectives (SLOs) tie those SLIs together to define service level thresholds and requirements. SLAs use SLOs to define how the business requirements and associated notifications tie in to the overall monitoring service level framework. Using this arrangement, administrators and operations can now represent any SLA required within their environment in a manner that represents both their business and technical requirements.

2.5 Enterprise Monitoring and Incident Management Features

The following sections describe new monitoring and incident management features and enhancements in the release.

- [Administration Groups and Template Collections](#)
- [Blackout Enhancements](#)

- [Metrics Enhancements](#)
- [Metric Extensions](#)
- [All Metrics Chart Enhancements](#)
- [Incident Management](#)
- [Notification Enhancements](#)
- [Enhanced Target Down Detection](#)

2.5.1 Administration Groups and Template Collections

An Administration Group is a special type of group designed to automatically deploy management settings (monitoring templates, compliance standards, cloud policies) to targets when they join the group. Administration Groups are created by defining their membership criteria based on target properties. For example, the Administration Group containing all production targets in the Finance department must have the Lifecycle Status property set to Production and the Department property set to Finance. The management settings that should be applied to targets in an Administration Group are put together in a Template Collection which in turn is associated with the Administration Group. After that is done, when a new target must be setup for monitoring, administrators only have to set its target properties to match the membership criteria of the appropriate Administration Group. Enterprise Manager automatically adds the target to the Administration Group and auto-applies the applicable monitoring (and management) settings from the associated Template Collection. This automated monitoring setup provides data centers with a monitoring solution that can be easily scaled as their data center grows.

2.5.1.1 Search in Administration Group Hierarchy

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

A new search mechanism is provided to locate a specific group in the administration group hierarchy. Administrators can search for administration groups by name. After the group is found, then administrators can associate template collections with a group, review the management settings associated with the group, and so on.

Support for searches makes it much easier for administrators to setup and review management settings for groups in the administration group hierarchy. This is especially useful in deployments that have large administration group hierarchies where it is difficult to visually locate a group in a hierarchy containing hundreds or thousands of groups.

2.5.1.2 Flexible Editing of Administration Group Hierarchy

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

After an administration group hierarchy is defined, administrators may need to change the hierarchy by adding new levels, merging existing groups, or deleting a level. This can now be done easily without having to re-create the entire hierarchy.

This flexibility enables administrators to easily adjust their hierarchy to meet changing business needs.

2.5.1.3 Monitoring Templates and Template Collections Enhancements

Note: These enhancements are new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

You can create a monitoring template by pre-populating the monitoring template with metrics based on a user-selected target type. This is in addition to the option of creating a template based on the metric settings of an existing target. Also, when adding a metric to a monitoring template, this process has been streamlined to enable the user to directly choose specific metrics or metric extensions that are applicable to the target type. These enhancements make it easier for an administrator to create or edit monitoring templates.

You can export and import monitoring templates to share monitoring settings between different Enterprise Manager deployments. The inclusion of Metric Extensions as part of the exported or imported monitoring template provides an easy way to share many Metric Extensions at a time between Enterprise Manager deployments.

Monitoring templates are now self-updatable entities. This means Oracle can provide new monitoring templates for managed targets through the Self-Update mechanism.

Monitoring templates containing Oracle's recommended monitoring settings for targets are now more easily available to customers.

Details of monitoring templates within a template collection can now be easily viewed directly within the Template Collection pages. Also, more information is provided on the management settings associated with an administration group that come as a result of multiple inherited template collections. This feature provides administrators with a more streamlined and easier way to verify and adjust their monitoring setup for the targets in the administration group hierarchy.

2.5.2 Blackout Enhancements

Blackouts primarily support planned maintenance periods for managed targets. Consolidated blackout summary information is now available in the General region of the target home page.

2.5.3 Metrics Enhancements

The metrics user interface (All Metrics, Metric, and Collection Settings) has been enhanced to enable easier navigation and access to metric data. In All Metrics pages, you can search for a metric by name and view a summary of the currently open metric alerts and top five metrics with the most alerts within the last seven days. The metric charts have also been enhanced: you can hover your mouse over any part of the chart and receive tooltip information on the corresponding value of the metric. You can also toggle between the graphical view of the metric data and the tabular view to view more precise information on metric values at specific points in time. The new Threshold Suggestion feature is available to help you determine the appropriate thresholds for a metric based on the metric's historical data. The Threshold Suggestion feature is available in Metric and Collection Settings, All Metrics, and Monitoring Templates pages. Finally, configuration metrics are now included in the Metric and Collection Settings pages. This provides visibility into configuration metric collection information as well as the ability to change the collection schedule as needed.

User interface enhancements to metrics support include improved usability, support for changing settings for all metrics, and a new threshold suggestions feature. Changing and viewing metric settings are common tasks for many types of users. The enhancements included in this release are designed to improve the user experience and fill in feature gaps based on customer usage.

2.5.3.1 Advanced Thresholds Management

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

When monitoring performance, static thresholds may not provide the best alerting mechanism in all circumstances. This is particularly true when monitoring targets whose normal expected set of metric values (its baseline) varies based on the current workload of the target. Due to the varying nature of the expected metric values, having one set of static thresholds is not ideal because the threshold values would most likely be set too low or too high.

To provide a better alerting mechanism, Enterprise Manager now supports adaptive thresholds. Adaptive thresholds are thresholds calculated relative to a target's baseline behavior. For example, you can set the warning threshold for a performance metric to the 95th percentile of the target's baseline values and the critical threshold to the 99th percentile.

These advanced threshold management features provide more flexibility when specifying thresholds. They enable you to set thresholds based on expected workload changes which in turn lead to more accurate alerting.

2.5.3.2 Metric Alert Message Customization

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The message of a metric alert can now be customized. This enables administrators to fine tune alert messages to their preferred form of wording or even include operational context such as custom IT error codes used in their data centers.

Customized alert messages that are in tune with a datacenter's conventions can help streamline their alert management processes.

2.5.3.3 Metric Collection Schedule Enhancements

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

A metric collection indicates how often a metric is collected and evaluated against specified thresholds. If the collection schedule frequency is by days, by weeks, weekly, or monthly, you can now specify a start time. This enhancement gives administrators more control over metric evaluation and alerting which is important if the condition checked by the metric is time sensitive. For example, a metric might check the availability of certain processes a half hour before a business day starts if business applications depend on those processes.

2.5.3.4 Time-Based Static Thresholds

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Different thresholds can now be specified for metrics based on time periods. For example, during business hours you might define low thresholds for a request backlog metric in order to proactively catch delays that impact user requests. In the evening, when only batch processes are running and it is acceptable to have a larger backlog of requests because business users are no longer using the application, you might define higher thresholds for the same metric.

The flexibility of specifying different threshold sets enables monitoring to better suit business requirements.

2.5.4 Metric Extensions

Metric extensions are the next generation of user-defined metrics, which enable you to extend Enterprise Manager to monitor conditions specific to the enterprise's environment by creating new metrics for any target type. The migration of existing user-defined metrics to metric extensions is supported through the EM CLI, using the following EM CLI verbs:

- `abort_udmmig_session`
- `analyze_unconverted_udms`
- `create_udmmig_session`
- `list_unconverted_udms`
- `udmmig_list_matches`
- `udmmig_request_udmdelete`
- `udmmig_retry_deploys`
- `udmmig_session_details`
- `udmmig_submit_metricpicks`
- `udmmig_summary`
- `udmmig_update_incrules`

2.5.4.1 Grant Edit or Full Privileges on Metric Extensions

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

The owner of a metric extension can now grant Edit or Full privileges on the metric extension to another Enterprise Manager administrator or role.

This feature enables the metric extension owner to manage the privileges associated with the metric extension instead of having it managed only by Enterprise Manager super administrators.

2.5.4.2 Metric Extensions Enhancements

Note: These enhancements are new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

Metric extensions now support additional collection schedule options such as weekly on specified days of the week or monthly on specified days of the month. You can also specify a start time. Administrators have the option of specifying that metrics should be collected for special conditions such as when the target is down, when it is on a standby database, and so forth.

When defining metric columns, there are now options for defining these based on data from other metric columns. Specifically, administrators can define delta metrics (the change in value of the metric over a collection interval), metrics for rates per minute, or rates per five minutes. Rates indicate how much the metric value has changed over the specified time period. These statistical metrics can be used to gauge the throughput or efficiency of a monitored resource. Importing metric extensions has also been improved to enable administrators to retain or change the original metric name and version when importing it into Enterprise Manager. Collectively, these enhancements provide administrators with more flexibility and support for monitoring a broader set of target conditions.

2.5.4.3 Repository-Side Metric Extensions

Note: This features was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Repository-side metric extensions enable you to create new metrics for targets based on data collected in the Management Repository database. This is useful for metrics that are based on historical data that has been collected for a target or for metrics that aggregate data across different targets. Such data is typically available in the repository and not in the monitored targets. Although the data is collected from the database, the metric data and any alerts on the metric are associated with the target on which the metric extension is deployed.

2.5.5 All Metrics Chart Enhancements

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

The charts in the All Metrics page have been enhanced to show more data. This includes showing minimum and maximum values of the metric, periods when the metric was in warning or critical severity, and target down and agent unreachable periods of time for the target. This richer set of data enables administrators to better understand the performance and health of the target over time as indicated by its metric data.

2.5.6 Incident Management

Incident management features enable administrators to monitor and resolve service disruptions quickly and efficiently. Instead of managing numerous discrete events,

administrators can manage a smaller set of more meaningful incidents by priority and across the lifecycle of the incident.

The Incident Manager user interface provides a central point of control for managing events, incidents, and problems across managed targets. Key features include:

- Out-of-box and user-defined views to show events, incidents, or problems of interest (for example, show all incidents assigned to me)
- In-context access to My Oracle Support for access to Knowledge base articles
- Support for incident lifecycle operations including assigning, acknowledging, prioritizing, tracking status, escalating, and suppressing incidents
- In-context access to diagnostic and resolution capabilities to resolve incidents

If integration with external ticketing systems has been setup through the help desk connector, then the ticket ID and status of the help desk ticket associated with an incident is also displayed in Incident Manager.

Incident Rules enable the automation of actions related to events, incidents, and problems. These actions include the creation of incidents based on an event, notifications actions including opening of help desk tickets, and incident workflow operations such as incident assignment and escalation. Out-of-box incident rules are also provided that auto-create incidents for important events. Incident Rules thereby enable data centers to automate operational processes related to the management of events, incidents, and problems.

As part of user preferences, administrators can identify e-mail addresses used to send regular e-mail versus those used to send page notifications. For example, when creating incident rules, you can configure the system to page you when critical incidents occur, but to just send e-mails for warning-level incidents. In case of heavy load, the handling of event severity data across many targets is prioritized based on a target's Lifecycle Status property.

2.5.6.1 Incident Management Updates in 12.1.0.2

In Incident Manager, administrators can now perform bulk operations such as Clear and Acknowledge, against many applicable events and incidents at a time.

Incident Manager now displays additional properties about the target for which the incident or event has been raised. Such properties include Lifecycle Status, Cost Center, and so on. Search capabilities have also been expanded to include Lifecycle Status as search criteria. This feature helps provide more operational context about the targets on which the events or incidents were raised. Such operational context is useful in managing the lifecycle of the incident, for example setting the priority and owner of an incident can be based on the target's lifecycle status.

Incident Rules now support criteria based on the lifecycle status of a target. Administrators can now easily create rules for targets of specific lifecycle status values, for example rules for all Production targets and rules for all Development targets. This enhancement helps you to create rules for targets based on lifecycle status without requiring the intermediate step of creating a group that contains such targets.

2.5.6.2 Incident Management Updates in 12.1.0.3

Note: These features were new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

Incident Manager has been enhanced to provide better visual correlation of a specific event with related events. These are events on other targets on which the original target depends. Administrators have the option to expand the timeline shown to longer periods of time, enabling them to better assess any patterns of causal relationship between events. Finding possible causes of events helps with the prevention of such events in the future.

2.5.6.2.1 Target Down Root Cause Analysis In application environments, targets are dependent on one another. For example, a J2EE application might be deployed on a WebLogic server cluster consisting of several WebLogic servers and also might have its data stored on a cluster database. In this scenario, if one target goes down, it may cause other dependent targets to go down as well. For target down scenarios, Enterprise Manager automatically analyzes the various target down events and the targets' relationship to each other to determine which events are root cause and which events are symptoms.

Using this correlation analysis, administrators can perform more meaningful actions in Enterprise Manager such as creating incidents or notifying only on root cause events, excluding symptoms from the System Dashboard, deprioritizing incidents with symptom events, and so forth. Providing root cause analysis for target down events enables faster mean-time-to-repair and helps administrators meet service level agreement (SLA) goals.

2.5.6.3 Incident Management Updates in 12.1.0.4

Note: These features were new in the 12.1.0.4 release.

2.5.6.3.1 Incident Rule Set Simulator

The Rule Set Simulator enables you to test your incident rule sets. After specifying a sample event, the simulator shows you the rules to which the event will apply as well as their corresponding actions. This enables you to safely test your rules without the side effect of actually executing the actions specified in the rules. This is useful in production environments where you may not want actions such as emailing production staff or opening help desk tickets to actually occur.

2.5.6.3.2 Incident Manager Updates

Incident Manager now supports sharing custom views with all administrators. Administrators working in a team often end up creating their own identical but private views which define the subset of incidents they are interested in. Because you can now share these views, one administrator can create a view on behalf of a group and the share it with the group. Doing this saves time and effort and provides a more efficient way of working in a collaborative manner.

When viewing the details of an event or incident, the Related Events tab (page) now includes configuration changes on related targets that have occurred within 24 hours of the most recent event severity change. This enables administrators to quickly review potential configuration changes that may have impacted the event.

Two new tabs have been added to the set of tabs available for an event or incident in Incident Manager.

- The Notifications tab shows all of the notifications sent for the event or incident. Notifications include email and page notifications, use of advanced notification

methods (OS Command, PL/SQL procedure, SNMP traps), and the use of the event connector or ticketing connector. New users who are unfamiliar with the layout of Incident Manager now have a more intuitive and quick way to review notifications sent for an event or incident.

- For metric alert events, the Related Metrics tab shows a graphical view of metrics related to the metric on which the metric alert occurred. This helps administrators quickly assess other aspects of the target's health as indicated by these related metrics.

2.5.7 Notification Enhancements

2.5.7.1 SNMP Version 3 Support in Notification Methods

Note: These features are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The SNMP version 3 (SNMPv3) protocol offers a more secure way of sending messages between two entities. It supports better authentication of the source and encryption of the message to ensure message integrity. Enterprise Manager now supports sending SNMP traps using the SNMPv3 protocol.

This enhancement provides a more secure way to send event information from Enterprise Manager to third party management systems and enables data centers to be in compliance with their best practice security standards.

2.5.8 Enhanced Target Down Detection

Note: These enhancements are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

2.5.8.1 Faster Target Down Detection and Notification

Target down monitoring is now detected within seconds of when it occurs. This enables faster notifications of target down events and incidents. Faster detection and notification enables administrators to more quickly respond to such events thereby enabling higher levels of availability for monitored targets.

This feature applies to host, database instance (single instance database), Oracle WebLogic Server, Application Deployment, and Management Agent target types.

2.5.8.2 Enhanced Agent Down and Host Down Detection

For Management Agents that unexpectedly go down, the Agent Unreachable status has been enriched with a substatus that indicates the reason for being in an unreachable state. This feature helps administrators quickly address the root cause and restore Management Agent availability.

For Management Agents that are shutdown normally, new Agent Down events can now be sent. When a Management Agent is shutdown normally, it notifies its partner Management Agent that it is shutting down. A companion Management Agent is a management assigned to another Management Agent because of its close network proximity to that Management Agent. In addition to all of its regular functions, the

partner Management Agent monitors the status of its assigned Management Agent and its host. If and when the partner Management Agent receives the information about the Management Agent shutdown, it sends a Management Agent Down event for its assigned Management Agent within seconds of its occurrence.

In scenarios where the Management Agent is down (gracefully or unexpectedly) but its host is up, Enterprise Manager now shows the host status as Up but Unmonitored. In this situation, only the host status is being remotely monitored by the partner Management Agent and all other host metrics are not being collected because its Management Agent is down. System administrators can now choose to receive a notification for this status so they become aware that their host systems are currently unmonitored.

If a host goes down unexpectedly, a new Host Down event can be generated by the partner Management Agent within seconds of its occurrence.

The faster detection of Management Agent and host down events and the improved ability to distinguish between the two types of events enables faster notification of the appropriate administrators, more rapid resolution of these events, and ultimately higher overall availability for host and Management Agent targets.

2.6 Fusion Application Management

This section describes new features and enhancements for the following releases:

- [Oracle Fusion Applications Plug-in 12.1.0.1 Features](#)
- [Oracle Fusion Applications Plug-in 12.1.0.2 Features](#)
- [Oracle Fusion Applications Plug-in 12.1.0.3 Features](#)
- [Oracle Fusion Applications Plug-in 12.1.0.4 Features](#)
- [Oracle Fusion Applications Plug-in 12.1.0.6 Features](#)

2.6.1 Oracle Fusion Applications Plug-in 12.1.0.1 Features

2.6.1.1 Oracle Fusion Applications Management Support

You can now manage and monitor all Oracle Fusion Applications targets across the enterprise from a single console, including Fusion instances, product families, and application instances. Unlike other management tools, Cloud Control enables you to manage multiple Fusion Applications components within a WebLogic Server domain. This release also supports scale out of clustered Fusion Products and Fusion Applications.

2.6.1.2 Support Workbench Enhancements for Oracle Fusion Applications

To enhance troubleshooting Fusion Applications issues, the Enterprise Manager Support Workbench framework now includes incident filtering based on application type and incident consolidation from multiple tiers.

2.6.1.3 Oracle Fusion Applications Installation Backup and Recovery

You can now perform a full or partial backup and recovery of a Fusion Applications installation. You can back up all components of the Fusion Applications environment, including database and all component file systems, in one procedure. Likewise, you can implement recovery of a full environment or of individual components. This

feature replaces the manual Fusion Applications backup and recovery procedure with fully-automated backup and recovery workflows in Cloud Control, based on the System Backup and Recovery framework.

2.6.1.4 Enterprise Scheduler Service

You can now monitor the performance of Oracle Enterprise Scheduler (ESS) components and jobs. You can also view the status of job requests, including completed job requests by user, application, and work assignment.

2.6.2 Oracle Fusion Applications Plug-in 12.1.0.2 Features

2.6.2.1 Oracle Fusion Applications Management Support

Now, in addition to scaling out a WebLogic domain, you can scale out (or scale up) the Oracle HTTP Server (OHS). You can perform these scale-out operations in tandem or independently.

2.6.2.2 Streamlining Whole Server Migration

Whole server migration is the process of migrating a server instance to a different physical machine upon failure. With this release, there is a wizard that enables you to configure a deployment procedure that can trigger whole server migration in the event of host machine failure. The wizard makes it extremely easy and straightforward to plan for and set up whole server migration.

2.6.3 Oracle Fusion Applications Plug-in 12.1.0.3 Features

2.6.3.1 Fusion Applications Backup and Restore Enhancements

Administrators can quickly execute backup and restore operations for Fusion Applications directly from within Oracle Enterprise Manager reducing the overall manual maintenance efforts that can prove error prone and time consuming.

2.6.4 Oracle Fusion Applications Plug-in 12.1.0.4 Features

2.6.4.1 Fusion Application Provisioning Based on T2P

This feature enables administrators to use Oracle Fusion Applications in an automated manner as they move from test to production or between other environments.

2.6.4.2 Fusion Applications Discovery Diagnostics

The process of discovering a Fusion Applications instance can be challenging for customers. The purpose of this enhancement is to provide diagnostic tools that assist administrators in the event of a Discovery failure. The enhancement provides a number of different validations that assist administrators to identify the root cause or causes of the failure. Examples of the validations include:

- Validating that base agents as well as pre-requisite plug-ins are deployed on targets
- Validating that permissions are correctly set

- Validating jmx connections
- Validating the availability of all relevant servers

2.6.4.3 New Configuration Standards

There are two new Fusion Applications Configuration Standards in 12.1.0.4: the Fusion Applications Patch Delta Configuration Standard, and the PDIT: FA Configuration Standard.

The Fusion Applications Patch Delta Configuration Standard was designed to enable a comparison of the Fusion Applications patches applied to any Fusion Applications Instance against a pre-defined baseline.

The PDIT: FA Configuration Standard was designed to validate that certain configuration parameters on Fusion Applications targets are in compliance with Oracle's internal best practices. These best practices were defined by the Oracle team responsible for maintaining Oracle's internal Fusion Applications instances.

Administrators can view these standards, as well the associated rules contained in the standards in the Compliance Library.

2.6.4.4 Create Additional Associations

With this enhancement, after you have added an existing Fusion Applications instance as a managed target that Oracle Enterprise Manager Cloud Control can monitor, you can create associations between the Fusion Applications instance and Identity Management, Business Intelligence, Oracle Social Network domains, and authorized OHS targets. This enhancement provides a better, more complete picture of the Fusion Applications instances that you administer.

2.6.4.5 EM CLI for Packaging Fusion Applications Incidents

Before the 12.1.0.4 plug-in, administrators had to use the user interface wizard within Enterprise Manager to package up Fusion Applications incidents.

With this feature, administrators can leverage this new EM CLI verb to package up incidents from the command line. This feature will benefit administrators that need to monitor and maintain a large number of Fusion Applications Instances within a single Enterprise Manager instance.

2.6.4.6 Continued Improvement in Fusion Applications Scale-Out Capabilities

The wizard-driven scale-out capability for Fusion Applications targets has existed since the early releases of the Fusion Application Plug-in. The 12.1.0.4 plug-in includes the following enhancements:

- Improved auto-population of correct values in the Scale-Out wizard, especially in the management of OHS targets
- Support for the scale-out of Fusion Applications instances with SSL ports and certificates
- Improved Scale-Out treatment of different types of Clusters (for example, Fusion Applications and Infrastructure)

2.6.5 Oracle Fusion Applications Plug-in 12.1.0.6 Features

2.6.5.1 Problem Analysis

The following problem analysis updates are available with this plug-in release:

- You can add new correlations to existing rules through the Cloud Control console. This update enhances your ability to perform diagnostics more effectively.
- You can create a new rule through the Enterprise Manager Cloud Control UI. Out-of-box default metrics are shown in the correlated section.
- You can define keyed metrics as source metric for problem analysis.

2.7 Database Management

This section describes new features and enhancements for database management.

- [Database System Discovery Enhancements](#)
- [Configuration Management Enhancements](#)
- [Configuration Compliance](#)
- [Database System and Associations](#)
- [Database Patching and Upgrade](#)
- [Simplified EM CLI verbs for Deployment Procedures](#)
- [Performance Diagnostics Enhancements](#)
- [Zero Data Loss Recovery Appliance Plug-in 12.1.0.1 Features](#)
- [Database Plug-in 12.1.0.1 Features](#)
- [Database Plug-in 12.1.0.2 Features](#)
- [Database Plug-in 12.1.0.3 Features](#)
- [Database Plug-in 12.1.0.5 Features](#)
- [Database Plug-in 12.1.0.6 Features](#)
- [Database Plug-in 12.1.0.7 Features](#)
- [Database Plug-in 12.1.0.8 Features](#)

2.7.1 Database System Discovery Enhancements

Unlike previous releases, Enterprise Manager Cloud Control can detect databases in a data center even before the Management Agent is deployed on the host. Enterprise Manager Cloud Control can detect the presence of the database by using an agentless (nmap) technology. This is then integrated with the database target promotion process to perform deep and automated agent-based discovery. The target promotion also includes the deployment of target-specific monitoring templates, such as the ones for test and production databases. The result of the discovery process is a database system that includes associated targets and applications.

2.7.2 Configuration Management Enhancements

Enterprise Manager Cloud Control provides a set of features to manage database configurations and underlying infrastructure. This includes the ability to perform configuration searches, detect configuration drifts, and track configuration history. Configuration Search uses the underlying data and dependency mappings to find databases among thousands of databases. For example, it can find databases that are part of Exadata but missing a particular patch.

Configuration comparison functionality has been enhanced with new capabilities such as template support, system level comparison, comparison scheduling, and change notification. You can also ignore certain configuration differences. You can easily save output of a comparison and exported in plain text or CSV formats.

2.7.3 Configuration Compliance

Enterprise Manager Cloud Control can detect whether a database is compliant with Oracle's or the data center's own best practices. It includes a compliance framework which enables administrators to define rules and roll them up into compliance standards for better visibility. Rules can be created to detect changes from certain values or to detect real-time changes.

2.7.4 Database System and Associations

A Database System is automatically created on discovery of an Oracle Database. The system is built on the new target and association model that can be used to monitor the database's storage, connectivity, and high availability. This also enables you to monitor and manage applications that are dependent on the database. Database System topology can be used to view relationship between various entities within the database system as well as external dependencies.

2.7.5 Database Patching and Upgrade

Enterprise Manager Cloud Control enables administrators to patch and upgrade multiple databases in mass scale. The patch management capability includes proactive patch advisories and patch plans for deploying many interim patches to multiple databases under one single downtime period. Enterprise Manager Cloud Control also supports out-of-place patching which enables administrators to create a copy of the patched version and move database instances when a downtime can be afforded.

Similarly, Enterprise Manager Cloud Control automates the application of major upgrades to the database environments. Integration with My Oracle Support enables administrators to ensure that current patch levels are being maintained in the new release, before the databases are upgraded.

Both patching and upgrade features leverage the already collected information to perform extensive pre-requisite checks (such as conflicts) so that the process is seamless and error-free.

2.7.6 Simplified EM CLI verbs for Deployment Procedures

This release simplifies existing EM CLI verbs and includes new verbs that enable system administrators to execute and track Deployment Procedures in a scripted manner.

2.7.7 Performance Diagnostics Enhancements

Oracle Enterprise Manager Cloud Control 12c includes Active Session History (ASH) Analytics, a new tool to explore ASH data that enables the administrator to roll up, drill down, and slice or dice performance data across various performance dimensions. Using ASH Analytics the database administrator can explore the different performance attributes of a database session at any point in time. With the ability to create filters on various dimensions, the database administrator (DBA) can not only identify performance issues but also get a good understanding of various performance patterns and resource usage of the system.

Real-Time Automatic Database Diagnostics Monitor (ADDM) provides an innovative way to analyze problems in extremely slow or hung databases, which would have traditionally required a database restart. Real-Time ADDM can help resolve issues such as deadlocks, hangs, shared pool contentions, and many other exception situations without resorting to a restart of the database. Real-Time ADDM uses two different types of connection modes to connect to the target instance. The normal JDBC connection is intended to perform extensive performance analysis when some connectivity is available. The diagnostic mode which makes a latch-less connection is useful for extreme hang situations when normal connection is not possible.

2.7.8 Zero Data Loss Recovery Appliance Plug-in 12.1.0.1 Features

Zero Data Loss Recovery Appliance is a ground-breaking data protection solution that is completely integrated with Oracle Database and easily protects all databases in the data center with a massively cloud-scaled architecture. Enterprise Manager for Zero Data Loss Recovery Appliance provides comprehensive management and monitoring of Recovery Appliance operations, enabling complete control of the data protection lifecycle.

