

Oracle® Enterprise Manager Cloud Control Introduction



13c Release 5

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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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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.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

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](#)
- [Enterprise Manager Cloud Control Certification Information](#)

About Enterprise Manager Cloud Control 13c

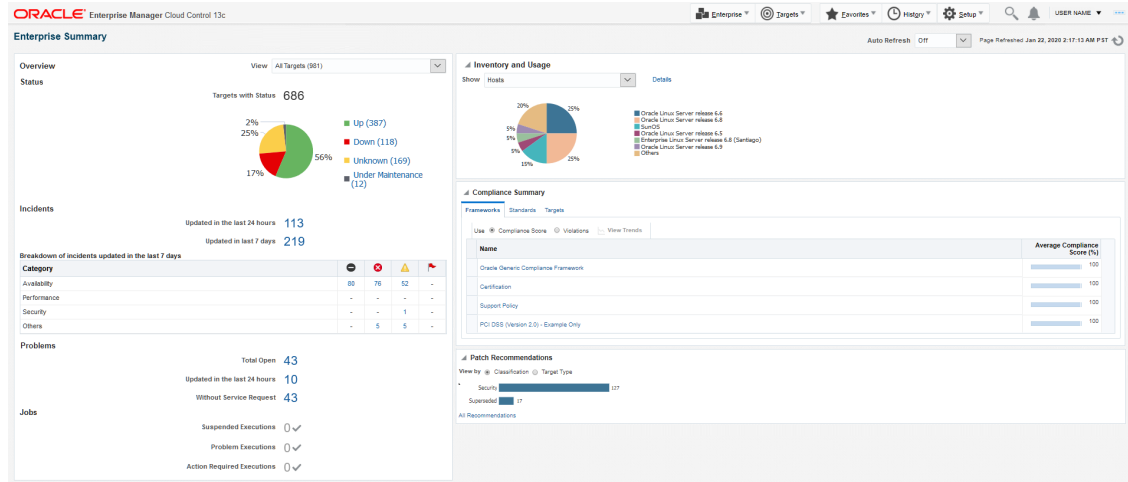
Oracle Enterprise Manager is Oracle's integrated enterprise information technology (IT) management product line, which provides the industry's only complete, integrated, and business-driven enterprise cloud management solution. Oracle Enterprise Manager creates business value for IT by leveraging the 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 Terminology

The following table lists the basic Oracle Enterprise Manager terms and concepts.

Term	Description
Association	An association is a relationship between two targets. For example, if a host target uses and depends on a web server target, an association should be created between the web server and the host.
Dashboard	A dashboard is a data visualization tool that gathers real-time data from the enterprise and displays them in easy-to-interpret widgets.
Event	An event is a significant occurrence on a managed target that typically indicates something has occurred outside normal operating conditions in an environment managed by Enterprise Manager. For example, events are raised when a target is detected to be down or when its performance metrics cross specified thresholds. For more information on events, see <i>Event Management in Oracle Enterprise Manager Cloud Control Monitoring Guide</i> .
Groups	Groups are an efficient way to organize, manage, and query the targets in your environment. There are two types of groups: static groups and dynamic groups. Static groups contain a fixed list of targets managed by the user and dynamic groups have their list calculated dynamically based upon filters the user provides.
Incident	An incident is a significant event or set of related significant events that need to be managed because it can potentially impact your business applications. These incidents typically need to be tracked, assigned to appropriate personnel, and resolved as quickly as possible. You perform these incident management operations through Incident Manager. For more information on incidents, see <i>Using Incident Management in Oracle Enterprise Manager Cloud Control Monitoring Guide</i> .

Term	Description
Metrics	Metrics are how you evaluate your targets. Metrics are separated into two main categories: configuration metrics and performance metrics. Configuration metrics represent slowly changing data about a target such as the host operating system version. Performance metrics represent dynamic data about a target which may change rapidly such as the host CPU Utilization (%).
Target	A target represents a monitored resource such as a database, a host, or an application server. Enterprise Manager collects configuration, availability, and performance metrics for each target and defines associations between different targets to represent their relationships.
Target Type	A target type describes the characteristics of the monitored resource.

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 JVM Engine](#)
- [About Oracle Analytics Server](#)
- [About Enterprise Manager Cloud Control Console](#)
- [About EMCTL](#)
- [About EM CLI](#)

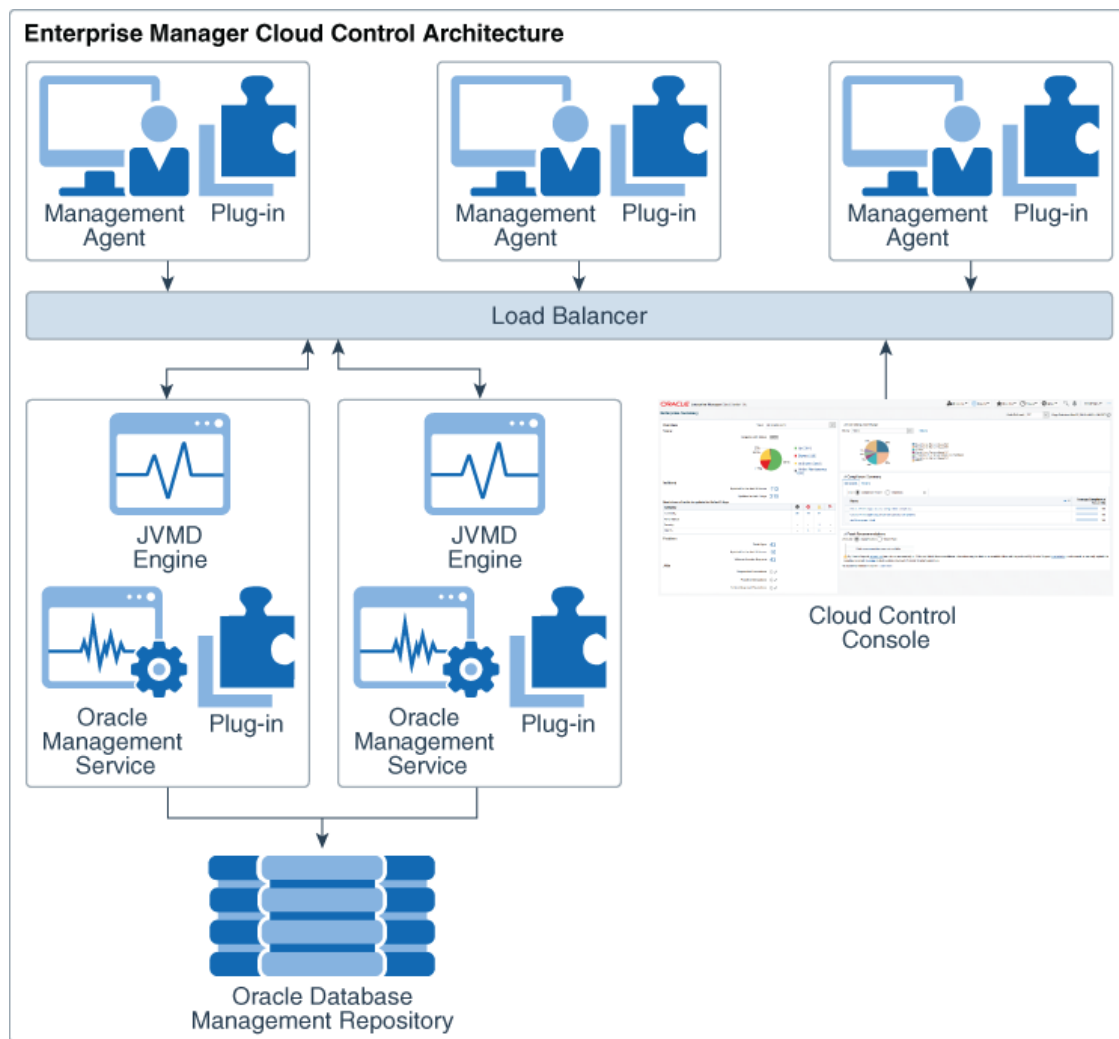
Architecture of Enterprise Manager Cloud Control

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 Database as a Service (DBaaS) and Infrastructure as a Service (IaaS).
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 Analytics Server

Starting with Oracle Enterprise Manager (EM) 13.5, Oracle Business Intelligence (BI) Publisher is no longer bundled with the EM installation or managed by the EM utilities, EMCTL and EMCLI. BI Publisher, rebranded as Oracle Analytics Server (OAS) v5.5.0 or above, needs to be installed independently of EM and managed by OAS utilities. Update all your EMCTL or EMCLI scripts that make references to BI Publisher verbs.

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 programmatically. 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*
- [About Oracle Data Masking and Subsetting](#) in *Oracle 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.

- 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.

Enterprise Manager Cloud Control Certification Information

This section describes how to obtain information on the products supported by Oracle Enterprise Manager in a release.

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, for example, 13.5.0.0.0.
4. Click **Search**.
5. In the **Certification Results** region, locate a target's supported versions by expanding its corresponding list. For example, expand the **Databases** list to view the supported versions of **Oracle Database (Managed Target)** and **MySQL Server (Managed Target)**.

2

New Features In Oracle Enterprise Manager Cloud Control 13c Release 5

This chapter provides an overview of the new features available in Oracle Enterprise Manager Cloud Control 13c Release 5 (13.5) 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](#)

In addition, Oracle Enterprise Manager 13.5 includes all the new capabilities introduced in Oracle Enterprise Manager 13.4, such as:

- [Database Migration Workbench](#)
- [Oracle Enterprise Manager Federation](#)
- [AWR Warehouse Diagnosability](#)
- [Support to Monitor Oracle Database Exadata Cloud Service and Oracle Database Exadata Cloud at Customer](#)
- [SCAP Compliance Standards](#)
- [Fleet Maintenance Single Instance Patching for Windows Deployments](#)
- [Oracle Enterprise Manager Mobile](#)
- [Oracle Enterprise Manager App for Grafana](#)

For a complete list of all new Oracle Enterprise Manager 13.4 features, see [New Features In Oracle Enterprise Manager Cloud Control 13c Release 4](#).

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 13.5 Release Update 25](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 24](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 23](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 22](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 21](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 20](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 19](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 18](#)

- [New Features in Oracle Enterprise Manager 13.5 Release Update 17](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 16](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 15](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 14](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 13](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 12](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 11](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 10](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 9](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 8](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 7](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 6](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 5](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 4](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 3](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 2](#)
- [New Features in Oracle Enterprise Manager 13.5 Release Update 1](#)
- [New Features in Oracle Enterprise Manager 13.5](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 25

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 25 (13.5.0.25).

- [REST APIs for Blackouts Management](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 24

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 24 (13.5.0.24).

- [Automated Migration of Oracle Management Service \(OMS\)](#)
- [Exadata Cloud Infrastructure Support for Multicloud@Azure](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 23

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).

- [Support for Including/Excluding Indirect Members in Dynamic Group](#)
- [Enterprise Manager Supports ADBs Configured Using ECPU](#)
- [Enterprise Manager Cloud Extension Capability](#)
- [Database Provisioning Failure Group Support During ASM Diskgroup Creation](#)
- [New CIS 1.2.0 Compliance Standards for Oracle Database 19c](#)

- [Support for Oracle Exadata 24.1 and Oracle Database 23ai](#)
- [New Management Packs for Advanced Management and Monitoring of Engineered Systems](#)
- [Exascale Monitoring](#)
- [EM CLI Verb Enhancement to Support *wallet_root* Location](#)
- [Enhancements and Addition to REST APIs](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 22

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 22 (13.5.0.22).

- [Cross Platform Enterprise Manager Repository Database Migration using RepMigrate Utility](#)
- [Holistic Patching](#)
- [SQL Analysis Tab for Real-time SQL Monitoring in Performance Hub](#)
- [Oracle DBSAT Compliance Standard Available for Pluggable and RAC Databases](#)
- [New Compliance Information Publisher Reports](#)
- [STIG Standards Version 2 Release 8 and 9 for Oracle Database 12c and 19c](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 21

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- [Support for FIPS 140-2 Standard Compliance](#)
- [Support for Metrics from Related Targets in Metric Step](#)
- [Runbooks Support for Metrics](#)
- [Support Links to EM Pages in Step Instructions and Note Steps](#)
- [Target Summary Dashboard](#)
- [View SQL Details in ADDM Spotlight](#)
- [Patch History](#)
- [Pre/Post Provisioning Script with Additional Fields](#)
- [Database Lifecycle Management and Cloud Management Pack Support for ExaDB-D](#)
- [New Lifecycle Maintenance History REST API](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 20

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).

- [Test OCI credentials](#)
- [Support for PAM-based Named Credentials in the EM Console](#)
- [ADDM Spotlight Enhancements in RU 20](#)
- [Fleet Maintenance Hub Supports Image and Version Creation](#)

- [Specify a Prefix for an Oracle Home Name](#)
- [New Chargeback Metric for Disabled PDBs](#)
- [Enhancement in REST API for Fleet Maintenance](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 19

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 19 (13.5.0.19).

- [Enable Automatic Re-evaluation of Metric Alerts](#)
- [Filter Findings and Recommendations by Category in ADDM Spotlight](#)
- [Workload Analysis on the Database Home Page](#)
- [New Chargeback Metric for PDB](#)
- [Enhancements in REST API for Fleet Maintenance](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 18

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- [Save Step Output into Runbook Variables](#)
- [Multi-event Type Support for Event Compression Policies](#)
- [View Widgets and Filters on the Dashboards Page](#)
- [Launch Widgets/Filters Table View Option in the Widgets and Filters Tabs](#)
- [Blocking Sessions Tab in Performance Hub](#)
- [ADDM Spotlight Enhancements in RU 18](#)
- [Downloading Database Migration Utilities Disabled by Default](#)
- [Signing off Database Migrations as Complete](#)
- [Redeploy an Oracle Home](#)
- [Fleet Maintenance – Upgrade Databases Using AutoUpgrade Utility](#)
- [New EMCLI Verb query_suppressed_recommendations](#)
- [STIG Standard Version 2 Release 7 for Oracle Database 12c and 19c](#)
- [Discover and Monitor Autonomous Exadata VM Clusters in Oracle Exadata Database Service on Dedicated Infrastructure Targets](#)
- [Enhancements in REST API for Fleet Maintenance](#)
- [Enhancements in REST API for Credentials Management](#)
- [Enhancements in REST API for Target Type](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 17

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- [Dynamic Runbooks Enhancements](#)
- [Export and Import Dashboards](#)

- [Auto-configuration of Widget Inputs](#)
- [Optional Inputs for the Group - Metrics - Line Widget](#)
- [Auto Licensing is Now Renamed to Default Settings](#)
- [Performance Hub Report](#)
- [ADDM Spotlight Enhancements in RU 17](#)
- [New EMCLI Verb `dg_convert_standby_to_cluster`](#)
- [New CIS 1.1.0 Compliance Standards for Oracle Database 19c](#)
- [Rollback Support for Failed Fleet Maintenance Updates](#)
- [Pre and Post Migration Analysis Dashboards Available for TTS based Migrations](#)
- [Support for Parallel Shutdown of Database Instances for Grid Infrastructure Patching](#)
- [Enhanced Search Functionality on Procedure Activity Page](#)
- [Support to Convert SNMP V2 to V3 at Scale for All Hardware Components in Exadata](#)
- [Enhancement in Metrics REST API to Get `currentThresholdSettings` Information](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 16

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- [Export/Import of User-defined Compression Policies](#)
- [SNMP Trap Notification Support for Incidents](#)
- [Add Input Parameters to Custom SQL Queries in Dashboards](#)
- [Customize Predefined SQL Queries in Dashboards](#)
- [New Event Annotations Feature in ADDM Spotlight](#)
- [User Name Link in ASH Analytics User Session in Performance Hub](#)
- [New Metrics to Monitor Multiple Data Guard Fast-Start Failover Observers](#)
- [Heat Map and ADO Available for PDBs](#)
- [Fleet Maintenance Hub](#)
- [STIG Standard Version 2 Release 6 for Oracle Database 12c and 19c](#)
- [Support to Migrate All Protected Database Backups from one ZDLRA to Another](#)
- [Modernized Workflow for Configuring Database Backup to ZDLRA](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 15

