Oracle® Enterprise Manager
Cloud Control Introduction

13c Release 4

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Oracle Enterprise Manager Cloud Control Introduction, 13c Release 4

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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.

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.

Related Resources

For detailed information on Oracle Enterprise Manager architecture and focus areas, see the documentation available in Oracle Help Center:

`https://docs.oracle.com/en/enterprise-manager/index.html`

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.
italic	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.

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Overview of Oracle Enterprise Manager Cloud Control 13c

This chapter provides an overview of Enterprise Manager Cloud Control 13c 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 13c
- Enterprise Manager Cloud Control Architecture
- Enterprise Manager Management Focus Areas

About Enterprise Manager Cloud Control 13c

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 Console
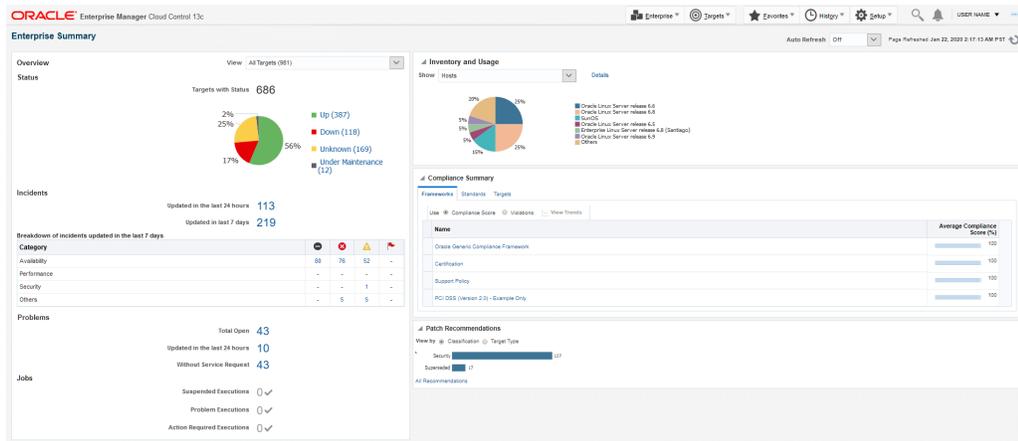
For more information, see Enterprise Manager Cloud Control.

Enterprise Manager Cloud Control Architecture

This section introduces you to the architecture of Enterprise Manager Cloud Control and describes the core components of the product. It includes the following sections:

- Architecture of Enterprise Manager Cloud Control
- About Oracle Management Agent
- About Oracle Management Service (OMS)
- About Oracle Management Repository
- About Plug-ins
- About Oracle JVMD Engine
- About Oracle BI Publisher
- About Enterprise Manager Cloud Control Console
- About EMCTL
- About EM CLI

Architecture of Enterprise Manager Cloud Control

Enterprise Manager Cloud Control includes the following components:

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

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

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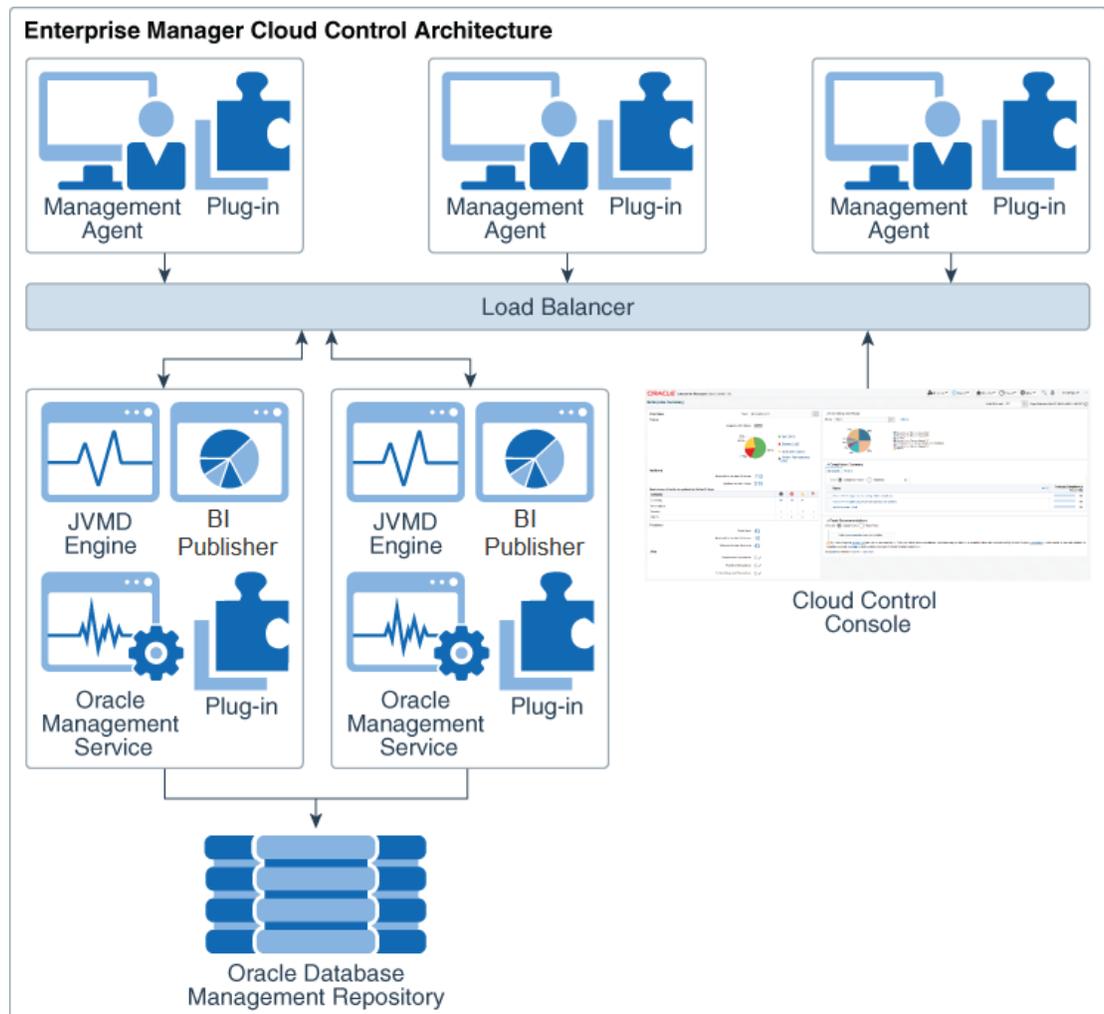
> **Note:**
>
> In Figure 1-2, the load balancer and the multiple Oracle Management Service (OMS) instances are depicted only to indicate how a sample Enterprise Manager Cloud Control architecture would look in a large organization. They are not a prerequisite or a requirement for an Enterprise Manager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

About Oracle Management Agent

The Management Agent is an integral software component that enables you to convert an unmanaged host to a managed host in the Enterprise Manager system. The Management Agent works in conjunction with the plug-ins to monitor the targets running on that managed host.

With the first Oracle Management Service (OMS) you install, by default you receive a Management Agent called the *Central Agent.* The *Central Agent* is used for monitoring only the first OMS host, the first OMS, and the other targets running on the first OMS host. To monitor other hosts and the targets running on those hosts, you must install a separate *Standalone Management Agent* on each of those hosts.

About Oracle Management Service (OMS)

Oracle Management Service (OMS) is a Web-based application that orchestrates with the Management Agents and the plug-ins to discover targets, monitor and manage them, and store the collected information in a repository for future reference and analysis. The OMS also renders the user interface for Enterprise Manager Cloud Control.

The OMS is deployed to the middleware home, which is the parent directory that contains Oracle WebLogic Server, OMS, plug-ins, Java Development Kit (JDK), Oracle WT directory, Oracle Common, and other relevant configuration files and directories. While installing the OMS, the Enterprise Manager Cloud Control Installation Wizard automatically installs Oracle WebLogic Server and JDK, and therefore, a WebLogic Server admin console is available by default.

About Oracle Management Repository

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

The OMS 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 OMS and displayed in the Enterprise Manager Cloud Control console. Since 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.

About Plug-ins

Plug-ins are pluggable entities that offer special management capabilities customized to suit specific target types. Unlike the earlier releases of Enterprise Manager, in Enterprise Manager Cloud Control, the plug-ins work in conjunction with the OMS and the Management Agent to monitor every target in your environment. Therefore, they are deployed to the OMS as well as the Management Agent. In the earlier releases, plug-ins enabled you to monitor only third-party targets, but in Enterprise Manager Cloud Control, plug-ins enable you to monitor all types of targets in your environment.

Plug-ins have independent release cycles, so every time you have a new version of an Oracle product released, you will have a new version of the plug-in released to support monitoring of that new product version in Enterprise Manager Cloud Control. An independent release cycle simplifies things because you no longer have to wait to upgrade your Enterprise Manager system to support a new product version; instead you can upgrade your plug-ins to monitor the new product version.

Table 1-1 lists the default plug-ins that are installed with a new Enterprise Manager system. In addition to these 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   Default Plug-ins Installed with Enterprise Manager Cloud Control

Name	Description
Oracle Database	Enables you to discover, 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.
Oracle Fusion Middleware	Enables you to discover, monitor, and manage Oracle Fusion Middleware products such as Oracle WebLogic Domain, Oracle WebLogic AdminServer, Oracle WebLogic Server, Oracle SOA Suite, Oracle Web Tier, and so on.
Oracle Exadata	Enables you to discover, monitor, and manage Oracle Exadata targets.
Oracle Cloud Framework	Enables you to access basic features that are common across cloud services such as Middleware as a Service (MWaaS), Database as a Service (DBaaS), Infrastructure as a Service (IaaS), and Testing as a Service (TaaS).
Systems Infrastructure	Enables you to discover, monitor, and manage Oracle hardware systems and Super Cluster engineered systems, including server hardware, chassis, racks, power distribution unit, network equipment, operating systems, virtualization software, and clustering software.

For a complete list of the plug-ins available with Oracle Enterprise Manager, see Plugins Included In This Release in *Enterprise Manager Cloud Control Release Notes*.

About Oracle JVMD Engine

Java Virtual Machine Diagnostics (JVMD) Engine enables you to diagnose performance problems in Java applications in the production environment. By eliminating the need to reproduce problems, it reduces the time required to resolve these problems, thus improving application availability and performance.