2.7.9 Database Plug-in 12.1.0.1 Features

2.7.9.1 Oracle Real Applications Clusters Management Enhancements

Enterprise Manager Cloud Control can be used to monitor and manage Oracle Real Applications Clusters (RAC) One Node databases. RAC One Node has the same rich monitoring capabilities as a regular RAC databases. You can perform Online Database Relocation of RAC One Node using Enterprise Manager. Additionally, fail-over or relocation of RAC One Node database instances is now automatically handled by Enterprise Manager.

Enterprise Manager Cloud Control can be used to manage Quality of Service (QoS) Management functionality provided in Oracle Clusterware release 11.2.0.2 and above. You can create and edit policy sets, review or implement recommendations, and monitor QoS metrics.

2.7.9.2 Manage Automatic Storage Management Clusters as a Target

You can now monitor and manage clustered Automatic Storage Management (ASM) instances as a single clustered target. This includes discovery, monitoring, configuration, and administration operations at the cluster level. Also, shared storage resource monitoring will be performed from one master agent with a failover mechanism, resulting in higher performance and availability.

2.7.9.3 Backup and Restore Enhancements

The new Group backup feature in Enterprise Manager Cloud Control provides the ability to backup multiple databases, Oracle homes, and file systems in one operation. Centrally maintained backup configurations can be created, containing uniform database and file backup settings that are applied to all of the objects in a Group backup. A Group backup can include all or a subset of the databases that are members of the group. In addition, in environments where Oracle Secure Backup is used to backup file systems to tape, the respective Oracle homes of each included database can also be included in a Group backup, as well as any other files or directories on hosts that are members of the group. Oracle homes that are backed-up as part of a Group backup can be independently restored to their original location or a new location.

2.7.9.4 Streams and XStreams Support

Streams and XStreams configurations can now be managed and monitored using Enterprise Manager Cloud Control. In addition to improvements in configuration management and performance monitoring, logical change record (LCR) tracking is available for high-level diagnosis of replication issues. Enterprise Manager Cloud Control also simplifies the management and monitoring of replicated environments.

2.7.9.5 Schema Change Management Enhancements

The new Change Plans function enables application developers and database administrators to encapsulate multiple required database schema changes into a change plan, which can be used to document, capture, and apply schema changes. Change plans are also integrated with developer DBA tasks into SQL*Developer and Oracle Enterprise Manager task automation. This integration reduces the manual processes between the various stakeholders involved in the process of promoting planned changes across enterprise databases while ensuring the integrity of the process.

2.7.9.6 Active Session History Analytics

Active Session History (ASH) Analytics enables a performance specialist to explore the different performance attributes of a database session at any point in time. With the ability to create filters on various dimensions, the DBA can not only identify performance issues but also obtain a good understanding of various performance patterns, workload behavior, and system resource usage.

2.7.9.7 Emergency Monitoring

The Emergency Monitoring feature enables the database administrator to connect to an unresponsive database through a special proprietary mechanism and diagnose performance issues when normal mode connection is not possible. It has an in-built hang analysis capability that enables you to identify blocking sessions and kill these blockers with a click of a button.

2.7.9.8 Real-time Automatic Database Diagnostic Monitor

ADDM is an innovative way to analyze problems in extremely slow or hung databases, which would have traditionally required a database restart. Real-Time ADDM can help resolve issues such as deadlocks, hangs, shared pool contentions, and many other exception situations without resorting to a restart of the database. Real-Time ADDM uses two types of connection modes to connect to the target instance. The normal JDBC connection is intended to perform extensive performance analysis when some connectivity is available. The diagnostic mode which makes a latch-less connection is useful for extreme hang situations when normal connection is not possible.

2.7.9.9 Compare Period ADDM

Compare Period ADDM enables the administrator to answer the age-old question: Why is performance slower today compared to yesterday? The administrator can compare performance across any two periods of time and determine the root cause of why performance in one period was different than in the other. In addition to pinpointing the root cause for the difference in performance, Compare Period ADDM also indicates whether the two periods are comparable, for example do they have similar SQL workloads running in the same period, by the use of the SQL Commonality index for the two periods.

2.7.9.10 New Active Reports

Three new Active Reports have been added in this release: ASH Analytics, Real-Time ADDM, and Compare Period ADDM. These are interactive reports that can be used for offline analysis. These reports offer the same level of interactivity as the actual Enterprise Manager screens, with drill-downs to detail views. These Active Reports can be emailed to anyone for offline analysis without giving the recipient direct access to Enterprise Manager.

2.7.9.11 Application Data Model

The Application Data Model (ADM) maintains the table definitions associated with an application, the referential relationships connecting those tables, sensitive data elements, and the associated columns contained in the application. Instead of having to manually discover sensitive data, the application data model can programmatically identify and store the sensitive data elements through sensitive data scanning and import of data masking templates.

2.7.9.12 Data Subsetting

Data subsetting provides the ability to create a smaller sized copy of the original production data that can be given to developers for testing. While it is a data subset, the referential relationships are preserved so that the data set is complete. This enables enterprises to lower storage costs while making production data available to developers for testing, without having to incur the storage footprint of the entire production database.

2.7.9.13 Reversible Data Masking

You can use reversible data masking, which relies on encryption and decryption algorithms, to enable user data encryption deterministically, as a regular expression in a format that you choose. Unmasking reverses the process and reverts back to the original data. This feature is useful in environments where sensitive data must be masked and sent to a third party for processing.

2.7.9.14 Real Application Testing and Data Masking Integration

Oracle Real Application Testing and Oracle Data Masking integration provides users with the ability to perform secure testing without compromising data security and compliance regulations. You can now use the SQL Performance Analyzer and Database Replay features against databases where sensitive information has been masked.

2.7.9.15 Application Templates for Data Masking and Data Subsetting

Enterprise applications are highly complex involving hundreds of tables and thousands of referential relationships. These tables also contain sensitive or private data that cannot be shared with developers or testers. Enterprise Manager now provides predefined data masking and data subsetting templates for different applications. Data masking templates contain the list of columns, sensitive data, and their associated masking formats. Data subsetting templates identify the tables involved in the subsetting process, their referential relationships and associated WHERE clause to extract the subset of the data. These templates enable you to automatically create test systems based on best practice recommendations from the Oracle Applications teams. These templates enable customers to easily create test systems with a subset of the data that is relationally intact and with sensitive information de-identified.

2.7.9.16 Segregation of Duties

Enterprise Manager now supports the separation of roles specifically for provisioning into Designer and Operator. The Designer role corresponds to administrators who define provisioning standards. The Operator role typically corresponds to administrators who do actual software provisioning. Operators can be less experienced administrators.

2.7.9.17 Provisioning Profiles

A provisioning profile is a read-only snapshot of an existing database environment that can be used as a starting point to provision a new database. The snapshot can capture the Grid infrastructure (Clusterware and Automatic Storage Management), homes, database homes, and Database Configuration Assistant (DBCA) templates. This can all be stored in the Software Library for later use.

2.7.9.18 Input Lockdown

The locking down feature in Database Provisioning enables Designers to lock down the set of variables, such as host targets, credentials, Oracle homes to be provisioned, and others, in the deployment procedure wizard. This enforces standardized deployments and minimizes errors in configurations during mass deployment. The operator can then deploy the procedure that the designer configures and saves in the Procedure Library.

2.7.9.19 Provisioning Bundle Updates through the Self Update Feature

You can now access provisioning bundles directly through the Self Update feature, greatly simplifying the process of updating deployment procedures, Software Library entities, and other provisioning artifacts.

2.7.9.20 Default Variable Values in Deployment Procedures

Deployment Procedure interviews, the user-friendly wizards that guide you through the provisioning activity, now support saving of default variable values for use by other users.

2.7.9.21 Customizable User-Defined Deployment Procedures

User-Defined Deployment Procedures (UDDP) enable automation of custom, and often complex, processes (for example, third-party application provisioning, JRE upgrade, and so forth).

2.7.9.22 Software Library Entities

You can now assign privileges to Software Library entities, enabling the enterprise to implement segregation of duties and thus help in complying with corporate security policies. There is a single console for all Software Library entities. This reduces the time spent searching for entities while providing more meaningful ways to display information. This release also includes support for different storage types, such as agent file system, NFS, and HTTP.

2.7.9.23 Improved Troubleshooting for Deployment Procedures

Deployment Procedures are integrated with the Incident Framework, where incidents are automatically created for critical failures. An incident triggers dump scripts to collect debug information, which can then be packaged in an archive and sent to Oracle Support for analysis. Deployment Procedures also support execution in debug mode, which can be used for additional logging information.

2.7.10 Database Plug-in 12.1.0.2 Features

2.7.10.1 Synchronizing the Software Library

You can now synchronize manually downloaded Cluster Verification Utility (CVU) binaries with the Software Library. Enterprise Manager, by default, provides a routine job that is scheduled daily to download binaries from My Oracle Support, if corresponding binaries in the Software Library need to be updated. If your Enterprise Manager deployment is behind a firewall or a DMZ such that the HTTP connection to My Oracle Support is disabled, the routine job will skip its execution. In this case, you can manually download the CVU binaries corresponding to your platform from OTN or My Oracle Support using patch 9288873 as the source. Subsequently, you can use the Cluster Verification Utility to ensure that the latest CVU binaries are present in the Software Library.

2.7.10.2 Automatic Storage Management Cluster File System Support

Enterprise Manager now supports Automatic Storage Management Cluster File System Support (ACFS) Security and Encryption features. ACFS encryption enables users to store data on disk in an encrypted format. Enterprise Manager users who are ACFS administrators are now able to use these features to implement and manage security on file system objects stored in ACFS.

2.7.11 Database Plug-in 12.1.0.3 Features

2.7.11.1 Support for Oracle Database 12c Release 1 (12.1)

Database Plug-in 12.1.0.3 provides complete management and monitoring support for Oracle Database 12c Release 1 (12.1) targets, including the following:

- Support for creating and managing pluggable databases (PDBs)
- Backup and recovery
- Performance management
- Real-time database operations monitoring
- Enhancements to real-time Automatic Database Diagnostic Monitor (ADDM) storage
- Automatic Storage Management Cluster File System Support (ACFS) and Automatic Storage Management (ASM) management support
- Database security, including data redaction and database auditing
- Database testing, including consolidated replay, data subsetting, and data masking features

2.7.11.2 Support for Pluggable Databases and Container Databases

Enterprise Manager Cloud Control enables administrators to manage the complete lifecycle of a PDB including provisioning container databases (CDBs), and PDBs (from seed or unplugged PDBs), cloning existing PDBs, migrating non-CDBs to PDBs, patching (single instance and RAC) and upgrading. In addition, features such as configuration management, compliance management, change management, and auto discovery have been updated to support both CDBs and PDBs.

2.7.11.3 Support for Container Database Backup and Recovery

Enterprise Manager now supports CDB backup and recovery through the new PDB syntax. Users can backup and recover an entire CDB, individual PDBs, or the tablespace or datafile of specific PDBs.

Users familiar with Enterprise Manager-managed backup and recovery tasks can leverage the same skill set for CDB backup and recovery tasks.

2.7.11.4 New Pluggable Database Target Type to Support Container Based Databases in Oracle Database 12c

Enterprise Manager now provides built-in support for performance management, storage management, user and security management, and so on to effectively manage and monitor PDBs from a single console. This makes the administration of PDBs easy by enabling an administrator to switch between containers on all PDB target pages. The CDB level pages that are accessible only at the root container by the CDBA enable administrators to manage and monitor the entire database as a single unit.

2.7.11.5 Enhancements to Expose Navigation Between Containers in a Container Database

Enterprise Manager enables an authorized administrator to seamlessly navigate between different containers in a CDB. The administrator can use the container picker at the top of the page to move between PDBs in pages (for example storage administration, user management) that display PDB specific information.

2.7.11.6 Support for Oracle ASM Features

Enterprise Manager now supports Oracle Flex ASM, disk resync improvements, Oracle ASM rebalance improvements, the ability to enable access control for Oracle ASM files on Windows, Oracle ASM corrupt media recovery (scrubbing), and Oracle ASM filter driver. Users benefit from the easy-to-use interface used to monitor and manage tasks such as job scheduling, metrics collection, and so on.

2.7.11.7 Support for Oracle ACFS New Features

Enterprise Manager support for Oracle Automatic Storage Management Cluster File System (Oracle ACFS) features includes Oracle ACFS enhancements for Grid homes, Oracle Flex ASM for Oracle ACFS and Oracle ADVM (ASM Dynamic Volume Manager), Oracle ACFS tagging, and Oracle ACFS snapshot enhancements. This support enables all Oracle ACFS file system functionality to be managed by an easy-to-use graphical management interface.

Enterprise Manager also now supports ACFS security and encryption. This new support provides security management solutions to customers who use Enterprise Manager to manage Oracle ACFS.

2.7.11.8 Database Replay Support for Database Consolidation Using Pluggable Databases

Database Replay supports concurrent execution of multiple database replays on a single target database to test and verify database consolidation. The database captures can come from a traditional database or from an Oracle PDB, captured at the container or at the PDB level. When replaying workloads against a PDB, the replays can be targeted to specific PDBs through connection remapping.

Database Replay support for consolidated replays enables the investigation of the interaction of multiple production scale workloads consolidated to a single database. It also eliminates risk and unanticipated problems for database consolidation projects.

2.7.11.9 Data Masking Support

The following enhancements have been made to data masking and data subsetting functionality.

2.7.11.9.1 Mask During Subsetting or Mask at Source To mask confidential data for non-production use, enterprises were required to make a copy of the production database and then mask the data before sharing it with non-production users such as testers or developers. Masking at the source or masking while subsetting at the source database enables enterprises to provision a secure and reduced size test system directly from the production database without the need for a full production database copy. Enterprises may choose to execute the masking or subsetting operations or both to provision the test database in a single workflow.

Masking at the source or masking while subsetting at the source ensures that sensitive production data never leaves the source database when provisioning test systems and, therefore, complies with data privacy policies.

2.7.11.9.2 Self Update for Oracle Applications Masking and Subsetting Templates Enterprises can mask sensitive data using data masking templates for Oracle applications such as Oracle Fusion Applications and Oracle E-Business Suite. Given the complexity of enterprise applications such as Oracle Fusion Applications or Oracle E-Business Suite, the process of manually importing the data masking templates can be complex. Using self update for Oracle applications, enterprises can directly download masking and subsetting templates from Oracle and import them into their Oracle Enterprise Manager Cloud Control 12c environment with no manual intervention.

Enterprises can easily and seamlessly implement the best practices for protecting sensitive data and provisioning reduced sized databases in their Oracle applications non-production environments using the self update option for Oracle applications masking and subsetting templates.

2.7.11.9.3 Enhancements to Support Oracle E-Business Suite Masking Use Cases Securing Oracle E-Business Suite includes protection for the underlying E-Business data in production and non-production databases. While steps can be taken to provide a secure configuration to limit Oracle E-Business Suite access, an approach that will meet regulations and laws, such as Sarbanes-Oxley (SOX), Payment Card Industry Data Security Standard (PCI DSS), and the Health Insurance Portability Act (HIPAA), protecting non-production data is achieved by scrambling sensitive data in the non-production copy.

With Oracle Data Masking Pack today, enterprises can take advantage of anonymizing sensitive data in a cloned environment easily and quickly. Scrambling E-Business Suite data becomes somewhat challenging due to the complex meta-data architecture and knowing where the sensitive information resides in the architecture. To alleviate this challenge, Oracle has released the Oracle E-Business Suite Template for Data Masking Pack.

The template contains out-of-the-box, meta-data knowledge of the E-Business Suite architecture and the sensitive columns. Additionally, the template contains pre-defined industry best-practice masking algorithms to ensure that the optimal technique is used to securely mask the data while maintaining the application integrity.

Oracle Data Masking and the E-Business Suite template enables organizations to enforce compliance with regulatory requirements that restrict the use of production data in non-production environments.

2.7.11.10 Real-Time Database Operations Monitoring

SQL monitoring introduced in Oracle Database 11g enables DBAs and developers to monitor individual executions of SQL scripts. Real-time database operations monitoring extends SQL monitoring to include long running database application operations such as batch jobs, scheduler jobs, and extraction, transformation, and loading (ETL) jobs. Using similar capabilities to real time SQL monitoring, database operations monitoring provides a database-server based tracking mechanism that enables users to identify database operations and then monitor progress and alerts, tune associated SQL queries, and compare performance.

Database administrators can easily associate SQL queries or scripts with long running database operations and get a holistic view of the progress instead of having to track individual SQL scripts thereby saving valuable time in troubleshooting complex database operations.

2.7.12 Database Plug-in 12.1.0.5 Features

2.7.12.1 Application Data Model Enhancements

Fine grained privilege control is now available for Application Data Model (ADM). You can differentiate Data Discovery and Modeling users into designer and operator roles on application data models. Doing this enables you to separate duties and enforce enterprise security requirements easily.

2.7.12.2 Enterprise Manager ASM Monitoring and Management Enhancements

ASM monitoring and management has been improved. Improvements have been made to the scalability and performance of metric data upload for large environments and the following metrics relating to ASM resource usage have been added:

- User Limit Usage
- Process Limit Usage
- Session Limit Usage

Reports showing historical space usage trends are now available through BI Publisher. These enhancements provide improved usability and manageability of the ASM target using Enterprise Manager.

2.7.12.3 Enterprise Manager Support for Golden Gate and Streams Integration for Replication Management

Error handling and statistics are enhanced in Oracle Enterprise Manager to take advantage of new XStream capabilities. The database administrator now has more complete information about the replication environment.

2.7.12.4 SQL Performance Analyzer Quick Check

SQL Performance Analyzer (SPA) Quick Check enables performance verification of routine DBA operations that affect database performance on production databases. SPA Quick Check runs as an optimized workflow, utilizing predefined inputs including a SQL tuning set and other SPA task execution options. Depending on the

system change, SPA Quick Check is run by a one-click button or by choosing the SPA Quick Check option in a database input wizard. It is optimized to use minimal resources by focusing on SQL with execution plan changes and combining multiple steps in one step. SPA Quick Check is run in a private session-scope and resource controlled manner, thereby enabling it for day to day production use cases such as optimizer statistics gathering or parameter change evaluation.

SPA Quick Check makes it simple, easy, and quick to use SPA for routine DBA tasks directly on production databases. It provides change-aware workflows which incorporate best practices when performing day to day operations and guarantees that database changes result in improved performance.

2.7.12.5 Enhancements for Database Replay Consolidation

This section describes enhancements for Database Replay consolidation.

2.7.12.5.1 Workload Scheduling For Consolidated Database Replay Consolidated Database Replay enables multiple simultaneous database replays against a multi tenant or non-CDB consolidated database. Workload scheduling can be used to ensure that the target database system can handle the consolidated workload under various conditions. For example, to test a worst case database load scenario, the workloads could be scheduled so that all of the workload peaks occur at the same time. Workload scheduling can also be used for scale-up testing to determine the maximum workload that the target system can handle. Oracle Enterprise Manager Cloud Control 12c supports workload performance visualization through an easy to use interface that enables you to schedule individual workloads in a consolidated replay to test various what-if scenarios.

2.7.12.5.2 Workload Subsetting Workloads captured with Database Replay can now be subsetted into smaller individual workloads. A long duration database capture can be broken into individual workload subsets that target specific time periods or highest load portions of the capture. Rather than replaying the entire long duration capture, the workload subsets can be used for targeted and efficient workload testing. The generated workload subsets can be replayed by themselves or consolidated and scheduled like any other captured workload to investigate various what-if load scenarios.

Oracle Enterprise Manager Cloud Control 12c now supports an intuitive user interface that enables you to visualize workload performance and subset it as necessary to capture the most interesting or highest portions of the workload. The workload subsets enable a more targeted, efficient, and flexible approach to testing.

2.7.12.6 Support for Data Guard Rolling Upgrade

Oracle Enterprise Manager now provides support for database rolling upgrades using a transient logical standby database including standalone databases and RAC databases up to the total limit of allowed standby databases to be upgraded in the process.

Automation of the difficult manual upgrade process of the complex Dataguard database architecture, which involves primary and multiple standby databases, eliminates errors, provides flexibility, and lowers effort and cost involved in performing the upgrade outside of Oracle Enterprise Manager.

2.7.12.7 Support for Global Data Services

Global Data Services provides an Enterprise Manager-based user interface that enables administrators to manage and monitor a global service management configuration.

Administrators for a global service management configuration are now be able to use the familiar Enterprise Manager interface to manage and monitor configurations.

2.7.12.8 Masking Enhancements for Fusion Middleware, E-Business Suite, and PeopleSoft Applications

This section describes masking enhancements for Fusion Middleware, E-Business Suite, and PeopleSoft applications.

2.7.12.8.1 Enabling and Disabling Sensitive Columns in Masking Definitions

Oracle Data Masking definitions contain references to sensitive columns (identified in the application data model) and the format types to be used to mask the sensitive columns amongst other parameters. Until this release, regeneration of the masking definition did not include any sensitive columns that had been disabled. Users had to delete columns that were no longer required to be masked. With this new release of data masking, users can simply disable (or enable) the sensitive columns and regenerate the masking script.

Giving users this capability eases the manageability of masking definitions by reducing the number of definitions required for various environments of an application. In addition, small variations between environments can be self-contained within one masking definition.

2.7.12.8.2 Filtering Sensitive Columns in Masking Definitions

When there are large numbers of sensitive columns in masking definitions for complex enterprise applications such Oracle E-Business Suite, users can manage this large sensitive column set easily using the search and filter sensitive mechanism on the masking definition.

This feature enables easy management of the mask definition through quick identification of sensitive columns and association of the masking format type used for that column.

2.7.12.8.3 Support for Masking CLOB and BLOB Columns Previously, data masking supported the masking of unstructured data (Character Large Objects (CLOB) and Binary Large Objects (BLOB)) by replacing the data with a fixed number, string, or null. Now users can search for multiple sensitive data within the CLOB and BLOB columns and replace just the sensitive data with obfuscated data leaving the data structure intact.

Doing this enables applications that rely on a valid CLOB and BLOB to be used in non-production environments securely. In addition, the quality of development and testing is improved because the characteristics of the data are maintained.

2.7.12.8.4 Fine Grained Privilege Control of Data Masking Definitions Fine grained privilege control is now available. Data masking users can be differentiated into designer and operator roles to manage masking definitions or execute the masking process This ability enables the separation of duties and enforcement of enterprises security requirements.

2.7.12.9 Subset Enhancements

This section describes subset enhancements.

2.7.12.9.1 Adaptive Referential Sizing of Subsets Test Data Management natively provided insight into the space estimation required for the referentially intact subset of a database based on criteria specified in the subset definition. Further insight is now provided, enabling users to understand the traversal path of the subset on the associated application data model. Additionally, Test Data Management now provides the flexibility to selectively remove certain tables from the subset even when the tables are determined to be included through referential integrity defined in the application data model.

This feature provides the transparency and control needed to determine the size of the subset resulting in greater accuracy in subset size estimation.

2.7.12.9.2 EM CLI Support for Subset Definition This release provides EM CLI support for Test Data Management operations. For example, previously users were required to log in to Enterprise Manager to execute a subset and perform other functionality. Now users can execute a subset with EM CLI commands, enabling easy integration with in-house processes and workflows within Enterprise Manager.

2.7.12.9.3 Fine Grained Privilege Control of Subset Definitions Fine grained privilege control is now available. Test Data Management users can be differentiated into designer and operator roles to manage subset definitions and execute the subset process. This ability enables the separation of duties and enforcement of enterprises security requirements.

2.7.12.10 Support for Database Replay Capacity Planning and Scale-up Testing

Oracle Enterprise Manager Cloud Control 12c provides comprehensive support for Database Replay capacity planning and scale-up testing by providing an intuitive graphical interface for the following features:

- Workload subsetting
- Scheduling
- Concurrent replays
- Schema duplication and connection remapping
- Workload folding

This enables DBAs to visualize workload performance, build workloads for scale-up and custom load test scenarios, and schedule them in a concurrent replay that forms the basis of capacity planning or scale up testing. For example, to test a worst case database load scenario, the workloads can be scheduled or time-shifted so that all of the workload peaks occur at the same time. This can be used to ensure that the target database system can handle peak or worst case performance scenario.

This feature enables customers to easily and accurately size their system for future growth and consolidation while maintaining or improving their business SLAs.

2.7.12.11 Patching for RAC and Grid Infrastructure Databases

2.7.12.11.1 Out of Place Patching for RAC and Grid Infrastructure Databases You can patch RAC and Grid Infrastructure (GI) databases release 11.2.0.2 and higher out of place in rolling and parallel mode. You can patch GI databases only out of place using GI patch

set update (PSU) patches. You can patch RAC only databases out of place using Oracle Database PSU patches.

Out of place patching provides the following benefits:

- Reduced downtime. In the case of RAC databases being patched out of place, there is no downtime in database availability throughout the operation.
- Flexibility in patching. Users can selectively migrate (or patch) the RAC databases in the cluster based on the change approvals by their application teams.
- Restoration. In case of any issues after migration to the new patched Oracle home, users can switch back to the older Oracle home and patch level. This process is completely automated and combined with automatic updates of the targets in Enterprise Manager. This provides seamless monitoring and management.

2.7.12.11.2 Patch Deployment on GI-RAC Configurations with Mixed Versions There is now support for patching RAC clusters with multiple versions of RAC Oracle homes. This includes the ability to shutdown and startup databases gracefully in the Oracle homes that have different versions from then Oracle home being patched. Typical customer environments contain multiple versions of RAC Oracle homes, for example 11.2.0.1, 11.2.0.2, and 11.2.0.3 on top of a GI of version 11.2.0.3. This is especially true when multiple applications are supported off the cluster and during periods of upgrades when users perform partial upgrades and wait out. This includes:

- Deployment of GI PSUs or Exadata BPs on the GI environment which is managing RACs of lower versions
- Support for both in place and out of place modes in rolling and parallel

2.7.12.11.3 Multiple Patch Deployment on GI and RAC Databases Enterprise Manager supports the application of multiple one-off patches. For example, you can apply one-off patches and overlays at the same time that you apply a PSU in a single downtime session of patching for RAC databases. To do this:

1. Apply the GI PSU or Exadata BP additional one off patches (including. overlay) to both GI and RAC databases.
2. Apply multiple patches for separate layers such as GI only and RAC only.

Support is available for both in place and out of place patching. It is a very common requirement to apply multiple patches to the RAC cluster along with the PSU patching cycles.

2.7.12.12 Upgrade RAC Clusters from Older Versions up to Later Versions

Users can now upgrade RAC clusters from older versions to higher versions (up to Oracle Database 12c). This support includes:

- Full stack upgrade covering GI and RAC databases.
- Flexibly upgrade to suit the operational and testing needs (GI only, a few RAC databases, or all RAC databases).
- Minimize downtime by upgrading software and the database separately
- Comprehensive prerequisite checks including RAC checks and cluster verify (CVU) checks. These can be updated directly from My Oracle Support.
- Integrated back up and restore policies.

Automation of complex, extended operations such as RAC upgrades which can be performed on a large scale helps in reducing the manual effort and cost involved for customers.

2.7.12.13 Compression Central and Compression Advisor

Oracle Enterprise Manager not only enables you to track the extent (percentage) of compression in your database but also provides a compression map that enables you to explore how the database and its objects are currently compressed. The compression advisor also provides an estimate of the compression ratio and overall space reduction if databases objects are compressed.

2.7.12.14 Out of Box Support for Information Lifecycle Management

Oracle Enterprise Manager provides a heat map that displays the parts of the database that are being actively queried or actively updated. In the current release, Enterprise Manager also provides the capability to configure Automatic Data Placement (ADP) policies and monitor the current placement of objects on compression and storage tiers. The out of the box preview report shows the objects that will be moved during the next cycle of ADP while in-built alerts helps in tracking the policies that cannot be executed due to insufficient space or time.

