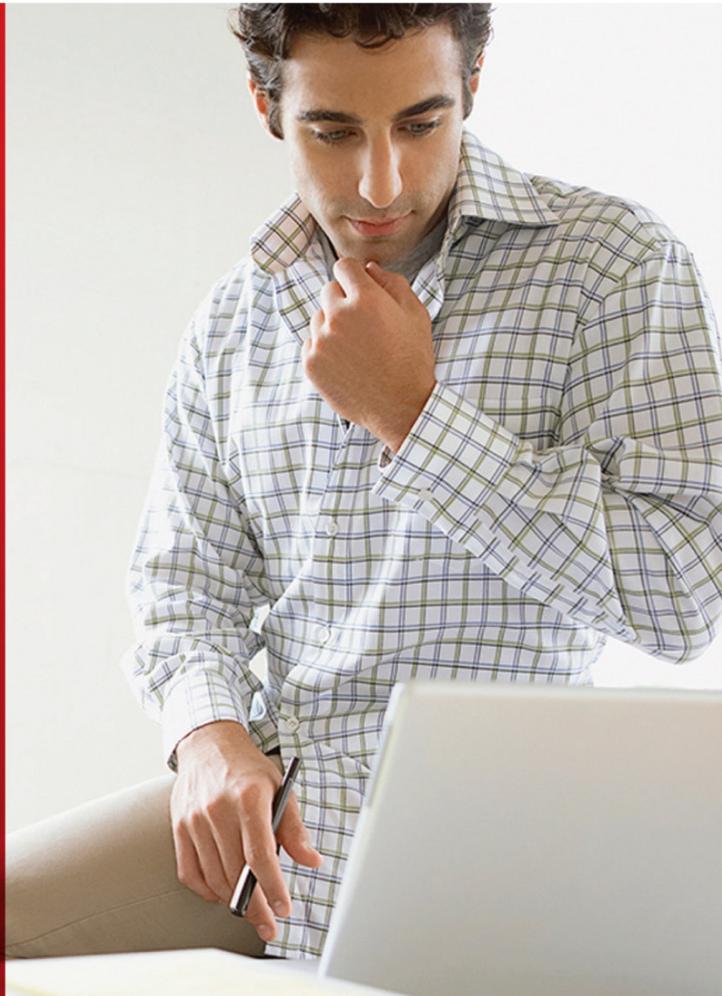




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# Oracle GoldenGate 12c: Management Pack Overview

Student Guide  
D88033GC10  
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# 1

## Introduction



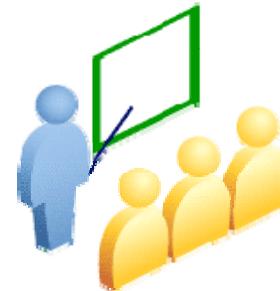
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# Objectives

After completing this lesson, you should be able to:

- List the course prerequisites
- List the course objectives
- List the course schedule
- Identify the facilities in your location



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## Scenario

The objectives of each lesson have a business scenario describing a real-life situation that can be solved by an Oracle GoldenGate solution. For this course, assume that you are the administrator of a pair of databases at Example Company ([www.example.com](http://www.example.com)). There is a database West in the Americas (AMER) and a database East in Europe (EURO). Data needs to be replicated from AMER to EURO (west to east, unidirectional).

# Course Prerequisites

## Required

- Installation and configuration of Oracle GoldenGate instances
- Basic knowledge of UNIX user-level commands, desktop navigation, and editors
- Basic familiarity with XML concepts
- Basic knowledge of SQL (INSERT, UPDATE, DELETE)
- Basic knowledge of Oracle Database 12c administration
- Basic TCP/IP networking knowledge

## Suggested

- Basic knowledge of SNMP and SMTP email configuration



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It is assumed that you have recently completed the four-day course *Oracle GoldenGate 12c Fundamentals for Oracle* [D84357GC10] or its equivalent, in which you learned how to install and configure Oracle GoldenGate instances.

These prerequisites can be met by Oracle courses, or by other kinds of experience and training.

## Course Goals

After completing this course, you should be able to:

- Install and configure Oracle GoldenGate 12c Management Pack on one or more computers, including the Monitor and EMCC GoldenGate plug-in
- Administer, manage, examine, and view reports on Oracle GoldenGate instances by using GoldenGate Monitor and/or the EMCC Control
- Send and receive Oracle GoldenGate alerts via SNMP and email



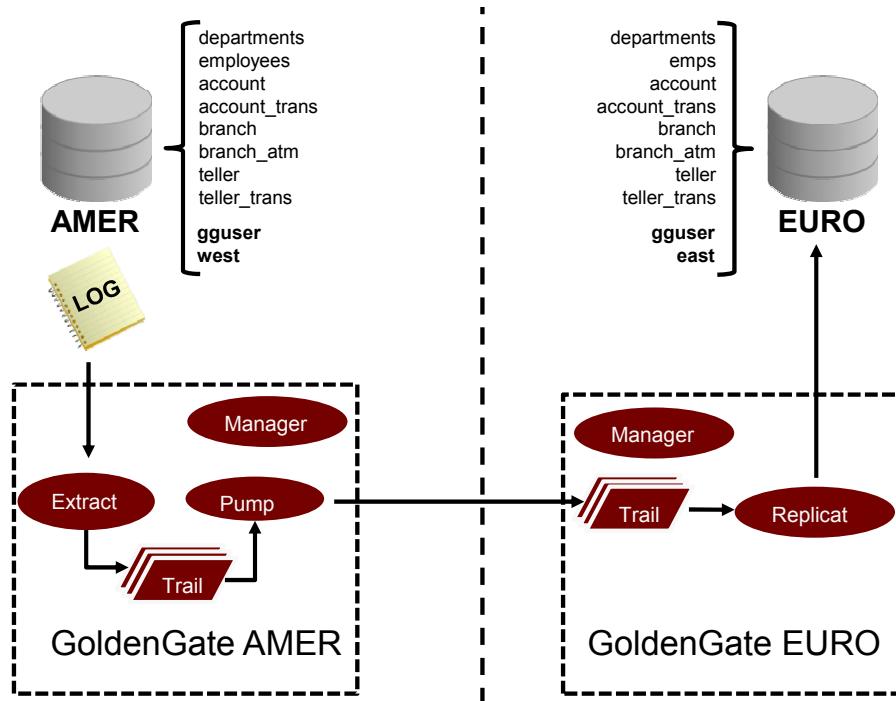
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In addition to these high-level terminal goals, each lesson has a lower-level set of enabling objectives.

In this course, we will not discuss the following topics in any significant detail:

- Administering the database itself
- Installation to support non-Oracle databases
- Creating the Oracle GoldenGate instances

# Classroom GoldenGate Scenario



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The classroom scenario consists of two databases, AMER and EURO. There also exists two instances of GoldenGate. GoldenGate AMER includes extract and data-pump processes. Data in the AMER tables is modified by scripts which generate events sent via GoldenGate AMER. GoldenGate EURO includes a replicate process, which processes changes into the GoldenGate EURO database.

# Schedule

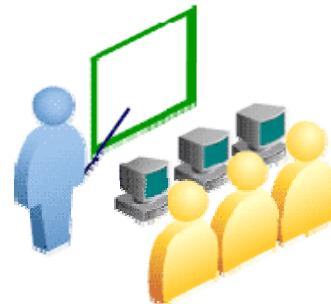
Session	Topics
<b>Day 1</b>	Lesson 1: Course Introduction Lesson 2: Oracle Management Pack Components Lesson 3: Installing Oracle GoldenGate Monitor Lesson 4: Using GoldenGate Monitor to Manage an Environment
<b>Day 2</b>	Lesson 5: Using GoldenGate Monitor for Reporting Statistics and History Lesson 6: Using GoldenGate Monitor: Configuring and Using External Alerts Lesson 7: Introducing EMCC and Installing the GoldenGate EMCC Plug-In Lesson 8: Managing GoldenGate Instances Using EMCC



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## Facilities in Your Location

- Enrollment/registration/sign-in
- Security badges
- Parking
- Phones
- Internet
- Restrooms
- Practices
- Lunch
- Kitchen/snacks
- Hours
- Materials (paper, pens, and markers)



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Contact your instructor or the education coordinator for site-specific information. Some of these may not be applicable for a Live Virtual Class (LVC).