Starting with Oracle Enterprise Manager 13c , as part of the Oracle Fusion Middleware Plug-in deployment, one JVMD Engine is installed and configured by default on the OMS. For every additional OMS you deploy, you receive one JVMD Engine by default with that OMS.

While JVMD Engine is installed by default on the OMS host, you will still need JVMD Agents to be manually deployed on the targeted JVMs.

About Oracle BI Publisher

Oracle Business Intelligence (BI) Publisher is Oracle's primary reporting tool for authoring, managing, and delivering all your highly formatted documents. Oracle BI Publisher makes your data stand out with pixel-perfect reports and dashboards, offers a variety of report and dashboard layouts, and enables you to create all types of highly formatted documents.

Starting with Oracle Enterprise Manager 13c, Oracle BI Publisher is installed and configured by default on the OMS. For every additional OMS you deploy, you receive one Oracle BI Publisher by default with that OMS.

About Enterprise Manager Cloud Control Console

The Enterprise Manager Cloud Control console is the user interface you see after you install Enterprise Manager Cloud Control. See Figure 1-1. 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.

About EMCTL

EMCTL is a command-line tool that enables you to execute certain tasks on the 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.

About EM CLI

The Enterprise Manager Command Line Interface (EM CLI) is a command-line tool that 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.

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
- Hybrid Cloud Management
- Lifecycle Management
- Application Performance Management
- Application Quality Management

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.

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.

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.

Database Management

Oracle Enterprise Manager Cloud Control is the premier tool for managing your Oracle Database environment.

Database management involves the monitoring, administration, and maintenance of the databases and database groups in your enterprise and with Enterprise Manager you receive:

- A complete set of integrated features for managing Oracle Database, which enables you to:
  - Perform day-to-day tasks and run repetitive jobs
  - Detect problems and use the available guided resolution workflows
- Unparalleled scalability that lets you manage a single database or thousands of instances.
- An intuitive management product that leads the industry in ease of deployment and use.

You can perform Database Management tasks on the Database Home page in the Oracle Enterprise Manager Cloud Control UI or Oracle Enterprise Manager Database Express, which is a web-based database management tool that is built inside the Oracle Database.

Oracle Enterprise Manager Cloud Control 13c supports the management of Oracle Database Standard Edition One, Oracle Database Standard Edition, and Oracle Database Enterprise

Edition. However, you must have the Oracle Database Enterprise Edition to use the entire breadth of database management features that Oracle Enterprise Manager Cloud Control provides with the following management packs:

- Oracle Diagnostics Pack
- Oracle Tuning Pack
- Oracle Database Lifecycle Management Pack
- Oracle Data Masking and Subsetting Pack
- Oracle Real Application Testing
- Legacy: Configuration Management Pack for Oracle Database
- Legacy: Change Management Pack for Oracle Database
- Legacy: Provisioning and Patch Automation Pack for Oracle Database

For information on generic Oracle Enterprise Management Cloud Control and Oracle Database concepts, see:

- Introduction to Oracle Enterprise Manager Database Express in *Oracle Database 2 Day DBA*
- Enterprise Database Management in the *Enterprise Manager Cloud Control Licensing Information User Manual*
- *Oracle Database Concepts*

The following sections provide information on some of the Database Management capabilities provided by Oracle Enterprise Manager Cloud Control with links to more information:

- Database Administration
- Database Maintenance
- Database Performance Management
- Database Security Management
- Database Lifecycle Management

Database Administration

Using Oracle Enterprise Manager Cloud Control you can keep your Oracle Databases available and running efficiently.

You can use the available administration tools to manage database objects and initiate database operations inside an Oracle Database.

The following list provides some of the database administration tasks you can perform:

- Allocate system storage and plan future storage requirements.
- Use the Oracle Scheduler to control when and where various tasks occur in the database environment.
- Migrate your database storage to use Oracle Automatic Storage Management.
- Use the Database Resource Manager to control the distribution of resources among various sessions by controlling the execution schedule inside the database.

- Create and manage primary database objects such as tables, views, and indexes.

- Perform administration tasks for Oracle XML DB, such as viewing or editing parameters for the Oracle XML DB configuration file.

- Create, manage, and perform specific actions against materialized views, which are schema objects that can be used to summarize, compute, replicate, and distribute data.

For detailed information, see:

- Managing Database Storage Structures in *Oracle Database 2 Day DBA*

- Administering Oracle ASM with Oracle Enterprise Manager in the *Oracle Automatic Storage Management Administrator's Guide*

- Managing Resources with Oracle Database Resource Manager in the *Oracle Database Administrator's Guide*

- Oracle Scheduler Concepts in the *Oracle Database Administrator's Guide*

- Administration of Oracle XML DB in the *Oracle XML DB Developer's Guide*

Database Maintenance

Oracle Enterprise Manager Cloud Control provides functions to maintain Oracle Databases.

The following list provides some of the database maintenance tasks you can perform:

- Use backup and recovery features such as:

  - Physical backup and recovery that is built on Oracle's Recovery Manager (RMAN) command-line client.

  - Complete or point-in-time media recovery.

  - Flashback recovery, which provides a range of physical and logical data recovery tools as efficient, easy-to-use alternatives to physical and logical backups.

- Configure Oracle Data Guard and use its comprehensive capabilities to manage and monitor primary and standby databases.

- Use the Transport Tablespaces wizard to copy a set of tablespaces from one Oracle Database to another.

- Monitor Oracle Real Application Clusters.

- Use the Database High Availability (HA) console to monitor database HA.

- Use the Database Maximum Availability Architecture (MAA) Advisor page to view recommended Oracle solutions for outage types such as computer failures, storage failures, and human errors.

For detailed information, see:

- Introduction to Backup and Recovery in the *Oracle Database Backup and Recovery User's Guide*

- Using Oracle Enterprise Manager Cloud Control in *Oracle Data Guard Concepts and Administration*

- Oracle Data Guard Broker User Interfaces in *Oracle Data Guard Broker*

- Transporting Tablespaces Between Databases in the *Oracle Database Administrator's Guide*

- Monitoring Oracle Clusterware with Oracle Enterprise Manager in the *Autonomous Health Framework User's Guide*
- Best Practices Blueprints for High Availability

Database Performance Management

Oracle Enterprise Manager Cloud Control offers a comprehensive database performance management solution, which includes real-time and automatic performance diagnostics and monitoring capabilities.

This solution comes as a part of the Oracle Diagnostics and Oracle Tuning packs, which enable you to identify the problem areas in your database environment and use the tuning capabilities to tune your database's performance.

The following list provides some of the performance management tasks you can perform:

- Monitor database health and performance, analyze the workloads running against the database, and identify issues.
- Use the Performance Hub to view the Active Session History (ASH) analytics, monitored SQL statement data for a specified time period.
- Detect and diagnose performance issues automatically using Automatic Database Diagnostic Monitor (ADDM).
- Use Automatic Workload Repository (AWR) and automate database statistics gathering by collecting, processing, and maintaining performance statistics for database problem detection and self-tuning purposes.
- Use the following tuning advisors to examine a SQL statement or set of statements and determine how to address issues and optimize database performance:
  - SQL Tuning Advisor
  - SQL Access Advisor
- Use the following Real Application Testing components to perform real-world testing of your Oracle Database:
  - SQL Performance Analyzer
  - Database Replay

For detailed information, see:

- Monitoring and Tuning the Database in *Oracle Database 2 Day DBA*
- *Oracle Database 2 Day + Performance Tuning Guide*
- *Oracle Database SQL Tuning Guide*
- *Oracle Database Testing Guide*
- Oracle Diagnostics Pack in the *Enterprise Manager Cloud Control Licensing Information User Manual*
- Oracle Tuning Pack in the *Enterprise Manager Cloud Control Licensing Information User Manual*

Database Security Management

Oracle Enterprise Manager Cloud Control provides security features to protect data and control how a database is accessed and used.

The following list provides some of the database security tasks you can perform:

- Restrict user access to data using flexible database access control and fine-grained privilege control.

- Manage database users and authorizations in one location using the Enterprise user security feature.

- Use Transparent Data Encryption (TDE) to automatically encrypt data when it is written to the database and automatically decrypt data when accessed.

- Use Oracle Label Security (OLS) to classify data and control access using security labels.

- Use Virtual Private Database (VPD) to enforce data access at the row and column level, using security conditions to protect the data.

- Use Oracle Database Vault for strong security controls to prevent unauthorized access to sensitive information by privileged users and protect against unintended changes to the database.

- Use data redaction to protect data by presenting a masked version of the data to non-privileged users. The masked version of the data pre-serves the format and referential integrity of the data, so any application that uses the data continues to work as expected.

- Use data masking to replace sensitive data with fictitious yet realistic looking data, and subsetting to downsize either by discarding or extracting data, thereby reduce storage costs.

For detailed information, see:

- Security Best Practices for Database Management in Enterprise Manager in the *Enterprise Manager Cloud Control Security Guide*

- Database Security in the *Database Lifecycle Management Administrator's Guide*

- Introduction to Oracle Advanced Security in the *Oracle Database Advanced Security Guide*

- Managing Security for a Multitenant Environment in Enterprise Manager in the *Oracle Database Security Guide*

- Administering Enterprise User Security in the *Oracle Database Enterprise User Security Administrator's Guide*

- Introduction to Oracle Data Masking and Subsetting in the *Oracle Database Data Masking and Subsetting Guide*

- Oracle Data Masking and Subsetting Pack in the *Enterprise Manager Cloud Control Licensing Information User Manual*

Database Lifecycle Management

Oracle Enterprise Manager Cloud Control provides a full database lifecycle management solution with its Database Lifecycle Management Pack.

This solution provides complete lifecycle management for Oracle Databases deployed on an on-premises, cloud, or hybrid environment, and includes:

- Automated discovery of assets

- Fleet maintenance for patching and upgrades

- Database configuration and compliance management

- Schema change management

- Hybrid cloud management

For detailed information, see:

- *Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*

- Database Lifecycle Management Pack for Oracle Database in the *Enterprise Manager Cloud Control Licensing Information User Manual*

- Enterprise Manager Database Lifecycle Management Pack

Middleware Management

Oracle Enterprise Manager Cloud Control 13c 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

- Non-Oracle Middleware (for example, JBoss Application Server and IBM WebSphere Application Server)

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.

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 13c 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 13c Extensibility Exchange page:

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

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.

For information on:

- Cloud Management packs offered by Oracle Enterprise Manager Cloud Control, see Cloud Management in *Enterprise Manager Cloud Control Licensing Information User Manual*.