This feature provides enhanced visualization of information lifecycle management capabilities in the database. It helps administrators create better data management facilities in the database.

2.7.12.15 Support for Oracle Data Vault Privilege Analysis

Privilege Analysis is a new feature of Oracle Database Vault that is used to capture usage of database privileges. It enables an administrator to capture all of the database privileges that are actually used by a user or role inside the database and provides a list of all the unused privileges that the user or role has. The administrator can then decide to remove unused privileges thereby achieving least privilege model, minimizing attack surface and making the database more secure.

Application developers and database administrators usually do not know up front what privileges they will need so they try to obtain the maximum set of privileges. The often means obtaining the DBA role. The DBA role has almost all privileges in the database and makes any user who has it an over-privileged user. Customers have long recognized this problem but lacked the tool to help them discover the minimum list of privileges that a user needs to perform a given task in the database.

Oracle Database Vault Privilege Analysis provides this critical tool to solve this problem. It enables customers to achieve the least privilege model, minimize attack surface, and make their databases more secure. The Oracle Enterprise Manager user interface is critical in helping customers realize the value and reap the benefits of Privilege Analysis easily and effectively.

2.7.12.16 Database Discovery Enhancements

2.7.12.16.1 Discovery Options Additional discovery options can be provided to change the default discovery behavior. Supported hints are `db_name`, `db_target_prefix`, `db_target_suffix`, `discovery_timeout` <in seconds per host>, and `no_db_domain` <true/false>, for example, `db_name=PRODUCTS, discovery_timeout=15`.

These options give users better control of the discovery process which can result in faster and less resource intensive discovery.

2.7.12.16.2 Specify Group Users can add all selected targets to a group while saving the targets for monitoring. These means that users save time and effort because they no longer have to add targets to a group as separate tasks.

2.7.13 Database Plug-in 12.1.0.6 Features

2.7.13.1 Lifecycle Management Support for Oracle Database 12c Release 1 (12.1.0.2.0)

Enterprise Manager provides the following life cycle support for Oracle Database 12c Release 2 (12.1.0.2.):

- Provisioning Oracle Database 12c Release 1 (12.1.0.2.0)
- Upgrading to Oracle Database 12c Release 1 (12.1.0.2.0)
- Upgrading CDB from release 12.1.0.1.0 to release 12.1.0.2.0

2.7.13.2 Complete Patching Orchestration of Data Guard Protected Databases

Enterprise Manager can now completely automate the application of patches to both the primary and standby databases in a Data Guard configuration. DBAs no longer have to manually handle the patching of primary and standby databases.

This feature also enables integration with the Change Activity Planner and you can integrate switchover or switchback of the primary database. Doing this enables you to have complete automation of the process, which saves time and lowers the risk of manual errors.

2.7.13.3 Support for Out of Place Patching for Data Guard Databases

Database patches can now be applied in out of place mode (as well as in place) to databases in Data Guard configurations.

Out of place patching reduces downtime and shortens recovery time if an issue is discovered after patch application. This done by enabling switchback to the original unpatched Oracle home.

2.7.13.4 Oracle Database 11g STIG Compliance Standard

Oracle now provides a compliance standard based directly on the Department of Defense Oracle database secure technical implementation guide. You can directly leverage this standard to confirm that your 11g databases conform to this standard.

Many federal and local government agencies as well as private sector businesses follow the Department of Defence Oracle Database STIG standard to ensure the security of their databases. This standard automates the initial and ongoing validation of Enterprise Manager managed Oracle 11g databases to this standard.

For more information, see the *Oracle Enterprise Manager Cloud Control Oracle Database Compliance Standards*.

2.7.13.5 PDB Creation from PDB Snapshot Profiles

You can now create a PDB from a PDB snapshot profile using a storage snapshot. When you create a new PDB, you can choose from a list of saved snapshot profiles.

This feature enables you to use snapshot profiles and makes it easier for you to select a profile and use that for creation and cloning operations.

2.7.13.6 Switchback for Single Instance Databases Patched Out of Place

Out of place patching coordinates the application of a database patch by cloning the existing Oracle home and applying the patch to the new Oracle home before switching the running database instance to the new Oracle home.

You can now coordinate both the application of a database patch in out of place mode as well as switch back to the original home all from within Enterprise Manager. Switching back can be necessary in case of an issue discovered after switching the databases.

2.7.14 Database Plug-in 12.1.0.7 Features

2.7.14.1 Transparent Data Encryption Enhancements

The Transparent Data Encryption feature now supports a third type of key store with the introduction of Oracle Key Vault. This addition helps users configure their key store on an Oracle Key Vault server. The updated Configure Key Store wizard enables you to select Oracle Key Vault as a key store type for managing Master keys used for Data Encryption. Migration and reverse migration operations from Wallet to Oracle Key Vault and vice-versa are also now supported.

2.7.14.2 Support for Sensitive Column Types and Custom Data Redaction Formats in Oracle Data Redaction Policies

Enterprise Manager can now use Sensitive Column Types to suggest suitable Oracle Data Redaction formats to redact the data present in a table or view column. Also, Enterprise Manager enables users to create, save, and reuse custom Oracle Data Redaction formats.

2.7.14.3 Out of Place Patching for DBaaS and Software Standardization for the Data Center

Database administrators must maintain the cloud and apply minor updates, for example Patch Set Updates (PSUs) and Critical Patch Updates (CPUs), and major updates, for example patch set or major version updates.

This update enables administrators to standardize and maintain the cloud infrastructure by enabling them apply major and minor updates seamlessly.

2.7.14.4 DBaaS Pool Patching Mechanism

The Database as Service (DBaaS) pool patching mechanism enables process pools to subscribe to database and GI images. New images are automatically deployed to servers in the pool. Self service users or administrators can choose to migrate databases to the new home.

This update enables subscription based, mass scale out of place patching and upgrades with reduced downtime. It provides flexibility to users to move to new software versions on their terms and to track compliance across cloud and non-cloud environments. This update enables administrators to standardize and maintain the cloud infrastructure by enabling them apply major and minor updates seamlessly.

2.7.14.5 Software Standardization Advisor

The Software Standardization Advisor detects configuration variances at patches applied level among the existing databases and recommends new standardized

configurations to consolidate and reduce the variations among the database fleet. It also recommends software configurations to standardize the database. This helps to reduce the proliferation of the software variances based on patch levels across the existing database fleet.

2.7.14.6 Data Lifecycle Management

Enterprise Manager Cloud Control now supports enhanced methods of cloning databases. You can use the new Clone and Refresh page to create a Full Clone database, a Snap Clone database, and a CloneDB database. Data masking and custom SQL script execution is integrated in this single flow along with in line patching capability. The new Clone and Refresh page also enables administrators to refresh, manage, and promote clone databases to Test Master databases.

2.7.15 Database Plug-in 12.1.0.8 Features

2.7.15.1 Snap Clone Leveraging Sparse Clones on Exadata

You can now create a Test Master pluggable database (PDB) to use as the snapshot source for thin cloning on Exadata ACFS.

For functional testing scenarios, for example on development or testing systems, business IT users now have on-demand access to production data copies without incurring the penalty of multi-terabyte storage.

2.7.15.2 Data Cloning to Oracle Cloud

With this release you have the following data cloning to Oracle Cloud options:

Like-to-like cloning: on premise to-from Oracle Private Cloud:

- Enterprise Manager12c PDB to 12c PDB, assuming the containers exist on both sides
- Regular non-container dedicated database to dedicated database

Like-to-unlike data migration:

- Regular to PDB migration where the source is an on-premise non-PDB database and the data is migrated to a cloud based PDB
- PDB to normal database migration where the source is a PDB on an Oracle PaaS cloud and data and schema are migrated to a non-container CDB on premise

2.8 Middleware Management

This section includes the following topics:

- [Fusion Middleware Plug-in 12.1.0.1 Features](#)
- [Fusion Middleware Plug-in 12.1.0.2 Features](#)
- [Fusion Middleware Plug-in 12.1.0.3 Features](#)
- [Fusion Middleware Plug-in 12.1.0.4 Features](#)
- [Fusion Middleware Plug-in 12.1.0.5 Features](#)
- [Fusion Middleware Plug-in 12.1.0.6 Features](#)
- [Fusion Middleware Plug-in 12.1.0.7 Features](#)

- [Fusion Middleware Plug-in 12.1.0.8 Features](#)

2.8.1 Fusion Middleware Plug-in 12.1.0.1 Features

2.8.1.1 Topology Views of the Fusion Middleware Environment

Oracle Enterprise Manager Cloud Control now enables you to visualize and monitor Oracle Fusion Middleware environments and components so that they might depend on. These topologies can be against a single service oriented architecture (SOA) composite, WebLogic domain, or across multiple WebLogic domains. Such capabilities enable you to understand relationships across your Java Platform, Enterprise Edition (Java EE) applications and the software supporting them, as well as to identify potential problems and their impact across tiers.

2.8.1.2 Oracle Exalogic Management Enhancements

This release supports full management capabilities with dedicated dashboards for Oracle Exalogic Elastic Cloud targets, enabling administrators to easily monitor and manage Exalogic hosts, Oracle WebLogic domains, application deployments, and Coherence clusters running on Oracle Exalogic Elastic Clouds.

2.8.1.3 Oracle Fusion Middleware Provisioning Enhancements

There are several new features related to middleware provisioning that help to reduce the time-consuming, error prone, manual process associated with installing and configuring middleware software:

- The new Middleware Provisioning page provides centralized access to a variety of middleware-related provisioning operations, such as creating entities in the Software Library that can later be used as the source from which to clone, launching a variety of deployment procedures associated with provisioning middleware software, and tracking the status of submitted deployment procedures.
- Support for creating Software Library entities for Fusion Middleware software is now available. You can create a provisioning profile entity that includes WebLogic binaries and domain configuration, or a Middleware home entity that includes just WebLogic binaries.
- You can clone a WebLogic domain or Middleware home from entities already created in the Software Library. Doing this ensures that consistent, standardized middleware images are deployed across your IT organization.
- There is a new out-of-box deployment procedure for deploying, redeploying, and undeploying Java EE applications from the Cloud Control console, thereby reducing the need for multiple administration consoles.
- Provision-related operations are now accessible in the context of a specific WebLogic domain. From the domain target menu, you can create an entity in the Software Library, clone the domain, scale up or scale out the domain, or deploy an application to the domain. This enables you to access such features quicker and with fewer clicks.
- You can clone and scale out/up WebLogic domains without requiring that SOA Suite be installed to the source domain.

2.8.1.4 Management Support for Identity and Access Management Mobile and Social Features

This release provides the up and down status of Mobile and Social service along with the collection of the selected Mobile and Social metrics.

2.8.1.5 Platform-as-a-Service and Infrastructure-as-a-Service Environment Enhancements

These enhancements enable a Platform-as-a-Service (PaaS) user to request an environment with a WebLogic Server cluster and to enable the user to make additional requests to scale out the requested environment. This update also enables an Infrastructure-as-a-Service (IaaS) user to request an environment with two Linux servers and storage and to enable additional requests for more storage to be submitted.

2.8.1.6 Monitoring and Diagnostics

With this release, you can customize performance views to:

- Select multiple metrics at a time for correlation
- Overlay metrics for comparison and better analysis
- Compare performance impact on a periodic basis
- Maintain historical views for trend analysis

A new system topology view provides a better overview of associations and dependencies, complete with drill-down capabilities for detailed analysis. Enhanced log file alerts improve your ability to discover log file patterns and to generate an alert on any matching pattern. Improved monitoring support includes monitoring for push replication, reap sessions, and transactional caches.

2.8.1.7 Cache Administration

A new interface for Cache Data Management provides query-based data operations and a central user interface for key cache operations. This new feature saves time in cache operations and simplifies administrator tasks. Queries can now be saved for future reference. Cache data can be exported and imported to a file. Additional cache operations include View, Purge, Add Index, Remove Index, and so forth. This feature gives administrators the ability to plan for downtime without losing the cached data and to better prepare caches in a new data center (such as in a high availability scenario).

2.8.1.8 Coherence Provisioning

This release provides support for node updating. You can automate the update process tasks (for example updating configuration files, application JARs, and so forth) on the nodes, which reduces risk and time. A central repository is now available for asset management. Provisioning enhancements include support for well-known address (WKA) based topologies, additional development and production options (such as Mode of Deployment), and improved flexibility in provisioning.

If the coherence node is started with the Java Virtual Machine Diagnostics (JVM) Diagnostics agent with the proper parameters, you can drill down in context from the coherence node to the associated Java Virtual Machine (JVM) target in the JVM Diagnostics. Do this to diagnose the real-time Java issues for the node for issues such as memory leak monitoring, locking analysis concerning coherence requests, and blocking issues for coherence calls.

2.8.1.9 Configuration Management

Improved configuration management enables you to set configuration parameters to make historical comparisons available. You can save your configuration into a repository as a *reference image* or *gold image* and then compare it against a current configuration. This feature enables you to quickly identify performance and availability issues related to configuration changes.

2.8.1.10 Performance Summary Baseline Support

With this release, you can create a performance summary baseline for a middleware-related target, save it, and compare baseline performance data to current performance data. This enables you to analyze and correlate performance data more efficiently.

2.8.1.11 Composite Application Dashboard

The new Composite Application dashboard enables you to build a comprehensive view representing a multi-tier composite application composed of multiple application deployments and Services Oriented Architecture (SOA) composites. You can easily include all additional components (such as databases, service buses, Coherence clusters, and other middleware and non-middleware targets). The Composite Application dashboard provides full visibility across the composite application with access to key monitoring and diagnostics regions, which can be easily customized and personalized. The overall result of this enhancement is a single dashboard view providing not only health information about the application, but also deeper visibility into component health and incidents at a glance.

2.8.1.12 Enterprise-Wide Web Service Policy Dashboard

If you use Oracle Web Services Manager for security, you can now monitor all of your policies across the enterprise in a single central dashboard. From there, you can drill down into the specifics of any violation on each server.

2.8.1.13 Middleware Diagnostic Advisor

This release includes a new tool to help administrators quickly resolve performance issues. The Middleware Diagnostic Advisor de-emphasizes administrator expertise in WebLogic internals and cross-tier functioning by taking advantage of WebLogic Server internal metrics. The Middleware Diagnostic Advisor significantly reduces problem resolution time by presenting "root cause" findings shown in context of the most relevant configuration parameters and by offering out-of-box suggestions for each finding. Trending and correlation metrics help administrators understand performance patterns and assist with diagnosing and resolving performance issues.

2.8.1.14 WebLogic and Fusion Middleware Log Viewer

This release enables you to centrally search logs generated by WebLogic and Oracle Fusion Middleware across all Oracle Fusion Middleware components. You can perform structured log searches based on log properties such as time, severity, or Execution Context ID (ECID). You can also download log files or export messages to a file. This feature provides ready access to log files no matter where they are stored on the file system.

2.8.1.15 Integration of BEA Guardian

The former BEA Guardian WebLogic health checks have been integrated into Enterprise Manager. In addition, custom health checks can also be created.

Consequently, administrators are better able to verify that their WebLogic environment is in compliance with these standards.

2.8.1.16 Application Replay

Application Replay enables you to perform realistic production scale testing of your web and packaged Oracle applications. It provides the most efficient and highest quality testing through zero overhead workload capture and without any need for script development and maintenance. The captured workload can then be replayed with production characteristics on a test system to validate application infrastructure changes from the middle tier to the disk.

2.8.2 Fusion Middleware Plug-in 12.1.0.2 Features

2.8.2.1 Enhanced Deploy/Undeploy Java EE Application Deployment Procedure

When using the Deploy/Undeploy Java EE Application deployment procedure to deploy or redeploy an application, you can now specify a single component—the Java EE Application component—from the Software Library. Previously, you had to specify multiple generic components to accommodate the archive file, the deployment plan, a predeployment script to create a data source, and a postdeployment script to roll back in the event of a problem. The ability to specify a single component not only saves time, but also presents a much cleaner interface.

2.8.2.2 Enhancements to Oracle Fusion Middleware WebLogic Domain Target Discovery

While adding Oracle Fusion Middleware WebLogic domain targets to Enterprise Manager Cloud Control, you can now choose whether to add WebLogic Server targets that are discovered in a down state. This gives you more control in determining what to automatically add to Cloud Control for centralized management and monitoring. Further, when you refresh detected domain and target membership changes (managed servers that have been removed from a domain), you can choose to update the Management Repository in the context of the refresh operation (remove those managed servers from the Management Repository). Doing this saves you from having to manually remove targets following a domain refresh operation. If problems occur while adding Middleware-related targets or refreshing domain membership, you can enable additional debugging information to quickly diagnose and resolve the issue.

2.8.2.3 Request Instance Diagnostics

You can trace the path of a request in a WebLogic domain and generate a report of all of the metrics associated with a particular instance of the request.

2.8.2.4 Support for Patching a WebLogic Domain

You can now use Enterprise Manager Cloud Control to apply one-off patches and critical patch updates across all managed servers within a WebLogic domain. In addition to validation checking and rollback support, the new feature enables you to apply patches in a rolling fashion to avoid downtime.

2.8.2.5 Disaster Recovery Operations

With the Oracle Site Guard feature of Enterprise Manager Cloud Control, you can now automate disaster recovery operations such as switchover and failover. For example, if

a primary site becomes unavailable due to a planned or unplanned outage, you can use EM CLI or the Enterprise Manager user interface to automatically switch a standby site into production and track the operation's progress through Cloud Control. Consequently, you are able to minimize the downtime associated with the outage.

2.8.3 Fusion Middleware Plug-in 12.1.0.3 Features

2.8.3.1 Monitoring and Diagnostics Features

2.8.3.1.1 WebLogic Cluster Performance Summary Page A new customizable performance summary page is available for Oracle WebLogic Cluster target types. This new page provides a series of default performance metric charts displaying performance data over time. Administrators can customize the default view by modifying the performance metrics displayed, changing the timeline of data displayed, comparing current performance data with past performance data, and comparing multiple clusters' performance data on a single page.

2.8.3.1.2 Routing Topology Enhancements Administrators can now modify the default performance metrics that are displayed when metric annotations are enabled on the middleware Routing Topology page. While three performance metrics can be displayed on the diagrammatic view, additional metrics can be configured to appear on the tool tip which is accessible as the pointer hovers over a node on the topology page. In addition, historical performance data collected for the chosen metrics can be accessed from the same tool tip. Such customization of and easy access to performance data will help administrators in monitoring their middleware environment.

2.8.3.1.3 Log File Monitoring This release of Oracle Enterprise Manager Cloud Control introduces log file monitoring for the WebLogic Server as well as Application Deployment target types. Middleware administrators can configure the new log monitoring metric to send alert notifications to on-call administrators when specific patterns are found in the middleware-related log files.

By leveraging the log monitoring capability, administrators can receive alert notifications in context of the problematic middleware target; consequently, reducing troubleshooting time.

2.8.3.1.4 WebLogic and Fusion Middleware Log Viewer Enhancements

Beginning with this release, two significant enhancements have been made to the log viewing capabilities within Oracle Enterprise Manager Cloud Control. First, instead of being able to group log messages only by Message Type or Message ID, administrators now have the flexibility of grouping messages by several other possible fields - including Execution Context ID (ECID)/Relationship ID, Host, Host IP Address, Incident ID, Module, Target, Thread ID, or User. Second, the search criteria for log messages that an administrator defines can be saved for future usage and accessed through the Favorites menu. These enhancements to the log viewer feature of Oracle Enterprise Manager Cloud Control will save the administrator time when diagnosing performance problems across middleware software.

2.8.3.1.5 New Home Pages for Oracle Service Bus Target

New management pages for the Oracle Service Bus target replace the previous pages. The new pages improve the look-and-feel of the OSB monitoring pages and enable the OSB targets to appear in the standard Fusion Middleware Farm/Domain navigation tree.

2.8.3.2 Business Application Target Features

The Business Application (BA) Target is a monitored functional application. The BA Target monitors different views and layers of the application stack. It combines the user's perspective (through Real User Experience Insight), transaction visibility between application components (through Business Transaction Management (BTM)), application component monitoring (including Java Virtual Machine (JVM) and Application and Dependency Performance), and system monitoring.

The BA Target provides a consolidated overview that enables BA owners to see and understand the health of their applications. The BA target pages enables you to see all aspects of the BA health. They also provide problem triage capabilities and a starting point to drill down to more detailed system and application component related views.

The following pages are an integral part of the BA Target:

- **Business Application List Page**

This page provides a list of all BA Targets for which you have at least read permission, including significant status indicators. You can use it to navigate to a specific BA dashboard. This page enables you to see at a glance which BAs require attention.

- **Business Application Home Page**

This is the home page for the BA target. The dashboard can display Oracle Real User Experience Insight (RUEI), BTM, and System regions containing data associated with the BA. In addition, an event status region shows the rollup of all events and incidents for RUEI key performance indicators (KPIs), BTM transactions, system metric violations, and SLAs. The status region also presents the System status and the BA target status. The default configuration includes the following regions:

- RUEI KPIs
- BTM Transaction List
- System Status
- Incidents
- Service Test Status

This dashboard enables you to view all aspects of the BA health. It also provides problem triage capabilities and a starting point to drill down to more detailed system related views (including JVM Diagnostics, composite application, and WLS monitoring home page,).

- **Business Transaction Drill-Down Page**

The Business Transaction region on the Business Application Home page displays the transactions mapped by the administrator of the BA, one transaction for each row. Click a transaction link to view the dedicated business transaction page.

This page contains the following regions and features:

- Transaction Summary
- Business Transaction Aggregate Flow

- Operations

In the topology view of the transaction's aggregate flow, you can click individual nodes to further connect to additional performance management functionality. Right-clicking on a node gives you the option to view the matching servers in JVM Diagnostics or to open the selected operation in the BTM native user interface.

Note: Note that the link to JVM Diagnostics will only result in a valid page if JVM Diagnostics is deployed in the servers where the selected operation is located.

- **Real User Experience Insight Session Diagnostics Page**

With this feature it is possible to correlate the Request Instance trace that is reported in Request Instance Diagnostics to a user session reported in RUEI Session Diagnostics. It also provides a contextual drill-down to review the request within the complete user session.

This feature is created from the following pages:

- Session Search
- Session Diagnostics

The Session Search page enables you to specify what set of sessions to review. Selections can be made by time and with a combination of filters such as browser type, end user country, filters for selecting specific functional areas of the application, and so on.

The search affects the number of sessions displayed at the bottom of the page. For each session some overview data is presented including user name, user origin, statistical overview of performance, experienced errors during the session, and so on.

By clicking any of the session links displayed in the table, you are routed to the second page in this feature which displays the entire user session, including all individual clicks the users performed the session.

2.8.3.2.1 Registering RUEI Engine and BTM Engine in Enterprise Manager Cloud Control You can register a Real User Experience insight deployment and a BTM engine as a system in Enterprise Manager Cloud Control. Only one RUEI and one BTM system can be created in Enterprise Manager Cloud Control. The registered system is used to provide data and events to Enterprise Manager Cloud Control. RUEI and BTM data is available to you from the Enterprise Manager console. In addition to supporting several user interface regions, it also creates Enterprise Manager events for any RUEI KPI threshold and BTM SLA violations. The events are associated with the BA target.

Note: Only one BTM system can be created in Enterprise Manager Cloud Control. The registered system is used to provide data and events to Enterprise Manager Cloud Control.

2.8.3.2.2 BTM Transaction in the Business Application Target The BTM region in the BA exposes transactions and has some transaction detail capability.

An association is created between a BTM transaction and one or more Enterprise Manager Cloud Control targets so that thresholds and conditions defined on the BTM

side will trigger events on the associated targets. Enterprise Manager registers a BTM server with OMS to make its transactions accessible by the BA.

When creating a BTM region in the BA target, you must select which BTM transactions to expose in that region.

2.8.3.2.3 User Experience Monitoring in the Business Application Target With the release of the Business Application dashboard, RUEI events are now exposed in the dashboard to provide end-to-end visibility in regards to user experience KPIs.

In addition, RUEI regions are now available directly within Oracle Enterprise Manager. This enables administrators to analyze user experience data with critical transaction and middle-tier data, providing end-to-end visibility.

2.8.3.3 Lifecycle Management Features

2.8.3.3.1 Synchronization of WebLogic Server Configuration Files If differences are detected between WebLogic domains or WebLogic Servers during a configuration comparison operation, you can now synchronize WebLogic Server related configuration files (for example config.xml) from the Cloud Control console to make the configurations the same.

2.8.3.3.2 Oracle Fusion Middleware Provisioning Enhancement The Provision Middleware Deployment Procedure and Scale up/out Middleware Deployment Procedure now support the lock down feature. This feature enables administrators with designer privileges to launch the procedure, enter values for certain fields, and lock them so that the fields cannot be edited when accessed by other administrators. Creating these deployment procedure templates helps administrators to enforce standardization and consistency across the enterprise.

While cloning or scaling out a WebLogic domain, you can now modify the default names for the administration server, managed servers, clusters, and systems for the destination domain.

While cloning a WebLogic domain, you can now specify the applications directory and Node Manager home directory locations.

2.8.3.3.3 Patchability Report for Fusion Middleware To ensure that WebLogic Server and SOA Infrastructure components are suitable for patching operations, administrators are encouraged to review the new Fusion Middleware Target Patchability Report available from Information Publisher before creating patch plans. This report analyzes WebLogic domains as well as SOA Infrastructure and identifies whether the targets have missing properties or unsupported configurations and provides recommendations for resolving the issues found.

2.8.3.3.4 Apply Patches Across WebLogic Domains Beginning with Fusion Middleware Plug-in release 12.1.0.4, administrators can apply WebLogic Server patches to several WebLogic domains in a single operation. Such support increases efficiency because administrators can create and track a single patch plan across domains instead of creating multiple patch plans.

2.8.3.3.5 EM CLI Support for Creating Java EE Application Component Administrators can now create a Java EE Application component in the software library through the EM CLI thereby automating application deployment end-to-end.

2.8.3.4 Oracle Site Guard Features

This section provides an overview of the new features available in Oracle Site Guard 12c Release 1 (12.1.0.3) plug-in releases.

User Interface for Site Guard Configuration

In 12c Release 1 (12.1.0.3), you can use the Enterprise Manager Cloud Control Console user interface to perform the following task:

- Creating Oracle Site Guard Configuration
- Associating Credentials for Site
- Associating Pre-Scripts and Post-Scripts
- Associating Storage Scripts

For more information, see "Setting Up Oracle Site Guard" in the *Oracle Enterprise Manager Lifecycle Management Administrator's Guide*.

Preferred credentials Support

In this release, you can use preferred credentials to run an operation plan.

Preferred credentials are used to simplify access to managed targets by storing target login credentials in the Management Repository. With preferred credentials set, users can access an Enterprise Manager target that recognizes those credentials without being prompted to log in to the target. Preferred credentials are set on a per user basis, thus ensuring the security of the managed enterprise environment.

- **Default Credentials:** Default credentials can be set for a particular target type and will be available for all the targets of the target type. It will be overridden by target preferred credentials.
- **Target Credentials:** Target credentials are preferred credentials set for a particular target. They could be used by applications such as the job system, notifications, or patching. For example, if the user chooses to use preferred credentials while submitting a job, then the preferred credentials set for the target (target credentials) will be used. If the target credentials are not present, the default credentials (for the target type) will be used. If the default credentials are not present, the job will fail. If not specified, by default, preferred credentials refer to preferred target credentials.