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- [Non-SYS User Support](#)
- [Proxy Credentials when Connecting to OCI](#)
- [New High Availability Role Target Property](#)
- [Webhooks and Slack Notification Methods](#)
- [Agent Preferred Connect String](#)

- [Job System Data Warehouse](#)
- [New Runbooks Features](#)
- [Oracle-Provided Dynamic Runbooks for Health Overview](#)
- [ADDM Spotlight Enhancements in RU 15](#)
- [Workload Tab in Performance Hub](#)
- [New PDB Mode Metrics for PDBs in RAC Instances](#)
- [TDE Support for Migration Workbench](#)
- [Fleet Maintenance Variables for Oracle Home Path and Working Directory](#)
- [Suppress Patch Recommendations for Compliance](#)
- [Migration Workbench Transportable Tablespace Pre-Migration Analysis Enhancements](#)
- [ZDLRA Recurring Archival Backup Job](#)
- [Advanced Customizations for Exadata Warehouse](#)
- [Exadata Warehouse Support for ExaDB-C@C Metric Data](#)
- [Oracle Enterprise Manager App for Grafana Version 4.0.0](#)
- [IBM Tivoli Netcool/OMNIbus REST Event Connector](#)
- [Database Maintenance REST Endpoints](#)
- [ZDLRA Management REST Endpoints](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 14

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- [Privileged Access Management Integration with Enterprise Manager](#)
- [New `resync_target` EMCLI Verb](#)
- [Integration with Oracle Fleet Patching and Provisioning](#)
- [STIG Standard Version 2 Release 5 for Oracle Database 12c and 19c](#)
- [Pre-Migration Analyzer for Transportable Tablespace Migrations](#)
- [Discover and Monitor Oracle Exadata Database Service on Dedicated Infrastructure Targets](#)
- [Credentials Management and Jobs Management REST Endpoints](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 13

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- [SQL Statistics Collection for Database Targets](#)
- [User-defined Event Compression Policies](#)
- [Aggregate Target Type Input in Widgets for Composite Targets](#)
- [RAW Metric Data in Out-of-the-Box Metric Widgets](#)
- [Widget Groups in Oracle Enterprise Manager Dashboards](#)

- [Agent Preferred Connect Descriptor field](#)
- [ADDM Spotlight](#)
- [Modernized Workflow for Configure Backup to Cloud](#)
- [Top Activity Lite in Performance Hub](#)
- [NFS Storage Type Support for Fleet Maintenance](#)
- [Incidents Tab in Oracle Exadata Infrastructure Home Page](#)
- [On-Demand Archival Backups for ZDLRA Protected Databases](#)
- [Global Target Properties, Target Type, and Updated Target REST Endpoints](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 12

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 12 (13.5.0.12).

- [Auto-generate Secure Passwords for Database Users and Database Monitoring Users](#)
- [Kerberos Credential Support for Migration Workbench](#)
- [New EXAchk AHF Compliance Standards for Cloud@Customer](#)
- [PDB Administrator Credentials for New PDB Migrations](#)
- [Support for Oracle Autonomous VM Clusters in Exadata Cloud Discovery](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 11

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- [Import/Export Published Runbooks and Define External Links](#)
- [Use Kerberos Credentials with Corrective Actions](#)
- [Include/Exclude Indirect Members in an Administration Group Hierarchy](#)
- [Event Compression Analysis](#)
- [Create Widgets Using Custom SQL Queries](#)
- [Workload Analysis in Oracle Enterprise Manager](#)
- [Oracle Database Vault for Autonomous Databases](#)
- [Graphical Explain Plan in Performance Hub](#)
- [Optimizer Environment and Outline Tabs for SQL Monitoring in Performance Hub](#)
- [STIG Standard Version 2 Release 4 for Oracle Database 12c and 19c](#)
- [New Force Flag for cleanup_cs_target_association](#)
- [Custom Pre and Post Scripts for Transportable Tablespace Migrations](#)
- [DBSAT Compliance Sensitive Data Assessment Report](#)
- [Encryption of Metadata Dump Files in Transportable Tablespace Migrations](#)
- [Migration Workbench Method Selection Moved to the Launch Page](#)
- [Use EMCLI to Switch from CellCLI to RESTful API for Monitoring](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 10

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- [New Features for Enterprise Manager-OCI Integration](#)
- [Job System Configuration](#)
- [Relevant Runbooks](#)
- [Data Masking and Subsetting for Autonomous Databases](#)
- [Migration Workbench Transportable Tablespace Non-CDB to Non-CDB Migrations](#)
- [Database Lifecycle Management and Private Cloud Management for ExaCC](#)
- [Auto-Purge Old Metric Data in Exadata Warehouse](#)
- [Chargeback Support for Unused Resources](#)
- [New Fixed Cost Item Type](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 9

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 9 (13.5.0.9).

- [Set Kerberos/RADIUS-based Named Credentials as Preferred Credentials for Database Targets](#)
- [User and Roles Creation Pages in JET UI](#)
- [Create Custom Widgets in Enterprise Manager Dashboards](#)
- [Exadata Tab in Performance Hub](#)
- [Discovery and Monitoring of Oracle Exadata Cloud@Customer Gen2](#)
- [User Management REST Endpoints](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 8

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 8 (13.5.0.8).

- [SSL/TLS Support](#)
- [Enterprise Manager Warehouse](#)
- [Event Compression](#)
- [Data Redaction Support for Autonomous Databases](#)
- [Provision and Clone Databases with a non-DBSNMP Monitoring User](#)
- [Use Non-root Users for Discovery and Monitoring](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 7

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- [Comprehensive OCI Data Export Statuses](#)

- [Leverage User Knowledge Via Dynamic Runbooks](#)
- [New Metric Group for PDBs](#)
- [Oracle Database Plug-in Metric Reference Manual Split Into Smaller Manuals](#)
- [New Configuration and Compliance Management Views](#)
- [Migration Workbench Multiphase Transportable Tablespace Migrations](#)
- [Fleet Maintenance Automatic Operating Scheduling](#)
- [Export Exadata Database Machine and ZDLRA Performance Metric Data to Exadata Warehouse and Analyze](#)
- [Chargeback Templates](#)
- [REST API for Oracle Enterprise Manager](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 6

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- [Monitor a Database Using Kerberos and RADIUS Authentication](#)
- [Automatic Password Rotation for SYSDBA and SYSDBG Monitoring Users](#)
- [Monitor a Database Using SYSDBG Privileges](#)
- [Multiple OCI Services can be Associated with the Same Bridge](#)
- [Updates to the `backup_database` EMCLI Verb](#)
- [STIG Standard Version 2 Release 2 for Oracle Database 11.2g, 12c, and 19c](#)
- [New EXAchk AHF Compliance Standards](#)
- [Cloud Pre-Migration Advisor Tool Available for On-Premises Migrations](#)
- [New Database Migration Workbench Guide](#)
- [Oracle Enterprise Manager App for Grafana version 3.0.0](#)
- [Connector Enhancements](#)
- [Jupyter Notebooks for Oracle Enterprise Manager Warehouse](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 5

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).

- [Rapid Platform Update](#)
- [Filters in Oracle Enterprise Manager Dashboards](#)
- [Oracle DBSAT Compliance Standard](#)
- [Migration Workbench Transportable Tablespace Migrations](#)
- [Update a Non-CDB to a New PDB Using Fleet Maintenance](#)
- [Support for Advanced ZDLRA Backup Anywhere Management](#)
- [Support for New Compliance Attributes for Protection Policies](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 4

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

- [Monitor a Database Using a Custom \(Non-DBSNMP\) User](#)
- [Create a Custom Dashboard](#)
- [New Compliance Rule Detail Tab](#)
- [Pluggable Database Update and Upgrade using Fleet Maintenance UI](#)
- [Cloud Pre-Migration Advisor Tool Available for Migration Workbench](#)
- [Monitor SI Server Target Using REST APIs](#)
- [Use Non-root User Credential for Monitoring SI Server and ZFS Target](#)
- [Support for ZDLRA Named Users](#)
- [New REST APIs for Onboarding Protected Databases with ZDLRA](#)
- [Chargeback for Oracle Cloud Infrastructure](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 3

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 3 (13.5.0.3).

- [New Out-of-the-Box Dashboards](#)
- [Agent Patching UI Enhancements](#)
- [New features for Autonomous Databases in Oracle Enterprise Manager](#)
- [New EXAchk AHF Compliance Standards](#)
- [Enterprise Manager Mobile Features](#)
 - [Deep Linking](#)
 - [Enhanced Group Filtering](#)
 - [Enterprise Manager Dashboards](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 2

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- [Oracle Enterprise Manager Dashboards](#)
- [Data Distribution Analysis and Visualization for Database Sharding](#)
- [Database Scheduler Jobs Metrics](#)
- [Support for Multiplex Locations in the `clone_database` and `create_standby_database` EMCLI Verbs](#)
- [New `convert_to` Option in the `dg_convert_standby` EMCLI Verb](#)
- [STIG Standards Release 18 for Oracle Database 12c](#)
- [Compliance Dashboard Enhancements](#)

- [New MTM Metric for Derived Association](#)

New Features in Oracle Enterprise Manager 13.5 Release Update 1

This section lists some of the new features available in Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- [Simplified Agent Patching](#)
- [Enterprise Manager Federation Group Filtering](#)
- [Security Assertion Markup Language \(SAML\) Support for Authentication](#)
- [Automatic Password Rotation for Non-DBSNMP Users](#)
- [Support for Parallelism in the `clone_database` and `create_standby_database` EMCLI Verbs](#)
- [Copy SQL Tuning Set from an On-premises Database to an Autonomous Database](#)
- [ignoreProtectionPolicies Property in ZDLRA Health and Protected Database metrics](#)
- [Automatic Detection of Database Role Changes](#)
- [Support for Database Backup to OCI Object Storage Using SWIFT Endpoints](#)
- [Enhancements and Additions to Sensitive Data Types](#)
- [New Fleet Maintenance UI](#)
- [Migration Workbench Functionality Enhancement](#)
- [Oracle Database 21c Support for Provisioning, Upgrading, and Patching](#)
- [CIS Compliance Standards for Oracle Database 19c](#)
- [Self Update for Compliance Standards](#)
- [New Search Bars for Configuration and Compliance](#)
- [Enterprise Manager Mobile Features](#)
 - [Group Filtering](#)
 - [Share Details](#)
 - [Incident Manager Enhancements](#)

New Features in Oracle Enterprise Manager 13.5

This section lists the new features available in Oracle Enterprise Manager 13.5.

- [Enhancement to the Software Only Option](#)
- [WebLogic Certificates Management](#)
- [Improved EM Prerequisite Kit](#)
- [Simplified Installation and Reduced Footprint](#)
- [Ability to Use Oracle Cloud Infrastructure Services](#)
- [Support for REST-based Connectors](#)
- [Oracle Enterprise Manager Compliance Standards](#)
- [Improved Job System Diagnostics](#)
- [New verb `cleanup_cs_target_associations`](#)

New Features by Focus Area

This section lists new features categorized by focus area.

- [Installation and Upgrade](#)
- [Configuration, Security, and Maintenance](#)
- [Enterprise Monitoring](#)
- [Database Management](#)
 - [Database Lifecycle Management](#)
 - [Engineered Systems Management](#)
- [Cloud Management](#)
- [Extensibility and Integration](#)
- [Enterprise Manager Mobile](#)

Installation and Upgrade

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

- **Automated Migration of Oracle Management Service (OMS):** The OMS can now be migrated to a different host using a new deployment procedure and a few guided configuration steps.
For more information, see *Oracle Management Service Migration in Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 24 (13.5.0.24).
- **Non-SYS User Support:** You can now configure Oracle Enterprise Manager with a non-SYS admin user during the installation, patching and plug-ins deployment. The removal of the dependency on the SYS user allows administrators to use an admin user for these tasks since organizations continue to lock privileged credentials like the SYS database user, allowing Enterprise Manager administrators use another user, a non-SYS user, to perform those activities.
For more information, see:
 - *Workflow Installing an Enterprise Manager System Using Software Only Install and Configuring Later in Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*
 - *Patching with Non-SYS User (Admin User) in Oracle Enterprise Manager Cloud Control Administration Guide*
 - *Deploying Plug-Ins to Oracle Management Service (Reduce OMS Restart time and Downtime) in Oracle Enterprise Manager Cloud Control Administration Guide*
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).
- **SSL/TLS Support:** You can now configure Oracle Enterprise Manager with an SSL-enabled repository database during an installation or an upgrade, using the Software-Only method. You can also reconfigure an existing Oracle Enterprise Manager 13.5 deployment for more secure TLSv1.2 communication between the OMS and the Enterprise Manager Repository.
For more information, see:

- Installing Enterprise Manager Using the Software-Only with Plug-ins Method in *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*.
- Upgrading Oracle Management Service and Oracle Management Repository to 13c Release 5 in *Oracle Enterprise Manager Cloud Control Upgrade Guide*.
- Configure TLSv1.2 for Communication with the Enterprise Manager Repository in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 8 (13.5.0.8).

- **Rapid Platform Update:** Rapid Platform Update introduces a new method to patch the OMS with the system being up during most of the patching activity. This reduces the maintenance window for patching when compared with previous releases, thus increasing the monitoring of critical targets during planned maintenance. For more information, see Rapid Platform Update in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).

- **Simplified Agent Patching:** Agent System Patches now consolidate all platform and plug-in patches into a single system patch, thus simplifying patch tracking and deployment. For more information, see Agent System Patches in *Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Enterprise Manager Federation Group Filtering:** You can now consolidate multiple Enterprise Manager deployments using group filtering. For more information, see Configuring Enterprise Manager Federation in *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Enhancement to the Software Only Option:** The software only option for the Oracle Enterprise Manager 13c Release 5 Installation and Upgrade process has been enhanced. Oracle Enterprise Manager 13c Release 5 installation wizard now offers the option to perform a software only install or upgrade. For more information, see Installing the Enterprise Manager Using the Software-Only Method in *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide* and Upgrading the OMS and the Management Repository to 13c Release Using the Software-Only Method in Graphical Mode Along With Plug-ins in *Oracle Enterprise Manager Cloud Control Upgrade Guide*.

- **WebLogic Certificates Management :** Oracle Enterprise Manager 13c Release 5 can now carry over the existing custom WebLogic certificates when performing an upgrade. For more information, see Custom Certificates Configured for OMS and Management Agent Are Reused After Upgrading to Enterprise Manager Cloud Control 13c in *Oracle Enterprise Manager Cloud Control Upgrade Guide*.

- **Improved EM Prerequisite Kit:** Ensures that your environment meets all the repository requirements during installation or upgrade. These improvements include:
 - Consolidated repository database related checks available in a single pane view
 - Prerequisite check results in HTML format
 - AutoFix option to reduce the manual effort of applying
 - Standalone execution of the prerequisite kit before Installation or Upgrade process

For more information, see *Oracle Enterprise Manager Cloud Control Basic Installation Guide*, *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide* and *Oracle Enterprise Manager Cloud Control Upgrade Guide*.

- **Simplified Installation and Reduced Footprint:** The reporting framework is now set up outside of the Oracle Enterprise Manager installation, thereby simplifying the installation process. BI Publisher support is replaced with the standalone setup of Oracle Analytics Server (OAS).

For more information, see Standalone Oracle Analytics Server in *Oracle Enterprise Manager Cloud Control Administration Guide*.

Configuration, Security, and Maintenance

This section describes new features and enhancements for Configuration, Security, and Maintenance.

- **Cross Platform Enterprise Manager Repository Database Migration using RepMigrate Utility:** You can now perform cross platform Enterprise Manager Repository Database migration using the **RepMigrate** utility which reduces the complexity of the migration process.

For more information, see Cross Platform Enterprise Manager Repository Database Migration in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 22 (13.5.0.22).

- **Holistic Patching:** You can now manage the Enterprise Manager security updates (CPU patches) in an efficient way and minimize the downtime by using holistic patching.

For more information, see Holistic Patching in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 22 (13.5.0.22).

- **Support for FIPS 140-2 Standard Compliance:** You can now run Oracle Enterprise Manager, 13c Release 5 compliant with the Federal Information Processing Standard Publication 140-2 (FIPS 140-2).