- Enterprise Manager Snap Clone solution, see Enterprise Manager Snap Clone.

Hybrid Cloud Management

With Hybrid Cloud Management, Enterprise Manager Cloud Control provides you with a "single pane of glass" for monitoring and managing on-premise as well as Oracle Cloud deployments, all from the same management console. By deploying Hybrid Cloud 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. The communication between Management Agents and your on-premise Oracle Management Service instances is secure from external interference. In addition to a hardened architecture of its own, Enterprise Manager supports the use of additional external HTTP proxies that support tunneling, which can be configured to connect to the Oracle Cloud.

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.

Application Performance Management

Enterprise Manager 13c 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.

- 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.

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: Real Application Testing enables realistic, production-scale testing of the database infrastructure. It uses real, production workloads to generate load against databases under test and does not require any script development or maintenance. With Real Application Testing you can reduce your testing time by more than 80%. It provides the most efficient, optimized and highest quality testing for validating 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.

2

New Features In Oracle Enterprise Manager Cloud Control 13c Release 4

This chapter provides an overview of the new features available in Oracle Enterprise Manager Cloud Control 13c Release 4 (13.4) and the subsequent release updates.

The new features are categorized by release update and focus area.

- New Features by Release Update
- New Features by Focus Area

New Features by Release Update

This section lists new features categorized by release update.

Only information on major enhancements in each Release Update is available in the following sections. For information on all the enhancements available in a Release Update, see the corresponding README file.

- New Features in Oracle Enterprise Manager 13.4 Release Update 11
- New Features in Oracle Enterprise Manager 13.4 Release Update 10
- New Features in Oracle Enterprise Manager 13.4 Release Update 9
- New Features in Oracle Enterprise Manager 13.4 Release Update 8
- New Features in Oracle Enterprise Manager 13.4 Release Update 7
- New Features in Oracle Enterprise Manager 13.4 Release Update 6
- New Features in Oracle Enterprise Manager 13.4 Release Update 5
- New Features in Oracle Enterprise Manager 13.4 Release Update 4
- New Features in Oracle Enterprise Manager 13.4 Release Update 3
- New Features in Oracle Enterprise Manager 13.4 Release Update 2
- New Features in Oracle Enterprise Manager 13.4 Release Update 1
- New Features in Oracle Enterprise Manager 13.4

New Features in Oracle Enterprise Manager 13.4 Release Update 11

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 11 (13.4.0.11).

- CIS Benchmark v1.0.0 – Traditional and Unified Audit Profiles for Oracle Database 19c

New Features in Oracle Enterprise Manager 13.4 Release Update 10

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 10 (13.4.0.10).

- SQL Details and Session Details in JET UI
- Required Privileges Displayed in the Add Source Database to AWR Warehouse Flow
- New EM CLI Verb: cleanup_config_extension

New Features in Oracle Enterprise Manager 13.4 Release Update 9

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- RAC Instance Status Displayed on the PDB Home Page
- Compliance Dashboard Violations Report for Multiple Targets
- SCAP Compliance Standards
- Fleet Maintenance Single Instance Patching for Windows Deployments
- Configure Databases to Send Backups to ZDLRA Using EMCLI
- RESTful API based Monitoring for Exadata Database Machine Compute Node Server ILOM Targets
- Conversion of Exadata Database Machine 12c Type Targets to 13c Using EMCLI
- Additional Operations for Managing Kubernetes Clusters

New Features in Oracle Enterprise Manager 13.4 Release Update 8

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 8 (13.4.0.8).

- Diagnose Job System Issues
- Database Compliance Standard Enhancement
- KPI Metrics for Systems Infrastructure Oracle InfiniBand Switch
- KPI Metrics for Systems Infrastructure Cisco Switch
- Discovery of a Systems Infrastructure Server ILOM Using REST Through the User Interface

New Features in Oracle Enterprise Manager 13.4 Release Update 7

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

- Enhancement to the Automatic Indexing Activity Report for Autonomous Databases
- Database Migration Workbench
- Compliance Dashboard Violations Report

- **Enhancement to the Automatic Indexing Activity Report for Database Nodes of Oracle Exadata Database Machine**
- **Predefined Monitoring Template for ZDLRA Targets**
- **Read-only Access to ZDLRA Administration Console for an EM User**
- **Out-of-the-Box Dashboards for WebLogic Server in the Oracle Enterprise Manager App for Grafana v2.0.0**

New Features in Oracle Enterprise Manager 13.4 Release Update 6

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 6 (13.4.0.6).

- **Compliance Dashboard Filter Enhancements**
- **CIS Benchmark v3.0.0 – Traditional and Unified Audit Profiles for Oracle Database 12c Single Instance, Pluggable Database and Clusters**
- **Kubernetes Lifecycle Support on Private Cloud Appliance**
- **Automatic Indexing for Database Nodes of Oracle Exadata Database Machine**
- **ZDLRA Support for New Parameters on Copy-to-Media Jobs**
- **Database Migration Planner: Support for Exadata Cloud and Bare Metal DB System Destinations**

New Features in Oracle Enterprise Manager 13.4 Release Update 5

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- **Oracle Enterprise Manager Federation**
- **Configure Oracle ASM Filter Driver**
- **Cleanup Container Databases**
- **Drift and Comparison Management Dashboard**
- **Compliance Dashboard**
- **Mobile Terminal**
- **Monitor Target Compliance**

New Features in Oracle Enterprise Manager 13.4 Release Update 4

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Ability to Set Preferred Credential Type for Corrective Actions**
- **Oracle Enterprise Manager Support for Autonomous Data Warehouse – Dedicated and Autonomous Databases – Shared**
- **Oracle Enterprise Manager Support for Autonomous Databases – Dedicated on Oracle Exadata Cloud at Customer**
- **Oracle Enterprise Manager Support for Transparent Data Encryption Enabled Oracle Databases**

- Database Fleet Maintenance – Emergency Patching
- Unified On-premises and Cloud Provisioning
- CIS v2.1.0 – Traditional and Unified Auditing Profiles for Oracle Pluggable Database 12c
- ZDLRA Protected Database Enhancements
- Oracle Exadata KPI Metrics
- Discover Oracle Exadata Database Machine Using EMCLI
- manage_ra: Add Protected Database Operation for Recovery Appliance is Supported
- Unified Self Service Portal for On-premises and OCI Databases

New Features in Oracle Enterprise Manager 13.4 Release Update 3

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 3 (13.4.0.3).

- SQL Performance Analyzer for Migration from On-premises Database to Autonomous Database
- Ability to Re-run Compliance Evaluations
- CIS v2.1.0 – Auditing Profiles for Oracle Database 12c
- Security Technical Implementation Guides for Oracle Database
- Oracle Enterprise Manager App for Grafana

New Features in Oracle Enterprise Manager 13.4 Release Update 2

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 2 (13.4.0.2).

- AWR Support for Pluggable Databases
- Migrating Fleet Maintenance Gold Image Between Separate Oracle Enterprise Manager Installations

New Features in Oracle Enterprise Manager 13.4 Release Update 1

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 4 Update 1 (13.4.0.1).

- Filter Targets by Cost Center
- New Metric for Systems Infrastructure Cisco Switch - SNMP
- Oracle Consolidation Planning and Chargeback Plug-in

New Features in Oracle Enterprise Manager 13.4

This section lists the new features available in Oracle Enterprise Manager 13.4.

- Parallel OMS Upgrades
- Decommission Multiple Agents

- Always-on Monitoring – Filter Alerts by Severity and Event Type
- Exclude Targets from Composite Targets During a Blackout Using EMCLI
- Automated Password Functionality for DBSNMP (monitoring only) Database Password
- JET UI for Database Performance Pages
- Execute SQL is Supported via REST API
- Cluster Health Advisor Integration with Oracle Enterprise Manager Cloud Control
- Automatic Indexing for Autonomous Transaction Processing – Dedicated Databases
- Active Data Guard Support in AWR Warehouse
- AWR Warehouse Diagnosability
- Concurrent SQL Execution with SQL Performance Analyzer
- SQL Performance Analyzer Result Set Validation
- Real Application Testing Enhancements
- Database Support Availability Information
- TDE Support for Cloning Use Cases
- REST APIs for Fast-start Failover and Observer Management
- Support for Oracle Homes Consolidation
- Cleanup of Oracle Homes
- Standby Database Start Option After Patching
- Support for Exadata Extended Storage Server
- Support to Monitor Oracle Database Exadata Cloud Service and Oracle Database Exadata Cloud at Customer Using Oracle Enterprise Manager Cloud Control
- create_blackout: New Verb Options exclude_targets and exclude_types to Exclude Targets or Target Types from a Blackout
- create_dynamic_group: New Verb for Creating a New Dynamic Group
- db_software_maintenance: Added Support for Databases with TDE Enabled
- delete_swlib_entity: New Verb for Deleting an Entity from the Software Library
- get_supported_privileges: New Verb for Getting Privileges Available to the Type Specified
- relocate_wls: New Verb for Migrating Weblogic Server from Physical Host to Logical Host
- run_auto_discovery: New Verb for Running Target Discovery Automatically
- set_target_property_value: New Verb to Set the Value of a Target Property for a Specified Target
- upload_patches: New Verb for Multi-Part Patching
- verify_swlib -verbose: New Option to Display Verbose Logging Information
- Oracle Linux Virtualization (OLV)
- Middleware Management Certification Information
- Enterprise Manager Mobile

New Features by Focus Area

This section lists new features categorized by focus area.

- Installation and Upgrade
- Enterprise Monitoring
- Database Management
- Engineered Systems Management
- Enterprise Manager Command Line Interface
- Cloud Management
- Middleware Management
- Enterprise Manager Mobile
- Oracle Enterprise Manager App for Grafana

Installation and Upgrade

This section describes new features and enhancements for Installation and Upgrade.

- **Oracle Enterprise Manager Federation**: You now have the ability to define all your Enterprise Manager sites and access critical information from a single new interface. The Federation Overview Dashboard rolls up information such as the status of targets, incidents, problems, and jobs status across all your Enterprise Manager sites, provides various ways to sort your data, and allows you to drill down for more information directly to each Enterprise Manager site and its monitored targets.
  For more information, see Configuring Enterprise Manager Federation in the *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- **Parallel OMS Upgrades**: In a multi-OMS environment, you can now upgrade the primary OMS and then all additional OMS can be upgraded simultaneously.
  For more information, see Upgrading Multiple OMS in Parallel in the *Oracle Enterprise Manager Cloud Control Upgrade Guide*.