For more information on setting up preferred credentials, see "Setting Preferred Credential Using EM CLI Commands" in the *Oracle Enterprise Manager Lifecycle Management Administrator's Guide*.

Re-order Execution Order

For more information, see "Changing Execution Orders" in the *Oracle Enterprise Manager Lifecycle Management Administrator's Guide*.

2.8.3.5 Identity Management Features

2.8.3.5.1 Configuration Collection for Oracle Access Manager and Oracle Identity Manager

Configuration collection for Oracle Access Manager and Oracle Identity Manager is now available, enabling users to view and keep track of configurations in oim-config.xml, entries in the property (PTY) table, and oam-config.xml. Users can perform key configuration management tasks such as keeping track of configuration changes for diagnostic and regulatory purposes, taking snapshots to store

configurations, and comparing component configurations to ensure the consistency of configurations within the same environment or across different environments.

The feature provides automated configuration management to accelerate problem resolution and to find root causes of problems that could potentially slow performance or create outages.

2.8.3.5.2 Out-of-Box Compliance Rules and Change Detection for Oracle Identity Manager A set of 12 out-of-box compliance rules have been defined for Oracle Identity Manager based on best practices around plug-in and adapter reloading, caching configuration, and recommended database settings such as cursor sharing, block size, maximum number of blocks read in one I/O operation, buffer pool, initial number of database writer processes, log buffer, maximum number of open cursors, query rewrite integrity, and session cursors to cache. Users can perform rules based analysis and change detection, and get access to a compliance scorecard for each of the monitored Oracle Identity Manager deployments.

This feature provides compliance monitoring and change detection that can help customers meet compliance and reporting requirements, and accelerate problem resolution.

2.8.3.5.3 Oracle Identity Manager Database Performance A new page is available to analyze the performance of the Oracle Identity Manager database in the context of the Oracle Identity Manager (OIM) specific tables and user. Users can track key metrics such as the size of the double-space, top SQL statements, size of the segments, and growth rate, enabling users to identify root causes of database-specific problems that could potentially slow performance.

Users now have the ability to monitor database-specific metrics for Oracle Identity Manager to find root causes of problems that could potentially slow performance or create outages.

2.8.3.5.4 Out-of-Box Reports for Oracle Internet Directory, Oracle Access Manager, and Oracle Identity Manager Out-of-box BI Publisher reports are now available for Oracle Internet Directory, Oracle Access Manager, and Oracle Identity Manager. These reports summarize monthly LDAP Operations and Replication Jobs for OID, Provisioning, Self-Service and Role-Grant Requests for OIM, and Authentications & Authorizations Metrics for OAM - including Authentications/Authorizations Per Second and Failed Authentication/Authorization Ratio.

The out-of-box reports can be used to track the overall health of the monitored Identity Management environment enabling administrators to share these reports with the line-of-business or application owners to align IT and business demands.

2.8.3.6 Other Features

2.8.3.6.1 Oracle Traffic Director Target Correlation This feature correlates the new Oracle Traffic Director (OTD) target monitoring with the WebLogic and OHS targets ensuring that administrators can easily understand relationships via the middleware topology and analyze problems across tiers.

OTD is available from the Exalogic dashboard as well.

2.8.3.6.2 Performance & Health Monitoring of Oracle BI 11g Instances & Essbase The discovery of BI 11g Instance is now included as part of the Oracle Fusion Middleware/WebLogic domain discovery wizard, enabling you to quickly set up your

monitoring environment. The discovery includes all key Oracle BI components as well as Essbase. The BI components discovered include Oracle BI Server, Oracle BI Presentation Server, Oracle BI Scheduler, Oracle BI Cluster Controller, and Oracle BI Java Host. After the BI Instances are discovered, you can proactively monitor your Oracle BI environment from both systems and end-user perspectives. A wide range of out-of-box performance metrics are collected for monitored Oracle BI targets enabling you to set up alerts based on warning and critical thresholds, view current and historical performance information using customizable charts in the Metric Palette and reports, and diagnose performance problems by identifying bottlenecks in any of the monitored Oracle BI targets.

By providing out-of-box monitoring for Oracle BI 11g, Enterprise Manager 12c now offers a centralized systems management solutions to efficiently manage multiple Oracle BI deployments including testing, staging, and production environments from a single console. You can now gain the ability to monitor a wide range of performance metrics for all critical BI components (both BI 10g and BI 11g) to find root causes of problems that could potentially slow performance or create outages. Thresholds may be defined against server and component statistics that cover responsiveness (including Request Processing Time and Average Query Time), load (including Active Sessions, BI Presentation Server Requests Per Second, and BI Server Queries Per Second), and reliability (including Failed BI Queries). BI Dashboard Usage Reports and metrics on Failed and Total Oracle BI Scheduler Jobs are also available.

For the Essbase Server, you can now monitor running applications, view any unaccessed applications as well as other useful metrics and information such as the number of connected users, configuration changes, and potential incidents.

2.8.3.6.3 Coherence Elastic Data and QL Support With the new capabilities of Coherence on engineered systems introducing the new Elastic Data and QL capabilities, Enterprise Manager now provides complete visibility into these key Coherence platform features to ensure these optimizations are fully used to their maximum potential.

2.8.3.6.4 Exalogic Topology View The new Exalogic Topology View ensures that administrators can immediately identify cross-tier relationships between components, middle-tier platforms, and the underlying hosts and hardware that make up an Exalogic Elastic Cloud system.

2.8.3.7 Oracle Exalogic Management Enhancements

This release provides the following Exalogic dashboard enhancements:

- Integrated hardware and software schematics
- Hardware-software topology views
- Hardware targets monitoring (Compute, ZFA appliance, Infiniband Fabric, ILOM)
- OTD monitoring
- Support for virtual and non-virtual configurations
- Monitoring of Exalogic vServer guest virtual machines (VMs)
- Health checks
- Trusted partition/Virtual Central Processing Unit (vCPU) licensing report

2.8.4 Fusion Middleware Plug-in 12.1.0.4 Features

2.8.4.1 SOA Management Features

Enhancements to SOA Fault Management

SOA administrators can now perform comprehensive fault management directly from Enterprise Manager Cloud Control, including search and single and bulk fault recovery. This new feature replaces all of the previous faults and reject messages tabs and regions at the composite level with the top-level search and resubmit.

RAC support for SOA Dehydration Monitoring

SOA Dehydration store monitoring in Enterprise Manager Cloud Control now supports RAC databases.

2.8.4.2 Monitoring and Diagnostics Features

2.8.4.2.1 Enhancements to Auto Discovery for Oracle Fusion Middleware and WebLogic Domains Management Agent-based auto discovery for Oracle Fusion Middleware is now enabled automatically with Oracle Enterprise Manager Cloud Control 12c. In addition, administrators who use agent-based auto discovery for Oracle Fusion Middleware are no longer required to specify the Oracle Middleware home for each host that the discovery module runs on. Consequently, the process for discovering middleware software has been further automated by the removal of such manual steps. As in earlier releases, after agent-based auto discovery of Fusion Middleware has been performed, administrators must then promote the discovered software to managed targets.

2.8.4.2.2 Enhancements to Fusion Middleware and WebLogic Domain Discovery When adding Fusion Middleware and WebLogic domain targets to Enterprise Manager Cloud Control, administrators can now choose whether to discover all versions of deployed Java EE applications or just the active version of deployed applications. This provides more flexibility and control in terms of what to centrally manage and monitor from the Cloud Control console.

For each Java EE application that is discovered, a new domain application deployment target is also added. This domain application deployment target provides a single view of the application across the entire domain, rather than a more granular view at the server or cluster levels.

2.8.4.2.3 WebLogic Server 12.1.2 Management Beginning with this release, administrators are able to discover and centrally manage their WebLogic Server version 12.1.2 deployments. All existing management features continue to be supported with WebLogic Server version 12.1.2, including:

- Performance management
- Business Transaction Management
- Process control
- Configuration management
- Cloning middleware and scaling up/out domain
- Patching

2.8.4.2.4 Support for Managing Oracle GlassFish Domains Administrators can now discover and centrally manage their open source as well as commercial versions of

Oracle GlassFish domains in the Oracle Enterprise Manager Cloud Control console. Management features for Oracle GlassFish include:

- Performance management – monitor Oracle GlassFish availability and performance out-of-box, track such data historically, and receive notifications of potential problems.
- Process control – submit predefined job to start, restart, or stop Oracle GlassFish components.
- Configuration management – perform extensive analysis (for example, search, compare, track change) against automatic, daily collections of Oracle GlassFish data.

Having a single interface for managing Oracle GlassFish software along side other data center environments such as databases and operating systems is critical to ensuring applications are available and performing at an optimal level.

2.8.4.3 Exalytics Management

With the introduction of the Exalytics target, Exalytics management is now consistent with other engineered systems. Both virtual and physical deployments will be supported for this target. These features include guided discovery, a personalizable software dashboard, routing topology, hardware (ILOM) monitoring and personalizable software and hardware dashboards, and vCPU usage reporting.

These features align Exalytics management with the Engineered Systems Management story and show a tighter integration between Exalytics and Enterprise Manager Cloud Control 12c. The new features improve the user's management experience and productivity. The vCPU reporting supports the reporting and auditing requirement for virtualized environments using vCPU licensing.

2.8.4.4 JVM Diagnostics/ADP Installation and Upgrade

You can now automate the deletion of JVM Diagnostics/ADP engines and agents. This feature is available from the Enterprise Manager Cloud Control user interface. Previously deletion or undeployment required manual steps.

2.8.4.5 Updates to the Middleware Summary Page

The Middleware Summary page (accessible by selecting Middleware from the Targets menu) has in the past displayed a table with the status and health of middleware software managed by Enterprise Manager Cloud Control.

Beginning with this release, administrators can now choose to display a graphical view of the same data. This graphical view is similar to a heat map where targets are represented as boxes and the size and color of each box depicts a potential problem areas. Such a view enables administrators to quickly analyze a large amount of data, customize filtering, and pinpoint problems more efficiently.

The Middleware Summary page also provides predefined searches that filter the target types shown in both of the tables as well as graph views. The searches available are based on what middleware targets have been discovered by Enterprise Manager Cloud Control. The most recent search selected is saved as the default search to display when returning to the Middleware Summary page. Saved searches enable administrators to find what they are looking for faster.

2.8.4.6 Monitor Oracle Jolt Performance Metrics

Administrators can now monitor Oracle Jolt performance metrics including maximum capacity, pending requests, pool state, request errors (per minute), and requests (per

minute). Such metrics are available from the WebLogic Server target when Oracle Tuxedo and WebLogic are configured to use Oracle Jolt.

2.8.4.7 WebLogic Cluster Performance Summary Page Supported for Non-Oracle JRF Enabled Clusters

The WebLogic Cluster Performance Summary page no longer requires you to enable Oracle Java Required Files (JRF) on the cluster. Performance metric data appears on the summary page regardless of whether or not the cluster is Oracle JRF enabled.

2.8.4.8 Oracle Exalogic Management Enhancements

The following new features related to Exalogic Management help provide enhanced operational visibility:

- Control Stack monitoring for virtualized Exalogic systems enables administrators to view the status of the software infrastructure.
- It is now possible to send Enterprise Manager Ops Center hardware alarms and alerts to Enterprise Manager Cloud Control's incident management system and manage hardware and software incidents from a single pane of glass.
- Exacheck target now appears in the Exalogic Navigation Tree providing in-context navigation to Exacheck results.
- Additional performance and filtering optimizations has been made to the Exalogic Software Dashboard.
- Exalogic BI Publisher Reporting has been enhanced.

2.8.4.9 Diagnostic Snapshot Enhancements

Administrators have traditionally been able to create a diagnostic snapshot from the Enterprise Manager Cloud Control console whenever a middleware-related issue occurs, and then analyze the diagnostic snapshot in offline mode either from the same Enterprise Manager Cloud Control instance that generated the snapshot or from a completely different Enterprise Manager Cloud Control instance (for example, when the snapshot is sent to Oracle Support for analysis). This release includes the following enhancements to the Diagnostic Snapshot feature:

- Archived logs for WebLogic Server and JVM targets can be included in a new diagnostic snapshot.
- You can create a diagnostic snapshot through the EM CLI.
- You can include diagnostic snapshots in a Support Workbench incident.

These additional Diagnostic Snapshot capabilities reduce the resolution time of external bugs related to Fusion Middleware software.

2.8.4.10 Archived Log Files Supported in Log Viewer

Administrators can now use Log Viewer to view and correlate messages across archived log files for Fusion Middleware components. In the past, Log Viewer supported viewing and correlating messages from active log files only. Including archived log files in Log Viewer helps administrators to diagnose and resolve performance problems that may have occurred in the past.

2.8.4.11 Lifecycle Management Features

2.8.4.11.1 Enhancements to Cloning and Scaling Up/Out Middleware Administrators can now use the Provision Middleware or Scale Up/Scale Out Middleware deployment procedures to clone or scale up/out a WebLogic domain that has its administration port enabled or a domain that accepts only secure SSL traffic. Prior versions of the deployment procedures did not support cloning or scaling up/out of such a configured domain. In addition, these same procedures now support entering credentials for each host destination individually (applicable in situations where preferred credentials are not used).

2.8.4.12 Administration Features

2.8.4.12.1 Enhancements to Fusion Middleware Process Control Job The out-of-box job for Fusion Middleware Process Control now offers options for how to start, restart, and stop WebLogic Server targets. Administrators can configure the job to use Node Manager, the default script in the domain home, or a custom script. These same options are also available when you initiate a start, stop, or restart operation from target home pages or target menus. In addition, the same process control operations available from the Oracle Enterprise Manager Cloud Control 12c console are now available from the Enterprise Manager Command Line Interface (EM CLI). These features give administrators maximum flexibility in managing and maintaining WebLogic environments.

2.8.4.12.2 Perform Administration Operations Against Fusion Middleware Key administration operations previously available from the Fusion Middleware Control console and WebLogic Server Administration Console are now available from the Cloud Control console. These operations include:

- Locking a domain configuration through the Change Center before making changes to prevent other administrators from making changes during your edit session. You can also view all changes that have been saved, view the server instances that must be restarted for configuration changes to take effect, release a lock, and activate or undo changes.
- Viewing, configuring, and using MBeans for a specific Oracle WebLogic Server or Application Deployment target through the System MBean browser.
- Managing JDBC data sources - including the ability to create, edit, delete, control and test JDBC data sources.
- Recording configuration actions performed as a series of WebLogic Scripting Tool (WLST) commands. You can use WLST to replay the commands to help automate the task of configuring a domain. You can start, stop, or view a recording.

Having a single tool for both monitoring and administering Fusion Middleware components simplifies an administrator's job and increases productivity.

2.8.4.12.3 Selective Tracing for Oracle Fusion Middleware Administrators can now perform selective tracing from the Cloud Control console. Selective tracing enables administrators to gain more fine-grained logging data but limit the data so that it applies to a specific application name as well as other specific attributes of a request (for example, user name, client host, or web service port). Having such detailed yet focused log data assists administrators while diagnosing problems with applications and their underlying infrastructure.

2.8.4.12.4 Privilege Propagating Support for Oracle WebLogic Server and Oracle Application Server Related Targets Beginning with this release, the following Oracle Fusion Middleware related target types support privilege propagation:

- Oracle WebLogic Domain
- Oracle WebLogic Cluster
- Oracle WebLogic Server
- Domain Application Deployment
- Clustered Application Deployment
- Oracle Application Server
- Oracle Containers for Java (OC4J)

This support enables administrators to have privileges automatically propagate to members of a target, rather than requiring the administrator to manually grant other administrators privileges to each target individually. You can grant to an administrator or a role a privilege on one of the listed targets once and have that same privilege automatically propagate to any new member of that target.

For example, granting operator privilege on a WebLogic domain target to an administrator grants the administrator the operator privilege on the domain's member targets (for example, clusters, servers, deployed applications) and also to any members that will be added to the domain in the future. Automation of privilege propagation across these additional Fusion Middleware targets enables administrators to be more effective and efficient in managing their middleware software.

2.8.4.12.5 Log Configuration for Oracle Fusion Middleware Components Beginning with this release, administrators can configure log file settings for Oracle WebLogic Server, Application Deployment, SOA Infrastructure, Essbase Server, Directory Integration Platform Server, Oracle Virtual Directory, Oracle Reports Application, Oracle Reports Bridge, Oracle Reports Server, and Oracle Reports Tools targets. Configuration settings exposed in the Cloud Control console user interface include:

- Location of the log file
- Format of the log messages in the log file (For example, Oracle Diagnostic Logging – Text, Oracle Diagnostic Logging – XML)
- Log level for both persistent loggers and active runtime loggers
- Rotation policies – either size based or time based – used for the log file

2.8.4.13 User Interface Updates for Site Guard Operations

You can use the new Site Guard user interface to create, execute, and monitor operation plans for switchover, failover, start, and stop.

2.8.4.14 RUEI Metric Page

The RUEI Metric page uses the same search mechanism as the Session Diagnostics page but here the result set is displayed in the Metric Correlation Chart where RUEI metrics can be compared against all other system metrics and be displayed in time. This means that End User Page Load times can be presented in time compared with Java active threads or system CPU usage to discover possible connections. Any view can be stored in the correlation chart. This page can also be directly opened from any RUEI event from the Events and Incidents console. All RUEI events have a link to the metrics page and when selected, the Metric page opens in context of the right metric filters and time period immediately.

2.8.4.15 JVM Real-Time Thread State

This region displays a list of all of the JVMs that are associated with the Business Application. It provides a per JVM view of real-time status based on the JVM thread activities. You are presented with thread counts of specific activities and states including DB Wait, IO Wait, Runnable, and Idle. The number of threads counted in a specific state reflects how much work a JVM is performing on that area. For example, a larger than normal thread count in DB Wait state suggests a slower than normal DB response time. The region also provides direct access to the JVM Diagnostic pages for more detailed investigation. This region is updated with real-time data every 30 seconds.

2.8.4.16 JVM Active Threads

This region provides an overtime view of the data presented by the JVM real-time Thread State region. The data is summarized across all of the JVM and presented for the last 24 hours.

2.8.4.17 Enhancements to the RUEI Data page

The RUEI Data page has been enhanced with a new region displaying the health of all user flow that are related to the Business Application. It shows the number of completes, completion rate, the error percentage, and what step of the user flow caused most dropped sessions from the user flow in a single table overview.

2.8.4.18 Enhancements to the RUEI Session Diagnostics

On the Session Diagnostics page, you can open the replay for the reported page with the Session report and display the source details of the screen view and an actual screen replay of the page as the user experienced it. ADF based pages, Siebel HI, and Oracle Forms display only source details.

2.8.5 Fusion Middleware Plug-in 12.1.0.5 Features

2.8.5.1 Exalytics Management

Hardware monitoring is now available for Exalytics. The Exalytics ILOM is discovered as part of the Exalytics discovery flow and enables users to collect metrics from the ILOM. Key metrics are available on the new Exalytics Systems hardware tab. This page also includes install base port information from the Host Channel Adapter (HCA), such as status and throughput.

Hardware monitoring makes the engineered systems management story for Exalytics more complete. It enables users to set up alerts, look at history, and quickly get an understanding of the health of their Exalytics machines. This enables better monitoring coverage and better aligning of Exalytics Management with the single pane of glass vision.

2.8.5.2 Process Control Enhancements

The out-of-box job for Fusion Middleware Process Control now supports the ability to start or stop the administration server for a domain. Consequently, administrators no longer have to manually perform process control operations on the administration server outside of the Cloud Control console which increases productivity and reduces management costs.

2.8.5.3 RESTful Services Monitoring

Enterprise Manager Cloud Control users can now monitor and manage RESTful Services. Monitoring representational state transfer (REST) services for J2EE application targets includes monitoring REST applications, REST resources, and REST methods. This also adds support for the Most Requested Region for REST Services for the Application Deployment home page and Server home page.

2.8.5.4 Siteguard Enhancements

Siteguard is Oracle's middleware disaster recovery feature. Siteguard now provides recheck enhancements for DataGuard and Z File System (ZFS) library integration for ZFS storage scripts as well as execution of scripts from AUX hosts.

This feature provides tighter integration with ZFS and smoother Data Guard site-level role transitions.

2.8.5.5 Web Service Policy Attachment and Configuration Support

2.8.5.5.1 Direct Policy Attachment Support

Note: Fusion Middleware 12.1.2 targets only.

Direct policy attachment support is available for the following subject types:

- WLS WebLogic Web Service endpoint
- JRF Web Service endpoint
- REST application (REST Resource)

This enables Enterprise Manager Cloud Control administrators to manage Web Services within an Enterprise Manager Cloud Control environment. Previously, Enterprise Manager Cloud Control administrators could only monitor Web Services health. For any Web Service management task, they were required to go to the target Fusion Middleware.

2.8.5.5.2 Global Policy Attachment Support

Note: Fusion Middleware 12.1.2 targets only.

Global Policy Attachment (GPA) support is available for all supported subject types in the 12.1.2 FMW release.

With GPA, Enterprise Manager Cloud Control administrators can secure Web Service assets out-of-the box. Web Service monitoring pages now show "effective policies". Oracle Web Service Manager (OWSM) performs complex calculations taking into account all of the direct policies along with configuration property overrides and the applicable global policies and their configuration property overrides.

2.8.5.6 Enhancement to the Creation of Middleware Home Gold Images in the Software Library

In prior releases, if administrators wanted to create a Middleware home gold image in the software library (to be used as the source for future cloning operations) they were required to first discover the Oracle WebLogic domain for that Middleware home.

Beginning with Fusion Middleware Plug-in 12.1.0.5, when administrators create a Middleware home gold image, they can choose the source for that gold image from a list of Oracle homes or Middleware homes rather than from a list of domains. Having this capability simplifies and improves the user experience of Middleware home gold image creation.

2.8.5.7 Enhancements to Standalone Oracle HTTP Server Management

In previous releases, Oracle Enterprise Manager Cloud Control 12c provided only the ability to monitor the status of a standalone Oracle HTTP Server (that is, an Oracle HTTP Server that is not associated with an Oracle WebLogic domain). Beginning with Fusion Middleware Plug-in release 12.1.0.5, the management of standalone Oracle HTTP Servers has been expanded to include the following features:

- Improved discovery of standalone Oracle HTTP Servers
- Predefined performance metrics. These include metrics such as Active HTTP Requests, Virtual Host metrics (such as Request Processing Time), alert notifications, and performance history features.
- View and correlate messages from standalone Oracle HTTP Server access and error log files.
- Automatic collection of configuration data. Configuration files such as `httpd.conf` are collected on a daily basis thereby enabling analysis of the collected data through comparison operations and change tracking.
- Predefined job to stop, start or restart standalone Oracle HTTP Server processes

These capabilities enable administrators to not only more easily add the web tier component as a managed target but to also more thoroughly monitor and manage it.

2.8.5.8 JVM Performance Page for GlassFish Server

Beginning with Oracle Fusion Middleware Plug-in 12.10.5, a JVM performance summary page is available for Oracle GlassFish Server targets. The page provides JVM performance details such as memory usage, garbage collection statistics, and JVM threads metric data. Gaining insight into the performance data of the underlying JVM that supports GlassFish helps administrators diagnose performance problems.

2.8.5.9 Schedule and Track Execution of WLST Commands Through New WLST Script Job

Beginning with Oracle Fusion Middleware Plug-in Release 12.1.0.5, a WLST script job is available out-of-the-box in the Job library. WLST is used by administrators to manage the configuration of the domain, view performance data about resources in the domain, or manage security data. With the WLST script job, administrators can specify a WLST command or reference a fully qualified script file name and schedule the operation to be run immediately or at a future point in time. The WLST script job can be submitted against one or more Oracle WebLogic domain targets.

Having this job available enables administrators to schedule and track the execution of WLST commands from a single, centralized interface. In addition, administrators do not have to include user names and passwords in the WLST scripts themselves. Instead, they can leverage credential management in Oracle Enterprise Manager 12c (for example, referred or named credentials).

2.8.5.10 Coherence Management Enhancements

2.8.5.10.1 Node Discovery Node discovery is now based on a unique name with a mandatory node name Oracle Enterprise Manager. This feature enables users to keep track of nodes across multiple restarts in a more robust way. This will also solve the target proliferation problem experienced by some customers when the node name was left blank.

Misconfigured nodes (nodes that are not properly configured according to the discovery and monitoring requirements) are clearly identified. This will help customers identify why some nodes are not showing up in the targets list.

The reasons for discovery failure on each node that is not configured properly are clearly described. This saves time and helps customers to quickly fix the node configuration.

2.8.5.10.2 Automatic Coherence Node Status Update Oracle Enterprise Manager can automatically detect the node restart if Coherence uses the ExtendedMbean flag (added in Coherence 3.7.1.9). The ExtendedMbean flag forces Coherence to use the node name in the object name of the Java Management Extension (JMX Mbean). For example `Dtangoso1.coherence.management.extendedmbeaname=true` can be added to the command line of the coherence nodes.

If you do not use the ExtendedMbean flag, you must use the refresh job.

2.8.5.10.3 Node Target Status Change Detected in Seconds A node crash can now be detected in seconds and the for collection frequency of the Status metric of Oracle Coherence Node target is now available in seconds.

Note: Ensure that you disable existing Oracle Coherence Node target default monitoring templates before you discover Coherence. You must create a new monitoring template using a sample target option so that you can use the seconds collection frequency in the template.

2.8.5.10.4 Out-of-Band Configuration Comparison Template The out-of-band configuration comparison template provides better control to customers and helps identify configuration drifts across multiple Coherence nodes.

2.8.5.10.5 JVM Diagnostics Support for Coherence Requests JVM Diagnostics support for Coherence requests helps customers to identify the performance impact of various tasks performed on storage enabled nodes. For example, the `process()` method of the aggregator is shown as a request.

Note: JVM Diagnostics is not part of the Management Pack for Oracle Coherence.

2.8.5.11 JBoss Monitoring Enhancements

JBoss monitoring includes the following enhancements:

- Standard JMX based discovery and monitoring. Previously, monitoring was platform specific to J2EE Management Enterprise Bean (MEJB).
- No need to add JBoss specific JARs during discovery.
- Metric Extensions using JMX.
- Several new metrics greatly enhanced to meet customer needs.

- Several new metrics for thread pools, heap, garbage collection, and so forth.
- Problem analysis for metrics.

These enhancements make it much easier to diagnose performance problems.

2.8.5.12 Automated Provisioning of Oracle Service Bus

Administrators can provision new Oracle Service Bus (OSB) environments from pre-configured OSB binaries saved as a gold image in the Enterprise Manager 12c software library. The provisioning process enables the configuration of the Java Message Service (JMS), Java Transaction API (JTA), and Coherence for OSB domains being provisioned. You can also add managed servers (scale out) during the provisioning process.

2.8.5.13 JVM Diagnostics Enhancements

When deployed on a WLS on which the JRF template was applied, JVM Diagnostics is now able to collect instance invocation information without dependency on ADP or a BTM agent. In addition to ECID, JVM Diagnostics will also collect the request duration (plus/minus sample interval), request name, and user name. This data is available on the Request Id Diagnostics page and the thread detail pages.

The Request Id Diagnostics page has been enhanced as follows:

- Provides transaction search by ECID, duration, request name, and user name
- Shows exclusive and inclusive transaction time by individual JVMs and databases

Oracle Identity Management (IdM) support includes:

- Target correlation by enabling bi-directional drill downs between the JVM and the IdM targets
- Collection of IdM specific JVM argument items, including out of the box violation settings
- Out of the box definition of idle IdM thread rules

SQL capturing for nonregistered databases (including non Oracle databases) is now available.