For more information on how to make sure all EM components run in FIPS mode, see Oracle Enterprise Manager FIPS140-2 Settings in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **Test OCI credentials:** The Oracle Cloud Infrastructure (OCI) account credentials used for connecting to OCI from Enterprise Manager are saved as named credentials. You can now test the named credentials in Enterprise Manager to ensure the proper working of the credentials and connectivity to OCI.

For more information, see Test OCI Credentials in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).

- **Support for PAM-based Named Credentials in the EM Console:** You can now create PAM-based named credentials in the Enterprise Manager console after you simply register the PAM provider with EM and create the credentials mapping with EM credentials attributes. This simplifies the workflow, offering a user-friendly approach to managing PAM-based named credentials within the Enterprise Manager console.

For more information, see PAM Configuration in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).

- **Proxy Credentials:** You can now provide proxy credentials when connecting to the cloud to transfer data.
For more information, see Step 1: Export Enterprise Manager Data to OCI in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Privileged Access Management Integration with Oracle Enterprise Manager:** You can now use a **Privileged Access Management (PAM)** solution to mitigate the risk of privileged access to accounts, credentials, and operations that offer an elevated level of access. PAM solutions deployed as on-premises software, Software-as-a-Service or hardware appliances integrate with Enterprise Manager to allow you to perform management tasks such as database patching using Fleet Maintenance, running host commands and jobs, compliant with your security requirements.
For more information, see Privileged Access Management Integration in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- **Set Kerberos/RADIUS-based Named Credentials as Preferred Credentials for Database Targets:** New out-of-box Preferred Credential sets (*Normal Database Credentials (Advanced)* and *SYSDBA Database Credentials (Advanced)*) allow you to associate Kerberos/Kerberos Keytab or RADIUS Named Credentials to these credential sets for Oracle Database, RAC, and Pluggable Database target types.
For more information, see Setting Kerberos/RADIUS-based Named Credentials in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 9 (13.5.0.9).

- **User and Roles Creation Pages in JET UI:** The **User Creation** and **Roles Creation** pages have been updated to Oracle JET UI. To access these pages, select **Security** from the **Setup** menu.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 9 (13.5.0.9).

- **Monitor a Database Using Kerberos and RADIUS Authentication:** Kerberos and RADIUS authentication can now be used for Oracle Database, Pluggable database, and RAC database target types.
For more information, see Kerberos and RADIUS Authentication in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **Security Assertion Markup Language (SAML) Support for Authentication:** You can now configure Oracle Enterprise Manager with SAML, which is an open standard that allows a seamless, single sign-on login.
For more information, see Supported Authentication Schemes in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

Enterprise Monitoring

This section describes new features and enhancements for Enterprise Monitoring.

- **Support for Including/Excluding Indirect Members in a Dynamic Group:** As aggregate targets are added to a dynamic group, all members of the aggregate target are, by default, also added to the group. Using the **Indirect Members** drop-down menu, you now have the option to include or exclude any indirect member targets as part of the dynamic group. For more information, see *Creating Dynamic Groups in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).

- **Support for Metrics from Related Targets in Metric Step:** Using the Metric Step, you can now show metric timeseries data from other targets. For example, if your incident was on a database, then in the runbook for the database incident, you may want to show related metrics from its underlying host. For more information, see *Creating Dynamic Runbooks in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **Runbooks Support for Metrics:** You can now create and use Dynamic Runbooks for metrics. This allows you to store and use procedures for triaging issues related to performance, capacity, and load even before the metric has crossed its alert thresholds. This feature can be accessed from the **All Metrics** page of the target homepage. For more information, see *Working with Dynamic Runbooks in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **Support Links to EM Pages in Step Instructions and Note Steps:** In your runbooks, you can now include a link to any Enterprise Manager page. This enables users of your runbooks to quickly access these pages in context of a triage step. The links can be specified to always go to a specific page, or can be parameterized using variables whose values will be populated from the runbook context, for example, your link may go to the homepage of the target on which the incident has occurred. For more information, see *Creating Dynamic Runbooks in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **Target Summary Dashboard:** The **Target Summary** dashboard is now available as part of the Enterprise Manager out-of-the-box dashboards. This dashboard provides an overview of the health, metrics, incidents, compliance, and jobs for a target. For more information, see *Out-of-the-Box Enterprise Manager Dashboards in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **Enable Automatic Re-evaluation of Metric Alerts:** You can now enable Enterprise Manager to automatically re-evaluate a metric alert after the Corrective Action has been executed, rather than waiting for the next collection schedule. For more information, see *Enabling Re-evaluation of Metric Alerts after Corrective Action Execution in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 19 (13.5.0.19).

- **Save Step Output into Runbook Variables:** When defining a step, you can now dynamically assign data from the output of the step to populate values of author-defined Runbook variables. This allows the author to dynamically fill in values (based on steps they create) without further intervention by the session user, making Runbooks more powerful for the author and easier to use for the session user.

For more information, see Using Dynamic Runbooks in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Multi-event Type Support for Event Compression Policies:** You can now define event compression policies that compress events of different event types (Target Availability, Metric Alert, and so on). This enables a broader set of events to be compressed, resulting in a smaller set of actionable incidents.


For more information, see Event Compression Policies in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **View Widgets and Filters on the Dashboards Page:** On the **Dashboards** page, you can now:
 - Click **Show widgets** to view the list of available out-of-the-box and custom widgets on the **Widgets** page and perform tasks such as filtering the list of widgets and duplicating or deleting custom widgets.
 - Click **Show filters** to view the list of available filters on the **Filters** page.

For more information, see Using Dashboards in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Launch Widgets/Filters Table View Option in the Widgets and Filters Tabs:** The  (Launch widgets/filters table view) icon is now available in the **Widgets** and **Filters** tabs. When creating or editing a dashboard, click the **Launch widgets table view** icon in the **Widgets** tab to view the widget library in a tabular format. On the **Widget library table view** page, you can filter the list of widgets and click **Apply changes to widget library** to view the filtered list in the **Widgets** tab. You can perform the same tasks for filters by clicking the **Launch filters table view** icon in the **Filters** tab.

For more information, see Creating a Custom Dashboard in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Dynamic Runbooks Enhancements:** The following Dynamic Runbooks features are now available:
 - The user of the runbook session may add comments at the runbook session level or for each step in the runbook. These comments could include observations or notes that the user wants to keep as it pertains to the step. Other EM users who have access to the incident for which the runbook session has been created may also add their comments as well. These comments could be used to provide helpful hints or suggestions to the user who is currently executing the steps in the runbook session.

- Runbook variables can be used as bind parameters on SQL, but that is not allowed for DDL statements. This allows for the use of runbook variables to substitute the values in the DDL SQL statements prior to them being submitted for execution in the REST API.
- The **Metric** step of Dynamic Runbooks shows the time series chart for the metric used in the runbook. This chart has now been enhanced to show lines representing the current warning and critical thresholds for the metric. This allows you to evaluate the metric trend against warning and critical thresholds.

For more information, see Using Dynamic Runbooks in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Export and Import Dashboards:** You can now export a custom dashboard with its widgets and filters in JSON format, and import it to a different environment. For more information, see Export and Import Dashboards in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Auto-configuration of Widget Inputs:** Some of the widget inputs, such as **Aggregate Target Name**, are automatically linked to the **Aggregate Target Name** filter and the **Configure <Name> Input for <Widget Name> (Required)** dialog is not displayed. This enhancement improves usability and multiple dialogs are not displayed when adding a widget to a dashboard. If you want to make changes to the widget input that is automatically linked to a filter, you can do so in the **Edit Widgets** tab. For more information, see Creating a Custom Dashboard in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Optional Inputs for the Group - Metrics - Line Widget:** A new optional widget input, **Key Aggregate Function**, can be used to configure input for the **Group - Metrics - Line** widget. Using this widget input option, you can aggregate multiple key metric values for a target. **Average** is the default function, however, you can edit the **Key Aggregate Function** input and select **Min**, **Max**, or **Sum** functions. In addition, the **Rollup Column** widget input option for the **Group - Metrics - Line** widget can now be edited and you have the option of selecting the **Min** and **Max** functions. Previously, only the **Average** function was available for this widget input option.

For more information, see Using Out-of-the-Box Metric Widgets in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Auto Licensing is Now Renamed to Default Settings:** The **Auto Licensing** pack access option on the **Management Pack Access** page is now renamed to **Default Settings**. For more information, see Enabling and Disabling Management Packs in Oracle Enterprise Manager in *Oracle Enterprise Manager Cloud Control Licensing Information User Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Export/Import of User-defined Compression Policies:** You can now export the user-defined event compression policies you created in one Oracle Enterprise Manager site and import them into another Enterprise Manager site.

For more information, see Event Compression Policies in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **SNMP Trap Notification Support for Incidents:** You can now create a rule to send Simple Network Management Protocol (SNMP) traps for incidents to third-party management tools. The incidents may contain compressed events. For more information, see *Creating a Rule to Send SNMP Traps for Incidents to Third Party Systems* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **Add Input Parameters to Custom SQL Queries in Dashboards:** You can now configure input parameters when creating widgets using custom SQL queries in Oracle Enterprise Manager. To do so, replace a part of the custom SQL query with a bind variable marker that acts as a placeholder for the input parameter and configure a custom input value. You can add regular input parameters or time input parameters to the SQL query. For more information, see *Creating a Widget Using Custom SQL* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **Customize Predefined SQL Queries in Dashboards:** You can now edit the predefined SQL queries provided to create a query-based widget and customize them to meet your requirements. To do so, select a predefined SQL from the **SQL Selector** drop-down list and click the **Convert to Custom SQL** check box. The predefined SQL query is now customizable and you can make changes to it similar to a custom SQL query. For more information, see *Creating a Widget Using Predefined SQL* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **New High Availability Role Target Property:** The user-defined 'High Availability Role' target property allows you to distinguish a database's role: primary or standby. When a database role change occurs, Oracle Enterprise Manager automatically updates this user-defined target property value, if defined, with the new database role (primary or standby). You can then apply this property towards your Dynamic Groups or Administration Groups. For more information, see *Planning an Administrative Group* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Webhooks and Slack Notification Methods:** Using the Oracle Enterprise Manager Generic Webhook, you can send event and incident notifications to any application that accepts webhook requests, such as Slack, and can parse payload specific content. The webhook payload format depends on the type of event. You have to provide the structure for the payload to map Enterprise Manager to the external software. For more information, see *Sending Notifications Using Webhooks and Slack* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Agent Preferred Connect String:** Allows you to provide the `Service Name` you want to use for database connectivity in all the areas where add or discover a new database target instance takes place.

For more information, see Agent Preferred Connect String in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Job System Data Warehouse:** The data warehouse feature enables the job system to preserve historical job summary data in a new table called `EM_JOB_FINISHED_EXECS`, allowing you to:
 1. Diagnose issues faster
 2. Triage failures
 3. Analyze historical trends

For more information, see Job System Data Warehouse in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **New Runbooks Features:**
 1. **Oracle-provided Runbooks:** These are predefined runbooks of various types that help you diagnose and resolve different incidents.
 2. **Rule Creation to Designate a Dynamic Runbook for an Incident:** After creating and publishing a runbook as part of Event Rule actions, you can designate specific runbooks to be used for an incident.
 3. **New OS Command Step:** The **OS Command Step** is the first new step type for which Runbooks allows the execution of a script or command as a part of the step. This functionality allows the execution of a single operation, as you would do on the command line or will allow for the specification of an interpreter to be used to execute a script that is entered as a part of the step definition.

For more information, see Using Dynamic Runbooks in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Oracle-Provided Dynamic Runbooks for Oracle Enterprise Manager Health Overview:** You can now use the Oracle-provided dynamic runbooks to diagnose and resolve different incidents with your Enterprise Manager environment. You can find the runbooks under **Health Overview**, which provides a comprehensive overview of the OMS and Repository operation and performance.
For more information, see Health Overview in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **New `resync_target` EMCLI Verb:** The `resync_target` verb reads the target data collection, the Metric Extension attachments and deployment settings, and sends it to the agent in order to remain synchronized with the OMS. This verb can be used to synchronize targets when reports indicate that the OMS and agent target collection settings do not match, or that the metric extension deployment or attachment is missing, or if the alerts are not generated as expected.
For more information, see `resync_target` in *Oracle Enterprise Manager Cloud Control Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- **SQL Statistics Collection for Database Targets:** If you are using the OCI Operations Insights (OPSI) service, you can take advantage of the SQL Statistics Daily data object exposed through SQL Explorer. It includes SQL performance statistics collected continuously on Operations Insights-enabled databases. Starting with the Database Plug-in version 13.5.0.13, the same SQL performance statistics metrics are also automatically collected from databases managed by Oracle Enterprise Manager. When enabling data export from Enterprise Manager to OCI, these new statistics will be exported to an OCI Object Storage bucket. Therefore, you can now perform the same SQL analysis on Enterprise Manager managed-databases, using Operations Insights. For information on the SQL Statistics Daily data object, see [SQL Statistics Daily](#) in Oracle Cloud Infrastructure documentation.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **User-defined Event Compression Policies:** Event compression policies serve as a noise reduction mechanism and state the condition under which multiple correlated events are grouped together in one incident. In addition to the out-of-box policies supplied by Oracle, Enterprise Manager now allows users to define their own custom event compression policies. For more information, see Event Compression Policies in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Aggregate Target Type Input in Widgets for Composite Targets:** You can now configure the Aggregate Target Type input for the data displayed in a widget. The default aggregate target type option is **Group**, however, you can edit the widget inputs and select other aggregate target types such as **Cluster ASM** and **Database System**. For information on how the Aggregate Target Type input is used in the out-of-the-box **Group - Metrics - Line** widget, see Using Out-of-the-Box Metric Widgets in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **RAW Metric Data in Out-of-the-Box Metric Widgets:** If you opt to display metric data for less than two days in out-of-the-box metric widgets, namely **Target - Metric - Line** and **Group - Metrics - Line**, the metric data is obtained from RAW data. For more information, see Using Out-of-the-Box Metric Widgets in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Widget Groups in Oracle Enterprise Manager Dashboards:** You can now add a widget group container to group related widgets in a new or existing dashboard. For more information, see Adding a Widget Group in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Agent Preferred Connect Descriptor field:** The Agent Preferred Connect Descriptor field is a new optional field in the existing Pluggable Database (PDB) discovery workflow. If an Agent Preferred Connect String is specified, it will be used by the agent for the monitoring connection to the PDB. In addition, you can set the Agent Preferred Connect Descriptor for

an already discovered PDB via the `AgentPreferredConnectionString` target property using the EMCLI `modify_target` command.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Auto-generate Secure Passwords for Database Users and Database Monitoring Users:** The password rotation job now supports the auto-generation of new passwords based on a specified reference password that is compliant with the current password policy in effect for all databases where this job is run. This ensures that all newly generated passwords comply with current password security policies.
For more information, see Automate Monitoring User Password Management in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 12 (13.5.0.12).