- **Decommission Multiple Agents**: You can now decommission multiple agents at the same time using the Enterprise Manager console or EM CLI. You can choose to remove multiple agents and their associated targets from the repository only, or you can choose to remove multiple agents and their targets from the repository as well as deinstall all agent software from their hosts. You need super administrator privileges to perform this operation.
  For more information, see Decommissioning Oracle Management Agents in the *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*.

Enterprise Monitoring

This section describes new features and enhancements for Enterprise Monitoring.

- **Diagnose Job System Issues**: The Job Diagnostic dashboards provide an administrator view into Job System operations, thus allowing you to isolate and identify problems when running jobs.
  For more information, see Diagnosing Job System Issues in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 8 (13.4.0.8).

- **Ability to Set Preferred Credential Type for Corrective Actions**: When defining a Corrective Action (CA), you can now specify the type of Preferred Credential (Normal or Privileged) to be used when the CA is invoked. Preferred Credentials used for CAs must be Global Named Credentials.
  For more information, see Specifying Preferred Credential Type for Corrective Actions in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Filter Targets by Cost Center**: On the **All Targets** page, under **Refine Search**, you can now filter targets by *Cost Center*, in addition to the existing target properties: Target Type, Target Status, Target Version, Lifecycle Status, Line of Business, Department, Location, Contact, Platform, Operating System, Owner, Site, and On Remote Host.
  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 1 (13.4.0.1).

- **Always-on Monitoring – Filter Alerts by Severity and Event Type**: New `emsctl enable_notification` and `disable_notification` verb options are available that let you filter alerts by:

  - Severity (`-severities`) such as Fatal, Critical, Warning, or Clear

  - Event Type (`-alert_types`) such as Metric Alert, Availability, and Metric Evaluation Error

  For more information, see Enabling Notifications in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

- **Exclude Targets from Composite Targets During a Blackout Using EMCLI**: New `emcli blackout` verb options (`exclude_targets`, `exclude_types`) are now available that let you exclude targets or target types from a blackout.
  For more information, see Exclude Targets from Composite Targets During a Blackout in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

- **Automated Password Functionality for DBSNMP (monitoring only) Database Password**: A new job type allows you to automate updating the password for *dbsnmp* or any monitoring user that is not SYSDBA or SYSOPER from the Enterprise Manager Cloud Control console. The password update job can be run on Oracle Database and Cluster Database instances.

Database Management

This section describes new features and enhancements for Database Management.

- **SQL Details and Session Details in JET UI**: The **SQL Details** and **Session Details** pages in the **Performance Hub** have been updated to use the Oracle JET UI. To access these pages, click the SQL ID and User Session ID respectively on the **Performance Hub** > **ASH Analytics** page.
  For more information, see Doc ID 2751569.1 in My Oracle Support.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 10 (13.4.0.10).

- **Required Privileges Displayed in the Add Source Database to AWR Warehouse Flow**: A new **Required privileges** link is now displayed under the **Override DBA role** check box in the **Add Source** dialog box accessed from the AWR Warehouse dashboard. On clicking the **Required privileges** link, you can view the database privileges that the database user must have to add a source database to the AWR Warehouse.
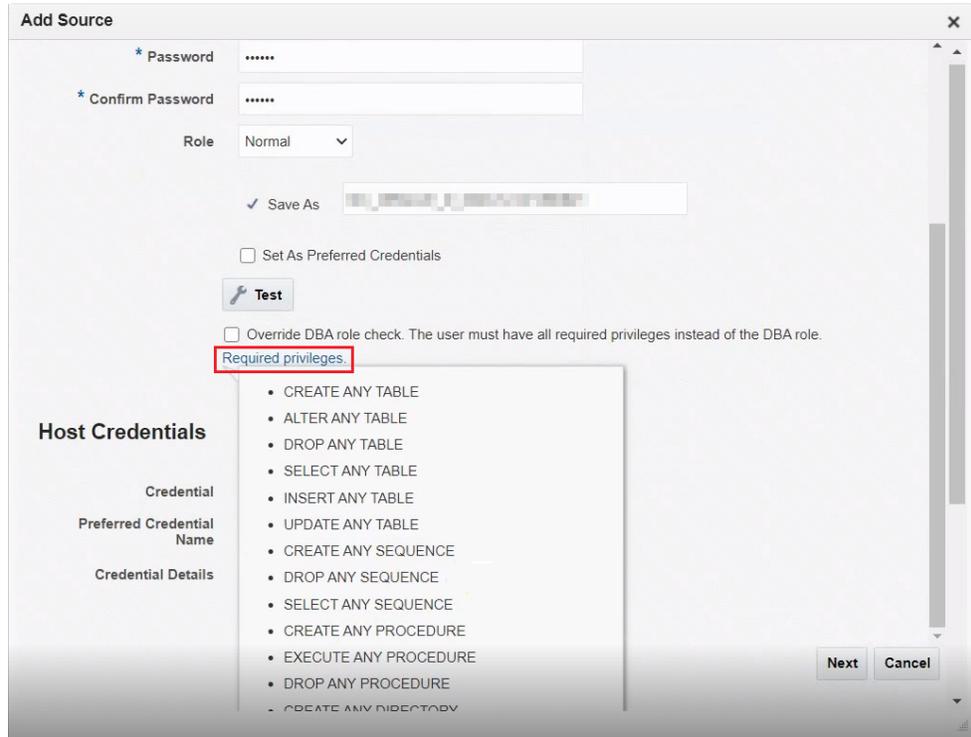
If you select the **Override DBA role** check box to allow a non-DBA database user to add a source database to AWR Warehouse, the **Required privileges** link is replaced with a **Missing privileges** link. On clicking the **Missing privileges** link, you can view the database privileges that the non-DBA database user must be granted to add a source database.
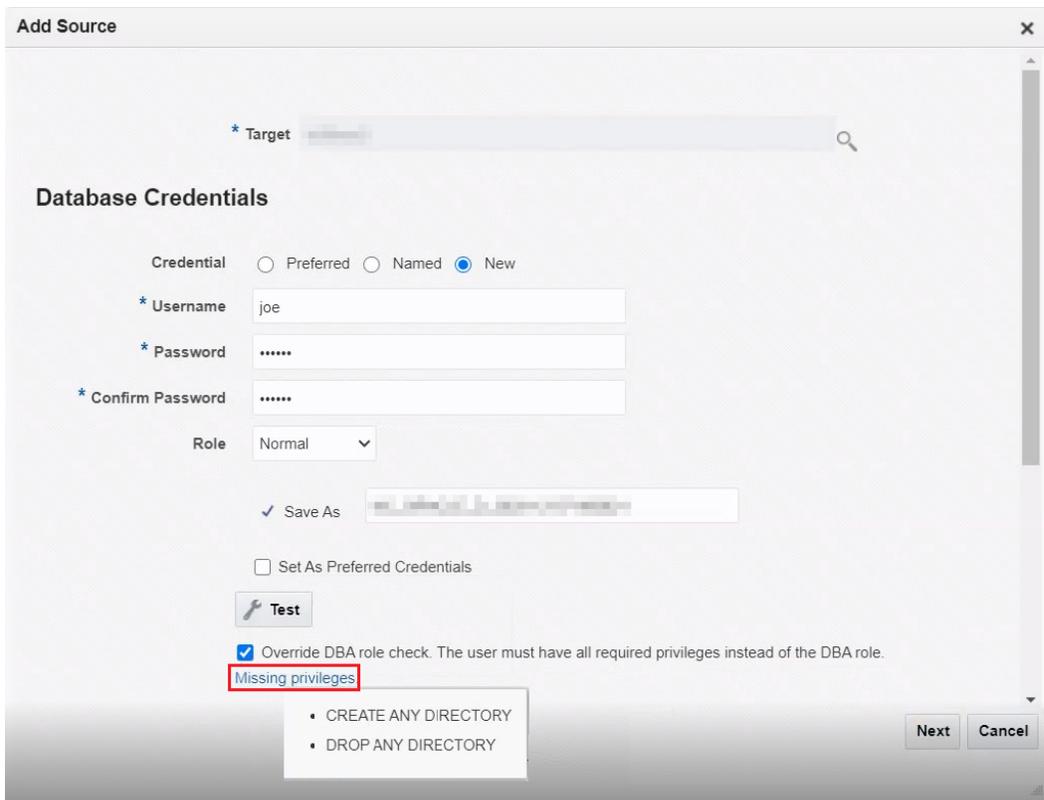
This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 10 (13.4.0.10).

- **RAC Instance Status Displayed on the PDB Home Page**: For a Pluggable Database (PDB) that is running on an Oracle Real Application Cluster (RAC) database, the number and status of the RAC instances are now displayed on top of the PDB Home page.
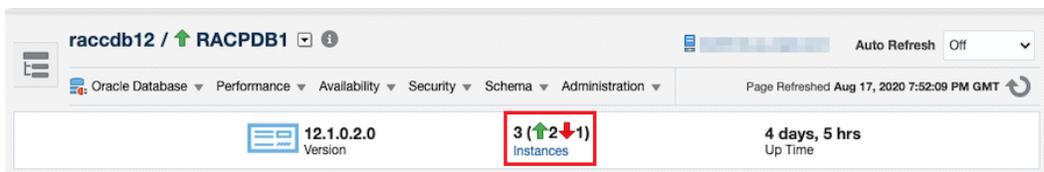
You can click the **Instances** link on the PDB Home page to view the name of the instance, the status of the RAC instance, and the status of the PDB on the RAC instance.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- **Enhancement to the Automatic Indexing Activity Report for Autonomous Databases**: The **Automatic Indexing Activity Report** for Autonomous Databases has

been enhanced with options to generate a report in the HTML format with graphical representations of the **Summary**, **Index Details**, **Verification Details**, and **Error** sections, for a selected time period. You can also use the **Download All Index Created Details** and **Download All Index Dropped Details** options to download the index details in a `.csv` format.

For more information, see Monitoring and Administration Tasks in the *Oracle Enterprise Manager Cloud Control Administrator's Guide for Oracle Autonomous Databases*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

- **Oracle Enterprise Manager Support for Autonomous Data Warehouse – Dedicated and Autonomous Databases – Shared**: You can now use Oracle Enterprise Manager to discover, manage, and monitor the following Autonomous Databases:

  – Autonomous Data Warehouse – Dedicated

  – Autonomous Transaction Processing – Shared

  – Autonomous Data Warehouse – Shared

  Note that Oracle Enterprise Manager support for Autonomous Databases was introduced in EM DB Plug-in Bundle Patch 13.3.2.0.190731, and previously only supported the Autonomous Transaction Processing – Dedicated database.