## Summary

In this lesson, you should have learned how to:

- List the course prerequisites
- List the course objectives
- List the course schedule
- Identify the facilities in your location



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## Additional Resources

Topic	Website
Education and Training	<a href="http://education.oracle.com">http://education.oracle.com</a>
Product Documentation	<a href="http://www.oracle.com/technology/documentation">http://www.oracle.com/technology/documentation</a>
Product Downloads	<a href="http://www.oracle.com/technology/software">http://www.oracle.com/technology/software</a>
Product Articles	<a href="http://www.oracle.com/technetwork/articles/index.html">http://www.oracle.com/technetwork/articles/index.html</a>
Product Support	<a href="http://www.oracle.com/support">http://www.oracle.com/support</a>
Product Forums	<a href="http://forums.oracle.com">http://forums.oracle.com</a>
The Oracle Online Learning Library	<a href="http://www.oracle.com/goto/oll">http://www.oracle.com/goto/oll</a>
A-Team Chronicles	<a href="http://www.ateam-oracle.com/">http://www.ateam-oracle.com/</a>



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## Practice 1-1 Overview: Using NX Client

This practice covers the following topics:

- Using NX Client to access the practice environment



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## Oracle Management Pack Components



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# Objectives

After completing this lesson, you should be able to:

- Describe the components of Oracle Management Pack for Oracle GoldenGate
- Verify the prerequisites for installing and running Oracle Management Pack for Oracle GoldenGate
- Select the component that you would use for a given scenario



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You are the DBA for Example Company. Your data center has two Oracle 12c databases in two locations: West and East. You are currently using Oracle GoldenGate to replicate data from West to East (unidirectional). Although the Oracle software works flawlessly, there are sporadic network outages that result in the occasional excessive delay in replication (lag) or the complete unavailability of a component. So it is advisable to centrally review the configurations and centrally manage the status of the components.

# Oracle GoldenGate Environments

- OS
  - Linux, Windows, Solaris, AIX, and so on
  - 32-bit and 64-bit
- Database
  - Oracle, DB2, MySQL, SQL Server, Teradata, and so on
- Oracle GoldenGate Instance (version 12c)
  - Also known as Core
  - Extracts, Replicats, Trails, Managers, and so on
- Oracle Management Pack for Oracle GoldenGate
  - Monitor, Agents
  - WebLogic Server and other infrastructure
- Oracle Enterprise Manager



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The software is available from either of the following locations:

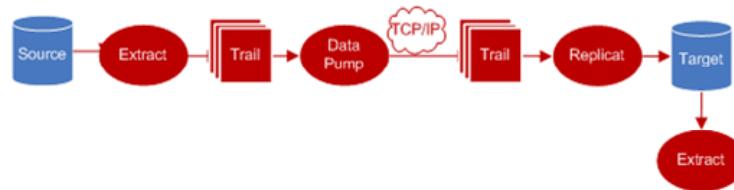
- Oracle Software Delivery Cloud: <http://eDelivery.oracle.com>
- Oracle Technology Network:  
<http://www.oracle.com/technetwork/middleware/goldengate/downloads/index.html>

Oracle Management Pack for Oracle GoldenGate requires approximately 2 GB of RAM in addition to whatever RAM is required for the other components.

Application servers (WebLogic Server, Tomcat, and so on) are used to support other Oracle GoldenGate components such as the Java Adapter (JMS messages), Veridata, and Director. Some application servers are built-in (such as Tomcat for Oracle GoldenGate Monitor); others must be installed separately (such as WebLogic Server for Oracle GoldenGate Director Server). Other functions require only plain old Java (such as Oracle GoldenGate Director Client).

# Oracle GoldenGate Monitor

- Provides a comprehensive environment for monitoring GoldenGate instances
- Provides insight into the state of GoldenGate objects
- Supports object management such as starting, stopping, configuring, and log viewing
- Runs on WebLogic Server
- Requires a relational database



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Oracle GoldenGate Monitor is Oracle's monitoring and management product that is targeted specifically at Oracle GoldenGate implementations. Oracle GoldenGate Monitor provides business value to the small to mid-size GoldenGate environments where only a subset of the components requires management. Unlike Oracle Enterprise Manager Cloud Control, Oracle GoldenGate Monitor is a GoldenGate-only monitoring solution, which provides insight and configuration for those objects that are particular to Oracle GoldenGate, such as extracts, replicats, hosts, and databases. Managing other objects, for example, instances of WebLogic Server, is not supported.

# Oracle GoldenGate Monitor Core Capabilities

- Discovery
- Monitoring, alerts, and notifications
- Diagnostics
- Runtime management
- Configuration management
- Reporting and view management



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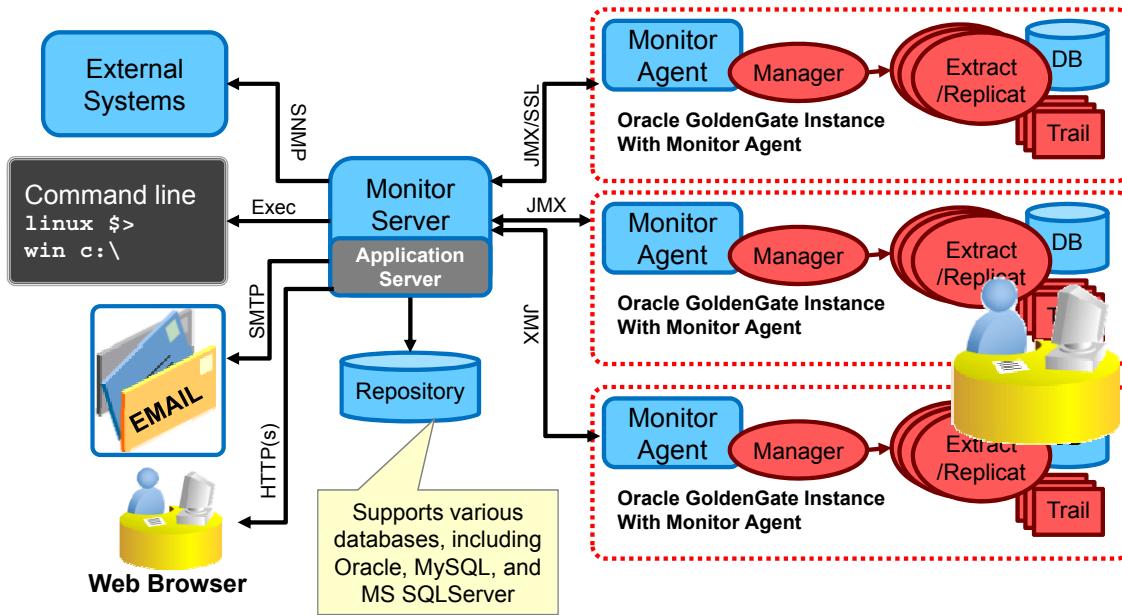
Oracle GoldenGate Monitor permits unattended management of GoldenGate environments. It comes with a comprehensive set of tools that support discovery, monitoring, and multiple forms of alerts and notifications. It also provides a set of tools for managing environments, including examining logs and other diagnostics. Key to a GoldenGate environment is runtime management. GoldenGate Monitor provides tools to start, stop, edit, and manage the runtime and configuration time environments.

Reporting and queries based on object fields and other information are key to managing a GoldenGate environment. To this effect, GoldenGate Monitor provides tools to examine, graph, and report the current functioning state of all manageable objects, whether they are database instances, hosts, extracts, or replicats.

In addition, GoldenGate Monitor provides a mechanism known as views, which can be used to subset large environments to only those components that are of interest.

**Note:** The current GoldenGate Monitor does *not* support the creation of GoldenGate objects directly. Object creation must be done via the GGSCI application.

# Oracle GoldenGate Monitor: Architecture



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Oracle GoldenGate Monitor is composed of:

- One or more instances of GoldenGate running traditional processes such as Extract and Capture. Monitor Server
- A one-to-one mix of GoldenGate Monitor agents (commonly referred to as a JAgent) for each GoldenGate instance. Monitor agents track GoldenGate and transfer metrics and information to the Monitor Server.
- The Monitor Server, which is a web application that is hosted on an application server, typically WebLogic Server. It uses a repository to store information, alerts, and other state information about the GoldenGate instances it tracks.
- The repository, which is a database that is used to track Monitor Server information. The repository supports Oracle 11gR1, Oracle 11gR2, or Oracle 12c, as well as select versions of MySQL and MS SQL Server.

GoldenGate can also interface with a variety of external systems to report alerts, including the Monitor Console (a GUI application) and email, SNMP, and arbitrary external systems by using an expandable command-line interface.

# Enterprise Manager Cloud Control (EMCC)

- Provides a comprehensive IT management infrastructure for both Oracle and non-Oracle hardware and software
- Provides insight into the health of all the components in your enterprise or private cloud Including GoldenGate!
- Supports private cloud management and self-service (IaaS, PaaS, DBaaS, and MWaaS)
- Is designed for flexibility and customization
- Runs on WebLogic Server
- Requires a relational database



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Oracle Enterprise Manager Cloud Control 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, thus enabling customers to achieve unprecedented efficiency gains while dramatically increasing service levels.