If a request is not recognized for a specific thread sample, the top nonsystem method is used as the request name. This functionality eliminates the many None requests typically shown.

GlassFish integration includes:

- Target correlation by enabling bi-directional drill downs between the JVM and the GlassFish targets
- Recognition of GlassFish request names for known calls

2.8.5.14 Identity Management Compliance

OIM configuration recommendations provide configurations and tuning recommendations for Oracle Database, Weblogic infrastructure, and OIM targets within Oracle Enterprise Manager. This is accomplished by defining, customizing, and managing compliance frameworks, compliance standards, and compliance standard rules. In addition, Enterprise Manager Compliance Management (EMCM) provides advice on how to change configurations to bring your targets and systems into compliance.

2.8.5.15 Application Replay Enhancements

Note: These enhancements are new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

After a successful replay, users were able to view reports to analyze, capture, and replay results. The reporting mainly focused on application page names and addressed questions such as what was the performance of the page and which pages diverged compared to capture.

Now users have the ability to not only look at page level diagnostics but also session level diagnostics. With this new ability, you can answer questions such as which sessions showed poor performance and then quickly identify the pages where the session was experiencing poor performance.

Additionally, to ensure that a page's poor performance is not caused by setup issues, a divergence report showing differences between the capture and replay of pages is provided. Similarly, when ensuring that a session's performance is not due to a divergence between capture and replay, users were required to view the raw HTTP requests and response contents manually and compare the difference. Now users can simply export a packaged zip file containing capture and replay content and diagnostics and import that into Oracle Application Testing Suite's OpenScript. Doing this enables an automated and visual comparison of capture and replay of a specific session, drastically reducing the time to identify any divergence or potential performance issues.

These diagnostics improvements enable deeper analysis of replay results quickly and reduce the time to isolate potential issues in a replay environment with perspective of end user sessions.

2.8.6 Fusion Middleware Plug-in 12.1.0.6 Features

2.8.6.1 Middleware as a Service Enhancements

2.8.6.1.1 Middleware as a Service Support for WebLogic 12c

Middleware as a Service (MWaaS) now supports WebLogic 12c so WebLogic customers who have upgraded to WebLogic 12c can take advantage of MWaaS. In addition, profiles used for MWaaS service templates can be created from plain WebLogic domains without the JRF extension.

MWaaS enables customers to have a unified private middleware PaaS solution across different versions of WebLogic. JRF runtime is no longer required so customers do not need to install FMW products to install JRF libraries.

2.8.6.1.2 Exalogic Rapid Start Kit

The Exalogic Rapid Start Kit consists of a collection of shell scripts that execute EM CLI commands that create Cloud administrator roles and users, configure MWaaS Cloud resource models such as PaaS Infra Zone, Middleware Pool, and quotas.

It takes many steps to set up the entire MWaaS through the graphical user interface (GUI) or CLI. The Rapid Start Kit helps customers quickly configure MWaaS by executing scripts that create necessary Cloud resource models and make associations

with relevant resources. It can save time for Cloud administrators and minimizes user errors during configuration. The Rapid Start Kit can serve as a template for customers who would like to have a CLI-based automation for a Cloud environment setup.

2.8.6.1.3 EM CLI commands and REST Admin APIs for MWaaS

EM CLI commands and REST Admin APIs cover both MWaaS cloud resource model configurations such as PaaS Infra Zone, Middleware Pool and quotas, and MWaaS SSA portals such as service requests, application deployment, and scale-up.

It takes many steps to set up the entire MWaaS through the GUI. Customers can quickly configure MWaaS by executing EM CLI commands that configure necessary Cloud resource models and make associations with relevant resources. Doing this saves time for Cloud administrators and minimizes user errors over the course of the configuration. Customers who want to integrate with 3rd-party orchestration engines for Cloud configuration or for SSA portal capabilities can also use RESTful APIs that can be invoked from any REST client.

2.8.6.2 Target Management Best Practices

Administrators can be unsure of what steps to perform after adding a WebLogic domain to the Cloud Control console. They may not be aware of all WebLogic management features available from the Cloud Control console or they may not know how to enable or access those features. With Fusion Middleware Plug-in release 12.1.0.6, after administrators add a domain to the console, they are presented with a list of next steps recommended by Oracle. These next steps, or target management best practices, include a summary of each feature as well as links to enable, configure, or access the feature, including:

- Perform Diagnostic Pre-checks: identifies potential issues related to discovery, domain refresh, monitoring, and other key features for managing Oracle Fusion Middleware software.
- Deploy Diagnostics Agents: resolves performance problems directly in production environments with minimal overhead.
- Create and Apply Monitoring Templates: specifies monitoring settings (for example metrics, thresholds, collection schedules, corrective actions) once and applies those settings to several targets at a time.
- Define Compliance Standards and Associate with Targets: ensures that Oracle Fusion Middleware software is configured, managed, and monitored according to industry or corporate standards.

2.8.6.3 Diagnostics Pre-check for Oracle Fusion Middleware

Understanding prerequisites for discovering and effectively managing Oracle Fusion Middleware and WebLogic domains from the Cloud Control console can be challenging. For instance, some management features require a Management Agent to be installed on the same host as the WebLogic Server it is managing, while other features require the Oracle JRF template to be applied to the WebLogic Server.

Fusion Middleware Plug-in release 12.1.0.6 helps to inform administrators of such requirements by providing a Diagnostics Pre-check in its Target Management Best Practices feature. The Diagnostics Pre-check performs a series of tests that identify potential issues related to discovery, domain refresh, monitoring, diagnostics, and other key features for managing Fusion Middleware software. Administrators can review the Diagnostics Pre-check test results to understand tests that were performed, their importance, the impact of any failed tests, and recommendations on what to do when any tests fail. Having access to this information, especially prior to adding the

middleware software to the Cloud Control console, enables administrators to fully understand prerequisites for discovery and centralized management as well as to make use of all middleware management features that Enterprise Manager Cloud Control provides.

2.8.6.4 Enhancements to Non-Oracle Middleware

Note: These features are new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

2.8.6.4.1 IBM WebSphere Application Server 8.5 Certification With this release, IBM WebSphere Application Server 8.5 is certified for use with Enterprise Manager.

2.8.6.4.2 New Pages for JBoss and IBM WebSphere Application Server Monitoring The monitoring page for JBoss and IBM WebSphere Application Server targets has been re-written in the Oracle ADF user interface framework, making the page customizable by users.

2.8.6.4.3 IBM WebSphere MQ Cluster Discovery In the past, the discovery model for WebSphere MQ clusters was all or nothing. With this update, users can discover the queue managers (QMs) in the cluster that are reachable by the agent. Users can add new QMs by using the local agents and discovery will add the new QMs to already created cluster targets.

2.8.6.5 Coherence

2.8.6.5.1 Management Node Status Computation The node status is based on the availability of the MBean node. However, the management node is a special node that is the JMX server where these MBeans are listed. The management node status is shown as DOWN instead of Metric Collection Error if the JMX server is not reachable. The status of other nodes is shown as Metric Collection Error because it is not possible to determine if those nodes are down without looking at Mbeans.

2.8.6.5.2 Top Components You can now see the top components in the context of each Coherence target. For example:

- At the cluster level you can see the top nodes for CPU% and the top caches for objects.
- At the node level you can see which services are the most backlogged.
- At the cache level you can see which nodes have the maximum gets.

There is now a bar chart for top components on the cluster, cache, and node home pages.

2.8.6.5.3 All Caches and All Nodes Page Cloud Control now automatically detects the addition of new nodes or caches to a Coherence cluster and alerts users that a cluster refresh is required.

The All Caches and All Nodes context sensitive page lists selected nodes and includes a master details regions. Select a row for a node or cache to view trends of key performance metrics on the detailed region.

2.8.6.6 Enhanced WebLogic Domain Discovery from EM CLI

Fusion Middleware Plug-in release 12.1.0.6 introduces a new EM CLI verb to further automate the process of adding several WebLogic domains to the Cloud Control console. The new `generate_discovery_input` EM CLI verb can be run after automatic discovery has already discovered several WebLogic domains. This new verb creates a discovery input file automatically based on the targets discovered from the automatic discovery operation. Administrators can then use this discovery input file in conjunction with the EM CLI verb `discover_wls` to further automate the process of promoting discovered domains as fully managed targets. Consequently, administrators are no longer required to create a discovery input file to perform domain discovery from EM CLI. Such automation increases productivity and reduces management costs.

2.8.6.7 Enhanced Middleware Summary Page

The Middleware Summary page (accessible from the Targets menu by selecting Middleware) has traditionally displayed a table with the status and health of middleware software managed by Enterprise Manager Cloud Control. Beginning with this release, the Middleware Summary page has been redesigned in order to provide administrators with a new, more flexible target search mechanism. For instance, administrators can now filter their middleware targets by target type, status, version, location, and/or by any combination of other default target properties. In addition, the enhanced summary page provides administrators with a number of pie charts which offer a graphical summary view of target property data as well as an additional, highly interactive filtering mechanism.

2.8.6.8 Enhancements for Exalogic Hardware Management

Oracle Enterprise Manager Cloud Control 12c and Enterprise Manager Ops Center support the management of the Exalogic hardware and virtualization stack. Both Exalogic Navstar and Echo releases are supported. This update provides enhanced hardware metrics and manageability for Echo releases.

2.8.6.9 Ability to Perform More Administration Operations Against Fusion Middleware

Additional administration operations previously available from the Fusion Middleware Control Console and WebLogic Server Administration Console are now available from the Cloud Control console. These operations include viewing and editing settings for the WebLogic domain, WebLogic cluster, WebLogic Server, server template (applicable to only WebLogic version 12 and later), and machine configurations. Changes made to these configurations are managed by the Change Center feature of the Cloud Control console.

Having a single tool for both monitoring and administering Fusion Middleware components simplifies an administrator's job and increases productivity.

2.8.6.10 Identity And Access Management Patching

Patching is one of the most important phases of the product lifecycle. It enables you to keep your software product updated with bug fixes. Oracle releases several types of patches periodically to help maintain your product. However, patching has always been the most challenging phase of the lifecycle because it is complex, risky, time consuming, and involves downtime.

2.8.6.11 Automated Provisioning from Installation Media-Based Provisioning Profiles

Beginning with Fusion Middleware Plug-in 12.1.0.6, administrators are able to create provisioning profiles from Fusion Middleware installation media previously downloaded from Oracle, including installation media for WebLogic Server, SOA Suite, Oracle Service Bus, and Repository Creation Utility (RCU). These provisioning profiles, stored in the Enterprise Manager software library, can then be leveraged as the source for future, first-time Fusion Middleware installations and domain configuration. Consequently, administrators are no longer required to manually install and configure Fusion Middleware software outside of the Cloud Control console in order to leverage Enterprise Manager's provisioning automation capabilities.

These additional provisioning capabilities increase an administrator's productivity and reduces management costs.

2.8.6.12 Gold Image Provisioning for SOA and WebCenter

Enterprise Manager Cloud Control now supports gold image provisioning for SOA and WebCenter.

2.8.6.13 Enhancements to Fusion Middleware Provisioning

The following enhancements have been made to Fusion Middleware provisioning:

- The regions on the Middleware Provisioning page (accessible by selecting Middle Provisioning from the Provisioning and Patching section of Enterprise Manager) now display additional information about each profile and deployment procedure in the enterprise, and enable administrators to specify what data is displayed and how it is displayed in each region.
- Administrators now have the option to create different types of provisioning profiles: profiles based on installation media, Oracle Home or WebLogic domain. In the past, there was only one type of profile.
- When performing first-time provisioning of a domain, cloning a domain, or scaling out a domain, administrators can choose to configure the WebLogic domain to be fronted by Oracle HTTP Server. All required steps to ensure requests are routed to Oracle HTTP Server for all applications deployed to the domain are done automatically.
- When performing a scale out operation on a WebLogic domain supporting SOA components, administrators can now fully configure new managed servers for SOA components directly from the Scale up/Scale out Middleware deployment procedure.
- When provisioning a WebLogic domain from a provisioning profile, administrators now have the choice between creating a new domain or extending an existing domain.

These enhancements improve the usability of the middleware-related provisioning features available from the Cloud Control console and further automate installation and configuration operations.

2.8.6.14 Support for Standalone Oracle HTTP Server Release 12.1.2

The Fusion Middleware Plug-in Release 12.1.0.6 supports the discovery and management of standalone Oracle HTTP Server Release 12.1.2. Management features (similar to the earlier releases of the standalone Oracle HTTP Server) include:

- Discovery of standalone Oracle HTTP Server release 12.1.2

- Predefined performance metrics including spanning server metrics such as Active HTTP Requests and Percentage of Busy Processes as well as Virtual Host metrics such as Request Processing Time for a Virtual Host are available from which thresholds, alert notifications, and performance history features can be leveraged
- View and correlate messages from standalone Oracle HTTP Server access and error log files
- Automatic collection of configuration data including configuration files such as `httpd.conf` and `mod_wl_ohs.conf` are collected on a daily basis, thereby enabling analysis of the collected data through comparison operations and change tracking
- Predefined job to stop, start, or restart standalone Oracle HTTP Server release 12.1.2 processes

These capabilities enable administrators to not only more easily add the web tier component as a managed target but to also more thoroughly monitor and manage it.

2.8.6.15 Enhancements to Fusion Middleware Process Control Job

The out-of-box job for Fusion Middleware Process Control now provides the ability to start a blackout before performing a stop target operation as well as to end a blackout after performing a start target operation. In addition, administrators can modify the default timeout setting (5 minutes per target) to the amount of time that the job should wait while it is trying to start, stop or restart a target before terminating the attempt and generating an error. Such features enable administrators to manage middleware targets, and operations on those targets, more efficiently and effectively.

2.8.6.16 Faster Notification of Down Target Status

Traditionally, when targets go down for unexpected reasons, Enterprise Manager becomes aware of the down status with the next scheduled collection of the target's response metric. Beginning with this release, when a WebLogic Server or Application Deployment target goes down, an asynchronous notification is sent to the Management Agent which then triggers the Management Agent to immediately test the target's response metric, regardless of the next scheduled collection.

If the target is detected to be down, Enterprise Manager can quickly send notifications about the target down event. In addition, administrators can also enable the Cloud Control console to automatically refresh its user interface for pages associated with WebLogic Server or Application Deployment targets. Doing this ensures that administrators who are using the console are made aware of the target down event within seconds of its occurrence.

2.8.6.17 Middleware Diagnostics Advisor

2.8.6.17.1 Auto Enable Middleware Diagnostics Advisor MDA is now auto-enabled when the JVM Diagnostics agent is deployed. This feature eliminates previous MDA deployment issues.

2.8.6.17.2 Finding Details Page Enhancements The Finding Details page has been enhanced to note the thresholds and the logic used to generate the finding.

2.8.6.17.3 Edit Thresholds Option Users can now edit the MBA Violations Percentage and JMS Wait Time (minutes) thresholds for better control over findings.

2.8.6.18 Top Requests Region Added to Java Virtual Machine and Java Virtual Machine Pool Target Home Pages

The Top Requests region is shown in the Java Virtual Machine and Java Virtual Machine Pool Target home pages. The region has a table listing the top requests captured by JVM Diagnostics. The available metrics include:

- Top Requests - The request name
- Avg Duration (ms) - The average duration in milliseconds that this request took for completion
- Samples - The number of monitoring samples having this request in the time range
- Count - The number of samples for which JVM Diagnostics could find or capture the start time of the request
- Min. Duration (ms) - The minimum time taken for this request to complete
- Max. Duration (ms) - The maximum time taken for this request to complete
- Stddev. Deviation (ms) - The standard deviation in time taken for this request to complete

Note: Duration and all related metrics are available only for WLS and only when JRF is deployed.

2.8.6.19 JVM Diagnostics Updates

The following JVM Diagnostics updates are available:

- One JVM Diagnostics manager can support up to 2000 JVMs.
- Enterprise Manager users can use the JVM Diagnostics to create a Java Flight Recorder (JFR) dump. The dump can be invoked manually from the UI or as a corrective action to a metric threshold violation. JFR dumps can be downloaded to the user's desktop and opened in Mission Control if installed. The JFR files can be managed (downloaded again and deleted) from the JVM Diagnostics UI, eliminating the need to log in into the JVM host.

2.8.7 Fusion Middleware Plug-in 12.1.0.7 Features

2.8.7.1 Fusion Middleware Provisioning Enhancements

The Fusion Middleware Plug-in 12.1.0.7 includes the following enhancements:

- The ability to clone SOA domains from source to destination environment.
- A detailed view of the WebLogic domain-based provisioning profile has been included. If you select a WebLogic domain profile, you may see some or all of the following details depending on the product family the domain belongs to: servers, data sources, JMS servers, and authentication providers.
- The Provision Fusion Middleware deployment procedure now supports Typical and Advanced modes of provisioning. You are encouraged to start with the default Typical mode. However, if you want the ability to customize a wide range of parameters for the destination domain (for example listener address, port values, JMS configuration), you can leverage the Advanced mode.

- RESTful Web Services-based API support for listing, describing, and deleting SOA and OSB profiles has been included.
- EM CLI support for listing, describing, and deleting SOA and OSB profiles has been included.
- Support for provisioning multi-node WebCenter Portal environments has been introduced.
- Support for scaling out a WebCenter domain is now available.
- Support for creating a WebCenter-based provisioning profile has been introduced.
- EM CLI support for listing, describing, and deleting WebCenter based provisioning profiles has been introduced.
- RESTful Web Services-based API support for listing, describing, and deleting WebCenter based profiles has been added.

2.8.7.2 Support for SOA as a Service and OSB as a Service

Beginning with Fusion Middleware Plug-in 12.1.0.7, support for SOA as a Service (SOAaaS) and OSB as a Service (OSBaaS) has been included as a part of the Oracle Middleware as a Service (MWaaS) family. Now self service administrators can use the Enterprise Manager Cloud Control console to create SOA and OSB zones, pools, and service templates. Using these service templates, self service user can request a new OSB service or SOA service and provision the respective resource. Support to create this service request has been embedded into the Self Service Portal.

This release also includes RESTful Web Services-based API support for SOAaaS and OSBaaS.

2.8.7.3 Common Self Service Framework

The common self service framework is now used to manage and monitor the Web Logic Server cloud service.

2.8.7.4 Oracle Site Guard Enhancement

This plug-in includes the following enhancements for Oracle Site Guard:

- **Customize Prechecks**

Enhance the Prechecks and Health Checks performed by Oracle Site Guard by adding your own Custom Precheck scripts. Use this feature to customize and improve the Prechecks and Health Checks that precede any operation plan.

- **Add User Scripts to Oracle Enterprise Manager's Software Library**

Add your own scripts to Oracle Enterprise Manager's software library and use them in Oracle Site Guard work flows. This leverages the ability of Oracle Site Guard to automatically deploy the scripts at runtime, thereby eliminating the need to manually pre-deploy your scripts on the hosts where they need to run.

- **Configure Custom Credentials for Script Execution**

Configure an alternate set of credentials for executing any configured script. This allows you to execute scripts using credentials that are different than the credentials configured for the script host.

- **Provide Credentials as Parameters to Scripts**

Provide one or more credentials as parameters for configured scripts. This allows you to securely pass credentials to any configured script when the script needs to perform additional authentication functions.

- **Stop the Primary Site during a Failover Operation**

Configure Oracle Site Guard to optionally stop the primary site during a failover operation. Oracle Site Guard attempts to stop the primary site components on best effort basis before failing over to the standby site.

- **Clone Operation Plans and Script Configuration**

Using the Create Like feature, create new operation plans and script configurations by cloning existing ones. This saves time during configuration, especially when the new operation plan or script being created is very similar to an existing plan or script.

- **Support for Oracle Fusion Middleware 12c**

Protect your Oracle Fusion Middleware 12c deployment using Oracle Site Guard.

- **Support for Oracle Database 12c**

Protect your Oracle Database 12c deployment using Oracle Site Guard.

2.8.8 Fusion Middleware Plug-in 12.1.0.8 Features

2.8.8.1 Generic JVM Provisioning for Private Cloud

This feature enables self-service users to provision non-Oracle middleware components as cloud services. It also uses Enterprise Manager's chargeback and quota management capabilities to enable administrators to limit service usage based on organizational policies.

2.8.8.2 JVMD Support for PaaS

Enterprise Manager Cloud Control now enables you to deploy JVMD agents on your Oracle Cloud virtual hosts. These deployed JVMD agents can report to a JVMD engine deployed in your private network. This feature enables you to monitor the JVMs deployed on the virtual hosts running your Oracle Cloud services as well as the JVMs deployed on the hosts in your private network using a single console, for example Enterprise Manager Cloud Control deployed in your private network.

2.8.8.3 Middleware Self Service Portal Support for Virtual Java as a Service with Exalogic Systems

WebLogic services that have been provisioned on Exalogic systems using Service Manager can now be viewed in the Cloud Self Service Portal as part of the Exalogic Private Cloud service family.

2.8.8.4 MWaaS on Solaris SPARC

This project integrates MWaaS with the Oracle Enterprise Manager Ops Center. It provides the ability to dynamically add or remove the virtual hardware in a MWaaS cloud.

2.9 Exadata Management

This section includes the following topics:

- [Exadata Plug-in 12.1.0.3](#)
- [Exadata Plug-in 12.1.0.4](#)
- [Exadata Plug-in 12.1.0.5](#)
- [Exadata Plug-in 12.1.0.6](#)

2.9.1 Exadata Plug-in 12.1.0.3

2.9.1.1 Oracle Exadata Database Machine Management Enhancements

Enterprise Manager Cloud Control now provides support for full lifecycle management of Oracle Exadata Database Machine. Key features include:

- Automatic discovery of all Exadata hardware and software components
- Automatic creation of Enterprise Manager system for end-to-end monitoring of the entire Oracle Exadata Database Machine
- Extensive administration capabilities for databases, Exadata cells, and Infiniband switches
- Rich performance diagnostics with the help of in-depth performance charts covering all hardware and software Exadata components

2.9.2 Exadata Plug-in 12.1.0.4

2.9.2.1 Exadata Database Machine Support for SuperClusters

The Exadata plug-in has been enhanced to support the discovery, monitoring, and complete management of the Oracle Exadata Database Machine in a SuperCluster engineered system. These enhancements includes support for logical domains (LDOMs) (control, IO, and guest) and zones (global and non-global) created within a SuperCluster. They enable customers to manage and monitor all of their Oracle engineered systems from a single Oracle Enterprise Manager console.

2.9.2.2 Enhanced I/O Resource Management in Oracle Exadata Database Machines

In this plug-in release along with the existing percentage based plan definition, the I/O resource management (IORM) enhancement enables you to define share based disk I/O plans. Share-based plans use a relative share instead of percentage allocations and levels. These plans are simpler to implement, but as effective as percentage allocations. For example, if a critical database called FINANCE has four shares, and a low-priority database called REPORTING has one share, then the FINANCE database is four times more likely to issue I/Os compared to the REPORTING database.

2.9.2.3 Oracle Exadata Database Machines Management

Many users have created their own multi-rack setup with two or more Exadata systems or they have added more storage to their existing Exadata systems using the Exadata Storage Expansion Rack. Starting with the 12.1.0.4 release of the Exadata plug-in, you can discover, manage, and monitor multiple Exadata machines as a single entity as long as they are part of the same database cluster. This support is applicable to all existing Exadata versions, for example V2, X2, and X3.

The multi-rack and storage expansion rack support enables administrators to manage and monitor multiple engineered systems from a central place. This will improve the administrator's ability to detect and diagnose hardware and software faults in a multi-rack setup.

2.9.3 Exadata Plug-in 12.1.0.5

2.9.3.1 Supported Hardware and Software Configurations

Oracle Exadata Plug-in Release 12.1.0.5.0 supports the following hardware and software:

- Certified and supported for the Exadata X4-2 with Exadata Server version 11.2.3.3 when the following Enterprise Manager patch is applied:
 - Patch 17965602: Platform patch based on Enterprise Manager Cloud Control 12c Release 3 (12.1.0.3), which is required for compute node monitoring.
 - Patch 17861041: Plug-in patch for the Oracle Exadata Plug-in Release 12.1.0.5.0, which is required for Exadata Storage Server monitoring.

The above patches also include fixes for issues in the Exadata Software version 11.2.3.3, which is installed with the Exadata X4-2 server.

- Certified for Oracle Database 12.1.0.1 June Release on Exadata 11.2.3.2.1 + patch.

Note: To successfully generate the `databasemachine.xml` file using OneCommand, you must first upgrade to the latest OneCommand on MOS and confirm your OneCommand Deployment Configuration Assistance is at BP 18 (11.2.0.3.18) or later.

See the "OneCommand" section of *Database Machine and Exadata Storage Server 11g Release 2 (11.2) Supported Versions* (Doc ID 888828.1) for a complete list of patches available for download in My Oracle Support:

<https://support.oracle.com>

2.9.3.2 Database Machine Management Improvements

The Oracle Exadata plug-in enables you to manage your Oracle Exadata Database Machine through Enterprise Manager Cloud Control.

The Oracle Exadata Plug-in Release 12.1.0.5.0 includes the following features for managing your Database Machine:

- Database Machine target now supports Software and Hardware Inventory feature.
- Database Machine navigation tree also displays databases residing on the Database Machine.
- Database Machine Home page has additional tab to show key software components, including databases, ASM, and Clusters residing on Database Machine.
- Database Machine Discovery Summary Page provides optional link to Database Discovery.

2.9.3.3 IORM Configurations Metric Improvement

The IORM configurations metric now supports the display of Category plan data.

Note: This metric only displays the Category plan data. The IORM user interface still does not allow the IORM Category plan to be set.

2.9.3.4 InfiniBand Network and Switch Improvements

The Oracle Exadata Plug-in Release 12.1.0.5.0 includes additional InfiniBand Switch Sensor fault detection, including power supply unit sensors and fan presence sensors.

2.9.3.5 Metrics Improvements

Metrics reports are critical to manage your Oracle Exadata Database Machine effectively. With the metrics, you can determine where additional resources are needed, when peak usage times occur, and so on.

The Oracle Exadata Plug-in Release 12.1.0.5.0 includes the following metrics enhancements:

- Enhanced metric scalability in large environment to reduce time out by reducing `cellcli` calls.
- Reduce metric collection error for the Exadata HCA metric. Improvements to combine the HCA port data collection in a single `cellcli` call to reduce chances of time out.
- Reduced metric collection error from Exadata IORM Status metric. The metric was removed, and the user interface now uses the available configuration data.

2.9.4 Exadata Plug-in 12.1.0.6

2.9.4.1 Enhanced Enterprise Manager Exadata Storage Server Grid Home and Performance Pages

The Exadata Grid Home page provides a customizable, high-level overview of the storage servers in the Oracle Exadata Database Machine and highlights any issues that require immediate attention. The Grid Performance page displays charts that report the IO queue per disk, average flash response time, and average hard disk response time. Additionally, the Usage Statistics region on the page displays information about Infiniband, flash cache, Smart Scan IO, Smart Log efficiency, IORM boost, and cell efficiency Ratio.

The redesigned Enterprise Manager Exadata Storage Server Grid home and performance pages help you to comprehensively monitor your Exadata environment, ensuring that your production system is performing optimally as outlined in the service level agreements.