- **Import/Export Published Runbooks and Define External Links:** You can import or export published Dynamic Runbook definitions, thus allowing you to leverage existing Runbooks to create new ones. Additionally, you can now specify links to external websites and MOS notes within *Note* steps.
For more information, see Exporting and Importing Dynamic Runbooks and Creating Dynamic Runbooks in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Use Kerberos Credentials with Corrective Actions:** The *Add Space to Tablespace (Advanced)* corrective action is now available and can be used with Kerberos credentials.
For more information, see Using Kerberos Credentials with Corrective Actions in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Include/Exclude Indirect Members in an Administration Group Hierarchy:** When creating an administration group hierarchy, you can now specify whether to include or exclude indirect members. Indirect members are targets whose target properties DO NOT match administration group criteria but have been added to the administration group because their parent target is a direct member of the administration group.
For more information, see Group Member Type and Synchronization in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Event Compression Analysis:** You can now analyze the impact Event Compression Policies would have on events and incidents over a selected period in the past.
For more information, see Event Compression Policies in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Create Widgets Using Custom SQL Queries:** You can now create a widget using custom SQL queries in Oracle Enterprise Manager dashboards. The custom SQL queries enable you to query data from an Oracle Enterprise Manager Management Repository view and use the available visualization options to visualize the data in a widget.
For more information, see Creating a Widget Using Custom SQL in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **New Features for Enterprise Manager-OCI Integration**

- **Data Export Monitoring:** You can now monitor the health of Enterprise Manager data export to OCI using Incident Manager. Export jobs moving information from Enterprise Manager to OCI can now be monitored directly via Incident Manager. Incident rules can be created to notify administrators automatically for quick data export issue resolution.
For more information, see *Monitoring Data Uploads from Enterprise Manager* in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.
- **Source Validation:** You can perform validation for an individual data source. The **Run Diagnostics** option is now available at the target level from the action menu.
For more information, see *Viewing Data Upload Status for a Service* in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.
- **Save Source Diagnostics:** Content of the Diagnostics table can now be saved to a comma-separated value (CSV) file for further analysis.
For more information, see *Viewing Data Upload Status for a Service* in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Job System Configuration:** The Job System Console's Dispatcher dashboard now allows you to modify dispatcher configuration parameters directly.
For more information, see *Dispatcher* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Relevant Runbooks:** Incident Manager allows you to view the top (up to three) Runbooks that may be relevant to a specific incident based on a computed Relevance Score.
For more information, see *Advanced Operations and Configuration (Relevant Runbooks)* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Create Custom Widgets in Enterprise Manager Dashboards:** You can now create a custom widget to visualize Oracle Enterprise Manager data relevant to you and add it to a new or existing dashboard.
For more information, see *Creating a Query-based Widget* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 9 (13.5.0.9).

- **Enterprise Manager Warehouse:** Enterprise Manager (EM) Warehouse extracts performance, configuration, and target inventory data from one or more Enterprise Manager repositories and stores it in an Autonomous Data Warehouse (ADW) in Oracle Cloud.
For more information, see *Enterprise Manager Warehouse*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 8 (13.5.0.8).

- **Event Compression:** Event Compression lets you filter out extraneous incident alerts caused by the excessive triggering of underlying events. The creation of these filters is simplified by allowing you to specify global compression policies that group correlated events into a single incident.
For more information, see *Compressing Multiple Events into a Single Incident* in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 8 (13.5.0.8).

- **Comprehensive OCI Data Export Statuses:** Comprehensive data export statuses have been added for Enterprise Manager targets exporting data to OCI. For more information, see Viewing Data Upload Status for a Service in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- **Leverage User Knowledge Via Dynamic Runbooks:** Dynamic Runbooks increase efficiency when analyzing and resolving incidents by leveraging user expertise in an organization. Experienced users create an automated series of steps (a Dynamic Runbook) that captures their expertise in using Enterprise Manager functionality to solve a problem. Any user can then execute the defined Dynamic Runbook to triage similar incident conditions. For more information, see Using Dynamic Runbooks in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- **Automatic Password Rotation for SYSDBA and SYSDG Monitoring Users:** Automatic password rotation can now be invoked by Oracle Database monitoring users with SYS* roles such as SYSDBA and SYSDG. For more information, see Automate Monitoring User Password Management in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **Monitor a Database Using SYSDG Privileges:** Oracle Enterprise Manager now allows users who have been granted Data Guard SYSDG administrator privileges as monitoring credentials for discovering and monitoring Oracle Database targets. For more information, see Monitoring with SYSDG Privileges in *Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **Multiple OCI Services can be Associated with the Same Bridge:** A single OCI bridge can now be used for multiple OCI services. For more information, see Integrating OCI Services with Enterprise Manager in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **Filters in Oracle Enterprise Manager Dashboards:** A new **Filters** feature is now available in Oracle Enterprise Manager dashboards, using which you can narrow down and view data within the context of a selected filter. You can add filters when customizing an out-of-the-box dashboard or creating a new dashboard. For more information, see Using Dashboards in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).

- **Monitor a Database Using a Non-DBSNMP User:** Oracle Enterprise Manager now allows non-dbsnmp users as monitoring credentials for discovering and monitoring Oracle Database targets. Previously, only the *dbsnmp* user could be used as monitoring credentials for monitoring Oracle Database targets.

For more information, see *Specifying New Target Monitoring Credentials in Enterprise Manager* in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

- **Create a Custom Dashboard:** You can now create a custom dashboard and add Oracle-defined widgets to the dashboard. In addition, you can also add widgets when customizing Out-of-the-Box dashboards.

For more information, see *Using Dashboards in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

- **New Out-of-the-Box Dashboards:** The following new out-of-the-box dashboards are now available as part of Enterprise Manager dashboards:
 - Federation Summary – By Sites
 - Federation Summary – By Groups

For more information, see *Out-of-the-Box Enterprise Manager Dashboards in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 3 (13.5.0.3).

- **Agent Patching UI Enhancements:** The **Agents** page table has an additional column showing the RU version. The **NMO Errors** page now indicates whether any agents did not run `root.sh`. For both UI enhancements, the user needs to select the column in order to display the information.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 3 (13.5.0.3).

- **Oracle Enterprise Manager Dashboards:** You can now use Enterprise Manager dashboards, which are data visualization tools that gather real-time data from the enterprise and display them in easy-to-interpret widgets. In the initial release, the following out-of-the-box dashboards are available in Enterprise Manager and you can customize these dashboards to meet your requirements:

- Enterprise Summary
- Group Summary

For more information, see *Using Dashboards in Oracle Enterprise Manager Cloud Control Monitoring Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **Automatic Password Rotation for Non-DBSNMP Users:** For users that are not the default monitoring user for database targets, you can use the *Change the Password for a Database User* job type to automate password rotation.

For more information, see *Automate Non-monitoring User Password Management in Oracle Enterprise Manager Cloud Control Security Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Ability to Use Oracle Cloud Infrastructure Services:** You can now use Oracle Cloud Infrastructure services (Logging Analytics and Operations Insights) against databases within your Oracle Enterprise Manager environment.

For more information, see Integrating Enterprise Manager with OCI Services in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

- **Support for REST-based Connectors:** In addition to SOAP, REST is now supported when developing ticketing connectors.
For more information, see Building a Ticketing Connector in *Oracle Enterprise Manager Cloud Control Connectors Integration Guide*.
- **Oracle Enterprise Manager Compliance Standards:** Sizing compliance standard rules are now built into Oracle Enterprise Manager. By default, Enterprise Manager checks the Enterprise Manager repository target against these rules and will send alerts suggesting changes for optimal performance.
For more information, see Compliance Standards in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.
- **Improved Job System Diagnostics:** Improved Job System Diagnostics Dashboards and ability to drill down into new health metrics such as Health for Jobs, Queues, and Dispatchers.
For more information, see Diagnosing Job System Issues in *Oracle Enterprise Manager Cloud Control Monitoring Guide*.

Database Management

This section describes new features and enhancements for Database Management.


- **Enterprise Manager Supports ADBs Configured Using ECPU:** Oracle Enterprise Manager is now certified to support Autonomous Databases that are configured using the ECPU compute model. An ECPU is an abstracted measure of compute resources. ECPUs are based on the number of cores, elastically allocated from the shared pool of Exadata database servers and storage servers.
For more information on ECPU, see [Compute Models in Autonomous Database](#).

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).
- **Enterprise Manager Cloud Extension Capability:** You can now take advantage of the OCI Ops Insights service's rich functionality directly in the Oracle Enterprise Manager interface with the new Enterprise Manager Cloud Extension capability. With this enhancement, you can view SQL performance insights, database capacity planning, and forecasting information in the context of a database, right on the **Database Resource** page in Enterprise Manager.
For more information, see Viewing Cloud Extension Data in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).
- **SQL Analysis Tab for Real-time SQL Monitoring in Performance Hub:** The **SQL Analysis** tab is now available on the **Real-time SQL Monitoring page for <SQL ID>** in Performance Hub and it has the following sections:
 - **SQL Analysis:** Displays a list of analytical messages provided by Oracle optimizer, which provide useful information at the plan line level to improve SQL performance.
 - **Failed Hints:** Displays a list of hints intended for the SQL execution but were not used by the database.
 - **Successful Hints:** Displays a list of hints that were successfully applied on the SQL execution.


You can click the **Line ID** number in each of these sections to go to the actual plan line in the **Plan Statistics** tab to view more information.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 22 (13.5.0.22).

- **View SQL Details in ADDM Spotlight:** In **ADDM Spotlight**, you can now navigate to the **SQL Details** page for SQL-related recommendations. To do so:
 1. On the **Findings** or **Recommendations** tab, click the number displayed in the **Recommendations** column.
 2. In the **Recommendations for Finding: Top SQL Statements** section, click the  icon for the SQL statement whose details you want to view, and then click **View SQL Details**.

The **SQL Details for <SQL_ID>** page is displayed for the SQL statement with details for the time range selected in **ADDM Spotlight**. Note that this page is the same as the **SQL Details** page in Performance Hub.


This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **ADDM Spotlight Enhancements in RU 20:** The following **ADDM Spotlight** features are now available:
 - **Display Event Annotations for Maintenance Windows:** You can now display event annotations for database maintenance windows in the **Summary** chart in **ADDM Spotlight**. A maintenance window is a contiguous time interval during which automated maintenance tasks are run. To view the event annotations for maintenance windows:
 1. In the **Findings** or **Recommendations** tab, select the **Include Event Annotations** check box above the **Summary** chart. A field with the **Configuration Change** and **State Change** event options is displayed adjacent to the **Include Event Annotations** check box.
 2. Click within the field adjacent to the **Include Event Annotations** check box and select **Maintenance Window**. The **Summary** chart now displays **Maintenance Window** events in addition to the **Configuration Change** and **State Change** events. You can hover the mouse over the downward facing arrows denoting events to view event details.
 - **Edit Database Parameters:** You can now navigate from **ADDM Spotlight** to the **Initialization Parameters** page to edit database parameters. In the **Findings**, **Recommendations**, and **Database Parameters** tabs, you can click the  icon for a database parameter-related finding, recommendation, or a database parameter that has high impact or non-default values, and click **Edit Database Parameters**. A new tab opens up with the **Initialization Parameters** page, which is filtered to only show the specific database parameter, and you can edit it.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).

- **Filter Findings and Recommendations by Category in ADDM Spotlight:** You can now filter the findings and recommendations in **ADDM Spotlight** by clicking the categories available in the **Summary** chart legend. For example, in the **Findings** tab, click **Top SQL** in the legend to the right of the **Summary** chart to only view the top SQL findings and related information in the **Summary** chart and table.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 19 (13.5.0.19).

- **Workload Analysis on the Database Home Page:** You now have the option of displaying information for an Automated Analysis task on the Database home page in Oracle Enterprise Manager. To do so, you can either click **Display on Home Page** when creating an Automated Analysis task or perform the following steps for an existing Automated Analysis task:
 1. Go to the Database home page in Enterprise Manager.
 2. Select **Workload Analysis** in the **Performance** menu.
The **Automated Analysis** tab is displayed on the **Workload Analysis** page.
 3. Click the **Analysis Tasks** tab.
 4. Click the  icon for the Automated Analysis task whose metrics you want to view on the Database home page, and then click **Display on Home Page**.



On setting the Database home page task, the **Workload Analysis** tile on the Database home page displays the **SQL Commonality** and **Elapsed Time** metrics for the task. You can click the tile to view the **Automated Workload Analysis for Last Run**, and click the **Workload Analysis Report** link for more details.




This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 19 (13.5.0.19).

- **Blocking Sessions Tab in Performance Hub:** The **Blocking Sessions** tab is now available in Performance Hub and you can use it to view the current blocking and waiting sessions in a hierarchical display. In **Blocking Sessions**, you can:
 - View detailed information about each blocking session and view the sessions blocked by blocking sessions.
 - Inspect or drill down into the SQL involved to determine the cause of blocking.
 - Perform several troubleshooting operations, including terminating one or more listed sessions to resolve a waiting session problem.

For more information, see [Blocking Sessions](#) in Oracle Cloud Infrastructure documentation.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **ADDM Spotlight Enhancements in RU 18:** When using **ADDM Spotlight** for a RAC database, the following enhancements are made to the user interface to display RAC instance-level information:
 - **Total Database Time During Time Range** displays the total database time for the selected time range. For a RAC database, click the  (clock) icon adjacent to **Total Database Time During Time Range** to view database time breakdown by RAC instances. Note that the clock icon is not displayed when using **ADDM Spotlight** for single instance databases.
 - In the **Findings** tab, click the  icon and click **View Instance Contribution** to determine the contribution of the RAC instances to that finding.

In addition, when displaying large amounts of data in time series charts such as the **Summary** chart in the **Findings** tab, you can now use the   (zoom in and zoom out) icons in the upper-right corner of the chart to alter the scope of what is displayed. After clicking the zoom in icon, you can use mouse and touch pad to scroll to the right or left of the chart, and zoom in and out. This is especially useful when you want to view data for a longer duration, such as the last 7 days. To undo the changes made to the chart using zoom in and zoom out, click the  (restore) icon.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Performance Hub Report:** You can now generate, view, and download activity reports that contain information about the performance of your databases. The report contains the Performance Hub user interface backed by the data collected and bundled with the report at the time you created it.

To access the **Performance Hub** report:

1. Click the **Reports** menu in the upper-right corner and select **Performance Hub**.
2. In the **Generate Performance Hub Report** dialog, set the report to contain one of three levels of data:
 - **Basic:** Includes only tab contents.
 - **Typical:** Includes tab contents with details for the top SQL statements.
 - **All:** Includes tab contents with details for all SQL statements.
3. Click **Download** to generate the report for the selected time period and download it.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **ADDM Spotlight Enhancements in RU 17:** The following **ADDM Spotlight** features are now available:
 - A new default option, **All**, in the **Recommendations** tab allows you to view all the recommendations in the specified time period. This is in addition to the **Database Parameters**, **SQL**, and **Schema Objects** options available in the **Summary** section in the **Recommendations** tab.
 - You can now view a tag cloud display of the summary of the findings and recommendations by overall impact in the specified time period. To view the tag cloud display, click the ☁ (cloud) icon in the upper-right corner of the **Summary** section in the **Findings** tab and for the **Database Parameters**, **SQL**, and **Schema Objects** recommendations in the **Recommendations** tab. In the tag cloud display, the size of the text indicates the overall impact and the color of the text corresponds to the different categories of findings and recommendations. For example, when viewing the tag cloud display in the **Findings** tab, if **Top SQL Statements** has the largest font, then it indicates that it has the largest number of findings, and its color indicates that it's a part of the **Top SQL** category.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **New Event Annotations Feature in ADDM Spotlight:** You can now add events to **ADDM Spotlight** charts to correlate interesting events with the timing of ADDM findings and recommendations. These events include database restart and configuration parameter changes. To use this feature, select the **Include Event Annotations** check box in the **Summary** section in the **Findings** and **Recommendations** tabs.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **User Name Link in ASH Analytics User Session in Performance Hub:** In the **ASH Analytics** tab in Performance Hub, the **User Session** section now has user name links. You can click the user name link to view detailed information about the user, such as the role, system and object privileges on the **View User: <user name>** page.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **New Metrics to Monitor Multiple Data Guard Fast-Start Failover Observers:** For Oracle Database 19c and later, a new **Data Guard Fast-Start Failover Observers** metric

category is now available. The metrics in this category enable you to collect and monitor the status of all the fast-start failover observers in the Data Guard configuration and are available for single instance and RAC databases.

For more information, see [Data Guard Fast-Start Failover Observers – Oracle Database 19c and later](#) in *Oracle Enterprise Manager Cloud Control Oracle Database Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **Heat Map and ADO Available for PDBs:** The ILM Heat Map and Automatic Data Optimization (ADO) features are now available for Pluggable Databases (PDBs) in Oracle Enterprise Manager. To access these features, go to the Home page of the PDB and in the **Administration** menu, select **Storage** and then select **Information Lifecycle Management**.