Enterprise Manager Cloud Control (EMCC) also provides on-demand access to servers and storage in a self-serviced, elastically scalable, and metered manner. The EMCC private cloud models can be divided into two primary categories: Infrastructure as a Service (IaaS), which allows users to request virtualized compute, storage, and network resources in order to run applications; and Platform as a Service (PaaS), which provides the specific database (DBaaS) and middleware (MWaaS) components required by applications.

Oracle Cloud Management Pack for Oracle Middleware delivers MWaaS capabilities that span the entire middleware cloud life cycle. It enables cloud administrators to identify pooled resources, configure role-based access, define the service catalog, and define the related chargeback plans. It allows cloud users to request middleware services and consume them on demand. Cloud self-service is beyond the scope of this course.

EMCC includes a restricted use license for its underlying Oracle DB and WLS 11g domain.

# Enterprise Manager Cloud Control

## Core Capabilities

- Delegated administration
- Monitoring, alerts, and notifications
- Groups, systems, and services
- Diagnostics
- Configuration management
- Standards compliance
- Job management
- Provisioning and patching
- Support workbench
- Reporting



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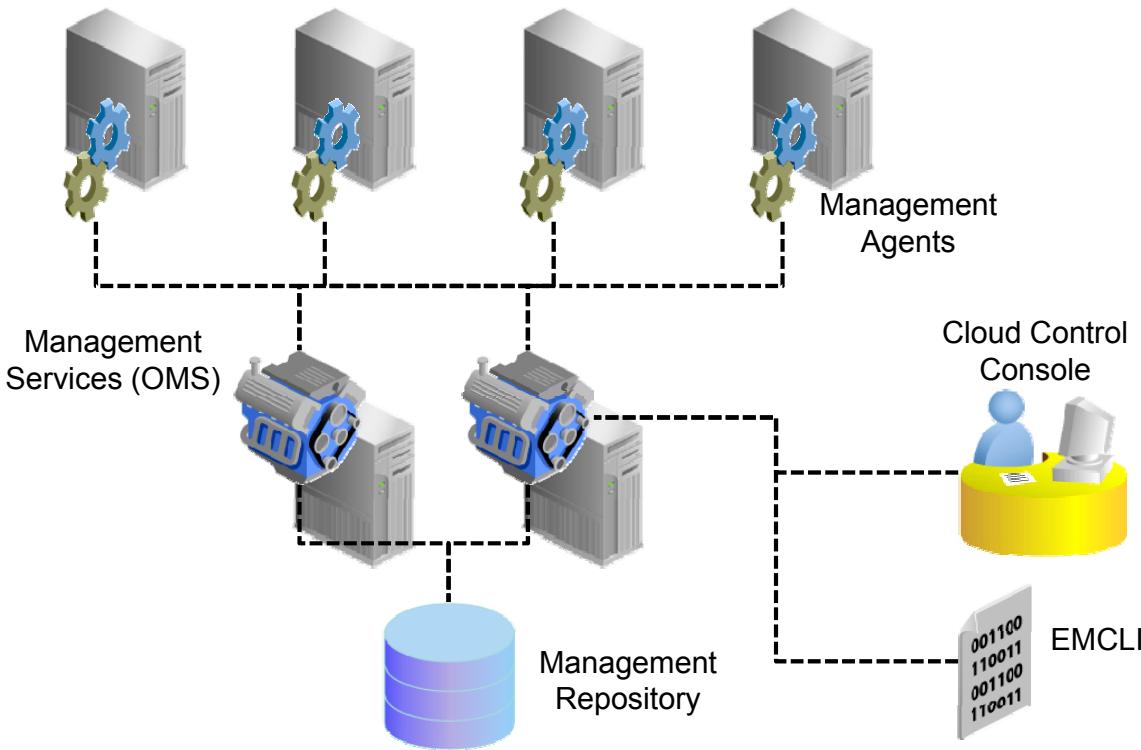
Enterprise Manager Cloud Control permits unattended monitoring of your IT environment. Enterprise Manager comes with a comprehensive set of performance and health metrics that allows monitoring of the key components in your environment, such as applications, application servers, databases, as well as the back-end components on which they rely (such as hosts, operating systems, and storage). Included in the set of monitorable components are GoldenGate objects.

EMCC's monitoring functionality is built on the concept of monitoring by exception. This means that EMCC monitors and raises events when exception conditions exist in your IT environment, and allows administrators to address them in a timely manner. For a typical monitoring scenario, when a target becomes unavailable or if thresholds for performance are crossed, events are raised and notifications are sent to the appropriate administrators.

The Enterprise Manager Job System can automate routine administrative tasks and synchronize the components in your environment so that you can manage them more efficiently. Jobs include starting, stopping, cloning, provisioning, deployment, and patching, or other custom procedures.

The Support Workbench provides a self-service means for you to obtain a support request number and to upload diagnostic data to Oracle Support quickly and with minimal effort. You can then view the status of the service request and ultimately the bug number (if one is generated) within the same user interface.

# Enterprise Manager Cloud Control Architecture



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

The Oracle Management Service is a Java application that runs on WebLogic Server and works with the Management Agents and the Management plug-ins to discover targets, monitor and manage those targets, and store the collected information in a repository for future reference and analysis. Oracle Management Service also renders the user interface for Enterprise Manager Cloud Control and supports the Enterprise Manager Command Line Interface (EMCLI).

The Oracle Management Repository (Management Repository) is a database where all the information collected by the Management Agent is stored. It consists of objects such as database jobs, packages, procedures, views, and tablespaces. At the time of installation, the Enterprise Manager Cloud Control Installation Wizard configures the Management Repository in your existing, certified database. The wizard, however, does not install a new database.

# Oracle GoldenGate

## Monitor Versus Enterprise Manager

Management Pack for GoldenGate	Monitor	Enterprise Manager
Visual representation of GoldenGate instances (diagrams)	Yes	Yes
Configuring new GoldenGate components	Yes	No
Control of GoldenGate components	Yes	Yes
Viewing process and log information	Yes	Yes, can also download
Interface to GGSCI	No	No
Creating alerts	Yes	Yes
Creating watch lists	Yes	Yes

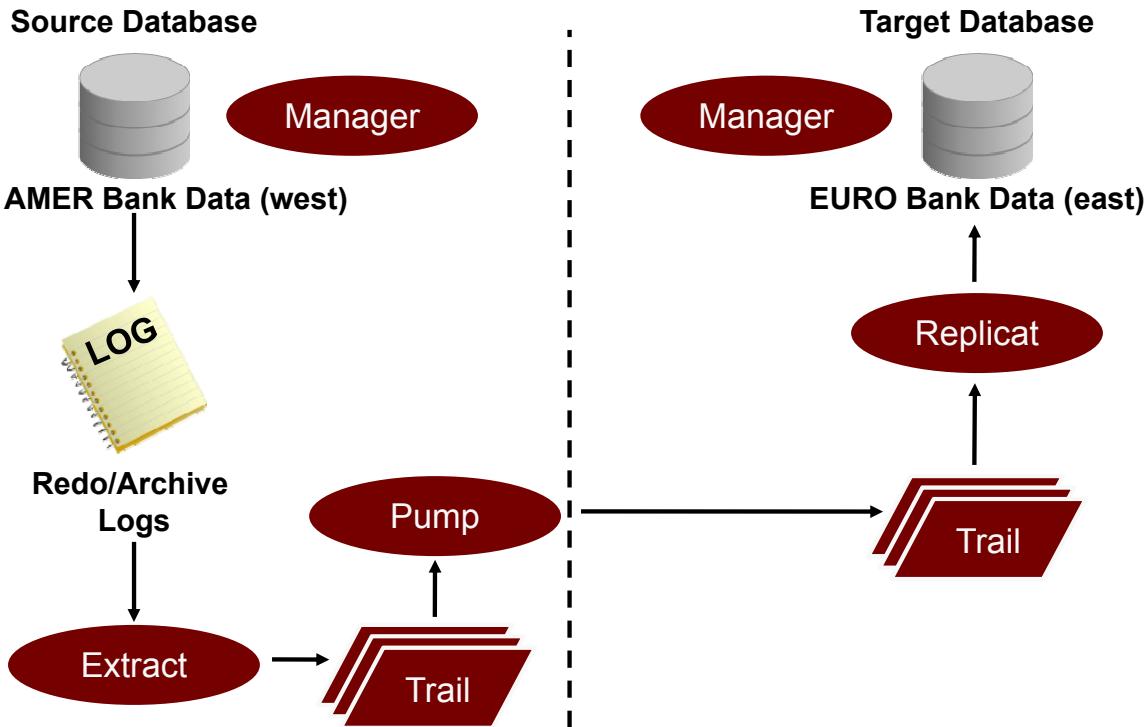


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Oracle GoldenGate Monitor and Enterprise Manager have some similar features to help you to manage and monitor your Oracle GoldenGate environment, but they also have their differences. Both allow you to view process and log information and create alerts and both provide the ability to create watch lists.