2.9.4.2 Enhanced Enterprise Manager Exadata Storage Server Cell Home and Performance Pages

The Exadata Storage Cell Home page now displays container-level data for ASM disk groups. The Exadata Storage Cell Performance page has two tabs, Flash and Hard Disks, and CPU and Memory. The Flash and Hard Disk tab displays flash and hard disk data aggregated at the grid level and enables users to compare a chosen performance metric across storage servers. The CPU and Memory tab displays

historical metric data for memory and CPU utilization and includes the list of SQL scripts with the top CPU activity over the past 7 days.

The enhanced EM Exadata Storage Server Cell Home and Performance pages reduce administrative burden by simplifying the monitoring of Exadata cells and their performance.

2.9.4.3 Newly Supported Hardware and Software Configurations

Oracle Exadata Plug-in Release 12.1.0.6.0 supports the following hardware and software:

- Oracle Exadata Server versions:
 - 11.2.3.3.0
 - 12.1.1.1.0, includes support for Oracle Database 12c.
- Exadata hardware:
 - X4-2 server
- SPARC SuperCluster (SSC) hardware:
 - T5-8 server

2.9.4.4 Enterprise Manager Cloud Control 12c Support for Oracle Multitenant Databases on Exadata

Oracle Enterprise Manager Cloud Control 12c Exadata plugin 12.1.0.5 supports Oracle Database 12c multitenant pluggable and container databases. This support includes displaying pluggable and container database level data and statistics in various Enterprise Manager pages and configuring Database Resource Manager.

These features enable businesses to run their consolidated databases in a secure and isolated multitenant model while prioritizing and managing the resources as needed.

This plugin makes it easier to monitor and manage Exadata hardware running Oracle multitenant databases. It helps organizations efficiently consolidate their IT infrastructure on the Exadata platform and reduce overall IT management costs.

2.10 Siebel Management

This section describes new features and enhancements for Siebel management.

- [Siebel Plug-in 12.1.0.3 Features](#)
- [Siebel Plug-in 12.1.0.4 Features](#)

2.10.1 Siebel Plug-in 12.1.0.3 Features

2.10.1.1 Siebel Discovery Available through EM CLI

Until now, Siebel discovery was available only from the Enterprise Manager user interface. You can now perform discovery using EM CLI as well. This release supports the deployment of Siebel assembly. After assembly deployment there is no automated mechanism available to discover the provisioned Siebel Enterprise. You can now automate the discovery as well.

2.10.1.2 Siebel Discovery Precheck Wizard

The Siebel discovery precheck wizard checks that all of the prerequisites for discovery are in place before actually performing a Siebel Enterprise discovery. This wizard enables you to determine what is missing and get it in place before performing the actual discovery.

2.10.1.3 Siebel Partial Discovery

In the past, the Siebel discovery was all or nothing- if one server failed the discovery failed. Now, Siebel discovery can be successful even it is only a partial discovery because one or more servers failed.

2.10.1.4 UpdateNow

The UpdateNow function can now update the entire enterprise or only selected servers.

Customers typically have a large number of Siebel servers as part of their enterprise. Some of these servers are maintained as backups. When discovered in Enterprise Manager Cloud Control, all of the servers appear as targets and as a result customers delete the server targets that they are not interested in. However, when changes are made to the enterprise (for example, new components added or existing components removed), users perform an enterprise refresh by using UpdateNow. In the past., all the servers were updated again and deleted servers reappeared. However, now customers can refresh only a selected list of servers through UpdateNow.

2.10.1.5 Log Analyzer Metric

In the past, Siebel administrators wrote Perl scripts and used other manual methods to identify Siebel errors in log files. To improve this situation, a new log analyzer metric has been added to the Siebel server target. It includes out of box patterns to search for in the log files. In addition, administrators can specify addition patterns to search for.

2.10.2 Siebel Plug-in 12.1.0.4 Features

2.10.2.1 Additional Discovery Precheck Validations

Customers can sometimes struggle with the process of discovering all of the Siebel targets in Enterprise Manager. Examples of factors that might cause Discovery to fail include host name mismatch, file level permissions mismatch, Siebel high availability configurations, Siebel platform-specific issues, and Siebel and Enterprise Manager patch levels.

In the previous release (Siebel Plug-in12.1.0.3), Enterprise Manager introduced the Discovery Pre-Check feature, which identifies the root causes of a Discovery failure and provides administrators with guidance on how to resolve these issues.

In this release, Enterprise Manager added an additional diagnostic test. This test compares targets found in Siebel-specific configuration files (for example the `siebns.dat` file) with target names found in Enterprise Manager (for example, target names in the repository). An example of a potential comparison error is host names that do not follow fully-qualified domain name practices, compared to host names in Enterprise Manager that do use fully-qualified domain names.

This diagnostic test identifies those targets that have a name mismatch, and provides recommendations on how to match these targets. Customers typically match targets in the `siebelserverconfig.xml` file, found in the `plugin scripts` folder. When this file is

updated and the targets are correctly correlated, customers can re-run this diagnostic to confirm that this issue has been resolved.

Discovery Precheck enables you to quickly and easily identify the root causes of a failure to discover all of the Siebel targets in Enterprise Manager, and provides guidance and suggestions on how to resolve these issues. The result is an improvement in the ease and speed of the implementation of the Siebel Plug-in.

2.10.2.2 Compliance Rules for Siebel

A Siebel Enterprise is made up of many individual yet related targets such as databases, Siebel servers, Siebel components, Siebel Workflow, and Siebel component groups. Administrators are faced with the challenge of ensuring that each target within an enterprise is correctly configured and adheres to their own standards or best practices.

Compliance rules, standards, and frameworks are an efficient and automatic way to ensure that target configurations comply with a certain standard. If a target violates a certain rule, administrators can either be notified proactively by Enterprise Manager's incident management capability, or view the violation within the Compliance Framework dashboards.

It is possible to add or modify targets in Siebel, and for those changes not to be reflected in Enterprise Manager. In this release, Enterprise Manager delivers two compliance rules, both of which ensure that the number and type of Siebel targets and associated Siebel target properties in Enterprise Manager agree with the number and type of Siebel targets and Siebel target properties found in the underlying Siebel Enterprise. Both compliance rules leverage data collected automatically through Oracle Enterprise Content Management (ECM):

- **Targets Out of Sync**
 - If the number and type of Siebel targets collected through ECM agree with the number and type of targets present in Enterprise Manager, then that Siebel Enterprise is not in violation of the compliance rule.
 - If the number and type of Siebel targets collected through ECM do not agree with the number and type of Siebel targets present in Enterprise Manager, then that Siebel Enterprise is in violation of the compliance rule.
- **Target Properties Out of Sync**
 - If the Siebel target properties collected through ECM agree with the Siebel target properties in Enterprise Manager, then that Siebel Enterprise is not in violation of the compliance rule.
 - If the Siebel target properties collected through ECM do not agree with the Siebel target properties in Enterprise Manager, then that Siebel Enterprise is in violation of the compliance rule.

Compliance rules are an invaluable tool for administrators to quickly and easily determine if the Siebel Enterprise is in compliance with their internal standards or best practices.

2.10.2.3 Siebel EM CLI Enhancements

It is possible to add or modify targets in Siebel, and for those changes not to be reflected in Enterprise Manager. The result is an inaccurate representation of the Siebel Enterprise in Enterprise Manager.

In 12.1.0.3, Enterprise Manager added the Update Enterprise and Update Server features at the Siebel server level, which provides synchronization capabilities of

Siebel targets and target properties between Enterprise Manager and the underlying Siebel Enterprise. This feature, however, was only available through the user interface within the Siebel Plug-in.

In this release of the Siebel Plug-in, the Update Enterprise and Update Server features are available through EM CLI as well.

Note: Customers can use EM CLI to update the entire Siebel Enterprise, or specific Siebel servers. Target Discovery and Target Deletion are also available through EM CLI, as of 12.1.0.3.

The benefit of the Update feature through EM CLI is that the command can be executed unattended and at regular intervals (for example creating a job in Enterprise Manager) to ensure that the targets and target properties in Enterprise Manager correctly reflect the underlying Siebel Enterprise.

2.10.2.4 Automatic Association of the Siebel Database with the Siebel Enterprise

Associations are used to identify relationships between targets. For example, the topology feature uses associates to present these relationships. Prior to this release, the Siebel Plug-in did not create associations between the Siebel targets and the respective Siebel database. Customers had to create this association manually.

In this release, these associations are created automatically as part of the configuration collection process on the discovered Siebel targets. The benefit of this enhancement is that these relationships are automatically captured and configured, which saves administrators time and effort. In addition, this type of association will help on further projects such as workload tagging and Siebel patching.

2.10.2.5 Enterprise Level Monitoring Credential Referencing

In previous releases, monitoring credentials for every Siebel target were saved as target properties at the individual target level. The result was that when the monitoring credentials changed, administrators had to update credentials on each and every individual target, which was an onerous task.

In this release, monitoring credentials are no longer stored at the individual target level. Instead, all targets within a Siebel Enterprise reference that Enterprise target's monitoring credentials. In other words, monitoring credentials are saved only at the Siebel Enterprise target level, and the same credential set is used by all Siebel targets that belong to that enterprise.

The benefit of this enhancement is that the management of monitoring credentials is vastly improved. Administrators are able to change credentials just once, at the enterprise target level, and are not required to repeat the change for each and every target within that enterprise.

2.11 Extensibility

The following sections describe new extensibility features and enhancements in this release.

- [Extensibility Developers Kit](#)
- [Plug-in and Connector Lifecycle Management](#)
- [Event and Help Desk Connectors](#)
- [Metric Extensions](#)

- [Custom Configuration Collections](#)
- [User-defined Deployment Procedures](#)
- [Metadata Plug-In Support](#)
- [Plug-in Builder](#)

2.11.1 Extensibility Developers Kit

This release provides the Extensibility Developers Kit (EDK) to support development of custom plug-ins for managing and monitoring target types with no out-of-box support. With the EDK, Oracle partners and integrators can extend Cloud Control support to virtually any type of target, without requiring direct support from Oracle development resources.

To access the EDK, select **Setup** in the Cloud Control console, select **Extensibility**, then select **Development Kit**.

2.11.2 Plug-in and Connector Lifecycle Management

The Self Update feature provides a user-friendly mechanism for downloading and deploying Management Plug-ins and connectors. There also is a console for managing the lifecycle of plug-ins, enabling standardized management of different plug-in types and simplified deployment of plug-ins to Oracle Management Service and Management Agents.

2.11.3 Event and Help Desk Connectors

Event Connectors enable the sharing of Enterprise Manager events with third party event management systems. Event Connectors support all event types, thereby enabling sharing of not only monitoring-related events (target availability events, metric alerts, and so forth) but also other types of events such as job status events, compliance standard violations, and so forth. Multiple event connectors (either different event connectors or multiple instances of the same connector) can be configured with the same Enterprise Manager deployment. This is useful in deployments that may require integration with multiple event management systems. A new retry feature is available that retries the delivery of events if the third party event management system becomes unavailable.

Help Desk Connectors enable you to open help desk tickets in third party help desk systems for events detected in Enterprise Manager. Enhancements to help desk connectors include support for all event types, visibility of the ticket status within Enterprise Manager, and support for multiple connectors (either different connectors or multiple instances of the same connector). This feature enables the same Enterprise Manager deployment to work with different help desk systems which is useful in data centers that may be sharing the same Enterprise Manager deployment across different lines of business, each with their own separate help desk system.

2.11.4 Metric Extensions

Metric Extensions are the next generation of user-defined metrics, enabling you to extend Enterprise Manager to monitor conditions specific to the enterprise's environment by creating new metrics for any target type including non-Oracle target types.

2.11.5 Custom Configuration Collections

Custom configurations provide a way to identify files and other configuration data that Cloud Control does not already collect. These customized configurations can be collected on well-known target types or on a target type introduced as part of the custom configuration definition. You can also use custom configurations to extend existing configuration data collections.

There are two options available to extend configuration data collections using a custom configuration specification:

- Add additional collection items to an existing target type
- Add a custom target type with new collection items

2.11.6 User-defined Deployment Procedures

User-Defined Deployment Procedures (UDDP) enable automation of custom, and often complex, processes (for example, third-party application provisioning, JRE upgrade, and so forth).

2.11.7 Metadata Plug-In Support

This section describes new features that support Metadata Plug-in (MP) features.

2.11.7.1 System Support

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

With this feature, partner SDK enables Metadata Plug-ins to define composite target types or systems which contain multiple member target types that are related to each other. This relationship between target types can be defined through associations which are displayed as part of the system topology.

2.11.7.2 Custom Discovery Support

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

This feature enables guided discovery of systems and composite targets that include multiple members which enables discovery and promotion of members in bulk instead of manual discovery of each member.

2.11.7.3 Localization Support

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

This feature will enable Metadata Plug-ins to include resource bundle properties files to support translated strings that can be used across different features in Enterprise Manager exposed through the partner SDK. This will allow partners and customers to

create Metadata Plug-ins that are linguistically and culturally appropriate for a target country or region.

2.11.7.4 Support for SQL Server 2012 (32-bit / 64-bit)

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

This plug-in now supports SQL Server 2012 (32-bit / 64-bit) target types, and no longer provides support for SQL Server 2000 (32-bit).

2.11.8 Plug-in Builder

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

The Enterprise Manager Plug-in Builder is a JDeveloper extension that helps integrators create plug-ins using the JDeveloper development environment. The intuitive graphical user interface wizards available within the plug-in builder enables you to easily develop plug-ins that can be imported and deployed within Enterprise Manager. The traditional way of creating a metadata plug-in using various XML editors is prone to semantic and syntactic errors. Therefore, Oracle recommends using this interactive development environment to take advantage of the runtime validation intelligence embedded in the extension.

See Also: For more information, see "Chapter 4: Plug-in Builder" of the *Oracle Enterprise Manager Cloud Control Extensibility Programmer's Reference*:

http://docs.oracle.com/cd/E24628_01/doc.121/e25161/plug-inbuilder.htm#BGBHGHJA

2.12 Cloud Management

This section describes new features and enhancements for the following releases:

- [Cloud Management Plug-in 12.1.0.1 Features](#)
- [Cloud Management Plug-in 12.1.0.2 Features](#)
- [Cloud Management Plug-in 12.1.0.4 Features](#)
- [Cloud Management Plug-in 12.1.0.5 Features](#)
- [Cloud Management Plug-in 12.1.0.6 Features](#)
- [Cloud Management Plug-in 12.1.0.7 Features](#)
- [Cloud Management Plug-in 12.1.0.8 Features](#)
- [Cloud Management Plug-in 12.1.0.9 Features](#)
- [Cloud Management Plug-in 12.1.0.10 Features](#)
- [Chargeback and Consolidation Planner Plug-in 12.1.0.1 Features](#)
- [Chargeback and Consolidation Planner Plug-in 12.1.0.2 Features](#)

- [Chargeback and Consolidation Planner Plug-in 12.1.0.4 Features](#)
- [Chargeback and Consolidation Planner Plug-in 12.1.0.5 Features](#)
- [Chargeback and Consolidation Planner Plug-in 12.1.0.6 Features](#)
- [Chargeback and Consolidation Planner Plug-in 12.1.0.7 Features](#)
- [Virtualization Management Plug-in 12.1.0.1 Features](#)
- [Virtualization Management Plug-in 12.1.0.2 Features](#)
- [Virtualization Management Plug-in 12.1.0.3 Features](#)
- [Virtualization Management Plug-in 12.1.0.4 Features](#)
- [Virtualization Management Plug-in 12.1.0.5 Features](#)
- [Virtual Infrastructure Plug-in 12.1.0.1](#)
- [Virtual Infrastructure Plug-in 12.1.0.2](#)
- [Cloud Framework Plug-in 12.1.0.1 Features](#)
- [Cloud Framework Plug-in 12.1.0.2 Features](#)

2.12.1 Cloud Management Plug-in 12.1.0.1 Features

Enterprise Manager offers capabilities necessary for deploying and managing clouds within the enterprise. This includes dynamic provisioning of applications and required infrastructure resources, tracking of resource usage trends and costs, and performance and availability monitoring of cloud infrastructure and applications running there. Enterprise Manager supports clouds built on both virtualized and physical infrastructure.

As part of the Cloud Management Plug-in, Enterprise Manager ships with an out-of-box self-service portal that enables developers, testers, DBAs, and other self service users to log on and request cloud resources as well as perform lifecycle operations such as start/stop, status, and health monitoring on them.

- For IaaS, you can deploy Oracle Virtual Machine templates and Oracle Virtual Assemblies containing application software on an Oracle Virtual Machine virtualized server infrastructure.
- For DaaS, the portal provides access to a service catalog which lists various published service templates for standardized single instance (SI) and RAC database configuration and versions.
- You can review your past and outstanding requests, resource quotas, current usage, as well as chargeback information for the resources that you own. The portal also enables you to automatically backup your databases on a daily basis or take on demand backups. You can restore the database to any of these backups. The Self Service Portal is your view into the cloud, so it is designed to be easy to use and yet useful.
- The portal is also backed by a command line interface (CLI) and application programming interface (API) that can be used to request and manage cloud resources instead of the user interface.

2.12.2 Cloud Management Plug-in 12.1.0.2 Features

2.12.2.1 Scaling Up and Scaling Down Tier Targets

You can scale up and scale down a tier within an assembly deployment. The scalability of a tier depends on how it is defined in the assembly. Scaling up enables you to create multiple servers; there are minimum and maximum limits. The scaling down feature also enables you to shut down servers in a tier.

2.12.2.2 Purging Deployment Requests

You can now purge deployment requests after a specified period of time by enabling the Request Archiving Policy.

2.12.2.3 Notification for Request Statuses

Self service users can now receive e-mail notification when their resource requests succeed or fail.

2.12.2.4 RESTful Web Services Support

This release includes RESTful Web Services-based API support for Database as a Service (DBaaS.) The previous release already provided API support for IaaS.

2.12.2.5 Middleware as a Service Features

2.12.2.5.1 Resource Pool Support is provided for guided flow to create middleware resource pools on a self-service zone. This feature enables SSA administrators to carve out resources for a middleware cloud.

2.12.2.5.2 MWaaS Quotas Support is provided for the creation of middleware cloud quotas by an SSA administrator. This feature enables administrators to allocate resources between different users and ensure that no one user can usurp all resources.

2.12.2.5.3 MWaaS Request Settings Support is provided for the creation of middleware request quotas by SSA administrators. This feature offers a the ability to schedule resources requests in advance.

2.12.2.5.4 Service Templates SSA administrators can create Service Templates and map them to resource pools and Zones. This feature enables SSA administrators to build a self-service catalog tailored to enterprise needs.

2.12.2.5.5 Provision and De-provision Service Instance A guided flow is available that enables SSA users to request a new service instance from a given set of service templates, resulting in creation of a new service instance and its appropriate placement in the resource pool. You can later delete a service instance as well, thereby returning resources to the underlying pool.

This feature enables SSA users to self-service provision and manage resources on the cloud.

2.12.2.5.6 Manage Application Lifecycle SSA users can deploy, redeploy, and delete a Java application from the self-service portal, enabling SSA users to manage the application lifecycle.

2.12.2.5.7 Service Instance Scaling SSA users can scale up or scale down a service instance from the self-service portal, enabling SSA users to manage scalability of a service instance.

2.12.2.5.8 Manage Data Sources SSA users can create data sources, add data sources to, or delete data sources from the service instance as required by an application. This feature enables SSA users to add data sources required by an application to the service instance.

2.12.3 Cloud Management Plug-in 12.1.0.4 Features

To support use cases where DRS/DPM is used in conjunction with schedule-based policies, the OVM pool as a target type is now available in the cloud policy authoring page. For example, an administrator may want to turn on DRS on a pool from Monday to Friday for load-balancing between hypervisors and turn on DPM on Saturday and Sunday to shut down under utilized hypervisors.

2.12.4 Cloud Management Plug-in 12.1.0.5 Features

2.12.4.1 Schema as a Service

This new capability provides the highest level of consolidation by hosting multiple schemas in a single database. Using Enterprise Manager 12c, users can request for one or more schemas, with seed data, from the out-of-the-box Self Service Portal. Metering and chargeback capabilities provide visibility into resource consumption and expense incurred.

2.12.4.2 Database Cloning Using Snap Clone

Snap Clone is a new capability in Oracle Enterprise Manager Cloud Control 12c that provides instant database cloning. It enables administrators to provision copies of production systems very quickly into test environments. This is done using the built-in copy-on-write (CoW) capabilities of the underlying storage layer. Cloud users can request these databases and have them provisioned within minutes instead of hours all while keeping the storage needs to a minimum. The self-service provisioning capabilities save operational costs while helping DBAs to become more productive by removing the burdens of manual cloning tasks.

2.12.4.3 Database Cloning using RMAN Backup

RMAN has been the tool of choice for backing up and restoring databases for many years. Oracle Enterprise Manager Cloud Control 12c provides ability to clone databases using RMAN backups through the Self Service Portal. This enables Cloud users who have not invested in storage cloning technologies to create full clones of databases within a few clicks.

2.12.4.4 Testing Cloud Self Service Portal

The Testing Cloud Self Service Portal, also known as Testing as a Service (TaaS), is a cloud-based platform for delivering automated application testing services. It is a self-service solution designed for private clouds. TaaS orchestrates the testing process end-to-end by automating the provisioning of test labs. This includes application under test and test tools, executing load and functional test scripts against the application, and providing rich application monitoring and diagnostics data for analysis. In addition, TaaS has a sophisticated charge back facility for metering and charging the usage of the testing cloud by end-users.

TaaS provides:

- A secure test library with access control for any assets consumed, for example Test Assets or Environment
- Automation and orchestration around provisioning of Test Drivers (test tools used together with TaaS)
- Test Drivers
- Rich monitoring and diagnostics
- Reporting capabilities
- Charge back and metering of resource usage during testing

2.12.5 Cloud Management Plug-in 12.1.0.6 Features

2.12.5.1 Infrastructure as a Service

IaaS includes the following enhancements:

- Import Virtual Machine enables you to directly import a template as a virtual machine.
- The storage features now support non-uniform NFS exports and iSCSI multipath.
- Network Time Protocol (NTP) can be configured for virtual servers for time synchronization.

2.12.5.2 Database as a Service

DBaaS includes the following enhancements:

- RESTful APIs for Schema as a Service, Snap Clone, and RMAN based cloning
- RESTful and EM CLI verbs for setup tasks related to PaaS Infrastructure Zone, Software Pool, and Provisioning Profile
- New Snap Clone Analyzer dashboard that shows storage utilization and savings
- Enhanced home pages and tree navigation for PaaS Infrastructure Zone and Software Pool
- Snap Clone support for NetApp ONTAP version 8.x (7 mode)

2.12.6 Cloud Management Plug-in 12.1.0.7 Features

2.12.6.1 TaaS Reporting Enhancements

The TaaS reporting enhancements enable users to generate reports using Oracle BI Publisher. The BI Publisher based reports enable users to export reports and results outside of Enterprise Manager.

2.12.6.2 Support for the Oracle Functional Testing Test Driver

Users can create tests and trials using the Oracle Functional Testing test driver. Users can execute a functional test automation script from TaaS and ensure functional application validation. This is in addition to the load test validation that can be done by using the Oracle Load Testing test driver.

2.12.6.3 Oracle Load Testing Test Driver Agent Calibration

The Oracle Load Testing (OLT) test driver agent automatically estimates how many OLT agents should be provisioned as part of a test trial. The estimation is based on the scripts and scenario in the test asset as well as the application type. This enables users to identify the hardware required to run a test trial before the test is executed.

2.12.6.4 TaaS External API

The TaaS External API enables customers to interact with TaaS without having to use the EM user interface. Doing this enables customers to benefit from TaaS by integrating with other solutions.

2.12.6.5 Identity And Access Management Patching

Identity and Access Management patching provides an integrated patching workflow with My Oracle Support. You can see recommendations, search patches, and roll out patches with one user interface. This feature provides a complete end-to-end orchestration of the patching workflow using patch plans, including automated selection of deployment procedures and analysis of the patch conflicts. There is minimal manual effort required to apply patches.

Patching is one of the important phases of the product lifecycle that enables you to keep your software product updated with bug fixes. Oracle releases several types of patches periodically to help you maintain your product. However, patching has always been the most challenging phase of the lifecycle because it is complex, risky, time consuming, and involves downtime.

2.12.6.6 Pluggable Database as a Service

Pluggable Database as a Service extends the Enterprise Manager 12c Database Cloud capabilities by adding support for the new Oracle Database 12c multitenant option. The capabilities added for pluggable databases include:

- Self service provisioning of new pluggable databases
- Self service migration of pre-12c databases to pluggable databases
- Service catalog for all approved pluggable database configurations
 - These features help achieve standardization in the data center
- Resource management for pluggable databases using Oracle Database Resource Manager (enables mixed workloads to be run in the same container database)
- Governance through quota, role-based access, policy based management, and so forth
- Metering and chargeback to improve accountability
- Comprehensive REST APIs for integrations with other tools

This feature will accelerate the adoption and migration to Oracle Database 12c pluggable database by providing a rapid and shared platform for provisioning. Customers will also be able to achieve standardization, maintain control, and improve accountability through the various capabilities of this feature.

2.12.6.7 Middleware as a Service Updates

2.12.6.7.1 Policy-Based Scale-up or Scale-down After provisioning, MWaaS instances can be configured to be elastic in response to varying workloads. In addition to

on-demand scale-up or scale-down that can be configured for one-time capacity adjustments, SSA end-users can configure policy-based scale-up or scale-down in the MWaaS portal. Policies can be schedule-based on recurring needs for capacity changes or event-based for dynamic elasticity by taking runtime metrics such as available JVM heap size into account. This new feature delivers a higher level of SLA even when the level of workload is not well-known in advance.

2.12.6.7.2 Enhanced Flexibility in MWaaS Configuration and Lifecycle Management During the MWaaS lifecycle, from creating golden images to service instance provisioning, it is more desirable to bind configuration parameters as late as possible so that a single golden image can be mapped to many MWaaS instances with different values of configuration parameters. For example, it is now possible to create multiple service templates with different JVM heap sizes by setting WebLogic Server start-up parameters over the course of MWaaS Service template configuration. In addition, source WebLogic domains can have various topologies such as a single WebLogic server cluster or unclustered WebLogic servers. At the time of provisioning, the topology can be overridden by the administrator. End-users also have control over service instance lifecycle management.

2.12.6.7.3 Placement Logic

Depending on the resource availability constraints, administrators must choose between maximizing resource utilization and enabling high-availability of MWaaS instances. MWaaS administrators can declaratively make such a decision for each service template in a way that placement logic for MWaaS instances can be controlled at the service template level.

2.12.7 Cloud Management Plug-in 12.1.0.8 Features

2.12.7.1 Snap Clone Enhancements

This plug-in includes the following snap clone enhancements:

- **Test Master:** You can use Active Data Guard or a physical standby for creating a test master database for cloning. This solves the problem of continuous replication between the production database and the test master.
- **Profile Refresh:** This feature enables you to change the profile used in a service template. This will enable administrators to update the database snapshot to the latest version without having to create a new service template

2.12.7.2 CloneDB in DBaaS

DBaaS has been enriched with thin cloning, CloneDB. With Oracle Database version 11.2.0.3 and higher, CloneDB uses dNFS technology to instantly start a clone using an existing backup of a database as the data store. The clone uses copy-on-write technology, so only changed blocks need to be stored locally, while the unchanged data is referenced directly from the backup files.