  For more information, see Use Oracle Enterprise Manager for Autonomous Databases in the *Oracle Enterprise Manager Cloud Control Administrator's Guide for Oracle Autonomous Databases*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Oracle Enterprise Manager Support for Autonomous Databases – Dedicated on Oracle Exadata Cloud at Customer**: You can now use Oracle Enterprise Manager deployed on premises to discover, manage, and monitor Autonomous Databases – Dedicated on Oracle Exadata Cloud at Customer.
  For more information, see Prerequisite Tasks for Autonomous Databases – Dedicated in the *Oracle Enterprise Manager Cloud Control Administrator's Guide for Oracle Autonomous Databases*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Oracle Enterprise Manager Support for Transparent Data Encryption (TDE) Enabled Oracle Databases**: Oracle Enterprise Manager now supports TDE-enabled Oracle Databases, for most capabilities. The currently supported configuration requires that the wallet location is specified using the `ENCRYPTION_WALLET_LOCATION` parameter in the `$ORACLE_HOME/network/admin/sqlnet.ora` file.
  For more information, see Oracle Enterprise Manager Support for TDE-enabled Oracle Databases in the *Oracle Enterprise Manager Cloud Control Security Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **JET UI for Database Performance Pages**: JET is the default UI for all Database Performance pages. The Flash pages were deprecated in Oracle Enterprise Manager 13.3.2 and JET pages are the supported way to access database performance data.

For more information, see Doc IDs 2709724.1, 2422790.1, and 2580773.1 in My Oracle Support.

- **Execute SQL is Supported via REST API**: You can now use HTTP-based REST endpoints to execute SQL commands and extract data. Using this you can extract data from:

    – The Oracle Management Repository

    – A database target configured in Oracle Enterprise Manager Cloud Control

    For more information, see Executing SQL via REST API in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

- **Cluster Health Advisor Integration with Oracle Enterprise Manager Cloud Control**: You can now use Oracle Cluster Health Advisor, which is integrated into the Incident Manager in Oracle Enterprise Manager Cloud Control, to detect and analyze operating system and cluster resource-related degradation and failures. Cluster Health Advisor is enabled by default and it continuously tracks the operating system resource consumption at each node, process, and device level. It provides detailed explanation regarding issues that occur in clusters where Oracle Clusterware and Oracle Real Application Clusters (RAC) are running, for example, during node eviction.
  Here are some of the benefits you can derive from the Cluster Health Advisor functionality:

    – Detects node and database performance problems

    – Provides early-warning alerts and corrective action

    – Supports on-site calibration to improve sensitivity

    For more information, see Introduction to Oracle Cluster Health Advisor in the *Oracle Database Autonomous Health Framework User's Guide*.

- **Automatic Indexing for Autonomous Transaction Processing – Dedicated Databases**: You can now enable Automatic Indexing for the Autonomous Transaction Processing – Dedicated databases monitored in Oracle Enterprise Manager Cloud Control.
  The automatic indexing feature automates index management tasks such as creating, rebuilding, and dropping indexes based on the changes in application workload, thereby improving database performance.

    For more information, see Monitoring and Administration Tasks in the *Oracle Enterprise Manager Cloud Control Administrator's Guide for Oracle Autonomous Databases*.

- **Automatic Workload Repository (AWR) Warehouse Enhancements**:

    – **Support for PDBs**: The AWR warehouse now supports PDBs. The new support for PDBs includes support for the warehouse repository as a PDB and also for PDBs as source databases that upload their AWR data to the warehouse. This feature requires Oracle Database 12.2 and higher as the source or repository.
      This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 2 (13.4.0.2).

    – **Active Data Guard (ADG) Support in AWR Warehouse**: ADG now supports the switch over when the warehouse database or source database is configured with ADG and the primary database goes down and the standby database becomes the primary. After the switchover, the databases are automatically switched in the AWR warehouse.
      Previously, the AWR warehouse did not recognize the switch over when the primary database was down and the standby database became the primary, and this caused issues such as Extract-Transform-Load (ETL) process failure.

- **AWR Warehouse Diagnosability**: You can now proactively identify the points of failure after the AWR warehouse is configured and the ETL process started running between the source database and warehouse, by running a number of tests on the AWR warehouse or a select set of sources and determine the health of the AWR warehouse configuration.

- **SQL Performance Analyzer Enhancements**:

  - **SQL Performance Analyzer for Migration from On-premises Database to Autonomous Database**: You can now use the SQL Performance Analyzer workflow to test the effects of a migration from an on-premises database to an Autonomous Database.
    For more information, see Monitoring and Administration Tasks in the *Oracle Enterprise Manager Cloud Control Administrator's Guide for Oracle Autonomous Databases*.

    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 3 (13.4.0.3).

  - **Concurrent SQL Execution with SQL Performance Analyzer**: You can now execute SQL concurrently with the SQL Performance Analyzer. The default behavior of the SQL Performance Analyzer is to execute SQL sequentially when testing to measure performance. In some cases, when very large SQL tuning sets are involved, you can execute SQL concurrently to expedite the testing process. This enables you to complete testing quickly and with added flexibility.
    For more information, see Configuring the Degree of Parallelism for an Analysis Task in the *Oracle Database Testing Guide*.

  - **SQL Performance Analyzer Result Set Validation**: You can now use SQL Performance Analyzer Result Set Validation to validate whether the result sets which were returned during the initial SQL Performance Analyzer test are similar to the result sets returned in the subsequent tests. This feature adds an additional assurance that the queries are executing as expected and returning the exact same set of data.
    For more information, see Validating SQL Result Sets Using SQL Performance Analyzer in the *Oracle Database Testing Guide*.

- **Real Application Testing Enhancements**:

  - When capturing a workload carrying PL/SQL based application logic for Database Replay, you can now select the **Extended** option for the PL/SQL capture mode on the **Database Replay** > **Create Capture: Options** page. This ensures that the workload is captured at the first level of recursive PL/SQL calls.

  - When replaying a workload carrying PL/SQL based application logic, you can now select the **Extended** value for the **PL/SQL Mode** replay parameter on the **Replay Workload: Customize Options** page > **Replay Parameters** tab, thereby ensuring that the workload is replayed at first level of recursive calls. Note that to be able to replay a workload in PL/SQL mode, it must be captured in the **Extended** mode.

  - For the **Synchronization** replay parameter, which controls the synchronization method used for database replay, you can now set one of the following values on the **Replay Workload: Customize Options** page > **Replay Parameters** tab:

    * **Time**: If the **Synchronization** parameter is set to **Time**, the replay uses the same wall-clock timing as the capture. This is the default option.

* **SCN**: If the **Synchronization** parameter is set to **SCN**, then the COMMIT order in the captured workload is observed during replay and all replay actions are executed only after all dependent COMMIT actions have completed.

Previously, the values available for the **Synchronization** replay parameter were **SCN**, **FALSE**, and **OBJECT_ID**.

– You can now replay a workload in **Query Only Mode** by specifying **True** against the parameter on the **Replay Workload: Customize Options** page > **Replay Parameters** tab. When a workload is replayed in **Query Only Mode**, it omits all PL/SQL, DML and DDL statements, thereby allowing the rerunning of the workload without restoring the database. This mode should be used to perform a sanity check before replaying the workload in **Read/Write** mode.

For more information, see Database Replay in the *Oracle Database Testing Guide*.

* **Support Availability Information**: Oracle Enterprise Manager Cloud Control 13.4 has added support for the following:

  – Oracle Database 18c and 19c as repository and managed targets

  – Oracle Exadata Database Machine X6, X7, X8, and X8M

Database Lifecycle Management

Following are the new features and enhancements for database lifecycle management:

* **Center for Internet Security (CIS) Benchmark v1.0.0 – Traditional and Unified Audit Profiles for Oracle Database 19c Single Instance, Pluggable Database, and Clusters**: You can now use the following CIS v1.0.0 auditing profiles for Oracle Database 19c:

  – Oracle 19c Database CIS V1.0.0 - Level 1 - RDBMS using Traditional Auditing for Oracle Database

  – Oracle 19c Database CIS V1.0.0 - Level 1 - RDBMS using Traditional Auditing for Oracle Pluggable Database

  – Oracle 19c Database CIS V1.0.0 - Level 1 - RDBMS using Traditional Auditing for Oracle Cluster Database

  – Oracle 19c Database CIS V1.0.0 - Level 1 - RDBMS using Unified Auditing for Oracle Database

  – Oracle 19c Database CIS V1.0.0 - Level 1 - RDBMS using Unified Auditing for Oracle Pluggable Database

  – Oracle 19c Database CIS V1.0.0 - Level 1 - RDBMS using Unified Auditing for Oracle Cluster Database

For more information, see CIS Compliance Standards in the *Oracle Enterprise Manager Cloud Control Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 11 (13.4.0.11).

* **cleanup_config_extension EM CLI Verb**: Enterprise Manager Command Line Interface introduces a new verb that cleans up invalid configuration extensions by removing all its associations with a given target.
For more information, see cleanup_config_extension in the *Oracle Enterprise Manager Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 10 (13.4.0.10).