**Note:** The features mentioned in the slide are covered in more detail in the lessons that follow in this course.

## Classroom Scenario



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In the classroom, we have configured a real-time transaction replication between two databases. The business story is a banking scenario where transactions that take place on the AMER database in the WEST schema must be replicated to the EURO database in the EAST schema. This happens to be a one-way replication, but two-way replication is supported as well.

Both databases are located on the same machine in the lab for portability, but in a real-world situation, they would be on different machines.

## Quiz

GoldenGate Monitor track and manage instances of WebLogic Server.

- a. True
- b. False



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### Answer: b

GoldenGate Monitor is designed to manage only GoldenGate environments and objects. Limited support is provided for non-GoldenGate objects such as databases, but other artifacts such as WebLogic Server instances are not manageable.

## Summary

In this lesson, you should have learned how to:

- Describe the components, features, and architecture of Oracle Management Pack for Oracle GoldenGate
- Describe the components, features, and architecture of Oracle Enterprise Manager Cloud Control



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## Practice 2-1 Overview: Getting to Know the Classroom Environment

This practice covers the following topics:

- Investigating the classroom environment
- Becoming familiar with file locations, including staged software
- Accessing class databases



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## Installing Oracle GoldenGate Monitor

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# Objectives

After completing this lesson, you should be able to:

- Install Oracle GoldenGate Monitor by using either of the following:
  - Command line
  - GUI installer
- Configure the files needed to communicate with existing Oracle GoldenGate instances
- Start Oracle GoldenGate Monitor Servers
- Create GoldenGate administration users



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# Roadmap

- Concepts and Prerequisites
- Installing GoldenGate Monitor Server
- Configuring Oracle GoldenGate Monitor Server
- Creating Oracle GoldenGate Monitor Agent Instances



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## Prerequisites

The prerequisites for GoldenGate Monitor Server 12c (12.1.3) include:

- Oracle GoldenGate 12c
- Java Developers Kit 1.7 or later
- Oracle WebLogic Server 12c
- Oracle Application Developer Framework 12c
- Database: Oracle Database 11gR1/2 and 12c, MySQL, and MS SQL Server (specific versions)



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The prerequisites for GoldenGate Monitor are (and include versions used during development of this course):

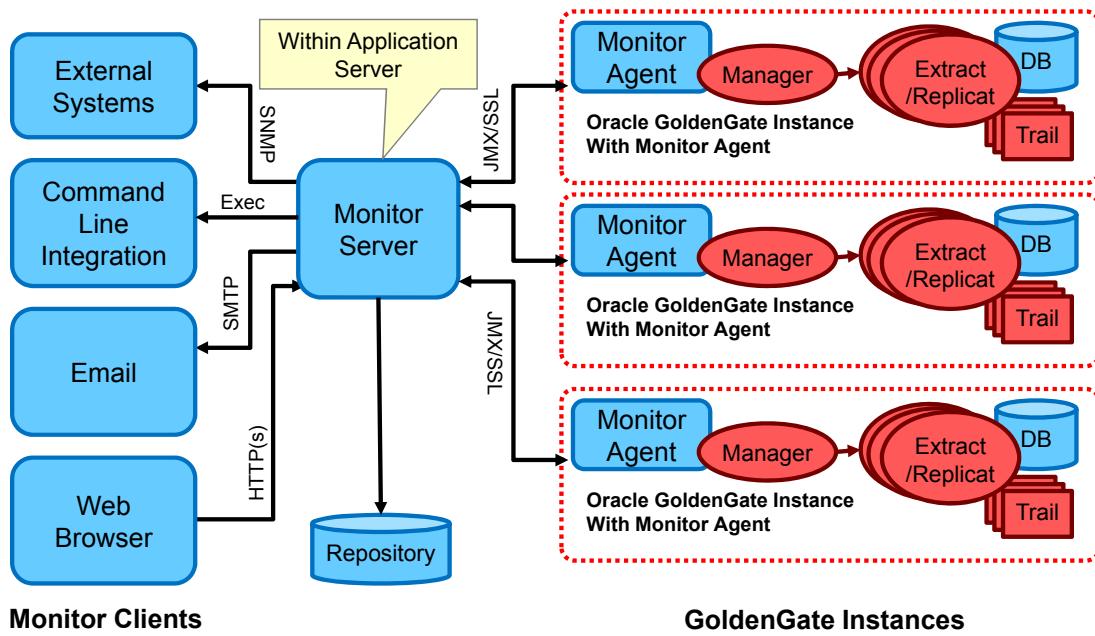
- Oracle GoldenGate 12c (12.1.2.0.0)
- Oracle Java Developers Kit 1.7 (1.7.0\_55)
- Oracle WebLogic Server (12.1.3.0.0)
- Oracle Application Developer Framework (12.1.3.0.0)
- Oracle Database (12.1.0.2.0)

Although strictly not a prerequisite, the following may also be required:

- Oracle GoldenGate Monitor packaged with Oracle GoldenGate Veritas v12.1.3.0.0 was used during the development of this course.

# GoldenGate Monitor Components

Oracle GoldenGate Monitor is composed of:



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GoldenGate Monitor is composed of a number of elements:

- **Monitor Server:** Monitor Server is the heart of GoldenGate Monitor. It is hosted on one of several application servers, most commonly WebLogic Server.
- **Monitor Clients:** Monitor Server includes support for a number of clients. The server itself has a web application interface, which is accessible via HTTP(S). Email notifications and alert clients are supported via Simple Mail Transfer Protocol (SMTP). Command-line alerts, which can be used to create custom interfaces, are supported, and so are Simple Network Management Protocol (SNMP) clients.
- **Repository:** Monitor Server requires a repository for data. Although this is typically an Oracle database, versions of MSSQL and MySQL are also supported.
- **GoldenGate instances:** For each GoldenGate instance, a monitor agent is created and configured. This agent uses JMX, possibly over SSL, to interface with Monitor Server.

# Roadmap

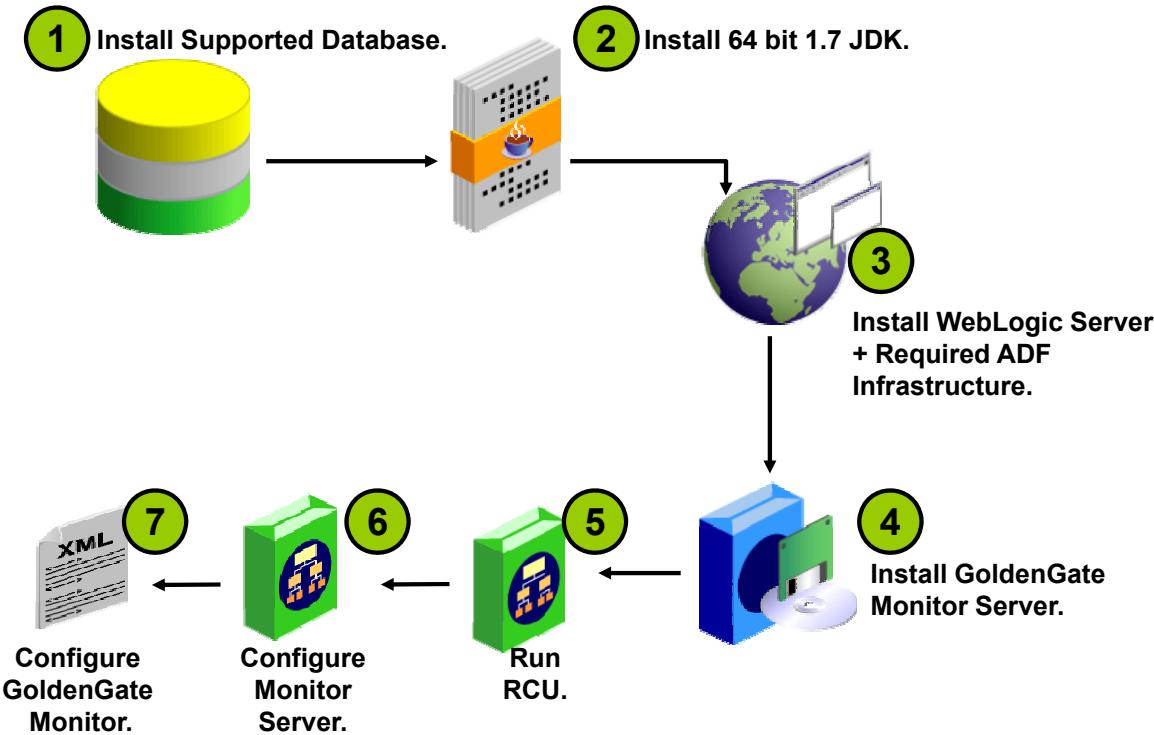
- Concepts and Prerequisites
- Installing GoldenGate Monitor Server
  - Installation overview
  - Installing WebLogic Server
  - Installing Application Developer Framework (ADF)
  - Installing GoldenGate Monitor
  - Running RCU
  - Creating a WebLogic Server Domain
  - Starting WebLogic Server Instances
- Configuring the GoldenGate Monitor Server
- Creating Oracle GoldenGate Monitor Agent Instances



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## Basic Installation Tasks



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Several tasks are required for installing Oracle GoldenGate Monitor.