This feature drastically increases the speed of cloning a system and means that several separate clones can function against a single set of backup data files, saving considerable amounts of space.

2.12.7.3 DBaaS Rapid Start Kit

Built using EM CLI verbs, the Rapid Start Kit automates the entire DBaaS setup for all platforms and hardware in less than a minute.

The Rapid Start Kit:

- Lists the desired building blocks for DBaaS in the `cloud_boundary.xml` file
- Designs the various offerings through the `cloud_boundary.xml` file
- Runs one script to implement the entire DBaaS portfolio

A single run of the script is capable of creating multiple zones, pools, users, roles, quotas, and referencing DB profiles as well as various service templates for SSA users.

2.12.7.4 DBaaS: Provision StandBy Databases from SSA Portal

The DBaaS offering has been enhanced to enable the provisioning of multiple physical standby databases of heterogeneous nature and protection modes for each primary database request.

In compliance with the Oracle recommended maximum availability architecture (MAA), this feature helps customers protect their investment in the data source layer from any physical corruption, hardware failure, or natural disaster.

2.12.7.5 New REST Admin APIs for MWaaS

MWaaS comes with a set of new REST Admin APIs that enable you to create, update, and remove cloud resource model artifacts such as Quota, Load Balancer, and service templates. In addition, self service operations such as MWaaS instance lifecycle management, shared library management, and rescheduling of lifespan of existing MWaaS instances can be executed through REST APIs, and they can be used to integrate MWaaS with 3rd party cloud orchestration engines.

2.12.8 Cloud Management Plug-in 12.1.0.9 Features

2.12.8.1 PDB as a Service Custom Placement Option

Customers often want to place PDBs that host data of similar applications inside a single CDB. Doing this ensures a flavor of consolidation with intelligent resource utilization. PDB as a Service (PDBaaS) now provides this capability through a specific service template option.

In this mode, at request submission time SSA users can specify a particular PDB from the pool members to host the PDB being created.

2.12.8.2 Data Lifecycle Management

The SSA administrator can now manage the complete life cycle of the source data including:

- Capturing data on demand or on a specific schedule
- Refreshing the data and creating new revisions of the profile
- Specifying a purge policy

SSA users can choose to refresh the service instance when a new revision is available.

2.12.8.3 Ability to Add and Remove Physical Stand By Databases from the SSA Target Homepage

The topology of a complete database system architecture, for example a primary database instance along with multiple physical standby databases, is defined in the

service template by the SSA administrator. If the Enable Standby Locking option is selected, users can use this template to provision a primary database, then later when required they can submit a request to add or remove one or more standby databases to the existing service instance. In addition, while submitting a new provisioning request from the SSA portal users are offered the flexibility of choosing the standby databases to be created from the topology.

Alternatively, to enforce deployment standardization, if the option is locked then any provisioning using this service template will create and delete primary as well as all the standby databases defined at once.

2.12.8.4 Ability to Specify Various Database Sizes for Provisioning

By specifying and grouping database attributes, administrators can now create database size templates that users can select when they submit a database provisioning request. The database size (for example small, medium, large) is determined by a combination of the following four attributes:

- CPU
- Memory
- Storage
- Number of processes

This feature enables SSA provisioned databases to adhere to specific configuration standards as selected in the service template.

2.12.8.5 Live Clone

During provisioning this feature duplicates RMAN on a Pool. It is intended to be used for migrating existing databases under the Oracle PaaS umbrella. The service template in this case refers to a live database instance being monitored by Oracle Enterprise Manager rather than any data profile.

2.12.8.6 Service Template Changes

While creating a service template, the self service administrator can now specify values for target properties such as Contact, Location, Line of Business, and so on, lock these properties, and mark them as mandatory. While creating a database, the self service user must specify values for all of the mandatory properties.

2.12.9 Cloud Management Plug-in 12.1.0.10 Features

2.12.9.1 Dynamic Scaling of PaaS Zone Through Integration with the Sun Solaris SPARC Ops Center 12c Adapter

Enterprise Manager 12c is integrated with the Ops Center through the Sun Solaris SPARC adapter. An instance of this registered adapter is used by the associated PaaS Infrastructure zone to provision or delete VMs on demand. The communication with the Ops Center server is achieved through the use of a client kit.

This integration enables customers to provide layered services capability in a private cloud, for example DBaaS using a Solaris VM based IaaS. Any spike in compute demand can now be handled instantly by cloud administrators.

2.12.9.2 DBaaS PaaS Provider Pools Integration with Ops Center

Administrators can now increase the capacity of a DBaaS pool by clicking a single button. Doing this transparently provisions a virtual machine or cluster through the associated Ops Center adapter attached to the PaaS zone. It also deploys the requisite software components, for example Enterprise Manager Agent, Grid Infrastructure, Oracle Database and so on, through the gold image provisioning or by cloning from an existing reference member of the pool.

Compute resource scarcity at PaaS provider level results in the failure of self service provisioning requests. This integration helps SSA administrators to respond to such failures promptly.

2.12.9.3 Clone to Oracle Cloud

Administrators now have the ability to create a full clone of an Enterprise Manager 12c pluggable database amongst existing container databases within the on-premise IT infrastructure or to an Oracle Cloud. Administrators can also clone a service from on-premise to Oracle PaaS and vice-versa. The cloning is supported in two broad categories:

- Peer-peer clone: Clones directly from an on-premise target to Oracle Cloud.
- Clone through the Software Library: Administrators can archive a gold image into the Software Library in one step and then deploy it in a separate step.

2.12.10 Chargeback and Consolidation Planner Plug-in 12.1.0.1 Features

The new Consolidation Planner helps you determine optimal server consolidation scenarios by leveraging data collected by Cloud Control against business and technical constraints. Using this capability, enterprises can reduce their capital expenditures as well their labor costs by consolidating separate databases and application servers into a smaller consolidated set of systems.

Chargeback functions enable you to track the use of business-critical resources or metrics by consuming entities (for example, cost centers) and enable businesses to report back the usage charges to the consuming entities. IT departments can accurately share or report costs with business users or business units commensurate with the usage of the resources.

2.12.11 Chargeback and Consolidation Planner Plug-in 12.1.0.2 Features

This release supports the following enhancements:

- You can now unassign cost centers and charge plans from targets. Targets that are disengaged in this way can be removed from Chargeback reports.
- You can now share a Real Application Cluster (RAC) not only by instance, but also by service. Services within a RAC can be assigned to different cost centers, but must all be assigned to the same charge plan.
- A new EM CLI verb (EM CLI `get_metering_data`) enables you to extract metering and charge data to a CSV file. This enables integration of Chargeback functions with external applications, for example, a billing engine or an analytics program.
- A new EM CLI verb (`test_named_credential`) is available to test the validity of specified named credentials. This is useful in scripts that can first verify if credentials are correct before using the credentials in jobs or other features that require credentials. The configuration of Privilege Delegation settings for a host can now be done by an Enterprise Manager administrator with Full privileges on

the host. Administrators with at least View privileges on the host can view the host's privilege delegation settings.

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

2.12.12 Chargeback and Consolidation Planner Plug-in 12.1.0.4 Features

2.12.12.1 Chargeback Enhancements

The setup and management for Chargeback has been significantly improved with new pages for charge plan setup and target configuration. Extensibility for existing chargeback targets is also provided by allowing custom metrics, including metric extensions, to be registered as charge items. This is done by using the new EM CLI commands such as `EM CLI list_charge_item_candidates` and `EM CLI create_charge_item`. This feature increases the flexibility that Chargeback administrators have when creating charge plans, enabling them to supplement the out-of-the-box metrics with metrics matched to their own specific requirements. New published repository views provide access to metering and charge data. These views can be used for reporting or for the integration of Chargeback with other applications.

Support for Oracle Pluggable Databases is also provided with this release. This enables the Chargeback administrator to add a Container Database (CDB) to Chargeback and assign each Pluggable Database (PDB) individually to a cost center.

2.12.12.2 Consolidation Planner Support for Exalogic

Customers can now consolidate from physical servers to Exalogic environments. To evaluate different consolidation scenarios, customers are now able to choose from several preconfigured scenarios (Conservative, Medium, and Aggressive) or create their own custom scenarios. These preconfigured and custom scenarios support both real and phantom Exalogic targets. This enables customers to consolidate middleware and cloud workloads onto the platform ideal for those workloads. The SPECjbb benchmark metric has been added to SPECint to provide this support.

2.12.12.3 Improved Support for Middleware Consolidation

Consolidation Planner now supports SPECjbb benchmark metrics as a basis for evaluation when consolidating onto Exalogic or other middleware environments. Previously only SPECint was supported, which measures only CPU performance, whereas SPECjbb measures overall system performance. Users can now evaluate system resources required for consolidating middleware and Java-based workloads by using a system-based benchmark metric designed to measure such workloads.

2.12.12.4 Improved Support for Virtual Machine Consolidation

The option to treat memory as a nonsharable resource has been added because multiple virtual machines (VMs) cannot share each other's memory spaces. Additionally, you can now specify a reserved amount of memory on target hosts for the hypervisor's requirement, memory which will not be allocated to VMs. You can also scale memory up or down on the target servers and display the suggested allocation for each virtual machine on the target server. These enhancements support more accurate and improved consolidation assessments by evaluating more realistic memory allocation schemes.

2.12.13 Chargeback and Consolidation Planner Plug-in 12.1.0.5 Features

The Chargeback and Consolidation Planner plug-in includes metering and chargeback support for Enterprise Manager Schema-as-a-Service. Charge plans can be created using the Database Service target type, enabling the chargeback administrator to charge each self-service Schema-as-a-Service user based on the resources they consume such as CPU and storage. This helps to ensure that IT costs are transparently and fairly distributed among the Scheme-as-a-Service self-service users.

2.12.14 Chargeback and Consolidation Planner Plug-in 12.1.0.6 Features

2.12.14.1 Additional EM CLI Verbs

The following EM CLI verbs have been added:

- `add_chargeback_entity`
- `assign_charge_plan`
- `assign_cost_center`
- `create_charge_entity_type`
- `export_charge_plans`
- `export_custom_charge_items`
- `import_charge_pans`
- `import_custom_charge_items`
- `list_charge_plans`
- `list_chargeback_entities`
- `list_chargeback_entity_types`
- `list_cost_centers`
- `remove_chargeback_entity`
- `unassign_charge_plan`
- `unassign_cost_center`

2.12.14.2 Extensibility

This feature introduces a framework that enables integrators (plug-in developers) to register new chargeable entities (for example target types and service types) and corresponding charge items. This includes the `create_charge_entity_type` verb to register custom target types with Chargeback. This verb enables Chargeback on targets that are not supported out-of-the-box.

When registered, the Chargeback service in Enterprise Manager will be able to recognize these new entity types. Users will then be able to add instances of these entity types to Chargeback, assign charge plans, cost centers, and view the computed charges in reports.

This feature makes it possible for out-of-the-box Chargeback support to be offered for any Enterprise Manager target type.

The `add_chargeback_entity` verb can be used by end users to register custom target types with Chargeback. This verb enables Chargeback for entities that do not have out of the box support.

2.12.14.3 Support for Custom Target Types

This release provides a new EM CLI command that enables users to register custom target types with Chargeback. This feature enables Chargeback on targets that are not supported out-of-the-box.

2.12.15 Chargeback and Consolidation Planner Plug-in 12.1.0.7 Features

2.12.15.1 Host Consolidation Support for Oracle Cloud Shapes

Oracle Enterprise Manager now provides host consolidation support for Oracle Cloud shapes. When creating scenarios for physical server to physical server (P2P) consolidations that target new or phantom destinations, you can choose physical machines configured in the Oracle cloud by selecting the cloud computing configuration, or shape, to use as the destination. Oracle provides a wide range of shapes to help you select a combination of processing power and memory for your instances that best suits your business requirements.

2.12.16 Virtualization Management Plug-in 12.1.0.1 Features

Enterprise Manager Cloud Control provides comprehensive management for Oracle Virtual Machine (x86) servers and Guest VMs. This includes bare metal provisioning for hypervisor, provisioning of Guests, performance and availability monitoring of virtualized resources and configuration and compliance management.

Other capabilities include:

- Managing zones and server pools for Oracle Virtual Machine servers.
- Viewing and monitoring details of your virtual and physical infrastructure.
- Creating networks, storage servers, and storage repositories.
- Deploying virtual assemblies, Oracle Virtual Machine templates, and database service templates.
- Viewing application to disk topology for virtualized environments. For example, you can drill down from the E-Business Suite middle tier to Oracle Database to the Guest virtual machine to the Oracle Virtual Machine server to storage details, viewing each tier in detail.
- Power management support to schedule Oracle Virtual Machine servers to be powered off at certain times.
- Dynamic resource management to balance workloads within a server pool.

2.12.17 Virtualization Management Plug-in 12.1.0.2 Features

2.12.17.1 Patching the Oracle Virtual Machine Server

Oracle provides a publicly available YUM repository that includes repositories for Oracle Virtual Machine. These repositories include the full releases of Oracle Virtual Machine and mirror those releases on the Oracle Virtual Machine DVDs/ISOs. The Oracle Virtual Machine Server must be patched to ensure that the latest software updates and enhancements are applied. Patching the Oracle Virtual Machine Server involves the following:

- Configuring the YUM repository
- Upgrading the Virtual Server

You perform both of these tasks in Cloud Control. From the Enterprise menu select **Infrastructure Cloud**, then select **Home**. See *The Cloud Administration Guide* for detailed instructions.

2.12.17.2 Acknowledging Oracle Virtual Machine Events

All operations performed on a server, server pool, storage, or network generate Oracle Virtual Machine events. The event can be informational, minor, or critical. A target in an error state generates a critical event. Targets with a Critical status cannot be used to perform any operations. The cloud administrator can now acknowledge Oracle Virtual Machine events through a menu selection.

2.12.18 Virtualization Management Plug-in 12.1.0.3 Features

2.12.18.1 Support for Oracle Virtual Machine 3.1.1 Management

The virtualization management functionality in Oracle Enterprise Manager Cloud Control 12c is now enhanced to include features from the latest Oracle Virtual Machine 3.1.1 release. The key enhancements include:

- Automatic refresh of the (Oracle Cluster File System 2 (OCFS2) repository size
- Automatic resize of OCFS2 as part of a LUN (repository/server pool) resize
- Backup/restore of OCFS2 repositories
- Cold migration of VMs
- Multipath boot support for Oracle SAN (Storage Area Network)
- Support for hot vCPUs
- Ability to add and remove OCFS2 repository from a cluster

2.12.19 Virtualization Management Plug-in 12.1.0.4 Features

2.12.19.1 Support for Oracle Virtual Machine 3.2.2 Management

This update of the Virtualization Management Plug-in provides support for managing Oracle Virtual Machine 3.2.2 environments.

2.12.19.2 Virtual Server Roles

The I/O operations performed by virtual servers are resource intensive and can reduce application performance. To avoid this, you can now edit the virtual server and designate some servers to perform utility functions by assigning the following roles:

- Utility Role: Servers with this role are used for non-virtual machine operations such as clone, import template, create repository, and delete assembly.
- Virtual Machine Role: Servers with this role are required to run VMs and perform start and stop operations.

2.12.19.3 Virtual Server Pool Enhancements

2.12.19.3.1 Virtual Machine Start Policy While creating a virtual server pool, you can now specify the policy to be used to start the VMs. The Virtual Machine Start Policy can be:

- Start on Best Server: The best server in the server pool is used to start the Virtual Machine.
- Start on Current Server: The virtual machine will be started on the same server on which it was created.

2.12.19.3.2 Agent Password You can now change the password for the OVM Agent running on the master server. The modified password is applied to the OVM Agents running on all virtual servers in the server pool.

2.12.19.4 Managing Multiple Virtual Servers

You can now upgrade, start, and stop multiple servers by selecting them on the Virtual Server Pool Members page.

2.12.19.5 Storage Repository

You can now periodically refresh and update the file system size of all storage repositories.

2.12.19.6 Cluster Timeout Period

During virtual server pool creation, if you enable clustering of Oracle Virtual Machine servers in a virtual server pool, you can specify the cluster timeout period.

If Activate Cluster is enabled, you can set the cluster timeout period in seconds. The disk heartbeat and network heartbeat are derived from the cluster timeout value.

2.12.19.7 Virtual Machine Administration

You can specify one or more tags for the virtual machine. These tags are used to logically group the VMs and can be used to search for one or more VMs that meet a certain criteria.

2.12.19.8 Virtual Machine Tagging

Virtual machine tagging is now available. These tags are used to group the virtual machines logically and can be used to search for one or more virtual machines that meet a certain criteria. To apply virtual machine tagging, specify one or more comma separated tags.

2.12.20 Virtualization Management Plug-in 12.1.0.5 Features

2.12.20.1 Support for Oracle Virtual Machine 3.2.1 Integration

The following new features are available in Oracle Virtualization (VT) Plug-in 12.1.0.5:

- Ability to import guest virtual machines
- Support for non uniform NFS exports
- Multi-access host for iSCSI storage server – support iSCSI multi-path

- Storage repository events
- Ability to change the server pool for a storage repository
- NTP configuration for servers
- Bond port with more than two network interface controllers
- Maximum object cache size configuration

2.12.21 Virtual Infrastructure Plug-in 12.1.0.1

Note: This plug-in was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

The Virtual Infrastructure plug-in enables direct monitoring of Oracle VM environments without requiring the Oracle VM Manager to be deployed. If you need a complete Infrastructure as a Service (IaaS) cloud solution based on Oracle VM Manager, use the Oracle Enterprise Manager Plug-in for Oracle Virtualization.

2.12.22 Virtual Infrastructure Plug-in 12.1.0.2

2.12.22.1 Dynamic Resource Provisioning Support

Through integration with Oracle Enterprise Manager Ops Center, dynamic on-demand resource provisioning enables Oracle Cloud and self service administrators to dynamically increase or decrease resources in their private cloud setup based on usage requirements. Resources can either be infrastructure resources such as hosts (based on virtual machines) or platform resources such as middleware and database Oracle homes. Resources can be dynamically added when additional service instances need to be provisioned due to high usage or decreased if existing resources are not being used.

2.12.23 Cloud Framework Plug-in 12.1.0.1 Features

Note: This plug-in was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

This plug-in adds support for the new cloud framework. It provides common functions across cloud services such as middleware, database infrastructure, and IaaS.

Custom portal access gives you the ability to enable selected services for individual users. For example, you might grant one user access to the Database portal only and grant other users access to both Test and Middleware.

The Cloud Framework portal provides the following new EM CLI verbs:

- Use `cancel_cloud_service_requests` to cancel cloud service requests.
- Use `delete_cloud_service_instances` to delete cloud service instances.
- Use `delete_cloud_user_objects` to delete cloud user objects.

- Use `get_cloud_service_instances` to get information about cloud service instances.
- Use `get_cloud_service_requests` to get information about cloud requests.
- Use `get_cloud_user_objects` to get information about cloud user objects.

2.12.24 Cloud Framework Plug-in 12.1.0.2 Features

The Common Self Service Framework enables self service administrators to manage and monitor all cloud services from a single pane of glass. Managing the private cloud is now more intuitive and easy across the different service families such as MWaaS and DBaaS.

The SSA framework also acts as a gateway between Enterprise Manager and other public cloud management solutions (for example Oracle Cloud) to provide a seamless experience to cloud users.

2.13 Lifecycle Management

This section includes the following topics:

- [Target Monitoring and Discovery Enhancements](#)
- [Configuration Discovery and Collection Enhancements](#)
- [Configuration Management Enhancements](#)
- [Compliance Enhancements](#)
- [Database Provisioning Enhancements](#)
- [Patch Management Enhancements](#)
- [Database Upgrade Enhancements](#)
- [Database Change Management Enhancements](#)
- [Data Comparison](#)
- [Bare Metal Provisioning](#)
- [File Update \(Make-It-So\) Support for Enterprise Configuration Manager and Control Compliance Suite Configuration Data](#)
- [Enhanced Provisioning of Java EE Applications](#)
- [New Procedure Activity page](#)
- [Change Activity Planner](#)
- [Offline Patching - Uploading Patches to the Software Library Directly from Remote Patch Repositories](#)

2.13.1 Target Monitoring and Discovery Enhancements

2.13.1.1 Automatic Target Discovery

Cloud Control can now automatically discover potential targets on the hosts that it manages. Targets that are discovered in this way can then be promoted to managed target status. The feature also supports mass deployment of Management Agents to selected targets to facilitate target promotion. After a Management Agent is deployed

to a host, it searches the host for manageable targets and reports any potential targets to Enterprise Manager, which you can choose to promote as well.

2.13.1.2 Out-of-Box and User-Defined Systems Support

The out-of-box systems feature supports discovery of Oracle-provided systems as a single entity, including discovery of targets that make up the system as well as the relationships between them. The user-defined systems feature enables you to model and monitor your application system infrastructure in Enterprise Manager by creating systems targets. System target creation involves choosing the targets of the system and defining how system availability should be computed. Both features provide richer support for monitoring the infrastructure systems of managed custom applications.

2.13.2 Configuration Discovery and Collection Enhancements

2.13.2.1 Relationships Dependency Collection

Data collection includes not only configuration properties, but also target relationships and dependencies, which allows for Configuration Management Database (CMDB) type analysis such as root cause and impact.

2.13.2.2 Extensible Configuration Collection

With the integration of Application Configuration Console blueprint technology, you can extend the collection of out-of-box targets by adding files, command output, and SQL query results to the collection. The additional configuration data is available to all standard configuration management features, including comparisons, search, history, and so forth.

2.13.2.3 Inventory Reporting

Enterprise Manager's Inventory Reporting feature enables you to learn about your current and historic database deployments, operating systems, and so forth. You can manipulate the data using target properties such as lifecycle, location, cost center, and so forth, to obtain a targeted list of assets as well. The information can be exported to a spreadsheet such as Excel for additional manipulation or distributed through e-mail.

2.13.2.4 Configuration Topology View

The Topology Viewer enables you to see and traverse target relationships that are automatically detected as well as those added manually. The Topology Viewer enables you to perform impact and root cause analyses and provides access to a target's main menu to take action.

2.13.3 Configuration Management Enhancements

2.13.3.1 Comparison Templates

Comparison templates enable you to control the comparison by ignoring obvious differences and noise to find the "needle in the haystack." Oracle ships default comparison templates for most target types, including database and WebLogic Server, which you can customize to your needs.

2.13.3.2 System Comparisons

System comparisons enable you to compare an entire application stack comprised of any number of components, which enables you to manage drift among lifecycle environments such as Development, QA, Production, and so forth.

2.13.3.3 Graphical Configuration Search

This release provides a library of out-of-box searches. In addition, you can easily build custom search specifications using a new graphical interface that leverages the target collection model, enabling you to choose from the model instead of entering SQL statements.

2.13.3.4 Relationship History

Configuration history now includes changes to relationships as well as to configurations. You can also be notified on changes to specific configuration properties or relationships.

2.13.4 Compliance Enhancements

2.13.4.1 Compliance Framework

The compliance framework has been completely revamped. The four-layer hierarchy follows industry standard best practices, making it easier to use and reusable. Compliance scores are always current while maintaining historical trending information.

2.13.4.2 Out-of-Box Compliance Standards

Enterprise Manager ships with over 30 compliance standards consisting of over 1700 individual compliance validations covering the entire stack including host, Oracle Database, Fusion Middleware, Fusion Applications, and more.

2.13.4.3 Self-Updatable Compliance Standards

Oracle posts new and updated compliance standards as they are developed. You can download and deploy these posted standards without having to upgrade Enterprise Manager itself. This enables the support of new products as they are released as well as access to updates to existing standards.

2.13.4.4 Real-Time Change Detection

The Management Agent now supports real-time event detection on supported platforms. The detection records the exact time of the event as well as who performed the action. Real-time monitoring can be used to detect events involving files, processes, database objects, users, and directory objects. You can manually or automatically mark these events as authorized or unauthorized, which automatically affects the compliance standard score.

2.13.4.5 Integration of BEA Guardian

The former BEA Guardian WebLogic health checks have been integrated into Enterprise Manager. In addition, custom health checks can also be created. Consequently, administrators are better able to verify that their WebLogic environment is in compliance with these standards.

2.13.5 Database Provisioning Enhancements

Enterprise Manager Cloud Control can deploy an entire database environment including underlying Grid infrastructure in minutes. The environment can be cloned from Provisioning Profiles which are either Oracle certified bits provided through Enterprise Manager Self-Update or gold images derived from a reference environment. Cloning procedures have been enhanced to capture configuration properties as well as the software payload. This is particularly useful when migrating databases from development to test to production environments or the reverse. Enterprise Manager Cloud Control also enables power-administrators (Designers) to lock down certain inputs so that other administrators (Operators) can provision with minimal user-interaction.

For more information about database provisioning features, see [Section 2.7, "Database Management"](#).

2.13.6 Patch Management Enhancements

This section describes patch management enhancements.

2.13.6.1 Out-of-Place Patching

The out-of-place patching capability minimizes down time for database patching. This approach clones the existing Oracle home of the database and patches the cloned Oracle home instead of the original Oracle home. Similarly, after applying the patch, moving the database to the new location involves minimal down time.

2.13.6.2 Patch Templates

Patch templates enable phased rollout of a set of tested patches across an organization. A patch template contains a predetermined set of patches and deployment options saved from the source patch plan for which you can select a completely new set of targets. This approach reduces the time and effort required to create new patch plans and enables patch designers to expose only approved plans to patch operators.

2.13.6.3 Target Patching Enhancements

The following target patching enhancements are now supported:

- Patching of Oracle Fusion Application targets.
- Patching of Oracle Grid infrastructure targets, which are part of Oracle Exadata Database Machine, using both in-place and out-of-place patching modes. In addition, if you patch in out-of-place patching mode, you can now switch back to the old Oracle home.
- Application of one-off patches and critical patch updates across all managed servers within a WebLogic domain. In addition to validation checking and rollback support, the new feature enables you to apply patches in a rolling fashion to avoid downtime.

2.13.6.4 Scheduling Patch Preparation, Deployment, and Switchback

Note: This enhancement was new in Enterprise Manager Cloud Control Release 4 (12.1.0.4).

Using patch plans, you can now schedule the preparation, deployment, and switchback operations of Enterprise Manager's patching automation. This enhancement enables you to schedule these operations and the required resources to perform automatically outside of business hours. Doing this can minimize the impact of patching on business operations and maximize DBA resource use.

2.13.7 Database Upgrade Enhancements

Enterprise Manager now automates the upgrade of databases from 10.x, and 11.1.0.x to 11.2.0.x databases. With this feature, you can perform mass database upgrades with minimal downtime, less manual intervention, and faster upgrade.

2.13.8 Database Change Management Enhancements

2.13.8.1 Change Plans

A change plan is an Enterprise Manager object that contains a set of schema changes, which can be deployed to one or more targets at a time. A change plan can be generated from a schema comparison. The application developer can also generate a change plan in SQL Developer, while making changes to the schema as part of application changes. Change plans ensure consistent and repeatable deployment of changes, without depending on application developers to supply SQL scripts for their changes.

2.13.8.2 Data Comparison

You can now compare data and report on differences. This ensures consistency of application configuration data across lifecycle environments, which in turn ensures proper testing.

2.13.8.3 Synchronization of `init.ora` Parameters

You can now compare and synchronize some or all initialization parameters between two or more databases automatically.