- **Compliance Dashboard Violations Report for Multiple Targets**: Administrators can now access a full report of all the violations for multiple targets and for multiple standards directly from the Compliance Dashboard. The reports are in HTML format and can also be saved as a single file for easy sharing.
  For more information, see About the Compliance Dashboard in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- **SCAP Compliance Standards**: Oracle Enterprise Manager now supports compliance management to ensure secure configuration of a Linux host. Oracle Enterprise Manager supports eight out-of-the-box Standard Profiles.
  Standard Profiles for Oracle Linux 8

  – Health Insurance Portability and Accountability Act (HIPAA)

  – DISA STIG For Oracle Linux 8

  – PCI-DSS v3.2.1 Control Baseline for Oracle Linux 8

  – Standard System Security Profile for Oracle Linux 8

  Standard Profiles for Oracle Linux 7

  – Health Insurance Portability and Accountability Act (HIPAA)

  – DISA STIG For Oracle Linux 7

  – PCI-DSS v3.2.1 Control Baseline for Oracle Linux 7

  – Standard System Security Profile for Oracle Linux 7

  A compliance standard in Extensible Configuration Checklist Description Format (XCCDF) can be imported into Oracle Enterprise Manager using the `upload_compliance_standard` verb and manage the compliance of managed targets.
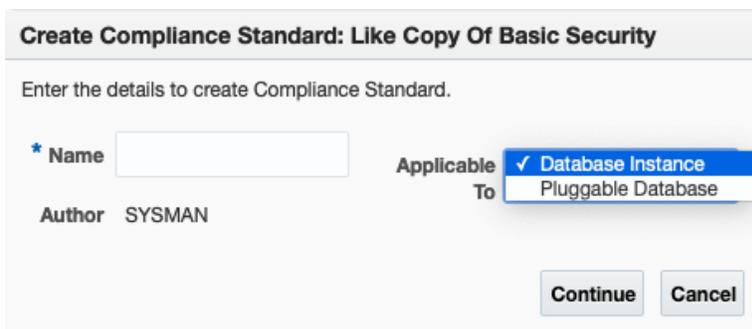
  For more information, see SCAP Supported Standards in the *Oracle Enterprise Manager Cloud Control Compliance Standards Reference*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- **Fleet Maintenance Single Instance Patching for Windows Deployments**: Oracle Enterprise Manager Fleet Maintenance now supports the patching of single instance databases on Windows-based platforms. Fleet Maintenance on Windows supports deploy, migrate, update, upgrade and/or rollback operations.
  For more information, see Prerequisites for Performing Fleet Maintenance on Windows in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- **Database Compliance Standard Enhancement**: Database Compliance Standards now allow the **Create Like** action on database targets. You can copy a database compliance standard into a new standard for a pluggable database. This new standard can be further customized with additional folders and rules.

For more information, see Creating Like a Compliance Standard in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 8 (13.4.0.8).

- **Database Migration Workbench**: A new Database Migration Workbench interface is now available to guide you through the following database migration phases and associated tasks:

  – Planning pre-migration activities

  – Selecting the source and destination, validating and submitting a migration

  – Viewing the details of a completed migration and ensuring that the newly migrated database performs as expected
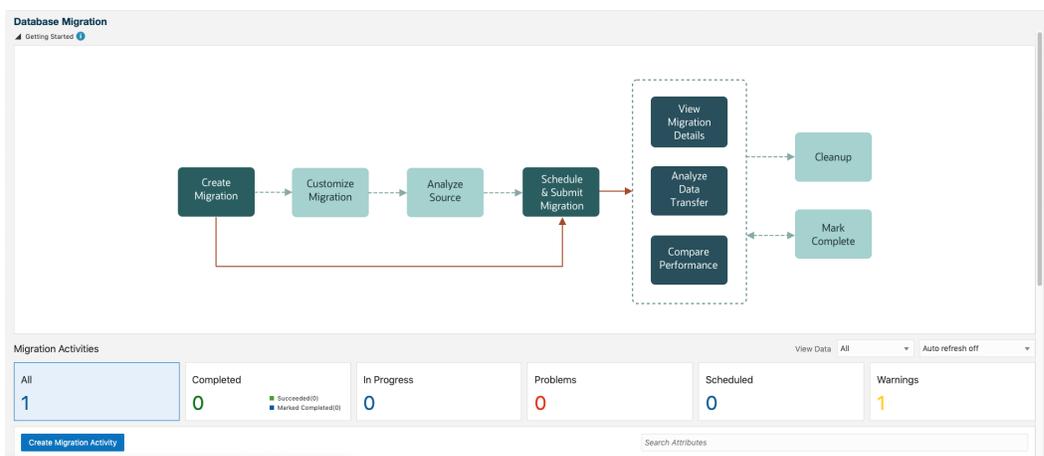
For more information, see Database Migration in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

- **Compliance Dashboard Violations Report**: Administrators can now access a full report of all the violations for each target for a particular standard, directly from the Compliance Dashboard. The reports are in HTML format and can also be saved as single file for easy sharing.

For more information, see About the Compliance Dashboard in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

- **Compliance Dashboard Filter Enhancements**: New enhanced filter options are now available for the Compliance Dashboard. You can now filter by **Target Type**, **Severity**, and **Properties** (such as **Contact**, **Cost Center**, and **Department**). This allows for a more precise level of search when filtering. Additionally, the Compliance Dashboard now features an **Applied Filters** ribbon at the top where you can see what filters are in use. You can remove or add filters from the ribbon, as required.

For more information, see About the Compliance Dashboard in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 6 (13.4.0.6).

- **Center for Internet Security (CIS) Benchmark v3.0.0 – Traditional and Unified Audit Profiles for Oracle Database 12c Single Instance, Pluggable Database and Clusters**: You can now use the following CIS v3.0.0 auditing profiles for Oracle Database 12c:

    – CIS Traditional Auditing for Oracle Database

    – CIS Traditional Auditing for Oracle Pluggable Database

    – CIS Traditional Auditing for Oracle Cluster Database (RAC)

    – CIS Unified Auditing for Oracle Database

    – CIS Unified Auditing for Oracle Pluggable Database

    – CIS Unified Auditing for Oracle Cluster Database (RAC)

    For more information, see CIS Compliance Standards in the *Oracle Enterprise Manager Cloud Control Compliance Standards Reference*.

    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 6 (13.4.0.6).

- **Configure Oracle ASM Filter Driver**: When provisioning a new Oracle RAC Database Grid Infrastructure using Oracle Enterprise Manager, you can now configure the Oracle ASM Filter Driver in the Automatic Storage Management section of the deployment procedure.

    For more information, see Procedure for Provisioning Oracle Grid Infrastructure and Oracle Databases with Oracle ASM in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- **Cleanup Container Databases**: Oracle Enterprise Manager Fleet Management operations now support cleanup of Container Databases (CDBs). The `CLEANUP` operation automates the removal of old CDBs upon completion of a patching cycle, helping free valuable resources.
    For more information, see Clean Up Operations in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.
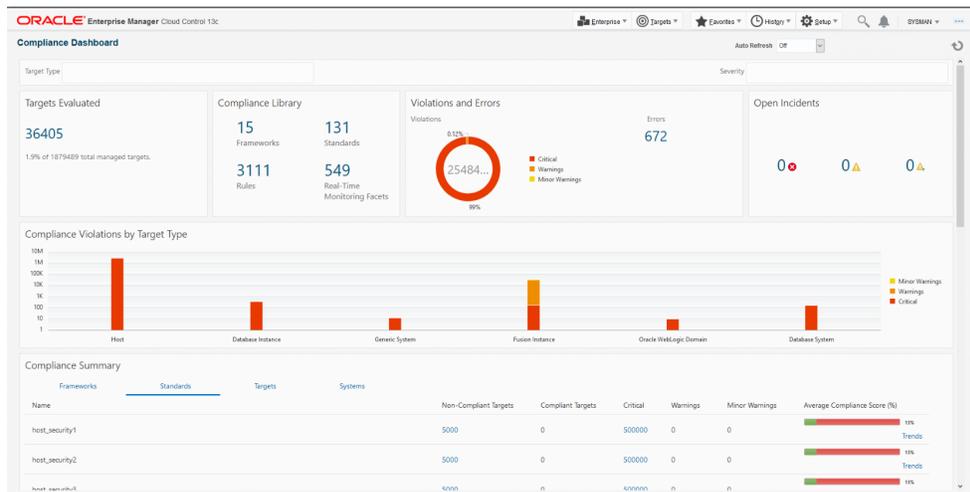
    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- **Comparison and Drift Management**: This version introduces a brand new Comparison and Drift Management Dashboard that allows you to see drifted, inconsistent, and comparison targets all from a single new interface.

For more information, see Comparisons and Drift Management with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5) and Above in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- **Compliance Dashboard**: This version introduces a brand new dashboard for security compliance and configuration management to increase the operational efficiency of administrators and reduce the overall cost of management. This is a one-stop page for monitoring the security compliance of all EM supported targets allowing you to filter down to specific standard or target type, assess the overall compliance state of targets, review context specific security incidents, analyze rule violations, and determine remediation steps.

For more information, see Evaluating Compliance in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- **Database Fleet Maintenance – Emergency Patching**: You can now perform Emergency patching with Fleet Maintenance. Databases that require an emergency patch will be switched out to new homes where they can be isolated and patched without impacting functioning databases in the original home. For more information, see Fleet Maintenance Emergency Patching in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Unified On-premises and Cloud Provisioning**: Manage database assets running in a combination of on-premises data centers or in Oracle Cloud Infrastructure (OCI) from the same user interface. The "Provision Pluggable Databases" now provides a unified experience to manage pluggable databases on any platform. Perform operations like create, clone, refreshable clone, relocate on-premises PDBs as well as OCI PDBs.

For more information, see Deploying Agents on OCI Resources and Provisioning Pluggable Databases Using Enterprise Manager in the *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

• **CIS v2.1.0 – Traditional and Unified Auditing Profiles for Oracle Pluggable Database 12c**: You can now use the following CIS v2.1.0 auditing profiles for Oracle Database 12c:

   – Oracle 12c Database CIS v2.1.0 - Level 1 - RDBMS using Unified Auditing for Oracle Pluggable Database

   – Oracle 12c Database CIS v2.1.0 - Level 1 - RDBMS using Traditional Auditing for Oracle Pluggable Database

   For more information, see CIS Compliance Standards in the *Oracle Enterprise Manager Cloud Control Compliance Standards Reference*.

   This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

• **Ability to Re-run Compliance Evaluations**: You can now choose to re-run compliance standard evaluations for any given target, to stay up to date, for example, with Security Recommendations For Oracle Products.
   This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 3 (13.4.0.3).

• **CIS v2.1.0 – Auditing Profiles for Oracle Database 12c**: You can now use the following CIS v2.1.0 auditing profiles for Oracle Database 12c:

   – Oracle 12c Database CIS v2.1.0 - Level 1 - RDBMS using Unified Auditing for Oracle Database

   – Oracle 12c Database CIS v2.1.0 - Level 1 - RDBMS using Unified Auditing for Oracle Cluster Database

   – Oracle 12c Database CIS v2.1.0 - Level 1 - RDBMS using Traditional Auditing for Oracle Database

   – Oracle 12c Database CIS v2.1.0 - Level 1 - RDBMS using Traditional Auditing for Oracle Cluster Database

   For more information, see Audit/Logging Policies and Procedures in the *Oracle Enterprise Manager Cloud Control Compliance Standards Reference*.

   This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 3 (13.4.0.3).