1. Install the supported database. GoldenGate Monitor uses a database to collect and store information. Install one of the supported databases. For this class and practice set, Oracle Database 12c is used.
2. Install the supported JDK. GoldenGate Monitor 12c requires a 1.7 or later JDK.
3. Install WebLogic Server and the required infrastructure. GoldenGate Monitor installs a web application into a WebLogic Server domain. Install a supported version of WebLogic Server. For this class, WebLogic Server 12.1.3.0.0 was used. Install the required Oracle Application Development Framework into the WebLogic Server middleware directory.
4. Install GoldenGate Monitor. The installation has changed from earlier versions and now installs into an existing middleware home directory.
5. Run the RCU utility to create the required GoldenGate Monitor schema.
6. Configure a WebLogic Server domain for Monitor Server.
7. Configure GoldenGate Monitor, which is discussed in detail a little later.

## Quiz

Which databases are supported for Oracle Monitor Server?

- a. Oracle 11g releases 1 and 2
- b. Oracle 12c
- c. MySQL (select versions)
- d. MS SQL Server (select versions)
- e. All of the above



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### Answer: e

Oracle GoldenGate Monitor Server supports the following databases:

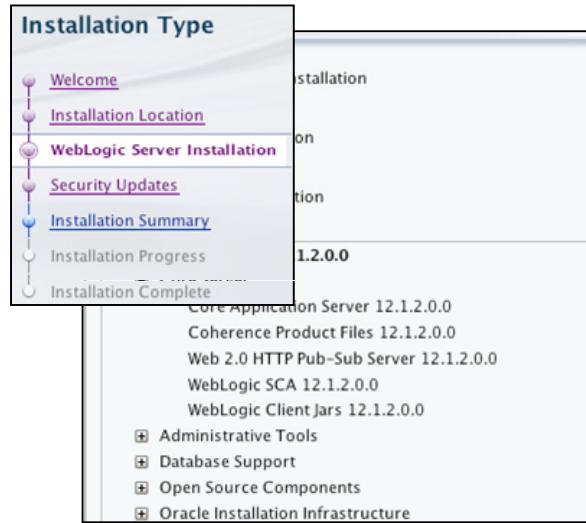
- Oracle 11gR1, 11gR2, and 12c
- MySQL 5.5
- MS SQL Server 2008, 2012

# Installing WebLogic Server

WebLogic Server:

- Is installed by using a generic Java-based installer
- Supports all Oracle Universal Installation modes
- Supports a variety of platforms, including:
  - Linux
  - Oracle Solaris
  - HP-UX
  - Windows

```
$ java -jar fmw_12.1.3.0.0_wls.jar  
Extracting files...
```



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The normal WebLogic Server installation process can be run in one of several ways and includes both WebLogic and Coherence.

Depending on the selected installation type, the following elements are installed:

- **WebLogic Server installation:** Installs all of WebLogic Server, all of Coherence, as well as the WebLogic Client JAR files
- **Coherence installation:** Installs all of WebLogic Server and Coherence, but does not install WebLogic Client files
- **Complete installation:** Installs all of WebLogic Server, Coherence, as well as the associated Client examples

You can run the installation program in the following modes:

- Graphical-mode installation is an interactive, GUI-based method for installing your software.
- Console-mode installation is an interactive, text-based method for installing your software from the command line.
- Silent-mode installation is a non-interactive method of installing your software. You use an XML properties file to specify the installation options. You can run this installation from either a script or from the command line. This installation allows you to define the installation configuration only once, and then use that configuration to duplicate the installation on many machines.

# Installing Infrastructure

## Oracle Application Development Framework:

- Contains support for ADF, JDeveloper, and others
- Installs into an existing MIDDLEWARE\_HOME
- Is required by GoldenGate Monitor
- Supports all Oracle Universal installation modes
- Can be run in silent or GUI modes

```
$ java -jar fmw_12.1.3.0.0_infrastructure.jar  
Extracting files. . .
```



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Oracle Application Developer Framework includes support for a number of products, including the Oracle ADF faces, JDeveloper, and other packages. See the documentation for a complete list of features supported by the Oracle ADF infrastructure installer.

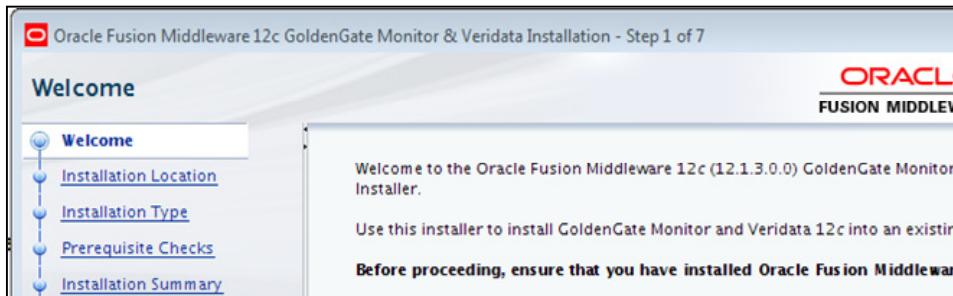
In addition to providing an integrated development environment for the Fusion Middleware 12c release, the 12.1.3.0.0 version of JDeveloper and ADF introduces several new features for you to explore. FMW 12.1.3 includes an updated SOA release, support for ADF and JDeveloper development, extended support for REST and Web Services, and many other features and enhancements. See the online documentation for a complete list of all Oracle Application Developer Framework elements.

# Installing Oracle GoldenGate Monitor Server

GoldenGate Monitor:

- Is installed by using a generic Java-based installer
- Can be run in GUI or silent mode
- Installs into an existing MIDDLEWARE\_HOME
- Requires running the RCU utility and other configuration

```
$ java -jar fmw_12.1.3.0.0_ogg.jar  
Extracting files. . .
```



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Oracle GoldenGate Monitor Server is installed by downloading, unzipping, and then running the installer. In the example in the slide, the installer is running using a `java -jar` command. The installer can also be run in no console and silent modes. The common installation options include:

- `-help`: Print help.
- `-silent`: Use silent mode. Inputs are taken from the command line or a response file.
- `-responseFile <path>`: This indicates the fully qualified location of an installation response file.
- `-noconsole`: Suppress the use of a GUI console (Windows only). This is ignored in Linux.
- `-debug`: Print debug information.
- `-logLevel <level>`: Omit log messages whose level is less than `<level>`. Valid options are: severe, warning, config, fine, finer, and finest.

Currently GoldenGate Monitor Server is installed only on top of WebLogic Server with the required WebLogic Server infrastructure.