For more information, see [Managing ILM Heat Map and ADO with Oracle Enterprise Manager](#) in *Oracle Database VLDB and Partitioning Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **ADDM Spotlight Enhancements in RU 15: ADDM Spotlight** now provides an option to view recommendations for parameters in the **Database Parameters** tab. The parameters with recommendations have an action menu called **View Recommendations**, and on clicking it, a panel with details about the recommendation is displayed. In addition, **ADDM Spotlight** now has a new **Last Run** option in the **Quick Select** menu. You can use this option to set the time range to the time from the last ADDM run, and on selecting this option, the findings and recommendations tables display the ADDM findings and recommendations from that one run. Also, the database parameter settings are from the same time range.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Workload Tab in Performance Hub:** The **Workload** tab is now available in Performance Hub, and it graphically displays sets of statistics that you can use to monitor the database workload and identify spikes and bottlenecks. For more information, see [Workload](#) in Oracle Cloud Infrastructure documentation.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **New PDB Mode Metrics for PDBs in RAC Instances:** Real-time alerts on the operational states (modes) of PDBs in RAC instances are now available through the **PDB Mode** metrics. You can use these metrics to track the mode of PDBs across all instances in a RAC database. These metrics cover the READ WRITE, READ WRITE RESTRICTED, READ ONLY, READ ONLY RESTRICTED, and MOUNTED modes. For more information, see *PDB Mode* in *Oracle Enterprise Manager Cloud Control Oracle Database Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **ADDM Spotlight:** The Automatic Database Diagnostic Monitor (ADDM) is built into the Oracle Database and automatically detects and reports performance problems with the database. ADDM Spotlight is a new Oracle Enterprise Manager interface that summarizes the performance problems reported by ADDM that were executed during a time period. It highlights the findings with the biggest performance impacts and makes recommendations on how to fix them. In addition, it shows database parameter values as well as changes to these during the analysis period. The ADDM spotlight information is also shown on the

Database home page, including a summary of ADDM findings over the last day and a link to drill down to the ADDM Spotlight page.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Modernized Workflow for Configure Backup to Cloud:** For managing database targets, a new JET workflow is now available to configure a database backup to OCI Object Storage. This workflow is available as a new **Configure Oracle Cloud Backup** menu item under **Availability** on the Database home page.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Top Activity Lite in Performance Hub:** The new Top Activity Lite capability is a simplified yet highly efficient mode of Performance Hub. In this mode, database administrators can monitor the live performance of managed databases in a single view for easy visualization of issues. Top Activity Lite allows quick response time for real-time monitoring while providing critical information required for performance diagnosis.

For more information, see [Top Activity Lite](#) in Oracle Cloud Infrastructure documentation.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Workload Analysis in Oracle Enterprise Manager:** You can now use Workload Analysis to identify, quantify, and eliminate the reason for regression or improvements. Workload Analysis performs an analysis of top queries in the database from two different time points expected to be the same or similar. Regressed statements can then be tuned by using SQL Tuning Advisor or SQL Plan baselines.

For more information, see Using Workload Analysis in *Oracle Database Testing Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Oracle Database Vault for Autonomous Databases:** You can now manage Oracle Database Vault for Autonomous Databases in Oracle Enterprise Manager and perform tasks such as propagating policies to other databases.

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

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Graphical Explain Plan in Performance Hub:** The **SQL Monitoring** tab in Performance Hub now includes the **Graphical Explain Plan** option using which you can view the SQL explain plan as a collapsible tree of nodes where each node represents an operation. In this plan, you can display as much or as little data as needed, and can rotate the tree to display the information either horizontally or vertically.

For more information, see [Graphical Explain Plan](#) in Oracle Cloud Infrastructure documentation.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Optimizer Environment and Outline Tabs for SQL Monitoring in Performance Hub:** On navigating to the **Real-time SQL Monitoring for SQL <ID>** page in Performance Hub, you can now view the optimizer parameters and their values in the **Optimizer Environment** tab, and filter the parameters by name. This page now also has the **Outline** tab, which displays the set of optimizer hints associated with the SQL statement (outline data) in text format.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Data Masking and Subsetting for Autonomous Databases:** The Data Masking and Subsetting functionalities are now available for Autonomous Databases in Oracle Enterprise Manager. You can use this comprehensive solution to minimize data exposure in non-production environments by discovering and masking sensitive production data. For more information, see Monitoring and Administration Tasks in *Oracle Enterprise Manager Cloud Control Administrator's Guide for Oracle Autonomous Databases*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).
- **Exadata Tab in Performance Hub:** The **Exadata** tab is available for Exadata databases managed through Oracle Enterprise Manager. This tab provides a unified view of Oracle Exadata hard disk and flash performance statistics and provides insight into the health and performance of system components including the databases, Exadata storage cells, and Automatic Storage Management (ASM). You can use the **Exadata** tab for enhanced performance diagnostics for Exadata databases. This tab is only available in the historical mode and supports only Container Databases (CDBs). It does not support real-time views or provide information on Pluggable Databases (PDBs). For more information, see [Exadata tab](#) in Oracle Cloud Infrastructure documentation.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 9 (13.5.0.9).
- **Data Redaction Support for Autonomous Databases:** The Data Redaction feature is now available for Autonomous Databases in Oracle Enterprise Manager. You can use this feature to redact sensitive information that is displayed in applications without altering the underlying database blocks on disk or in cache. For more information, see Monitoring and Administration Tasks in *Oracle Enterprise Manager Cloud Control Administrator's Guide for Oracle Autonomous Databases*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 8 (13.5.0.8).
- **New Metric Group for PDBs:** A new metric group, **Resource Usage**, is now available for Pluggable Databases (PDBs). The metrics in this metric group such as **Average Buffer Cache Usage** and **Average CPU Utilization**, enable you to monitor the various aspects of PDB resource usage. For more information, see Resource Usage in *Oracle Enterprise Manager Cloud Control Oracle Database Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).
- **Oracle Database Plug-in Metric Reference Manual Split Into Smaller Manuals:** The *Oracle Enterprise Manager Cloud Control Oracle Database Plug-in Metric Reference Manual* has now been split into the following documents to provide a better user experience when looking for information:
 - *Oracle Enterprise Manager Cloud Control Oracle Database Metric Reference Manual*
 - *Oracle Enterprise Manager Cloud Control Oracle Grid Infrastructure Metric Reference Manual*
 - *Oracle Enterprise Manager Cloud Control Oracle Engineered Systems Metric Reference Manual*
These new manuals are available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).
- **Updates to the backup_database EMCLI Verb:** The following updates are made to backup_database for both the customBackup and suggestedBackup subcommands:
 - A new composite (group) target type is now supported.

- A new `forceSerialMode` option, which executes the database backups in a rolling manner to minimize resource contention, has been added.

For more information, see `backup_database` in *Oracle Enterprise Manager Cloud Control Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **New features for Autonomous Databases in Oracle Enterprise Manager:** The following features are now available for Autonomous Databases in Oracle Enterprise Manager:
 - **Cloud Credentials Store:** Enterprise Manager now supports the storing of database user credentials as a database object in an Autonomous Database. The stored credentials can be used to access remote on-premises databases, Autonomous Databases, or Oracle Cloud Infrastructure Object Storage.
 - **Directory Objects:** You can now view the default and custom-created directories in an Autonomous Database on the **Directory Objects** page. In addition, you can also create directory objects and transfer files from the directory to the Object Storage and from the Object Storage to the directory.
 - **Database Links:** You can now create a database link from Autonomous Databases – Shared discovered in Enterprise Manager to a target database. Database links enable you to access objects and perform operations on the target database.
 - **Backup and Recovery Management and Monitoring of Autonomous Databases:** You can now view the list of backups of an Autonomous Database, schedule an on-demand backup, and restore the database.

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

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 3 (13.5.0.3).

- **Data Distribution Analysis and Visualization for Database Sharding:** An advanced analysis of data distribution across shards within a sharded database is now available using Sharded Database metrics. This includes the following features:
 - Ranking or visualization of shards by various size parameters, such as data size and number of unique keys.
 - Identification of "hot" shards based on throughput.
 - Visualization of size or load grouped within or across the following:
 - * Shardgroup
 - * Data Guard configuration
 - Search capability to find a shard with a specific key.
 - Individual shard-level drill down by chunks.

For more information, see Sharded Database in *Oracle Enterprise Manager Cloud Control Oracle Database Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **Database Scheduler Jobs Metrics:** You can now view Database Scheduler Jobs metrics, which report the current status of DBMS jobs registered through the `DBMS_SCHEDULER` interface. Using these metrics, you can monitor long running jobs and obtain alerts on individual jobs.

For more information, see [Database Scheduler Jobs](#) in *Oracle Enterprise Manager Cloud Control Oracle Database Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **Support for Multiplex Locations in the `clone_database` and `create_standby_database` EMCLI Verbs:** The `multiplex_locs` option has now been added to the `clone_database` and `create_standby_database` EMCLI verbs to support multiplex locations. Using this option, you can specify multiplex locations for the redo logs and control files. For more information, see `clone_database` and `create_standby_database` in *Oracle Enterprise Manager Cloud Control Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **New `convert_to` option in the `dg_convert_standby` EMCLI Verb:** The `convert_to` option has now been added to the `dg_convert_standby` EMCLI verb. Using this option, you can specify the role the standby database will be converted to. For more information, see `dg_convert_standby` in *Oracle Enterprise Manager Cloud Control Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **Support for Parallelism in the `clone_database` and `create_standby_database` EMCLI Verbs:** The `-degree_of_parallelism` option has now been added to the `clone_database` and `create_standby_database` EMCLI verbs to support parallelism. Using this option, you can specify the number of parallel channels used by RMAN to copy the database files. For more information, see `clone_database` and `create_standby_database` in *Oracle Enterprise Manager Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Copy SQL Tuning Set from an On-premises Database to an Autonomous Database:** You can now copy a SQL Tuning Set from an on-premises database discovered in Oracle Enterprise Manager to an Autonomous Database discovered in Oracle Enterprise Manager. For more information, see the [Copying a SQL Tuning Set from an On-premises Database to an Autonomous Database](#) tutorial.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **`ignoreProtectionPolicies` Property in ZDLRA Health and Protected Database metrics:** You can use the `ignoreProtectionPolicies` property on a Health or Protected Databases metric to ignore the incidents generated against the databases associated with a specific protection policy. For more information, see Recovery Appliance in *Oracle Enterprise Manager Cloud Control Oracle Database Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Automatic Detection of Database Role Changes:** Oracle Enterprise Manager now has the ability to automatically detect any database role changes that might have occurred in an Oracle Data Guard configuration, irrespective of where and how these changes were initiated. All detected role changes will trigger a recompute of the required dynamic properties and ensure that all metrics and attributes for the databases in this Data Guard

configuration are synchronized. If it's detected that a Fast-Start Failover (FSFO) has occurred, an alert is raised in Oracle Enterprise Manager.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Support for Database Backup to OCI Object Storage Using SWIFT Endpoints:** Oracle Enterprise Manager now supports backing up a database to Oracle Cloud Infrastructure Object Storage by leveraging the SWIFT endpoints. You will need to provide the SWIFT endpoint, credentials and Object Storage bucket information to configure the backup. This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).
- **Enhancements and Additions to Sensitive Data Types:** Oracle Data Masking and Subsetting Pack provides a comprehensive solution to manage secure production data for test and development environments. The sensitive data is identified through sensitive data discovery, where you can define search patterns specific to your business. You can also leverage the sensitive types that are available out-of-the-box. The pre-defined types that were updated include:
 - Credit Card Number
 - Email ID
 - IP Address
 - ISBN_10
 - ISBN_13
 - National Insurance Number
 - Phone Number
 - Social Insurance Number
 - Social Security Number
 - Universal Product Code

Additionally, the following new types are now supported:

- Age
- Card Expiration Date
- Card Security Code
- Card Security PIN
- Date of Birth
- Ethnicity
- First Name
- Full Name
- Gender
- India Aadhaar Number
- India PAN
- Last Name
- MAC Address
- Mexico CURP Code
- Place of Birth

- Postal Code
- Race
- Religion
- Sexual Orientation

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

Database Lifecycle Management

This section describes new features and enhancements for Database Lifecycle Management.

- **Database Provisioning Failure Group Support During ASM Diskgroup Creation:**
When provisioning new Grid Infrastructure or Single Instance High Availability databases using Enterprise Manager you can now specify the Failure Group disks during the initial ASM diskgroup setup.
For more information, see Procedure for Provisioning Oracle Grid Infrastructure and Oracle Databases with Oracle ASM in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).
- **New CIS 1.2.0 Compliance Standards for Oracle Database 19c:** The latest CIS Compliance 1.2.0 standards for Oracle Database 19c are now available. These standards are available through **Self Update** and Configuration and Compliance standard options.
For more information, see About CIS Compliance Standards in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).
- **Oracle DBSAT Compliance Standard Available for Pluggable and RAC Databases:**
Oracle Database Security Assessment Tool (DBSAT) Compliance Standard can now be used with Pluggable databases (PDB) and Real Application Cluster (RAC) database targets that have been incorporated into Enterprise Manager.
For more information, see Oracle DBSAT Compliance Standard in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 22 (13.5.0.22).
- **New Compliance Information Publisher Reports:** Two new default Information Publisher (IP) reports are now available for Compliance: Suppressed Compliance Violations and Configuration Extensions Uploading Large Amount of Data.
For more information, see Analyze Compliance Reports in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 22 (13.5.0.22).
- **STIG Standards Version 2 Release 8 and 9 for Oracle Database 12c and 19c:** The latest STIG Version 2 Release 8 and 9 standards for Oracle Database 12c and 19c are now available via the **Self Update** option and the traditional Configuration and Compliance standard options.
For more information, see About Security Technical Implementation Guide in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 22 (13.5.0.22).

- **Patch History:** You can now access database patching history for update and upgrade operations in Fleet Maintenance via REST API. This will allow you to view past update and upgrade operations and export them in .CSV format. Note that your environment's data retention policy dictates how far back Fleet Maintenance can show update and upgrade history.
For more information, see Patch History in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).
- **Pre/Post Provisioning Script with Additional Fields:** You can now use new additional data fields such as Oracle Home, Oracle Base, and SID when developing your Pre and Post database provisioning scripts.
For more information, see Pre/Post Scripts for Database Provisioning in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).
- **Fleet Maintenance Hub Supports Image and Version creation:** The Fleet Maintenance Hub user now has the ability to create Gold Images using the Enterprise Manager user interface. This feature complements the existing EM CLI and REST API methods. The guided creation process ensures the systematic inclusion of recommended patches, while allowing the flexibility to include custom patches that may be required for a new image or version.
For more information, see Use Fleet Maintenance Hub to get to Patch Compliance in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).
- **Specify a Prefix for an Oracle Home Name:** You can now streamline the nomenclature of Oracle homes and their corresponding targets by using a custom prefix. This designated prefix becomes an integral part of the Oracle Home name. If the home name prefix is not specified, the Enterprise Manager default naming convention will be applied. This capability is available through the user interface, EM CLI, and REST API.
For more information, see Deploy and Update Using the UI in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).
- **New Chargeback Metric for Disabled PDBs:** The new PDB Mode metric allows for Chargeback to calculate unused PDB entities in a multi-node RAC set-up when a PDB is disabled on a host, but enabled in others. The PDB Mode metric is disabled by default and needs to be enabled in order for Chargeback to calculate charges correctly.
For more information, see Adding Entities to Chargeback in *Oracle Enterprise Manager Cloud Administration Guide*.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).
- **New Chargeback Metric for PDB:** PDB Chargeback targets will use the new Resource Usage metric. This metric is disabled by default and needs to be **enabled** for Chargeback to function correctly with PDB targets. If this metric is not enabled, Chargeback will report an incorrect charge for PDB targets.
For more information, see Adding Entities to Chargeback in *Oracle Enterprise Manager Cloud Administration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 19 (13.5.0.19).