• **Security Technical Implementation Guides (STIG) for Oracle Database**: Latest version of STIG supported in Oracle Enterprise Manager 13c Release 4 Update 3 (13.4.0.3):

   – Oracle 12c Database STIG - Version 1, Release 16 for Oracle Database

   – Oracle 12c Database STIG - Version 1, Release 16 for Oracle Cluster Database

   – Oracle 11.2g Database STIG Version 1, Release 16 for Oracle Database

   – Oracle 11.2g Database STIG Version 1, Release 16 for Oracle Cluster Database

   For more information, see Security Technical Implementation Guide in the *Oracle Enterprise Manager Cloud Control Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 3 (13.4.0.3).

- **Migrating Fleet Maintenance Gold Image Between Separate Oracle Enterprise Manager Installations**: You can now send updates, software images and their metadata across separate Oracle Enterprise Manager installations by migrating the Fleet Maintenance gold image between Oracle Enterprise Manager environments. This is especially useful when having two Oracle Enterprise Manager installations, one for Development and one for Production.
  For more information, see Migrating Fleet Maintenance Gold Images between Enterprise Manager Deployments in the *Oracle Enterprise Manager Database Lifecycle Management Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 2 (13.4.0.2).

- **TDE Support for Cloning Use Cases**: TDE is now supported in the following Database Lifecycle Management workflows:

  – Creating a full clone database

  – Creating a full clone pluggable database (PDB)

  – Relocating a PDB

  EMCLI verb db_software_maintenance has been updated to support databases with TDE enabled.

- **REST APIs for Fast-start Failover and Observer Management**: You can now manage your Fast-start Failover and Observer targets via REST commands. Fast-start Failover increases the availability of a database by eliminating the need for administrator intervention as part of the failover workflow.

- **Support for Oracle Homes Consolidation**: You can now use the EM CLI **attach_home** flag to merge homes of databases running from different Oracle Homes, on the same host. A second Oracle Home can be merged to a previously deployed Oracle Home if the two homes are patched with the same version of the Gold Image. For more information, see Attach Oracle Homes in the *Oracle Enterprise Manager Database Lifecycle Management Guide*.

- **Cleanup of Oracle Homes**: Oracle homes consume valuable storage space, they can be cleaned up to release space when they are no longer in use. This operation removes unused, empty no longer needed Oracle Homes to help you better administrate space and resources. For more information, see Cleaning Up Oracle Homes in the *Oracle Enterprise Manager Database Lifecycle Management Guide*.

- **Standby Database Start Option After Patching**: The new **STANDBY_START_OPTION** parameter allows you to set a specific start option for your standby database after patching. The Parameter needs to be included in the **-input_file**. For more information, see Updating and Rolling Back Standby Databases in the *Oracle Enterprise Manager Database Lifecycle Management Guide*.

Engineered Systems Management

This section describes new features and enhancements for Engineered Systems Management.

- **Configure Databases to Send Backups to Zero Data Loss Recovery Appliances (ZDLRA) Using EMCLI**: Use the new EMCLI sub-command `-configureBackupToRA` for the EMCLI verb `configure_db_ha` to schedule an Oracle Enterprise Manager deployment procedure that processes multiple databases and configures each to send backups to a designated Recovery Appliance. The command also enables redo transport to the Recovery Appliance either from individual databases or from within a Data Guard broker configuration.

  The procedure steps include configuring a database backup wallet, installing the Recovery Appliance Backup Module in the database Oracle homes if necessary, and configuration of all required backup and redo settings in the database and in Oracle Enterprise Manager. Before running this command, the specified databases must already be enrolled with the Recovery Appliance as protected databases (as performed by the Recovery Appliance administrator using the `emcli manage_ra -addProtectedDatabase` command or the Oracle Enterprise Manager Recovery Appliance management console).

  For more information, see configure_db_ha in the *Oracle Enterprise Manager Command Line Interface*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- **RESTful API based Monitoring for Exadata Database Machine Compute Node Server ILOM Targets**: During the Exadata Database Machine discovery process, you can now promote Compute Node ILOM target with a REST access point in addition to SSH access point.

  – *Using Console*: In the discovery flow, specify or select the credential for monitoring compute node server ILOM using RESTful API.
    For more information, see step 10 in Discovering an Exadata Database Machine in the *Oracle Exadata Database Machine Getting Started Guide*.

  – *Using EMCLI*: As part of the prerequisites for the discovery of Exadata Database Machine targets using EMCLI, create the named credential `computenodeIlomRestCred`, include the configuration parameter `ilomVersionSupportRest` and the new named credential `computenodeIlomRestCred` in the input file. Run the discovery as earlier using EMCLI.
    For more information, see Named Credentials and Commands to Create Them and Configuration Parameters in the *Oracle Exadata Database Machine Getting Started Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- **Conversion of Exadata Database Machine 12c Type Targets to 13c Using EMCLI**: Create an input file by entering the information about the database machine target. Run the EMCLI command to start the conversion of the Database Machine target from 12c type to 13c by specifying the path of the input file. Collect the instance name of the submitted Deployment Procedure (DP) and check the status of the conversion using the console. In case of failure in any of the steps, a detailed diagnostic is performed and information is available for you to apply the fix.
  For more information, see Convert 12c Type Database Machine Targets to 13c Using EMCLI in the *Oracle Exadata Database Machine Getting Started Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

- **Additional Operations for Managing Kubernetes Clusters**: Use IaaS Self Service Portal to view the Kubernetes Clusters and perform the following new operations:

  – Add new node pools to the cluster

– Remove node pools from the cluster

– Scale up a Kubernetes cluster by adding nodes to the node pool

– Scale down a Kubernetes cluster by removing nodes from the node pool

For more information, see Viewing Kubernetes Clusters in the *Oracle Enterprise Manager Cloud Administration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 9 (13.4.0.9).

• **Key Performance Indicator (KPI) Metrics for Systems Infrastructure Oracle InfiniBand Switch**: The following KPI metrics are available for Systems Infrastructure Oracle InfiniBand Switch - ILOM:

– CPU Utilization

– Memory Utilization

– Storage Summary

– SSH Session Count

The following KPI metrics are available for Systems Infrastructure Oracle InfiniBand Switch - SNMP:

– CPU Utilization

– Memory Utilization

For more information, see Systems Infrastructure Oracle InfiniBand Switch - ILOM and Systems Infrastructure Oracle InfiniBand Switch - SNMP in the *Systems Infrastructure Plug-in Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 8 (13.4.0.8).

• **KPI Metrics for Systems Infrastructure Cisco Switch**: The following KPI metrics are available for Systems Infrastructure Cisco Switch - IOS:

– CPU Utilization

– Memory Utilization

– Storage Summary

– SSH Session Count

The following KPI metrics are available for Systems Infrastructure Cisco Switch - SNMP:

– Memory Utilization

– Storage Summary

For more information, see Systems Infrastructure Cisco Switch - IOS and Systems Infrastructure Cisco Switch - SNMP in the *Systems Infrastructure Plug-in Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 8 (13.4.0.8).

• **Discovery of a Systems Infrastructure Server ILOM Using REST Through the User Interface**: You can now discover the ILOM server using the REST access point through Enterprise Manager Cloud Control user interface. Use the guided process in the user interface to select the ILOM target, monitoring agent, and specify the monitoring credentials for the setup.

For more information, see Discover an ILOM Server Using REST Through the User Interface in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 8 (13.4.0.8).

*   **Enhancement to the Automatic Indexing Activity Report for Database Nodes of Oracle Exadata Database Machine**: The **Automatic Indexing Activity Report** for database nodes of Oracle Exadata Database Machine has been enhanced with options to generate a report in the HTML format with graphical representations of the **Summary**, **Index Details**, **Verification Details**, and **Error** sections, for a selected time period. You can also use the **Download All Index Created Details** and **Download All Index Dropped Details** options to download the index details in a `.csv` format.
    For more information, see Automatic Indexing for Database Nodes in the *Oracle Exadata Database Machine Getting Started Guide*.

    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

*   **Predefined Monitoring Template for Zero Data Loss Recovery Appliance (ZDLRA) Targets**: Oracle now provides a predefined monitoring template that can be used with ZDLRA (Recovery Appliance) target types. This predefined template enables you to apply the Oracle recommended Warning and Critical threshold values for the key ZDLRA metrics.
    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

*   **Read-only Access to ZDLRA Administration Console for an `EM User`**: An `EM User`, who is not an `RA Administrator` can now have read-only access to the ZDLRA administration and monitoring pages. The `RA Administrator` can grant the user the *Connect Target Read Only* privilege to the Recovery Appliance target to enable the read-only access.
    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

*   **Kubernetes Lifecycle Support on Private Cloud Appliance**: Use IaaS Self Service Portal to view the Kubernetes Clusters and perform other operations. You can create new clusters by providing the network information and by selecting the Master and Worker node configurations. Visit the Kubernetes Cluster Details page to view the configuration details, the requests placed, and their status.
    For more information, see Viewing Kubernetes Clusters in the *Oracle Enterprise Manager Cloud Administration Guide*.

    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 6 (13.4.0.6).

*   **Automatic Indexing for Database Nodes of Oracle Exadata Database Machine**: You can now enable Automatic Indexing for the database nodes of Oracle Exadata Database Machine monitored in Oracle Enterprise Manager Cloud Control.
    The automatic indexing feature automates index management tasks such as creating, rebuilding, and dropping indexes based on the changes in application workload, thereby improving database performance.

    For more information, see Automatic Indexing for Database Nodes in the *Oracle Exadata Database Machine Getting Started Guide*.

    This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 6 (13.4.0.6).

- **ZDLRA Support for New Parameters on Copy-to-Media Jobs**: When submitting the **Copy-to-Media** job template, you can optionally specify advanced parameters like **Format** and **Auto Backup Prefix** that will dictate the naming of the backup pieces being copied to media. You can also optionally specify a **Tag** to be applied to these copied backup pieces.
  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 6 (13.4.0.6).

- **ZDLRA Protected Database Enhancements**: Using the `manage_ra` emcli verb, you can now configure one or more databases for protection with one or more Recovery Appliance targets. This command can also be used with Oracle Enterprise Manager administration groups and can be run on a recurring schedule, making it easy to enroll newly discovered databases with the Recovery Appliance targets.
  In addition, using the same `manage_ra` verb, you can now enroll with a Recovery Appliance, a database that has not been discovered in Oracle Enterprise Manager as a target.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Oracle Exadata Key Performance Indicator (KPI) Metrics**: You can now view the KPI metrics for Oracle Exadata Database Machine and Oracle Exadata Cloud. For examples of Key Performance Indicators Metrics for Exadata Storage Servers and Exadata Storage Server Grid in Oracle Exadata Cloud, see Exadata Key Performance Indicators Metrics Examples in the *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

  For examples of Key Performance Indicators Metrics for Exadata Storage Servers and Exadata Storage Server Grid in Oracle Exadata Database Machine, see Exadata Key Performance Indicators Metrics in the *Oracle Exadata Database Machine Getting Started Guide*.