## GUI Mode Installation

To install GoldenGate Monitor by using GUI mode:

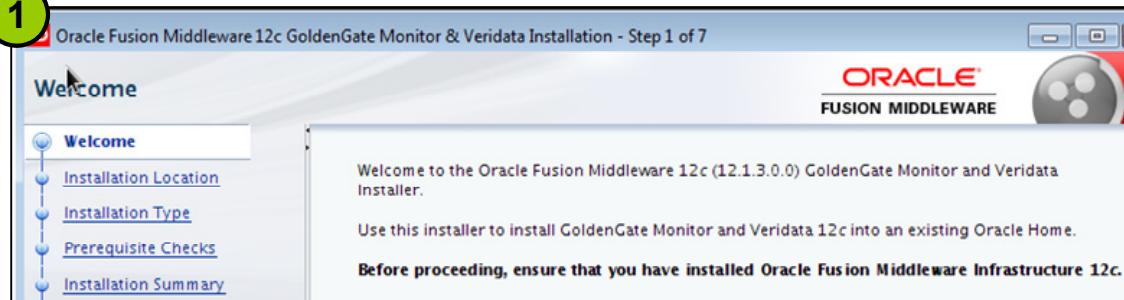
- Start the installer

0

```
$ java -jar fmw_12.1.3.0.0_ogg.jar
```

- Complete the installer steps

1



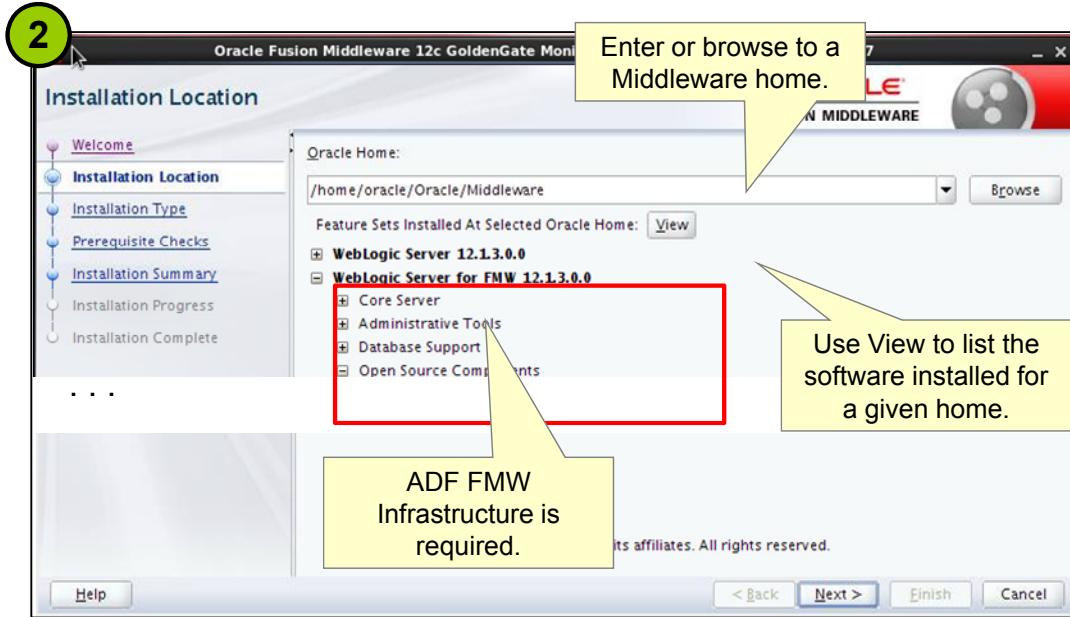
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To install GoldenGate Monitor in GUI mode, execute the generic Java-based installer. Follow the installer wizard steps to select an appropriate middleware home, Java JDK, and other options as required.

0. Start the installer by using a command that is similar to: `java -jar fmw_12.1.x.x.x_ogg.jar`
1. On the Welcome screen, click Next.

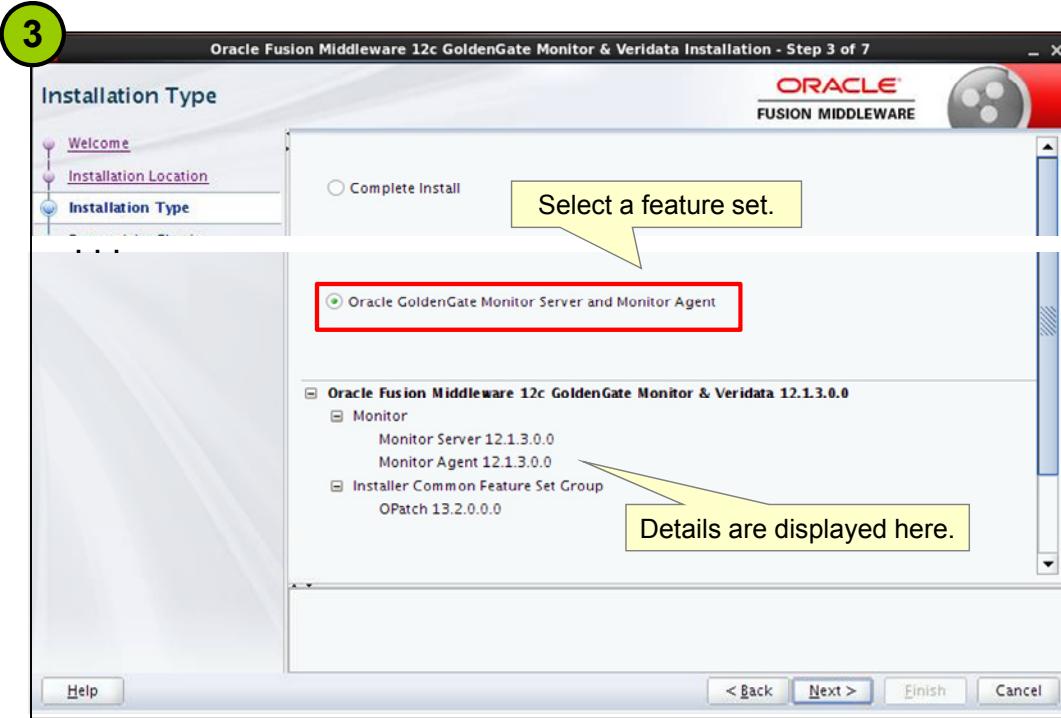
## Installation Step 2 of 7 Installation Location



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2. Use the Installation Location screen to navigate to a middleware home. You can confirm that the middleware home has the required ADF infrastructure installed by clicking **View** to show all installed features. Click **Next** to continue.

## Installation Step 3 of 7 Installation Type



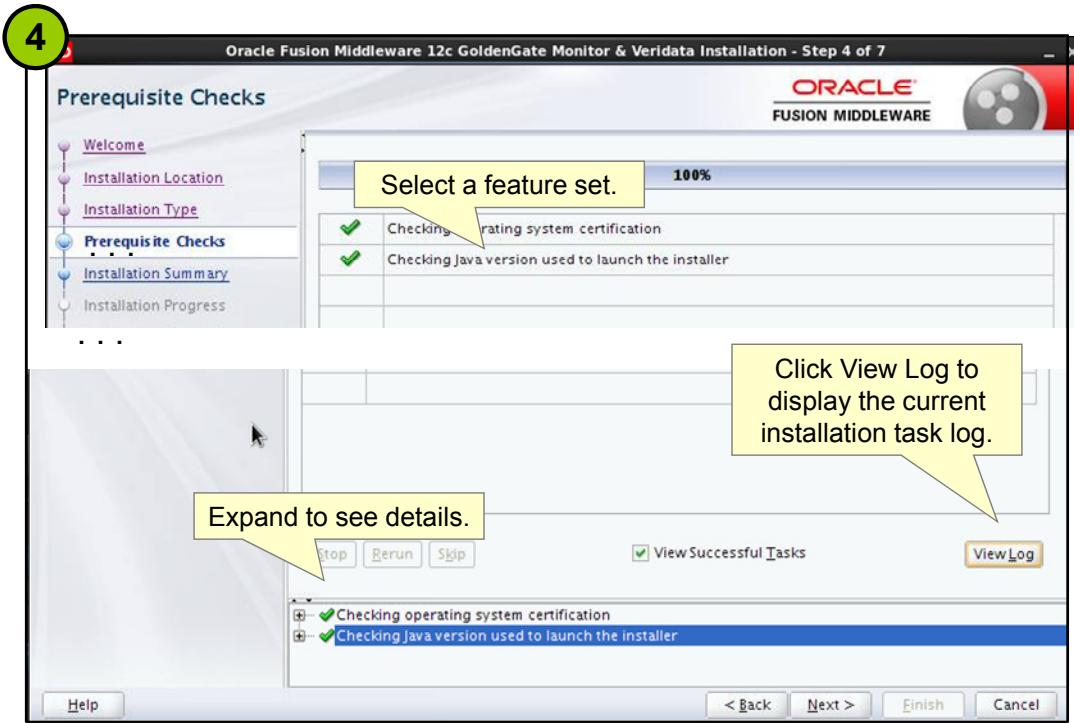
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3. The Installation Type screen supports the selection of components to install. Most populated combinations of GoldenGate Monitor and Veritas are supported. Select one component or a complete installation to add or install that component. Select combinations are also supported, as is shown in the slide: Oracle GoldenGate Monitor Server and Monitor Agent.