- **Downloading Database Migration Utilities Disabled by Default:** For **NEW** installations of Enterprise Manager 13.5 starting with Release Update 18 (13.5.0.18), the job that downloads the latest utilities required for migration will be disabled by default. For existing Enterprise Manager users, the job will remain enabled for three months after the last Migration Workbench activity. It is recommended that users enable this job to get the latest updates if they are on a migration project.
For more information, see Database Migration Prerequisites in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Signing off Database Migrations as Complete:** Migration activities that *Completed With Errors* can be signed off using EM CLI or REST API commands in addition to the already existing option to *Mark as Complete* in the Migration Workbench UI. You can also now revert Migration activities that had been previously marked as *Complete* to *Completed With Errors*. This is useful if issues are found that require additional attention and troubleshooting for a Migration activity that was previously reviewed and marked as *Complete*.
For more information, see Review Migration Status and Complete Migration in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Redeploy an Oracle Home:** Should an Oracle Home become corrupted and removed completely from the host, you can redeploy an Oracle Home on the same host by passing the `IS_REDEPLOY="true"` parameter with the EM CLI `db_software_maintenance verb`.
For more information, see Redeploy Oracle Homes in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Fleet Maintenance – Upgrade Databases Using AutoUpgrade Utility:** The AutoUpgrade utility is the preferred tool for upgrading Oracle databases. Oracle Enterprise Manager's Fleet Maintenance now uses AutoUpgrade to perform single instance and RAC database upgrades to version 12.2 and later.
For more information, see Fleet Maintenance AutoUpgrade in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **New EMCLI Verb `query_suppressed_recommendations`:** This new EMCLI verb can query previously suppressed Configuration and Compliance patch recommendations for a specific target, multiple targets, or a specific target type.
For more information, see `query_suppressed_recommendations` in *Oracle Enterprise Manager Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **STIG Standard Version 2 Release 7 for Oracle Database 12c and 19c:** The latest STIG Version 2 Release 7 standards for Oracle Database 12c and 19c are now available via the **Self Update** option and the traditional Configuration and Compliance standard options.
For more information, see About Security Technical Implementation Guide in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **New EMCLI Verb `dg_convert_standby_to_cluster`:** This new EMCLI verb converts a single instance Data Guard physical standby database to an administrator managed cluster database.

For more information, see `dg_convert_standby_to_cluster` in *Oracle Enterprise Manager Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **New CIS 1.1.0 Compliance Standards for Oracle Database 19c:** The latest CIS Compliance 1.1.0 standards for Oracle Database 19c are now available. These standards are available through **Self Update** and Configuration and Compliance standard options. For more information, see About CIS Compliance Standards in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Rollback Support for Failed Fleet Maintenance Updates:** You can now roll back failed update single instance or RAC database operations. The rollback operation returns the database to the initial state.

For more information, see Rolling Back Of a Failed Update Operation in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Pre and Post Migration Analysis Dashboards Available for TTS based Migrations:** Transportable Tablespace (TTS) based migrations using Oracle Enterprise Manager's Migration Workbench now feature Pre and Post migration detailed analysis allowing you to see a complete overview of the migration.

For more information, see Migrate a Full Database with Transportable Tablespace in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Support for Parallel Shutdown of Database Instances For Grid Infrastructure Patching:** You can now parallel stop Grid Infrastructure database updates running on cluster nodes using the `DRAIN_TIMEOUT` parameter. When specified in the input file, the `DRAIN_TIMEOUT` value will cause a wait for that set amount of time for sessions to drain from the node and then stop all instances, services, and resources running on the node. For more information, see Update Operations in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Enhanced Search Functionality on Procedure Activity Page:** Additional search filters have been added into the **Procedure Activity** page, allowing you to further refine your deployment procedure activity searches. The additional filters are: **Owner**, **Start Date From**, and **Start Date To**.

For more information, see Track, Fix and Resume Operations in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Fleet Maintenance Hub:** Oracle Enterprise Manager offers a brand new interface called **Fleet Maintenance Hub**, using which administrators can obtain insight into vulnerabilities for database assets and apply patches to affected targets. In this interface, you can identify database assets that are not subscribed to a gold image, review patch recommendations for images, and once gold images are refreshed, subscribe targets to a newer version of gold images and perform update and upgrade operations.
For more information, see Fleet Maintenance Hub in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **STIG Standard Version 2 Release 6 for Oracle Database 12c and 19c:** The latest STIG Version 2 Release 6 standards for Oracle Database 12c and 19c are now available via the **Self Update** option and the traditional Configuration and Compliance standard options.
For more information, see About Security Technical Implementation Guide in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **Transparent Data Encryption (TDE) Support for Migration Workbench:** Oracle Enterprise Manager Migration Workbench now supports encrypted migrations using TDE, allowing for increased data security while migrating. Migration Workbench TDE migrations are supported in the Migration Workbench UI, REST API, and EMCLI.
For more information, see Migrate Using Database Migration Workbench in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Fleet Maintenance Variables for Oracle Home Path and Working Directory:** Oracle Enterprise Manager Fleet Maintenance now accepts the use of variables for Oracle Home Path and Working Directory, allowing for easier bulk updates and upgrades by deploying multiple Oracle Homes on the same host within the same submission.
For more information, see Use of Oracle Home Path Variables in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Suppress Patch Recommendations for Compliance:** This new EMCLI verb allows you to suppress Compliance patch recommendations for a given target type or target name.
For more information, see `suppress_recommended_patch` in *Oracle Enterprise Manager Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Migration Workbench Transportable Tablespace Pre-Migration Analysis Enhancements:** Migration Workbench Transportable Tablespace Pre-Migration analysis features new enhancements that allow the Pre-Migration Analysis to be viewed in a nearly identical fashion to CPAT analysis.
These enhancements are:

- Pre-Migration analyzer is now fully integrated into a TTS deployment procedure, and is no longer a standalone module.
- Input validation now matches the wording of the Pre-Migration analysis and CPAT, making reports easier to parse and actions to be taken easier to identify.

- When performing a REST API pre-migration analysis (`action=CHECK_MIGRATION_READINESS`) a procedure execution ID is returned unifying analysis behavior for all migration types using Migration Workbench.

For more information, see *Migrate Using Transportable Tablespace* in *Oracle Enterprise Manager Database Migration Workbench Guide*.

These features are available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Integration with Oracle Fleet Patching and Provisioning:** Oracle Enterprise Manager now integrates with [Oracle Fleet Patching and Provisioning](#) (FPP). This enables users of FPP to leverage Enterprise Manager capabilities such as security patch recommendations and proactive patching using Fleet Maintenance.
For more information, see *Oracle Fleet Patching and Provisioning and Enterprise Manager Integration* in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- **STIG Standard Version 2 Release 5 for Oracle Database 12c and 19c:** The latest STIG Version 2 Release 5 standards for Oracle Database 12c and 19c are now available via the **Self Update** option and the traditional Configuration and Compliance standard options.
For more information, see *About Security Technical Implementation Guide* in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- **Pre-Migration Analyzer for Transportable Tablespace Migrations:** Oracle Enterprise Manager Migration Workbench can now perform a CPAT-like pre-migration analysis on Transportable Tablespace migrations allowing you to validate, view reports and correct potential migration errors before submitting.
For more information, see *Migrate Using Transportable Tablespace* in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- **NFS Storage Type Support for Fleet Maintenance:** You can now create and import Fleet Maintenance Gold Images using NFS storage options. This allows for a more efficient deployment to multiple hosts, reducing the number of copies and files by storing the Gold Image in an NFS reference location.
For more information, see *Creating a Gold Image* in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **Kerberos Credential Support for Migration Workbench:** Improving your organization's security, Oracle Enterprise Manager's Migration Workbench now supports authentication using Database Kerberos Credentials and Database Kerberos Keytab Credentials while performing Data Pump migrations. Microsoft Active Directory users can be exclusively mapped to a database account and authenticated with a Kerberos password or a Keytab file without password and human interaction.
For more information, see *Migrate a Full Database Data Pump* in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 12 (13.5.0.12).

- **New EXAchk AHF Compliance Standards for Cloud@Customer:** Oracle Enterprise Manager now integrates Oracle Autonomous Health Framework (AHF) EXAchk compliance standards for your Exadata Cloud@Customer systems. For more information, see AHF EXAchk Compliance Standards in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 12 (13.5.0.12).
- **PDB Administrator Credentials for New PDB Migrations:** When performing a database migration to a new PDB using Oracle Enterprise Manager Migration Workbench, the PDB administrator credentials can be used as named credentials for the new PDB. For more information, see Migrate Using Database Migration Workbench in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 12 (13.5.0.12).
- **STIG Standard Version 2 Release 4 for Oracle Database 12c and 19c:** The latest STIG Version 2 Release 4 standards for Oracle Database 12c and 19c are now available via the **Self Update** option and the traditional Configuration and Compliance standard options. For more information, see About Security Technical Implementation Guide in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).
- **New Force Flag for cleanup_cs_target_association:** The EMCLI verb `cleanup_cs_target_association` now has a `force` flag removing any failed or pending target associations for a compliance standard. For more information, see `cleanup_cs_target_associations` in *Oracle Enterprise Manager Command Line Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).
- **Custom Pre and Post Scripts for Transportable Tablespace Migrations:** You can now use Pre and Post scripts to further customize your Transportable Tablespace migrations using Oracle Enterprise Manager Migration Workbench. Pre and Post scripts are available for both Tablespace and Full Database migrations using TTS. For more information, see Custom Scripts for Tablespace Migration in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).
- **DBSAT Compliance Sensitive Data Assessment Report:** The DBSAT Compliance Standard features a new report focused on database sensitive data information vulnerabilities, further enhancing DBSAT offerings in Oracle Enterprise Manager. For more information, see Oracle DBSAT Compliance Standard in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).
- **Encryption of Metadata Dump Files in Transportable Tablespace Migrations:** Transportable Tablespace Migrations using Oracle Enterprise Manager Migration Workbench will now require an encryption password to be entered and confirmed for the metadata dump files. This is an additional layer of security for Transportable Tablespace Migrations. For more information, see Migrate Using Transportable Tablespace in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Migration Workbench Method Selection Moved to the Launch Page:** In order to further enhance and simplify the database migration experience using Oracle Enterprise Manager Migration Workbench the method selection for a migration (Data pump or Transportable Tablespace) has now been moved from the third step to the first step of the wizard. For more information, see *Migrate Using Database Migration Workbench* in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Migration Workbench Transportable Tablespace Non-CDB to Non-CDB Migrations:** You can now perform Transportable Tablespace (TTS) migrations from non-container databases (non-CDB) to non-CDB using Oracle Enterprise Manager Migration Workbench's user interface. Perform Tablespace and Full Database migrations using TTS, allowing for Near Zero Downtime incremental migrations of your non-CDB databases into new infrastructure. For more information on TTS Migrations, see *Migrate Using Transportable Tablespace* in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Database Lifecycle Management and Private Cloud Management for ExaCC:** Oracle Enterprise Manager now supports Database Lifecycle Management and Private Cloud Management for Exadata Cloud@Customer. Users can leverage the rich set of Database Lifecycle Management (DBLM) and Cloud Management Pack (CMP) features on ExaCC. Customers can now perform actions like Create, Patch, Clone, Relocate and secure compliance and configurations of PDB along with Private Cloud Management - PDBaaS. For more information on Database Lifecycle Management and Private Cloud Management for ExaCC, see *Exadata Cloud@Customer Lifecycle Management* in *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Provision and Clone Databases with a non-DBSNMP Monitoring User:** You can now provision new databases from Enterprise Manager and specify a non-DBSNMP user for database monitoring. You can patch, upgrade and clone databases with a non-DBSNMP monitoring user. These features are also available from Database as a Service, deployment procedures are backwards compatible and will be saved in the new DBSNMP format.

For more information, see *Procedure for Creating an Oracle Database and Creating a Full Clone Database Using the Clone Wizard* in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

For Database as a Service, see *Creating a Full Clone Database Using the Clone Wizard* in *Oracle Enterprise Manager Cloud Administration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 8 (13.5.0.8).

- **New Configuration and Compliance Management Views:** Two new management views have been added. The Compliance view `mgmt$rules_evaluated_per_day` provides information on rules evaluated daily. The Enterprise Configuration Management view `MGMT$CHANGES_PER_SNAPSHOT` is a diagnostic view that tracks changes per snapshot performed.

For more information, see `MGMT$RULES_EVALUATED_PER_DAY` and `MGMT$CHANGES_PER_SNAPSHOT` in *Oracle Enterprise Manager Cloud Control Management Repository Views Reference*.

These views are available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- **Migration Workbench Multiphase Transportable Tablespace Migrations:** You can now perform Multiphase Transportable Tablespace (TTS) migrations using Oracle Enterprise Manager Migration Workbench's user interface. This method allows migrations to occur via incremental backups using TTS, allowing for Near Zero Downtime migrations of your databases into new efficient infrastructure.

For more information, see *Perform a Multiphase Migration with Transportable Tablespace in Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- **Fleet Maintenance Automatic Operating Scheduling:** You can now automatically schedule Fleet Maintenance tasks for your Oracle Database targets. Select **Immediately/ Auto** when setting a start time for Migrate Listener and Update Databases operations, and tasks will start immediately after the previous task finishes.

For more information, see *Fleet Maintenance UI Operations in Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- **STIG Standard Version 2 Release 3 for Oracle Database 11g Release 2, 12c, and 19c:** The latest STIG Version 2 Release 3 standards for Oracle Database 11g Release 2, 12c, and 19c are now available via the **Self Update** option and the traditional Configuration and Compliance standard options.

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

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **New EXAchk AHF Compliance Standards:** Oracle Enterprise Manager now integrates Oracle Autonomous Health Framework (AHF) EXAchk for Virtual Exadata Engineered Systems X8 and X8M.

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

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **Cloud Pre-Migration Advisor Tool available for On-Premises Migrations:** The Database Migration Workbench now takes advantage of the Cloud Pre-Migration Advisor Tool (CPAT) for on-premises to on-premises migrations. CPAT connects to an Oracle database instance and performs a series of checks designed to ensure a successful migration. CPAT generates a report and its results are consumed by the Database Migration Workbench.

For more information, see *Migrate Using Database Migration Workbench in Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **New Database Migration Workbench Guide:** Oracle Database Migration activities information, such as planning, consolidation and Migration Workbench configuration and

associated tasks, can now be accessed from a dedicated new guide, the Enterprise Manager Migration Workbench Guide 13.5.

This new guide is available starting with Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **Oracle DBSAT Compliance Standard:** Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5) integrates the Oracle Database Security Assessment Tool (DSAT) as a new Compliance Standard. This allows you to associate your database targets, run the security assessment, and view its results through the existing Compliance functionality in Enterprise Manager.

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

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).

- **Migration Workbench Transportable Tablespace Migrations:** You can now perform Transportable Tablespace (TTS) migrations using Oracle Enterprise Manager Migration Workbench's user interface. You can perform Tablespace and Full Database migrations using TTS, allowing for Near Zero Downtime incremental migrations of your databases into new efficient infrastructure.

For more information, see Database Migration Workbench in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).

- **Update a Non-Container Database to a New Pluggable Database Using Fleet Maintenance:** You can now update a non-Container Database (non-CDB) into a new PDB using the Fleet Maintenance user interface, by selecting the **Upgrade** or **Upgrade Non-CDB as Pluggable Database** operations. This type of upgrade takes a non-CDB database and performs an upgrade into a new PDB.

For more information, see Migrate, Deploy, Update in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide* and [Patching an Oracle Pluggable Database Using Oracle Enterprise Manager's Fleet Maintenance Graphic User Interface](#).

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).

- **New Compliance Rule Detail Tab:** The Compliance Framework Evaluation Results section introduces a new **Rule Details** tab that provides a detailed summary of a given rule, its severity, the rule state (for example, Production or Test), a description, rationale and recommendations.

For more information, see View Compliance Framework Evaluation Results in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

- **Pluggable Database Update and Upgrade using Fleet Maintenance UI:** PDB updating and upgrading is now supported using the Fleet Maintenance user interface. Users can now select individual or multiple PDB targets to be patched, updated, or upgraded and they can either attach it to an existing Container Database (CDB) or deploy to a brand new CDB.

For more information, see [Patching an Oracle Pluggable Database Using Oracle Enterprise Manager's Fleet Maintenance Graphic User Interface](#) and Fleet Maintenance UI Operations in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

- **Cloud Pre-Migration Advisor Tool available for Migration Workbench:** The Database Migration Workbench now takes advantage of the Cloud Pre-Migration Advisor Tool (CPAT) used by other Oracle products in pre-migration activities. CPAT connects to an Oracle database instance and performs a series of checks designed to ensure a successful migration. CPAT generates a report and its results are consumed by the Database Migration Workbench. CPAT replaces the Schema Advisor used in prior versions to perform source database analysis.
For more information, see *Migrate Using Database Migration Workbench* in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

- **EXAchk AHF Compliance Standards:** Oracle Enterprise Manager 13c Release 5 Update 3 (13.5.0.3) integrates Oracle Autonomous Health Framework (AHF) EXAchk for Exadata Engineered Systems X8 and X8M. Oracle EXAchk is a lightweight and non-intrusive health check framework for the stack of software and hardware components in Exadata. Enterprise Manager provides a set of compliance standards and associated controls for overall health monitoring, automated risk identifications and proactive notification of issues for each Exadata System component and database instances.
For more information, see *AHF EXAchk Compliance Standards* in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 3 (13.5.0.3).