  For details of the metrics, see Oracle Exadata Storage Server: Exadata Key Performance Indicators and Oracle Exadata Storage Server Grid: Exadata Key Performance Indicators in the *Oracle Database Plug-in Metric Reference Manual*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Discover Oracle Exadata Database Machine Using EMCLI**: In addition to providing support for discovering Oracle Exadata targets using the console, Oracle Enterprise Manager now supports discovery using EMCLI. This feature helps to automate the discovery process where several Database Machines must be discovered offline or in the background.
  EMCLI based discovery is customizable, enabling you to add or skip components in the event of component outage and select the monitoring agents. The discovery process is idempotent, where the subsequent executions will make the best effort to discover any previously undiscovered targets (components) and will ignore any targets that have already been discovered and configured.

  The discovery works for both physical and virtual Exadata Database Machines (IB/RoCE) using local or remote agents.

  Complete the prerequisite tasks before you perform the discovery of the targets. Check the status for the deployment procedure to complete, and then perform the post-discovery verification tasks to begin monitoring your targets through Oracle Enterprise Manager.

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For more information, see Discover the Exadata Database Machine Target Using EMCLI in the *Oracle Exadata Database Machine Getting Started Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **New Metric for Systems Infrastructure Cisco Switch - SNMP**: *Priority Flow Control If Priority Table* metric is now available to get information about priority flow control for the PFC priority of each interface on the Cisco switch.
  For more information, see Systems Infrastructure Cisco Switch - SNMP in the *Systems Infrastructure Plug-in Metric Reference Manual*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 1 (13.4.0.1).

- **Support for Exadata Extended Storage Server**: Oracle Enterprise Manager Cloud Control now provides dedicated support for Exadata Extended (XT) Storage. Since XT storage servers do not have flash drives, Oracle Enterprise Manager Cloud Control will automatically suppress all the flash-related monitoring functionalities, and present only those IO Resource Management settings that are appropriate for XT storage. Exadata X8 systems configured with XT storage are automatically recognized by Oracle Enterprise Manager Cloud Control during discovery, and the corresponding Exadata Storage Server targets automatically adapt to the underlying storage server type.

- **Support to Monitor Oracle Database Exadata Cloud Service and Oracle Database Exadata Cloud at Customer Using Oracle Enterprise Manager Cloud Control**: You can benefit from the following features that are now available with support for the cloud target:

  – **Enterprise Manager Target for Exadata Cloud**:

    * Automatically identifies and organizes related targets

    * Provides an integration point for Exadata Cloud-specific functionality

  – **Improved Performance Monitoring**:

    * Adds Exadata Storage Server and Exadata Storage Grid targets

    * Offers visualization of storage and compute performance for Oracle Exadata Cloud

    * Enables use of the same Maximum Availability Architecture (MAA) Key Performance Indicators (KPI) that was developed for Oracle Exadata Database Machine

  – **Scripted CLI-based Discovery**: Using *emcli*, discover the cloud target which includes the existing hosts, clusters, ASM, Database and related member targets.

  – **Provides a Single Pane of Glass for All Exadata Targets**:

    * Monitor and manage Oracle Exadata Database Machine and Oracle Exadata Cloud systems through a common Exadata target menu

    * Consistent experience across Oracle Database Exadata Cloud Service and Oracle Database Exadata Cloud at Customer

  – **Visualization**: Visualize the database and related targets associated with each Oracle Database Exadata Cloud Service and Oracle Database Exadata Cloud at Customer.

Enterprise Manager Command Line Interface

This section lists the new or updated Enterprise Manager Command Line Interface (EM CLI) commands.

- manage_ra: Add Protected Database operation for Recovery Appliance is now supported.
  This verb is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- create_blackout: New verb options, `exclude_targets` and `exclude_types`, let you exclude targets or target types from a blackout.
  For more information, see Exclude Targets from Composite Targets During a Blackout in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

- create_dynamic_group: New verb for creating a new dynamic group

- db_software_maintenance: Added support for databases with TDE enabled.
  Added a new flag `-attach_home`. This is used to merge homes of two databases running from different Oracle Homes, on the same host. A second Oracle Home can be merged to a previously deployed Oracle Home if the two homes are patched with the same version of the Gold Image.

  Oracle Home is now a valid target type for cleanup by providing: `-performOperation -name="cleanup"`, `-target_list`, and `-target_type=oracle_home`.

- delete_swlib_entity: New verb for deleting an entity from the Software Library

- get_supported_privileges: New verb for getting privileges available to the type specified. (For example, `ALL | SYSTEM | TARGET | JOB`).

- relocate_wls: New verb for migrating Weblogic Server from physical host to logical host

- run_auto_discovery: New verb for running target discovery automatically

- set_target_property_value: New verb to set the value of a target property for a specified target

- upload_patches: New verb for multi-part patching

- verify_swlib -verbose: New option to display verbose logging information

Cloud Management

This section describes new features and enhancements for Cloud Management.

- **Database Migration Planner**: Support for Exadata Cloud and Bare Metal DB System Destinations.

  - **Bare Metal DB System**
    Extending Oracle Cloud Infrastructure service options, Database Migration Planner now supports Bare Metal DB System service options and associated shapes:

    * BM.DenseIO2.52

    * BM.DenseIO1.36
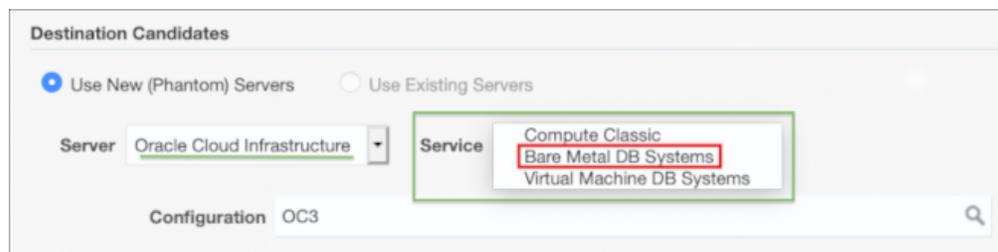
- **Exadata on Cloud**
  In addition to *Oracle Exadata On-Premise*, you can now choose the following Cloud-based server options:

    * Oracle Exadata Cloud at Customer

    * Oracle Exadata Cloud Service

  These features are available starting with Oracle Enterprise Manager 13c Release 4 Update 6 (13.4.0.6).

- **Unified Self Service Portal for On-premises and OCI Databases**: Use the Cloud Self Service portal to provide centralized provisioning and quota management of on-premises or Oracle Cloud Infrastructure (OCI) Pluggable Database as a Service.
  For more information, see Requesting a Hybrid Pluggable Database in the *Oracle Enterprise Manager Cloud Administration Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 4 (13.4.0.4).

- **Oracle Consolidation Planning and Chargeback Plug-in**: The Oracle Consolidation Planning and Chargeback Plug-in has now added support for Oracle Exadata Database Machine X8.
  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 1 (13.4.0.1).

- **Oracle Linux Virtualization (OLV)**: You can use Oracle Enterprise Manager Cloud Control to monitor Oracle Linux Virtualization Manager and its constituent parts. A comprehensive set of predefined performance and health metrics enables automated monitoring of the Oracle Linux Virtualization environment. Because all OLV components are full-fledged Enterprise Manager targets, monitoring an OLV Manager instance lets you monitor out-of-box metrics for all sub-components.
  For more information, see Monitoring Oracle Linux Virtualization Infrastructure Cloud in the *Oracle Enterprise Manager Cloud Administration Guide*.

Middleware Management

This section describes new features and enhancements for Middleware Management.

Certification Information: Oracle Enterprise Manager Cloud Control 13.4 has added support for Oracle Fusion Middleware 12.2.1.4.0.

For more information on the products supported by Oracle Enterprise Manager in 13.4:

1. Sign in to My Oracle Support and click the **Certifications** tab.

2. In the **Certification Search** region, select one of the following from the **Product** list:

   - **Enterprise Manager Base Platform - OMS**, to view the certification for OMS.

- **Enterprise Manager Base Platform - Agent**, to view the certification for Management Agent.

3. From the **Release** list, select the release you are interested in and click **Search**.

Enterprise Manager Mobile

Oracle Enterprise Manager Mobile can now be downloaded from the App Store® for Apple mobile devices and from Google Play for Android mobile devices.

- **Mobile Terminal**: The Mobile Terminal lets you type operating system commands against one host and immediately view the results, thus allowing you to perform administrative command line operations on the host within the context of Enterprise Manager.
  For more information, see Run a Host Command (Mobile Terminal) in the *Help for Enterprise Manager Mobile*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- **Monitor Target Compliance**: You can evaluate the compliance of targets as they relate to business best practices for configuration, security, and storage directly from the Enterprise Manager Mobile Target Summary screen.
  For more information, see Monitor Target Compliance in the *Help for Enterprise Manager Mobile*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 5 (13.4.0.5).

- You can use the Enterprise Manager Mobile application to perform incident management for the entire IT infrastructure managed by Enterprise Manager.
  For more information, see Oracle Enterprise Manager Mobile.

Oracle Enterprise Manager App for Grafana

The Oracle Enterprise Manager App for Grafana is now available for download.

- Oracle Enterprise Manager App for Grafana v2.0.0 has two new out-of-the-box dashboards for WebLogic Server:

  – **WebLogic Server Performance Summary**

  – **WebLogic Server JVM Performance Report**

  For more information, see Sample Dashboards in the *Oracle Enterprise Manager App for Grafana User's Guide*.

  This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 7 (13.4.0.7).

- The Oracle Enterprise Manager App for Grafana allows you to integrate and display Oracle Enterprise Manager metrics data in Grafana. Oracle Enterprise Manager collects extensive metric data from various managed targets. This app allows you to leverage this data by extending Oracle Enterprise Manager's data visualization capabilities for added dashboard customization supported by Grafana.

  For more information, see About the Oracle Enterprise Manager App for Grafana in the *Oracle Enterprise Manager App for Grafana User's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 4 Update 3 (13.4.0.3).

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