2.13.9 Data Comparison

In most application lifecycle processes, enterprises maintain separate test, staging, and production systems. Over time, system changes may introduce differences in application data. To detect differences and to troubleshoot problems, administrators, application developers, and application managers can use data comparisons to easily detect and rectify application problems caused by missing or extraneous data, or by variances in data.

2.13.10 Bare Metal Provisioning

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

You can save the configuration parameters for the BMP workflow as a deployment plan and reuse the plan for subsequent deployments.

2.13.11 File Update (Make-It-So) Support for Enterprise Configuration Manager and Control Compliance Suite Configuration Data

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

Enterprise Manager 12c supports the collection of entire configuration files which are parsed and stored in the Management Repository. When targets containing configuration files are compared, you can choose to synchronize unwanted differences from source to destination. With the use of comparison templates, you can ignore known or desired differences to maintain uniqueness.

By comparing a target to its baseline, you can see changes from a past state. You can essentially rollback changes by synchronizing differences from the baseline to the current configuration.

2.13.12 Enhanced Provisioning of Java EE Applications

You can now create a component of subtype Java EE Application in the Enterprise Manager Software Library. A Java EE Application component includes all necessary files related to an application to be deployed or redeployed:

- A standard Java EE archive (.ear, .war., .jar, and so forth)
- Deployment plan
- Predeployment and postdeployment scripts
- Target execution script
- Assorted other files, as required

Use the new component in conjunction with the Deploy/Undeploy Java EE Application deployment procedure to deploy and redeploy applications. The new component subtype is a great time saver. Previously, you had to create multiple components of subtype Generic Component, where each represents a file required for application deployment; that is, a generic component for the archive, another for the deployment plan, another for a predeployment script, another for a postdeployment script, and so forth.

2.13.13 New Procedure Activity page

Note: This feature was new in Enterprise Manager Cloud Control Release 2 (12.1.0.2).

The new Procedure Activity page offers the following benefits:

- Optimal screen design which enables you to access all of the steps and targets from the same page without having to drill down
- Multiple selections are possible from a single page. For example, if you want to select only the failed steps you can do so using the new design.
- The target-centric design with the introduction of filters makes it easy to analyze all failed steps from the same page and perform the required action on the step.

- You can view or download detailed output for every step which captures the log information pertaining to the step selected, making it easy to view and debug the step in case of a failure.
- Incident Creation is a new feature that has been introduced at the procedure level. It enables you to create an incident for the execution which can later be used to debug the procedure in case of a failure.+

2.13.14 Change Activity Planner

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

Currently, customers resort to cumbersome methods to create, execute, track and monitor change activities within their data center. Some customers use traditional tools such as spreadsheets, project planners, slightly automated APEX applications, and inhouse custom solutions. Customers often have weekly sync up meetings across stake holders to collect status and updates. Some of the change activities, for example the quarterly patch set update (PSU) patch rollouts, are not single tasks but processes with multiple tasks. Some of those tasks are performed within Enterprise Manager Cloud Control (for example Patch) and some are performed outside of Enterprise Manager Cloud Control. In addition, these tasks run for a longer period of time and involve multiple people or teams.

Enterprise Manger Cloud Control supports core data center operations such as configuration management, compliance management, and automation. Enterprise Manager Cloud Control release 12.1.0.3 leverages these capabilities and introduces the Change Activity Planner (CAP). CAP provides the ability to plan, execute, and track change activities in real time. It covers the typical data center activities that are spread over a long period of time, across multiple people and multiple targets (even target types).

Examples of change activity processes in a data center:

- Patching large environments (including PSU and critical patch update (CPU) patching cycles)
- Upgrading large numbers of database environments
- Rolling out compliance rules
- Consolidating databases to Exadata environments

CAP provides user flows for compliance officers, managers (including lead administrators), and operators (DBAs and administrators).

Managers can create change activity plans for various projects, and allocate resources, targets, and groups affected. Upon activation of the plan, tasks are created and automatically assigned to individual administrators based on target ownership.

Administrators (DBAs) can identify their tasks and understand the context, schedules, and priorities. They can complete tasks using Enterprise Manager Cloud Control automation features such as patch plans (or in some cases outside Enterprise Manager). Upon completion, compliance is activated for validations and updates the status of the tasks and the plans.

From the manager's view, you can track and monitor the progress of the plan through pie charts and tabled views. You can print or export the plan and its task status to an

Excel file. Use that file for project tracking, meetings, and reporting to management and compliance officers.

2.13.15 Offline Patching - Uploading Patches to the Software Library Directly from Remote Patch Repositories

Note: This feature was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

Customers often maintain local repositories of patches, sometimes called software depots, where they host the patches downloaded from My Oracle Support. In the past, you had to move these patches to your desktop then upload them to the Enterprise Manager's software library through the Enterprise Manager Cloud Control user interface.

You can now use the following EM CLI command to upload multiple patches directly from a remote location within the data center:

```
$ emcli upload_patches -location <path_to_patch_directory> -from_host <host_name>
```

The upload process filters all of the new patches, automatically selects the relevant metadata files from the location, and uploads the patches to the software library.

2.14 Application Performance Management

This section includes the following topics:

- [Java Virtual Machine Monitoring and Diagnostics Enhancements](#)
- [JVM Diagnostic Integration With ADDM](#)
- [Simplified Middleware Diagnostics Deployment and Configuration](#)
- [Diagnostic Snapshot Support](#)

2.14.1 Java Virtual Machine Monitoring and Diagnostics Enhancements

The latest Java Virtual Machine (JVM) monitoring and diagnostic enhancements include a broad range of capabilities related to ease of use, greater flexibility, and deeper visibility. Most significant, all JVMs are now considered Enterprise Manager targets. This means that you have more granular control over your settings, access, and flexibility with respect to the new personalization features for including JVM metrics in other dashboards such as the new Composite Application dashboard. The new JVM home page allows you to quickly enable deep JVM monitoring and drill into heap analysis, live threads, and overall JVM health metrics related to CPU utilization, garbage collection, thread state, and heap consumption. Filters can be deployed with a simple click enabling the JVM to be analyzed by method, request, thread state, database, database state, SQL calls, and even ECID monitoring to isolate transactions. You can now navigate bi-directionally between live JVM threads and database sessions with the correlation between JVM thread analysis and database diagnostics, enabling administrators and developers to collaborate in diagnosing cross-tier issues.

2.14.2 JVM Diagnostic Integration With ADDM

This feature provides seamless, bidirectional navigation between the JVM Diagnostics and ADDM to enable you to maintain context when dealing with JVM issues that

correlate with database calls. By providing database administrators with true cross-tier navigation, they can now quickly resolve SQL issues that arise from Java applications by tracing issues directly from the JVM.

2.14.3 Simplified Middleware Diagnostics Deployment and Configuration

This release simplifies the process of enabling JVM Diagnostics and Application Dependency and Performance (ADP). In the past, these components were deployed through manual, time-consuming, error prone installation processes. Now, managers and agents for both JVM Diagnostics and Application Dependency and Performance can be deployed and configured from the Cloud Control console interface.

2.14.4 Diagnostic Snapshot Support

The new diagnostic snapshot feature captures both Oracle WebLogic Server and JVM data and packages it for later analysis. The feature displays a page of diagnostic snapshots that can be imported into and exported out of Enterprise Manager, enabling much more flexibility with respect to when and where you analyze the data. Should a similar situation arise, the diagnostic snapshot can be preserved to enable for later analysis and comparison. Also, diagnostic snapshots can be shared with Oracle Support to ensure that Oracle can better assist in critical issues where additional support is needed. If you combine this feature with the WebLogic Support Workbench that was introduced in the previous release, Enterprise Manager truly is integrated deeply into the My Oracle Support portal and Oracle Support in general to streamline support and the exchange of information necessary to resolve issues quickly.

2.15 Oracle Enterprise Manager Cloud Control Mobile

The Oracle Enterprise Manager Cloud Control 12c Mobile application enables you to track and manage incidents from your iPhone. You can view incident and problem details and acknowledge, assign, prioritize, escalate and annotate incidents. You can also seamlessly connect to My Oracle Support to drill down to service requests associated with a problem. The flexible setup screen enables you to connect to multiple Enterprise Manager 12c environments.

2.15.1 Manage and Monitor Targets and Incidents

With smartphones and tablets becoming ubiquitous, the Oracle Enterprise Manager Cloud Control Mobile App enables administrators to manage and monitor all targets. The app provides the ability to look at all open incidents, update with the latest status, and assign an incident to other Enterprise Manager administrators.

2.16 My Oracle Support Integration

This section includes the following topics:

- [View Service Requests](#)
- [View Patch Recommendations](#)
- [Provide Network Access to My Oracle Support](#)

2.16.1 View Service Requests

You can view details for current service requests filed with Oracle Support through Enterprise Manager Cloud Control. The My Oracle Support menu opens the Service

Request page where you can monitor, update, and create service requests and associate them with the configurations found in Enterprise Manager.

2.16.2 View Patch Recommendations

Patch recommendations identify missing recommended patches issued by Oracle. Oracle compares the patches installed in your configuration with what Oracle recommends, and identifies any missing patches. You can view current patch recommendations for your environment through the Patch Recommendations region available from the Enterprise menu in Cloud Control.

2.16.3 Provide Network Access to My Oracle Support

Note: This requirement was new in Enterprise Manager Cloud Control Release 3 (12.1.0.3).

Beginning with Enterprise Manager Cloud Control 12c Release 3 (12.1.0.3), My Oracle Support accesses `support.oracle.com` directly. This means that you must provide network access to this URL, or grant proxy access to it from any client that will access My Oracle Support.

2.17 Big Data Appliance Management

2.17.1 Big Data Appliance 12.1.0.3

The Big Data Appliance (BDA) plug-in has undergone some significant enhancements in this release. One of the exciting additions is the cluster dashboard page that provides a single overall view of the CPU, memory, disk and network usage as well as data node and name node activity. The new Cloudera Manager target actively monitors the status of various Cloudera Manager components. The existing Hadoop targets pages have been enriched with various performance metrics including performance details of the map and reduced tasks.

Enhanced usability and integration with Cloudera manager improves the overall manageability of the BDA.

2.18 Engineered Systems Health Checks

2.18.1 Engineered Systems Health Checks 12.1.0.4

The Oracle Engineered System Health Checks plug-in processes the XML output from the Exacheck tool, which is included as part of Oracle Enterprise Manager system monitoring. Exacheck performs the following operations:

- Collects metrics reports on Exacheck health-check results
- Raises alerts based on monitoring templates

The Exacheck tool enables system administrators to automate the assessment of Exadata and Exalogic systems for known configuration problems and best practices. A

health check results report, which is visible on the target's home page, lists all metrics along with the failed checks, whether the alert is raised or not.

Exacheck 2.2.2 supports Exadata, Exalogic, Exalytics, and Supercluster checks. Standalone RAC database checks are also integrated and the output of the check is available in Oracle Enterprise Manager.

2.19 Oracle Storage Management Framework

This section includes the following topics:

- [Oracle Storage Management Framework Plug-in 12.1.0.3 Features](#)
- [Oracle Storage Management Framework Plug-in 12.1.0.4 Features](#)
- [Oracle Storage Management Framework Plug-in 12.1.0.5 Features](#)

2.19.1 Oracle Storage Management Framework Plug-in 12.1.0.3 Features

Self service administrators can now resize the volumes used to create snap clone databases.

Having a database run out of space is a serious condition and can cause unrecoverable crashes. Similarly, over allocation of storage leads to unnecessary costs. With this feature, self service users are not limited to the initial storage allocation for their snap clone databases. Now, self service administrators can resize the volumes to either add or remove the storage allocated to snap clone databases based on the needs of the user.

2.19.2 Oracle Storage Management Framework Plug-in 12.1.0.4 Features

2.19.2.1 Support for Snap Clone on Oracle SuperClusters

The Oracle SuperCluster series comes with Oracle Sun ZFS ZS3 and SPARC servers. The Oracle Sun ZFS ZS3 storage appliances can be registered and databases can be provisioned on the SPARC servers over InfiniBand. By registering the dual head ZS3, you will receive high availability for the databases.

In addition, the storage proxy agents now support the Sparc platform. You can register the ZS3 storage appliance and the SPARC servers can act as storage proxy agents within the super cluster.

2.19.2.2 Support for the Solaris ZFS File System

Enterprise Manager Cloud Control now supports a storage agnostic solution of Snap Clone using the ZFS file system based on Oracle Solaris 11.1. You can configure an Oracle Solaris 11.1 system with a SAN storage of your choice, create zpools, then register the Solaris machine in Enterprise Manager Cloud Control.

2.19.3 Oracle Storage Management Framework Plug-in 12.1.0.5 Features

2.19.3.1 Support for Snap Clone on EMC Storage

Enterprise Manager Cloud Control now supports Snap Clone on the EMC Symmetrix VMAX family and EMC VNX storage appliances. Using an EMC Symmetrix VMAX

Family or EMC VNX storage enables you to create thin volumes and ASM disks out of the created thin volumes.

2.19.3.2 NetApp 8 Cluster Mode Hardware Support for Snap Clone

Enterprise Manager Cloud Control 12c now enables NetApp 8 hardware in cluster mode (c-mode) to support Snap Clone.

2.20 Audit Vault and Database Firewall

This section includes the following topics:

- [Audit Vault and Database Firewall Plug-in 12.1.0.1 Enhancements](#)
- [Audit Vault and Database Firewall Plug-in 12.1.0.3 Enhancements](#)

2.20.1 Audit Vault and Database Firewall Plug-in 12.1.0.1 Enhancements

Enterprise Manager Cloud Control now provides support for monitoring Oracle Audit Vault and Database Firewall deployments. Key features include:

- Monitoring of Audit Vault servers and Database firewall core functions, their host operating systems and Audit Event Repository databases
- Monitoring of the Audit Vault agent's status and core functions, including the state of audit trails and communication links with Audit Vault servers
- Support of high availability deployment of the Audit Vault and Database firewall

2.20.2 Audit Vault and Database Firewall Plug-in 12.1.0.3 Enhancements

This version of the Audit Vault and Database Firewall plug-in automates many of the complicated tasks required to add Audit Vault agents and sources.

Glossary

adaptive alert thresholds

Computed statistical alert thresholds using either static (user-defined) or dynamic (self-adjusting) baselines.

See also [metric baselines](#).

ADDM

See [Automatic Database Diagnostic Monitor \(ADDM\)](#).

administration group

A type of group used to fully automate the application of monitoring and other management settings targets upon joining the group. When a target is added to the group, Enterprise Manager applies a template collection defined for the group to consisting of monitoring templates, compliance standards, and cloud policies the target.

administrator account

Enterprise Manager administrator account that provides permission to perform daily administration work and access administrative information.

agent

See [Oracle Management Agent](#).

alert

An issue raised by Enterprise Manager when a problem occurs, such as when a metric threshold is exceeded.

attestation

Process of having users or system managers confirm people's access rights on a periodic basis.

Automatic Database Diagnostic Monitor (ADDM)

Application that automatically takes regularly scheduled snapshots of the database activity. ADDM identifies the most resource-intensive components or operations and provides advice, which may recommend running an advisor or making configuration changes to your database.

Automatic Storage Management (ASM)

Application that automates and simplifies the layout of data files, control files, and log files. Database files are automatically distributed across all available disks, and database storage is rebalanced whenever the storage configuration changes.

Automatic target discovery

Process by which targets are located and added to Enterprise Manager. Automatic discovery begins when the Oracle Management Agent starts up after installation. Targets located on the Agent are discovered and added to Enterprise Manager to be monitored and administered. How the targets are installed determines which targets are automatically added.

Automatic Workload Repository (AWR)

Automatic capture of statistics data for real-time and historical performance analysis. AWR includes snapshot data, active session history data, and workload reports.

availability

The percentage or amount of scheduled time that a computing system provides application service.

AWR

See [Automatic Workload Repository \(AWR\)](#).

Beacon

Application to monitor transactions from different user communities or geographical regions. You can enable the Beacon software to monitor the availability and performance of network components (a host computer or an IP traffic controller) from more than one location, or Web pages and Web applications from multiple network locations.

blackout

Maintenance tool for suspending any data collection activity on one or more monitored targets. This allows you to perform scheduled maintenance on targets while excluding these special-case situations from the data analysis to obtain a more accurate, long-term picture of a target's performance.

brownout

Suppresses the sending of event notifications for specific targets. The targets will continue to be monitored and events will be generated but no notifications will be sent during the brownout.

cluster cache coherency

For Oracle Real Application Clusters (RAC) environments, helps you identify processing trends and optimize performance. The Cluster Cache Coherency page enables you to view the global cache block access latency, global cache block transfer rate, and global cache block transfers and physical reads.

control

See [Oracle Enterprise Manager Fusion Middleware Control](#)

dashboard

Tool for proactively monitoring status and alerts as they occur by viewing the health of managed targets in real time. The dashboard presents information using intuitive

icons and graphics that let you spot recent changes and quickly identify and respond to problems.

database configuration

The configuration information Enterprise Manager collects for an Oracle database, which includes:

- General database and instance information, such as the database name, instance name, and whether or not the database is running in restricted mode or archive log mode
- Initialization parameter values
- System Global Area values
- Tablespaces and their parameters
- Datafiles and their parameters
- Control files and their attributes
- Redo logs and their attributes
- Rollback segments and their parameters
- High availability information
- License information
- Database options information

database instance

Running Oracle Database consisting of memory structures (SGA) and background processes. An instance only exists while it is up and running. Essentially, a database resides on disk, while an instance resides in memory.

A database is normally managed by only one instance. However, when using Oracle Real Application Clusters, multiple instances can be started for a single database (on different hosts of a cluster).

See also [Oracle Real Application Clusters \(RAC\)](#).

enterprise configuration

Configuration information stored in the Management Repository for the set of hosts and targets that comprise your enterprise.

event

A significant occurrence on a target that has been detected by Enterprise Manager. Events include metric alerts, compliance violations, job events and availability alerts.

discovery

The process of identifying unmanaged hosts and targets on those hosts within your environment that could be managed by Enterprise Manager. You can discover hosts and targets automatically or manually.

fast-start failover

Ability of Data Guard to rapidly and automatically fail over to a standby database without requiring manual intervention. This improves the degree of availability as well as the disaster resilience for the system infrastructure.

fetchlet

Parameterized data access mechanism that takes arguments for input and returns formatted data.

group

A set of targets managed and monitored as a single logical unit. A group can include targets of the same type, such as all of your production databases, or it can include all the targets on a host which is comprised of different target types. Groups enable you to enable you to collectively monitor and administer many targets.

home page

See [target home page](#).

host configuration

Configuration information that Enterprise Manager collects for a host that is a managed target, including:

- Hardware for the host (including memory, CPU, I/O device, and network interface information)
- Operating system for the host (including information such as operating system properties, packages, and installed patches)
- Installed Oracle software, including (but not limited to) installed products and their components, patch sets, and interim patches on the host. Enterprise Manager uses the Oracle Universal Installer inventory or inventories on a host to obtain information about the Oracle products installed on the host.

incident

A significant event or set of related significant events.

incident rule

Instructs Enterprise Manager to take specific actions when incidents, events, or problems occur, such as sending notifications.

incident rule set

A collection of rules that apply to a common set of objects such as targets (hosts, databases, groups) and take appropriate actions when events and incidents occur.

instance

See [database instance](#).

Java EE

Abbreviation for Java 2 Platform Enterprise Edition. Java EE is an environment for developing and deploying enterprise applications.

Management Agent

See [Oracle Management Agent](#).

Management Plug-in

See [Oracle Management Plug-in](#).

Management Repository

See [Oracle Management Repository](#).

Management Services

See [Oracle Management Service](#).

metric

Unit of measurement used to report the health of the system.

management target

An entity that is actively being monitored and managed by Cloud Control.

metric baselines

Named period of time associated with a target and used as a reference for evaluating target performance. Statistics are computed over the baseline period for specific target metrics. You can use these statistics to automatically set metric thresholds for alerting, as well as to normalize graphical displays of system performance.

See also [adaptive alert thresholds](#).

metric snapshot

The notification system sends email when specific incidents, events, or problems arise. All Enterprise Manager administrators can set up e-mail notifications for themselves.

notification

The notification system sends email when specific incidents, events, or problems arise. All Enterprise Manager administrators can set up e-mail notifications for themselves.

notification method

Mechanism for defining different mechanisms for sending notifications. These include e-mail, SNMP traps, or running custom scripts—or all three. Once defined, these methods can then be used with Notification Rules for sending notifications to administrators as a result of alert occurrences.

Oracle ecosystem

Organization of software, hardware, and their environment so that they function as a unit. Typically, this consists of an Oracle platform and all third-party software, including storage systems, hosts, routers, and so on. The Cloud Control Home page provides a unified view of your ecosystem.

Oracle Enterprise Manager

Oracle Enterprise Manager is the Oracle integrated management solution for managing your computing environment.

Oracle Enterprise Manager Fusion Middleware Control

Fusion Middleware Control relies on various underlying technologies to discover, monitor, and administer the Oracle Fusion Middleware environment. Fusion Middleware Control consists of the Fusion Middleware Control console and its underlying technologies:

- Oracle Dynamic Monitoring Service (DMS)
- Oracle Process Management Notification (OPMN)
- Distributed Configuration Management (DCM)
- A local version of the Oracle Management Agent specifically designed to gather monitoring data for Fusion Middleware Control.

Oracle Management Agent

A process deployed on each monitored host. The Oracle Management Agent is responsible for monitoring all targets on the host, for communicating that information to the middle-tier Management Service, and for managing and maintaining the host and its targets.

Oracle Management Plug-in

Target type provided by the user or a third party to extend Enterprise Manager's set of predefined target types.

Oracle Management Repository

Two tablespaces in an Oracle Database that contain information about administrators, targets, and applications that are managed within Enterprise Manager.

The Management Service uploads to the Management Repository the monitoring data it receives from the Management Agent. The Management Repository then organizes the data so it can be retrieved by the Management Service and displayed on Cloud Control.

Oracle Management Service

A J2EE Web application that renders the user interface for the Cloud Control console, works with all Management Agents in processing monitoring and job information, and uses the Management Repository as its data store.

monitoring template

A template used to standardize monitoring settings across your enterprise by enabling you to specify the monitoring settings once and apply them to your monitored targets.

My Oracle Support

Oracle Support Services site where customers can get information about released patches and outstanding bugs. You can use Enterprise Manager to download patches from *My Oracle Support*.

Oracle Streams

Propagation and management of data, transactions, and events in a data stream either within a database, or from one database to another. Controls what information is put into a stream, how the stream flows from database to database, what happens to messages in the stream, and how the stream terminates.

policy

Defines the desired behavior of systems and is associated with one or more targets or groups. Policies include different categories of policy rules, such as configuration, security, and storage rules. Enterprise Manager compares the targets for which policy rules exist with the policy rules for that target type, and identifies the policy violations for the target.

policy association

Relationship of a policy rule and its settings to a target or monitoring template.

policy compliance score

Number denoting the conformance of a target to a set of requirements (policy rules.) The score, ranging from 0% to 100%, is much like a test score. A score of 100% means that the target was fully compliant with the goals of the policy. The policy compliance

score facilitates your assessment of the relative levels of attention needed for various targets given the violations on those targets.

policy evaluation

Process of testing a policy's condition and recording any violations in the repository.

policy groups

Standards that report deviations and enable closed loop remediation by optionally taking action to bring systems back into compliance.

policy rule

A conditional expression that tests values from a target against a condition; for example, verifying that database profile limits are set as expected.

policy rule library

Collection of policy rules.

policy settings

Conditions related to a policy. The policy settings include, but are not limited to, parameter values and excluded objects.

policy trend

The policy compliance trend of a policy in the domain of a particular target.

policy violation

Infringement of a policy rule. For example, one of the host security policy rules checks for open ports. The recommendation is that the insecure ports not be opened. Therefore, the violation is that there are open ports.

privileges

A right to perform management actions within Enterprise Manager, such as view any target and add any target in the enterprise, or a right to perform operations on a target such as maintaining and cloning the target. Types of privileges are defined by Oracle.

promotion

The process of converting unmanaged hosts and targets that have been discovered in your environment to managed targets that are actively being monitored and managed by Cloud Control.

Oracle Real Application Clusters (RAC)

Option that allows multiple concurrent instances to share a single physical database. It provides a high-availability database environment spanning multiple hosts. Each cluster can be comprised of multiple cluster databases, each of which consists of multiple cluster database instances.

redundancy group

Group that contains members of the same type that function collectively as a unit.

repository

See [Oracle Management Repository](#).

roles

Collection of predefined Enterprise Manager target or system privileges created by super administrators to facilitate granting multiple privileges or roles to users. Roles limit target access and access to specific management features.

Secure Socket Layer (SSL)

Software to secure the communications between the Management Service and the Management Agent. Encrypted communications between the Management Agent and Management Service over HTTPS ensures the privacy of data sent from one computer to another.

service

Entity that provides a useful function to its users, such as CRM applications, online banking, and email services. Some simpler forms of services are business functions that are supported by protocols such as DNS, LDAP, POP, or SMTP.

standby database

Read-only database on the standby node. The standby database, also referred to as the replicated database, is physically identical to the master database. In the event of catastrophic failures, data modification activities “fail over” to the standby database so that it becomes the new master database.

Super Administrator

Enterprise Manager administrator that can create, modify, and delete any Enterprise Manager administrator, create any role in the system, perform any action on any target in the system, and see all areas of the management system.

SYSMAN

By default during the installation of Oracle Enterprise Manager, one Super Administrator account is created with the user name of SYSMAN. The SYSMAN account should be used to perform infrequent system-wide, global configuration tasks such as setting up the environment. Other administrator accounts can be created for daily administration work. The SYSMAN account is:

- Owner of the Management Repository schema
- Default Enterprise Manager Super Administrator
- User name used to log in to Enterprise Manager the first time

system

Logical grouping of targets that collectively hosts one or more services. It is a set of infrastructure targets (hosts, databases, application servers, and so on) that function together to host one or more applications or services.

system privilege

Allows a user to perform system-wide operations. For example, the VIEW ANY TARGET system privilege allows the administrator to view any target on the system, including Oracle Management Agents and Oracle Management Services.

target

A single component that you can monitor or configure with Enterprise Manager. Examples of a target include:

- Single Oracle database

- Group of databases that provide your worldwide customers with product information
- Oracle Application Server or an instance of Oracle HTTP Server
- Web application that your customers visit to investigate or buy your products
- Linux host computer, including its memory, disks, and CPU
- Server load balancer switch that controls the Internet traffic for a set of Web servers

Enterprise Manager can manage all these targets. A complete list of the target types you can manage is included in *Oracle Enterprise Manager Grid Control Installation and Basic Configuration*.

target compliance score

Average of the individual policy compliance scores for policies that have been associated with a target. Also, a target's security compliance score is the average of the compliance scores for security policies associated with that target.

You can use a compliance score to assess a target's overall compliance, and a group can use a score to determine the most troubled targets with respect to policy violations.

target home page

Page that contains general information about the selected target. From a target home page, you can drill down for more detailed performance information.

target privilege

Privilege that allows an administrator to perform operations on a target. For example, the View Target privilege allows an administrator to view properties, inventory, and monitor information about a target.

threshold

Boundary values against which monitored metric values are compared. The comparison determines whether an alert should be generated.

topology

Graphically shows the relationships between components, nodes, or objects within different Oracle applications.

wait classes

Grouping of wait events. Whenever an Oracle process waits for something, it records the wait using one of a set of predefined wait events. These wait events are grouped in wait classes, which show how much of the database is waiting for CPU time. The wait classes appear in the Database Performance page.

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