After a feature set is selected, click **Next** to continue.

## Installation Step 4 of 7 Prerequisite Checks

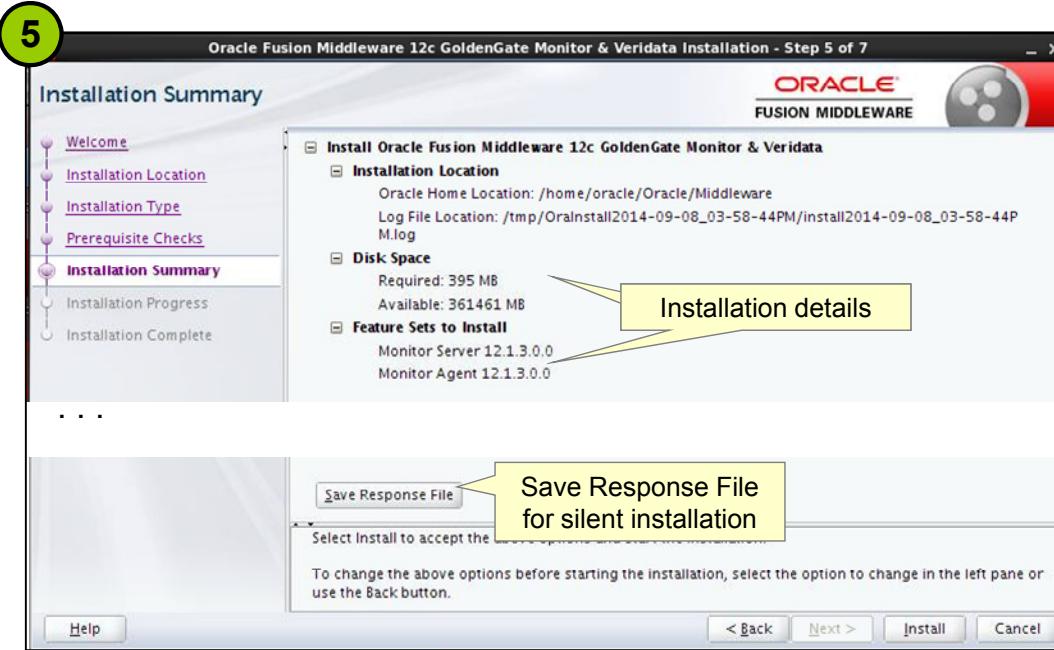


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4. This screen runs the required environment prerequisite tests. Click **View Log** to see a log of all steps up to this point. At the bottom of this screen is a list of tasks run. Expand or collapse the different task areas for more details, and then click **Next**.

## Installation Step 5 of 7 Installation Summary

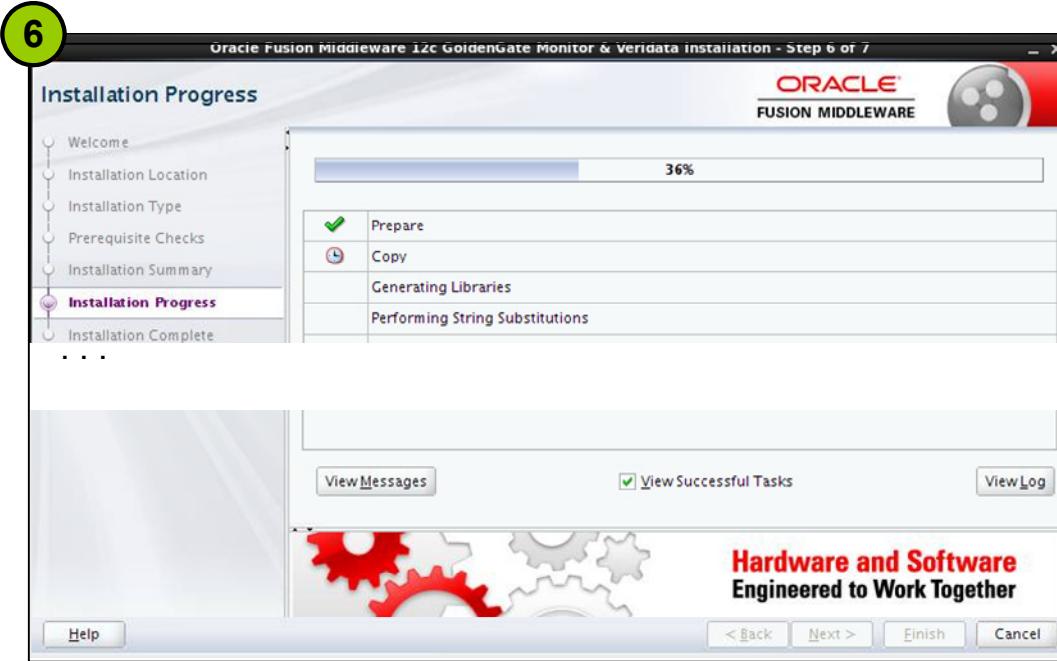


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5. This screen shows all selections that were previously made, and has an option to save a response file for later use. Use the **Back** button to return to a previous screen or click **Install** to continue with the installation.

## Installation Step 6 of 7 Installation Progress



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6. This screen displays the percentage complete, as well as a list of tasks completed and in process. When complete, the **Next** and **Finish** buttons are enabled. Click **Finish** to complete the installation or click **Next** to move to the Installation Complete screen.

# Installation Step 7 of 7

## Installation Complete



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The final step is the Installation Complete screen. This screen shows the features installed, as well as a set of next steps. Click **Finish** to exit the installer.

## Console and Silent Mode Installations

To install GoldenGate Monitor in console mode:

- Start the installer in console mode, and then follow the prompts (Windows only):

```
$ java -jar fmw_12.1.3.0.0_ogg.jar -mode=console
```

To install in silent mode:

- Create or capture a response file
- Run the installer in silent mode:
  - Specify the fully qualified path to the installation file.

```
$ java -jar fmw_12.1.3.0.0_ogg.jar -mode=silent  
-responseFile=/path/to/response.file.rsp
```



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In addition to GUI mode the installer supports both console and silent mode installs.

- Console mode installation is used only when a GUI is not available. Note that if you attempt to start GUI installation on a system that does not support graphical display, the installation program starts the Console mode installation.
- Silent mode installation is used when a common configuration is required across multiple machines. With silent mode installation, configuration is defined only once, and then duplicated across multiple installations. To start in silent mode, specify the -mode=silent parameter and a fully qualified path to a response file by using -responseFile=.../response.rsp.

## Creating the Repository

Repository Creation Utility (RCU) is a tool used to create and manage Oracle Fusion Middleware database schemas.

RCU:

- Is shipped as a separate file with its versions conforming to the version of an associated product
- Is available for Linux and Windows platforms
- Provides the flexibility to create custom schemas and tablespaces
- Uses prefixes to group related schemas together



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RCU is used to create various component schemas in an existing database. The Linux RCU is used to create schemas on supported UNIX databases. RCU supports multiple repositories (collection of related schemas) within a single physical database. It also supports the concept of prefixes, which are used to group related schemas together. For example, you could have two versions of the Monitor schema in your database: a test version and a production version. You could create a “Test” prefix for your test monitor instance (Test\_Monitor) and a “Prod” prefix for your production instance schema (Prod\_Monitor).

The mapping between the prefixes and schemas are maintained in schema\_version\_registry.