- **STIG Standards Release 18 for Oracle Database 12c:** The latest STIG standards for Oracle Database 12c are now available via the new **Self Update** option and the traditional Configuration and Compliance standard options.
For more information, see *About Security Technical Implementation Guide* in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **Compliance Dashboard Enhancements:** In the Compliance Dashboard you can now filter by the Life Cycle metadata property, allowing you to filter compliance violations for Mission Critical, Production, Stage, Test and Development values.
For more information, see *About the Compliance Dashboard* in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **New MTM Metric for Derived Association:** This new metric scans all target and report derived associations of more than 5 seconds.
For more information, see *Derived Associations Taking More Than 5 Seconds* in *Enterprise Manager Cloud Control Framework, Host, and Services Metric Reference Manual*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 2 (13.5.0.2).

- **New Fleet Maintenance UI:** You can now perform Fleet Maintenance tasks from the Enterprise Manager User Interface page using a simple intuitive process that guides you through setting up and performing Fleet Maintenance tasks for your Oracle Database targets.
For more information, see *Fleet Maintenance UI Operations* in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Migration Workbench Functionality Enhancement:** The Migration Workbench has been enhanced to support new destination targets. With this, on-premises databases and schema can now be migrated to:
 - On-Premises database, to either existing or new PDBs
 - Exadata, and across platforms
 - DBCS (ExaCC, ExaCS, Bare Metal, VM)
 - Autonomous Databases

For more information, see *Migrate Using Database Migration Workbench* in *Oracle Enterprise Manager Database Migration Workbench Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Oracle Database 21c Support for Provisioning, Upgrading, and Patching:** You can now Provision and Upgrade your databases to Oracle Database 21c. Fleet Maintenance activities can also be performed to Update and Patch database deployments up to 21c. For more information, see *Database Provisioning and Database Fleet Maintenance* in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **CIS Compliance Standards for Oracle Database 19c:** The latest CIS Compliance standards for Oracle Database 19c are now available. These standards are available via the new **Self Update** and traditional Configuration and Compliance standard options. For more information, see *About CIS Compliance Standards* in *Oracle Enterprise Manager Cloud Control Oracle Compliance Standards Reference*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **Self Update for Compliance Standards:** Compliance Standards are now available via **Self Update**. This allows you to obtain new and updated standards whenever they become available outside of minor and major Oracle Enterprise Manager releases. Standards can be accessed via the **Self Update** home page, a common dashboard used to obtain information about new updates and a common workflow to review, download, and apply updates.

For more information, see *Self Update for Compliance Standards* in *Oracle Enterprise Manager Cloud Control Database Lifecycle Management Administrator's Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **New Search Bars for Configuration and Compliance:** Configuration and Compliance features two new search bars making deployment search much faster and easier. These new search bars are located in the **Compliance Library** under **Deployments** and in the **Configuration Extensions** under **Deployments**.

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

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 1 (13.5.0.1).

- **New verb `cleanup_cs_target_associations`:** This is a new verb for Configuration and Compliance that removes failed or pending target associations for a given compliance standard.
For more information, see `cleanup_cs_target_associations` in *Oracle Enterprise Manager Command Line Interface*.

Engineered Systems Management

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

- **Exadata Cloud Infrastructure Support for Multicloud@Azure:** Exadata Cloud infrastructure support now includes a new Exadata VM Cluster deployment type: `Multicloud@Azure`.
For more information, see *Explore the Exadata Cloud Target Home Pages* in *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 24 (13.5.0.24).
- **Support for Oracle Exadata 24.1 and Oracle Database 23ai:** In Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23), support has been added for the following:
 - Monitoring and management is supported for Oracle Exadata System Software version 24.1.x.
 - Database monitoring and management is supported for Oracle Database 23ai (version 23.5 and higher) running on on-premises Oracle Exadata 24.1.x.

Note:

Support is restricted to TCP connectivity only. Discovery and monitoring using TCPS is currently not supported.

- **New Management Packs for Advanced Management and Monitoring of Engineered Systems:** This release introduces the Oracle Enterprise Manager Cloud Control *Exadata Management Pack* and *Zero Data Loss Recovery Appliance (ZDLRA) Management Pack*, which include new features for advanced performance optimization, management and infrastructure patching of Exadata and ZDLRA. The Exadata Management Pack features help you optimize the management of your Exadata or your fleet of Exadata machines. By identifying performance bottlenecks or spare capacity, you can make optimal use of your hardware and minimize performance degradation for key applications. The new infrastructure fleet patching reduces downtime and allows Exadata software and firmware to be up to date with minimal effort. The Zero Data Loss Recovery Appliance Management Pack reduces time in configuring and scheduling backups and allows you to set up advanced backup configurations to guarantee that your databases can be restored according to company policies. The new functionality is supported with various new interfaces, EM CLI, and REST APIs.
For more information, see *Introduction to the Engineered Systems Packs* in *Advanced Management and Monitoring for Engineered Systems*.

These packs are available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).
- **Exascale Monitoring:** The new Exascale target home page provides monitoring capabilities such as availability and health monitoring, as well as storage and IOPS utilization monitoring, both aggregated and distributed by serviced clients.
For more information, see *Discovering and Monitoring Exascale* in *Oracle Exadata Database Machine Getting Started Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).

- **EM CLI Verb Enhancement to Support *wallet_root* Location:** The `configure_db_ha - configureBackupToRA` command supports the database initialization parameter `wallet_root`, which specifies the location of a root directory tree containing sub-directories for all component wallets used by the database.

For more information, see `configure_db_ha -configureBackupToRA` in *Oracle Enterprise Manager Cloud Control Interface*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).

- **Database Lifecycle Management and Cloud Management Pack Support for Oracle Exadata Database Service on Dedicated Infrastructure:** The pack features that were earlier available only for *Oracle Exadata Database Service on Cloud@Customer* are now extended to *Oracle Exadata Database Service on Dedicated Infrastructure*. You can now perform database lifecycle management activities like create, patch, clone, relocate, strengthen security posture with compliance management, and establish standardization of configuration of pluggable database across your hybrid environment of Exadata Cloud. You can consolidate resources across hybrid environment such on-premises, now Exadata Cloud, Oracle Cloud, and other public clouds, to build a dedicated secure and private Hybrid Pluggable Database-as-a-Service.

You can also adopt a DevOps model of database management by deploying Pluggable Database-as-a-Service on your hybrid environment.

For more information, see Exadata Cloud Lifecycle Management in *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **Discover and Monitor Autonomous Exadata VM Clusters in Oracle Exadata Database Service on Dedicated Infrastructure Targets:** The guided discovery process in the EM console for the `Exadata Infrastructure` target now includes the discovery of Autonomous Exadata VM Clusters associated with Oracle Exadata Database Service on Dedicated Infrastructure (ExaDB-D) target.

After the discovery is complete, you can explore the new target home page and that of the associated Autonomous Exadata VM Clusters. For more information, see *Discover the Exadata Cloud Target Using Console and Explore the Exadata Cloud Target Home Pages* in *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Support to Convert SNMP V2 to V3 at Scale for All Hardware Components in Exadata:** You can now migrate the already discovered Exadata environments configured with SNMP v2 to use SNMP v3 without having to rediscover or manually perform the related operations.

For the EMCLI command syntax, input file parameters, and sample input file, see *Convert SNMP V2 to V3 at Scale for All Hardware Components in Exadata* in *Oracle Exadata Database Machine Getting Started Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Support to Migrate All Protected Database Backups from One ZDLRA to Another:** Zero Data Loss Recovery Appliance (ZDLRA) 21.2 adds a new *Copy-All Backups* mode, which enables migration of all backups for a given protected database from one ZDLRA to another. This new *Copy-All Backups* mode is supported in the **Add Protection Policy to**

Replication Server wizard in Oracle Enterprise Manager. This ensures that all the backups for databases in this protection policy that are within the recovery range get copied over to the new downstream ZDLRA.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **Modernized Workflow for Configuring Database Backup to ZDLRA:** The new UI workflow to configure a database to back up to a Zero Data Loss Recovery Appliance (ZDLRA) includes the following features:
 - Ability to specify the virtual private catalog user that will be used to back up the database
 - Choice of protocols for the backup – TCP, or TCPS if the ZDLRA is enabled for TCPS backups
 - Ability to specify the location for the backup wallet or to use an existing wallet if it already exists
 - Enabling redo transport for the database
 - Option to download and install the latest version of the ZDLRA backup module
 - Standard configuration for Data Guard databases – if the primary database is configured to send backups to the ZDLRA, then all the standbys in this data guard configuration can also be configured to back up to the same ZDLRA.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 16 (13.5.0.16).

- **ZDLRA Recurring Archival Backup Job:** Oracle Enterprise Manager now allows Zero Data Loss Recovery Appliance (ZDLRA) administrators to schedule a recurring Archival Backup job or procedure for a given protected database. This feature provides the administrator strategy-based scheduling options, for example *end of the month*, for recurring Archival Backups in accordance with corporate compliance standards. Archival backup jobs are automatically delayed to run only after the underlying elements needed to synthesize a full backup are available on the ZDLRA. This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).
- **Advanced Customizations for Exadata Warehouse:** The following new customizations are available in Exadata Warehouse:
 - *Customize Data Extraction Location:* By default, Exadata Database Machine agents store the data collected from compute nodes and storage servers in the agent stage directory. Use this customization option if you want to store the data in a different location.
 - *Customize Maximum Data Extraction:* By default, the space limit threshold is set to 80% of the staging directory. To adjust this limit as a percentage of the available space, use this customization option.
 - *Customize Forecast Settings:* To override the default settings used for performing forecast, use this customization option that updates the `xawh_config_props` parameter.
 - *Collection of Additional Metrics:* By default, Exadata Warehouse collects a curated set of metrics. If you want to collect additional metrics from Exadata Database Machine targets, then use this customization option.

For more information, see [Exporting and Analyzing Oracle Enterprise Manager Engineered Systems Performance Data Using Exadata Warehouse](#).

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Exadata Warehouse Support for Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C) Metric Data:** Set up Exadata Warehouse through Enterprise Manager Cloud Control such that it serves as a repository for fine-grained performance metric data collected from Oracle Exadata Database Service on Cloud@Customer (ExaDB-C@C). It provides a platform for long-term retention of historical and forecast data for performance and capacity analysis and planning. For more information, see Exadata Warehouse in *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Discover and Monitor Oracle Exadata Database Service on Dedicated Infrastructure Targets:** Use the guided discovery process in the EM console to discover the new `Exadata Infrastructure` target of the type *Oracle Exadata Database Service on Dedicated Infrastructure*. Provide the monitoring agent details, Oracle Cloud Infrastructure (OCI) account details, and select the cloud targets to discover. You can optionally provide the storage server credentials to monitor them. After the discovery is complete, you can explore the new target home page and that of the associated Exadata VM Clusters. See *Discover the Exadata Database on Dedicated Infrastructure Target Using Console and Explore the Exadata Infrastructure Target Home Pages* in *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- **Incidents Tab in Oracle Exadata Infrastructure Home Page:** A new tab for incidents is now available in the Oracle Exadata Infrastructure home page. In this tab, you can view the alerts and their details like the severity of the issue, summary of the incident, target name, target type, status of the incident, its escalation level, the age of the incident, and the date when it was last updated. For more information on the home page and the steps to navigate to the **Incidents** tab, see *Explore the Exadata Database on Dedicated Infrastructure Target Home Pages* in *Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **On-Demand Archival Backups for ZDLRA Protected Databases:** Archival Backups is a new feature of ZDLRA version 21. A new workflow is now available from Oracle Enterprise Manager for initiating on-demand, one-time archival backups for an individual database protected by a ZDLRA running ZDLRA 21.1 software. The new workflow can be launched from the Protected Databases page under the ZDLRA target administration menu. This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).
- **Support for Oracle Autonomous VM Clusters in Exadata Cloud Discovery:** When you discover Oracle Exadata Database Service on Dedicated Infrastructure using the EM console, the guided process now automatically discovers the underlying Autonomous VM Cluster targets. After the discovery is complete, the *Oracle Exadata Infrastructure Home Page* provides details of all the child targets, their resource usage, and network information including that of the Autonomous VM Clusters. Use the *Oracle Autonomous VM Clusters Home Page* to monitor the VM Cluster and its member targets. To monitor the Autonomous Databases (ADB) associated with the Autonomous VM clusters, discover the ADBs using the EM console or EMCLI. For the prerequisite tasks, steps for discovery, and details about the *Oracle Autonomous VM Clusters Home Page*,

see *Discovery of Exadata Database on Dedicated Infrastructure in Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 12 (13.5.0.12).

- **Use EMCLI to Switch from CellCLI to RESTful API for Monitoring:** You can at any time lock down an Exadata Storage Server and switch to RESTful API for monitoring or administration. For switching, you will need to provide the RESTful API monitoring credentials of each Exadata Storage Server in the monitoring configuration. If you have a large set of storage servers, then you can use EMCLI to provide the monitoring credentials through a single input file for updating the overall monitoring configuration. For the EMCLI command syntax, input file parameters, and sample input file, see *Update the Monitoring Configuration Using EMCLI for Switching from CellCLI to RESTful API in Oracle Exadata Database Machine Getting Started Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11).

- **Auto-Purge Old Metric Data in Exadata Warehouse:** Due to the large volume of the fine-grained metric data collected and the roll-up data generated as part of Exadata Capacity Warehouse, it is important to periodically delete old data from the remote repository. The auto-purge feature supports deleting old metric data on a periodic basis. To override the default retention periods and specify your own values for the retention period for fine-grained data, hourly roll-up data, daily roll-up data, and diagnostic data, use the EM Job type **Exadata Warehouse Auto Purge Settings**.

For the steps to create a new Job and for the default and allowed values of the parameters, see *Auto-Purging Old Metric Data in Oracle Exadata Database Machine Getting Started Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Discovery and Monitoring of Oracle Exadata Cloud@Customer Gen2:** Explore the new discovery wizard for discovering the Gen2 Exadata Cloud target using the *console*. Follow the simple guided process to provide the monitoring agent details, OCI details, and storage server named credentials to enable Oracle Enterprise Manager to discover the Gen2 Exadata Cloud target and its dependent targets. Ensure to complete the prerequisite tasks before you begin the discovery. See *Discovery of Gen2 Exadata Cloud in Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*. After the discovery is complete, you can monitor all the cloud targets through a single pane in *Oracle Exadata Infrastructure Home Page*. To monitor the individual VM clusters in Oracle Exadata Infrastructure, visit *Oracle Cloud VM Cluster Home Page*. See *Explore the Gen2 Exadata Cloud Target Home Pages in Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 9 (13.5.0.9).

- **Use Non-root Users for Discovery and Monitoring:** You can now create a non-root user and then use the credentials to discover and monitor *Virtual Platform* targets and *Systems Infrastructure Remote Host* targets. Additionally, you can use non-root user credentials to monitor *Systems Infrastructure ILOM Server* targets. For more information, see *Prerequisites for Discovery and Monitoring Using Non-root User and Monitoring Systems Infrastructure ILOM Server Target Using Non-root User in Oracle Exadata Database Machine Getting Started Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 8 (13.5.0.8).

- **Export Exadata Database Machine and ZDLRA Performance Metric Data to Exadata Warehouse and Analyze:** Set up Exadata Warehouse through Enterprise Manager Cloud Control such that it serves as a repository for fine-grained performance metric data collected from on-premises and cloud-based Oracle Engineered Systems like Exadata Database Machine and Zero Data Loss Recovery Appliance. It provides a platform for long-term retention of historical and forecast data for performance and capacity analysis and planning.
For more information, see Oracle Exadata Database Machine Administration in *Oracle Exadata Database Machine Getting Started Guide*.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).
- **Support for Advanced ZDLRA Backup Anywhere Management:** Oracle Enterprise Manager now supports end-to-end configuration of replication for databases in a given protection policy. When a protection policy is added to the replication server, the databases in this protection policy are enrolled with the downstream recovery appliance, as required. If the upstream and downstream recovery appliances are paired, then two-way replication can also be configured for these databases.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).
- **Support for New Compliance Attributes for Protection Policies:** Oracle Enterprise Manager now supports the new compliance attributes that were added to protection policies with ZDLRA 21.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 5 (13.5.0.5).
- **Monitor SI Server Target Using REST APIs:** After performing an Exadata 12c to 13c target type conversion, you can now monitor a Systems Infrastructure Server target using REST APIs. This is applicable only for ILOM version 5.0.1 and later.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).
- **Use Non-root User Credential for Monitoring SI Server and ZFS Target:** A System Infrastructure Server target or ZFS target can now be monitored using a non-root user. You can simply create a new user in the ILOM shell, or using the ZFS Console, and use it for discovery or as a monitoring credential. Note that the SNMP user creation and SNMP subscription will need manual changes in order for the SNMP alerts to be processed.
For more information, see Using Oracle ZFS Storage Appliance in Engineered Systems and Get Started With Server Management in *Oracle Enterprise Manager Cloud Control Administrator's Guide*.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).
- **Support for ZDLRA Named Users:** Oracle Enterprise Manager supports using ZDLRA named users with either the ADMIN or MONITOR role to discover and manage the Recovery Appliance. ZDLRA 21.1 introduced this concept of named administrative users to manage day-to-day ZDLRA administrative activities.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).
- **New REST APIs for Onboarding Protected Databases with ZDLRA:** The ZDLRA plug-in in Oracle Enterprise Manager now supports new REST APIs to onboard protected databases with the Recovery Appliance. These REST APIs can be used to onboard a fleet of databases with one or more Recovery Appliances.
This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

Cloud Management

This section describes new features and enhancements for Cloud Management.

- **Chargeback Support for Unused Resources:** Chargeback for Oracle Cloud Infrastructure now supports “Unused Resources”. Resources that are not being used can now be charged to the same entity or an associated host entity. For more information, see Chargeback for Oracle Cloud Infrastructure in *Oracle Enterprise Manager Cloud Control Cloud Administration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Fixed Cost Item Type:** Chargeback for Oracle Cloud Infrastructure now features a new additional **Fixed** item type under Recovery Rate. This item type shows the fixed costs involved in operating consumed resources such as power, real-estate and admin salary. For more information, see Chargeback for Oracle Cloud Infrastructure in *Oracle Enterprise Manager Cloud Control Cloud Administration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 10 (13.5.0.10).

- **Chargeback Templates:** You can now save Chargeback setup wizard session input to templates that can be applied to future sessions. This simplifies Chargeback setup when having to configure large numbers of OCI targets. For more information, see Chargeback for Oracle Cloud Infrastructure in *Oracle Enterprise Manager Cloud Control Cloud Administration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- **Chargeback for Oracle Cloud Infrastructure (OCI):** Chargeback allows you to divide the cost of OCI entities and charge internal customers based on their respective usage. For more information, see Chargeback for Oracle Cloud Infrastructure in *Oracle Enterprise Manager Cloud Control Cloud Administration Guide*.

This feature is available starting with Oracle Enterprise Manager 13c Release 5 Update 4 (13.5.0.4).

Extensibility and Integration

This section describes new features and enhancements for Extensibility and Integration.

- **REST APIs for Blackouts Management:** You can now use the Blackouts Management REST API to perform maintenance operations such as create, edit, or stop a blackout, as well as retrieve various information and statistics on your defined blackouts. For more details on the REST endpoints, see [REST API for Oracle Enterprise Manager](#).

The REST APIs are available starting with Oracle Enterprise Manager 13c Release 5 Update 25 (13.5.0.25).

- **Enhancements and Addition to REST APIs:** The following enhancements and addition are now available in the Enterprise Manager REST API:
 - **Enhancement in Fleet Maintenance REST API,** updates to support Exadata Patching and is a part of the new Exadata Management Pack.
 - **Enhancement in ZDLRA Management REST API:** You can now use the Fleet Create Archival Backup APIs to create archival backups for all protected databases in a

protection policy. This update is a part of the new Zero Data Loss Recovery Appliance (ZDLRA) Management Pack.

- **New Database Backup Management REST API:** You can now configure and schedule backups for a fleet of databases. This update is a part of the new Zero Data Loss Recovery Appliance (ZDLRA) Management Pack.

For more details on the REST endpoints, see [REST API for Oracle Enterprise Manager](#).

The enhancements to the REST endpoints are available starting with Oracle Enterprise Manager 13c Release 5 Update 23 (13.5.0.23).

- **New Lifecycle Maintenance History REST API:** In the REST API for Lifecycle Maintenance History, the *Get Lifecycle Maintenance History* API now displays the database maintenance history for update (patching) and upgrade operations in Fleet Maintenance. The *Export Lifecycle Maintenance History* API exports the database maintenance history for update (patching) and upgrade operations in Fleet Maintenance. The data retention policy for your environment dictates how far back Fleet Maintenance displays the update and upgrade history.
For more details on the Lifecycle Maintenance History REST endpoints, see [REST API for Oracle Enterprise Manager](#).

The new Lifecycle Maintenance History REST endpoints are available starting with Oracle Enterprise Manager 13c Release 5 Update 21 (13.5.0.21).

- **Enhancement in REST API for Fleet Maintenance:** In the REST API for Fleet Maintenance, the *Get Image Version* API now displays the release version number it is based on.
For more details on the Fleet Maintenance REST endpoints, see [REST API for Oracle Enterprise Manager](#).

This enhancement in Fleet Maintenance REST endpoints is available starting with Oracle Enterprise Manager 13c Release 5 Update 20 (13.5.0.20).

- **Enhancements in REST API for Fleet Maintenance:** The following enhancements are made in the existing REST API for Fleet Maintenance:
Support for SAN Storage:
 - Create Image (by importing the image bundle from SAN storage)
 - Export Image
 - Perform Operation – New field `externalStageLocation` is available in the deploy request payload to specify the SAN storage location for image archives

Support to Create Image Version in FPP Server:

- from reference Oracle Home patching
- by deploying new reference Oracle Home patching
- from existing version by deploying new reference Oracle Home patching

For more details on the Fleet Maintenance REST endpoints, see [REST API for Oracle Enterprise Manager](#).

This enhancement in Fleet Maintenance REST endpoints is available starting with Oracle Enterprise Manager 13c Release 5 Update 19 (13.5.0.19).

- **Enhancements in REST API for Fleet Maintenance:** The following enhancements are made in the existing REST API for Fleet Maintenance:
 - New REST API for *Create Gold Image Version* using an existing version
 - Support of *reportOnly* option for Rollback DB

- *imageType* & *creationType* inputs replaced with *storageDestination* in Version creation request payload
- Support for *IS_REDEPLOY* flag in Deploy Operation REST API

For more details on the Fleet Maintenance REST endpoints, see [REST API for Oracle Enterprise Manager](#).

This enhancement in Fleet Maintenance REST endpoints is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Enhancements in REST API for Credentials Management:** The existing REST API for Credentials Management now includes support to create and manage *Monitoring Credential* and *Preferred Credential*.

For more details on the Credentials Management REST endpoints, see [REST API for Oracle Enterprise Manager](#).

This enhancement in Credentials Management REST endpoints is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Enhancements in REST API for Target Type:** The existing REST API for Target Type now includes support to *create*, *list*, *modify*, *delete*, *provide more details of*, and *search for* the credential sets for the target type.

For more details on the Target Type REST endpoints, see [REST API for Oracle Enterprise Manager](#).

This enhancement in Target Type REST endpoints is available starting with Oracle Enterprise Manager 13c Release 5 Update 18 (13.5.0.18).

- **Enhancement in Metrics REST API to Get *currentThresholdSettings* Information:** The existing Metrics REST API `GET /em/api/metricTimeSeries` is now enhanced to get information about the current threshold settings by specifying a new query parameter `include=currentThresholdSettings`. The current threshold settings information contains *occurrence count*, *operator used*, *warning threshold*, and *critical threshold*.

For more details on the Metrics REST endpoints, see [REST API for Oracle Enterprise Manager](#).

This enhancement in Metrics REST endpoints is available starting with Oracle Enterprise Manager 13c Release 5 Update 17 (13.5.0.17).

- **Oracle Enterprise Manager App for Grafana Version 4.0.0:** The new version of the Oracle Enterprise Manager App for Grafana introduces two brand new dashboards (**Exadata Capacity Planning Report** and **Exadata Cloud Capacity Planning Report**) and several new features, such as:

1. Grafana alerting on the data queried from OEM repository or a target
2. New UI for query template variables
3. Define custom variables using data from the OEM repository
4. Dynamically fetch data from different tables based on user selected time range
5. Automatically change the time range from other variables
6. Conditional expressions in queries for dynamic data display

The Oracle Enterprise Manager App for Grafana version 4.0.0 is certified with Grafana version 9.2.0 and Oracle Enterprise Manager 13c Release 5 Update 11 (13.5.0.11) and later. For more information, see [Oracle Enterprise Manager App for Grafana](#).

- **IBM Tivoli Netcool/OMNibus REST Event Connector:** This connector integrates Oracle Enterprise Manager with IBM Tivoli Netcool/OMNibus through Tivoli Netcool/OMNibus' REST API, enabling the sharing of event information from Enterprise Manager to IBM Tivoli

Netcool/OMNIBus. It monitors all events sent from Enterprise Manager and automatically updates alert information in Netcool/OMNIBus.

For more information, see Introduction to the Connector in *Oracle Enterprise Manager IBM Tivoli Netcool/OMNIBus REST Connector Installation and Configuration Guide*.

This connector is certified with Oracle Enterprise Manager 13c Release 5 and was released around the time Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15) was released.

- **Database Maintenance REST Endpoints:** New REST APIs endpoints are now available for all the updates (patching) and upgrade activities. This includes endpoints for operations as well as for administrative activities such as image management and target subscriptions. The complete list of REST endpoints are documented here:
 - **Database Maintenance- Updates (Patching) and Upgrades**
 - **Database Maintenance- Using Oracle Fleet Patching and Provisioning (FPP)**
 - **Deployment Procedures** for tracking and managing the procedures submitted as part of the Database Maintenance activities.

For more details on the Database Maintenance REST endpoints, see [REST API for Oracle Enterprise Manager](#).

Note: The existing Database Fleet Maintenance REST APIs continue to be supported. See Database Fleet Maintenance REST APIs.

The Database Maintenance REST endpoints are available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **ZDLRA Management REST Endpoints:** The following REST endpoints for *Zero Data Loss Recovery Appliance* (ZDLRA) management are now available:
 - ZDLRA Protected Database Management
 - ZDLRA Protection Policy Management
 - ZDLRA Replication Management
 - ZDLRA Archival Backup Management

For more details on the ZDLRA Management REST endpoints, see [REST API for Oracle Enterprise Manager](#).

The ZDLRA Management REST endpoints are available starting with Oracle Enterprise Manager 13c Release 5 Update 15 (13.5.0.15).

- **Credentials Management and Deployment Procedure REST Endpoints:** The following REST endpoints are now available:
 - *Credentials Management:* Endpoints to manage the Oracle Enterprise Manager named credentials
 - *Deployment Procedure:* Endpoints to manage deployment procedures

For more details on the Credentials Management and Deployment Procedure REST endpoints, see [REST API for Oracle Enterprise Manager](#).

The Credentials Management and Deployment Procedure REST endpoints are available starting with Oracle Enterprise Manager 13c Release 5 Update 14 (13.5.0.14).

- **Global Target Properties, Target Type, and Updated Target REST Endpoints:** The following REST endpoints have been added/updated:
 - Global Target Properties: Manage global target properties such as obtaining definitions and known values.
 - Target Types: Endpoint for target create samples.

- Target: Endpoints updated to include all target Create, Read, Update, and Delete (CRUD) operations.

For more details on the Global Target Properties, Target Type, and Updated Target REST endpoints, see [REST API for Oracle Enterprise Manager](#).

The User Management REST endpoints are available starting with Oracle Enterprise Manager 13c Release 5 Update 13 (13.5.0.13).

- **User Management REST Endpoints:** User Management REST endpoints have been added to the Oracle Enterprise Manager REST API. For more details on the User Management REST endpoints, see [REST API for Oracle Enterprise Manager](#).

The User Management REST endpoints are available starting with Oracle Enterprise Manager 13c Release 5 Update 9 (13.5.0.9).

- **REST API for Oracle Enterprise Manager:** The REST API for Oracle Enterprise Manager provides REST endpoints that let you manage core framework subsystems. For more details on the REST API for Oracle Enterprise Manager, see [REST API for Oracle Enterprise Manager](#).

The REST APIs are available starting with Oracle Enterprise Manager 13c Release 5 Update 7 (13.5.0.7).

- **Oracle Enterprise Manager App for Grafana version 3.0.0:** The Oracle Enterprise Manager App for Grafana allows you to integrate and display Enterprise Manager metrics data in Grafana. Enterprise Manager App for Grafana version 3.0.0 was recently introduced and included two new out-of-the-box dashboards and a new Grafana Server version certification.

For more details on the Enterprise Manager App for Grafana, see [Oracle Enterprise Manager App for Grafana](#).

- **Connector Enhancements:** Oracle Enterprise Manager Connectors provide a way to connect to other Help Desk or management systems and enable you to share critical information such as alerts, availability, or targets status. Enterprise Manager Connectors are certified on a regular basis with the latest versions of Enterprise Manager. For the latest Enterprise Manager Connector resources, see [Connector Guides](#) and [Supplemental Connector Resources](#).

These Enterprise Manager Connectors are certified with Oracle Enterprise Manager 13c Release 5 and new connectors were released around the same time as Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

- **Jupyter Notebooks for Oracle Enterprise Manager Warehouse:** The Oracle Enterprise Manager Management Repository (OMR) contains critical monitoring, configuration, and diagnostics data. You can export this data from multiple Enterprise Manager sites to Oracle Cloud's Object Storage. You can now download the new Jupyter Notebooks for Oracle Enterprise Manager Warehouse to perform advanced analytics and draw insights on Enterprise Manager data stored in Object Storage. The Jupyter Notebooks can run on either the Oracle Data Science Service or Anaconda.

These Notebooks assume data is exported using Oracle Enterprise Manager 13c Release 5 Update 6 (13.5.0.6).

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.

- **Deep Linking:** Notifications sent by Oracle Enterprise Manager can now have embedded contextual links that directly access the Enterprise Manager Mobile management/monitoring functionality.
For more information, see Direct Access to Monitoring/Management Functions from Enterprise Manager Notifications in *Help for Enterprise Manager Mobile*.
This feature is available starting with Enterprise Manager Mobile version 1.4.
- **Enhanced Group Filtering:** You can now view group members from the target detail screen as a flattened hierarchy or direct members only.
For more information, see Group Membership Filtering in *Help for Enterprise Manager Mobile*.
This feature is available starting with Enterprise Manager Mobile version 1.4.
- **Enterprise Manager Dashboards:** Enterprise Manager out-of-box and custom dashboards are now available from within Enterprise Manager Mobile.
For more information, see Access Enterprise Manager Dashboards in *Help for Enterprise Manager Mobile*.
This feature is available starting with Enterprise Manager Mobile version 1.4.
- **Group Filtering:** Filtering by group context lets you create a federated view of Oracle Enterprise Manager. A federated view allows you to create a single group where you can manage incidents/problems/jobs across multiple Enterprise Manager installations.
For more information, see View Federated Enterprise Manager in *Help for Enterprise Manager Mobile*.
This feature is available starting with Enterprise Manager Mobile version 1.3.
- **Share Details:** Enterprise Manager Mobile lets you share the content of any page with other administrators using the native share functionality of your mobile device.
For more information, see Share Details via Text or Email in *Help for Enterprise Manager Mobile*.
This feature is available starting with Enterprise Manager Mobile version 1.3.
- **Incident Manager Enhancements:** Incident Manager now allows you to show custom views by category and views shared by other administrators. You can now filter a list of issues (incidents, problems, and events) using a custom date range that overrides the view definition date range.
For more information, see Manage Incidents in *Help for Enterprise Manager Mobile*.
This feature is available starting with Enterprise Manager Mobile version 1.3.

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