# Running RCU



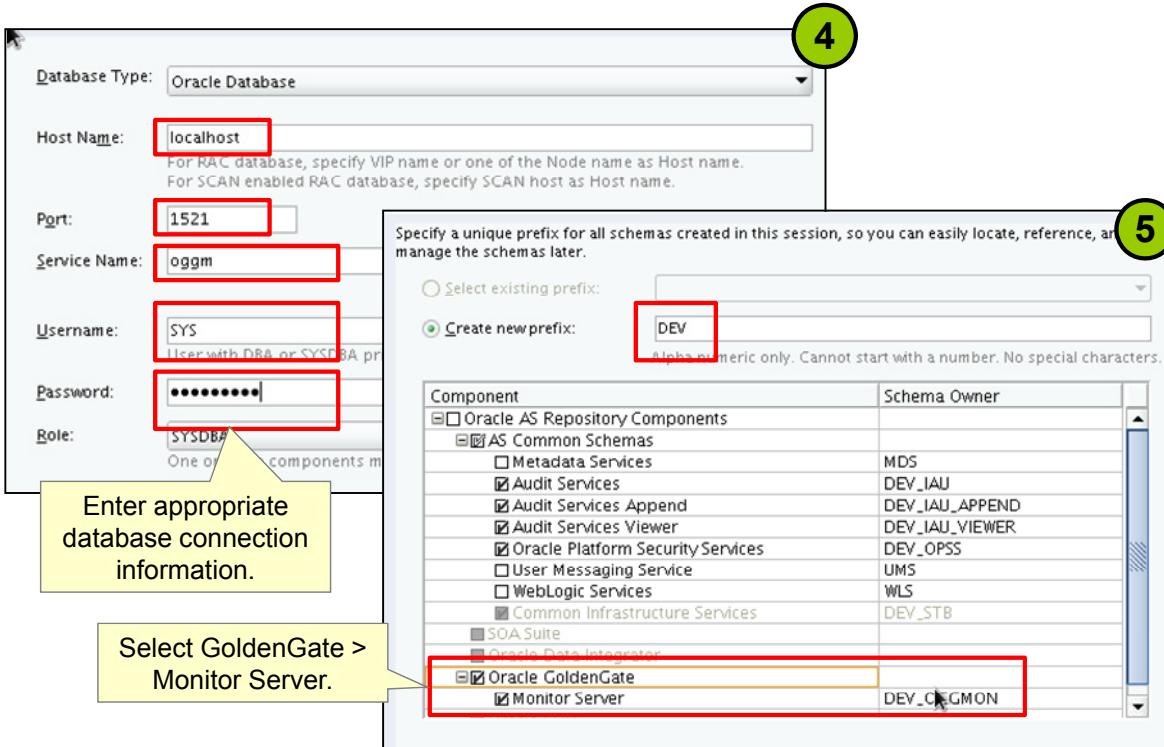
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To run RCU to create the database artifacts for Oracle GoldenGate Monitor, perform the following steps:

1. Start the RCU utility by executing `bin/rcu` in the directory in which RCU was installed. Typically, this is  `${MIDDLEWARE_HOME}/oracle_common/bin/rcu`.
2. The Welcome page is displayed. Click **Next**.
3. Select Create (the default) or Drop, and then click **Next**.  
If you select Create, you need to select a “create sub-mode.” The default is System Load and Product Load, which executes all required commands and assumes the use of an account with DBA privileges (such as SYS as SYSDBA on Oracle databases).

# Running RCU



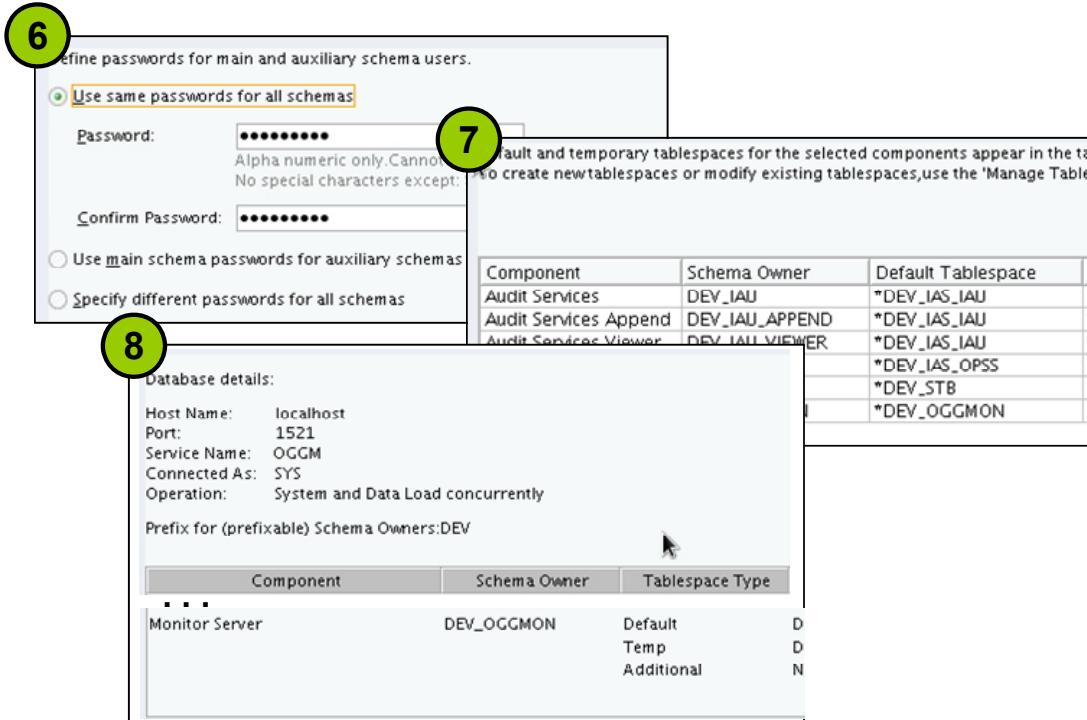
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4. Enter the required database connection credentials, including host name, port, service, and username. Note that the user must have SYSDBA privileges. Click **Next**.
5. Enter an appropriate prefix and select Oracle GoldenGate and one of its sub-elements. In this example, you select Monitor Server. Click **Next**.

Be aware that depending on the products previously installed into MIDDLEWARE\_HOME, different options will be shown. In the example in the slide, only Oracle GoldenGate Monitor was installed. However, if another product had been installed, its schema set would be included here.

# Running RCU



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6. Select an appropriate password for the entire set of schemas or select each password individually, and click **Next**.
7. Click **Ok** in the Tablespaces dialog box.
8. Review details and click **Next** to create the schemas.
9. Click **Close** (not shown).

# GoldenGate Monitor Server

GoldenGate Monitor Server can be installed to use:

- Oracle databases
- Non-Oracle databases, including MySQL and Microsoft SQL Server

With an Oracle database:

- Requires a WebLogic Server domain
- Can be added to an existing or a newly created domain
- Is added by using the WebLogic Server domain configuration wizard

```
$ ${MIDDLEWARE_HOME}/wlserver/common/bin/config.sh
```



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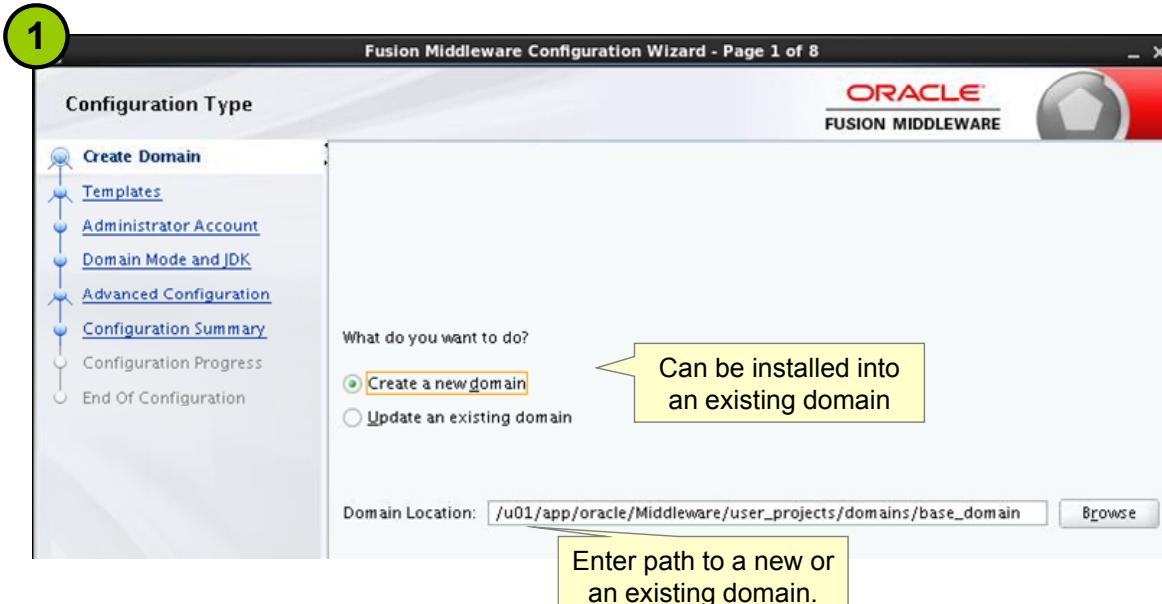
GoldenGate Monitor can be installed by using several databases, including Oracle Database 12c, MySQL, and Microsoft SQL Server. When installing with an Oracle database, a specific GoldenGate Monitor Server WebLogic Server Domain template is used to add the required components.

When working with Oracle databases, you must configure a WebLogic Server domain. See the Oracle GoldenGate Monitor installation guide for installing Monitor on non-Oracle databases.

1. To start the configuration wizard, run the  
\${MIDDLEWARE\_HOME}/wlserver/common/bin/config.[sh|bat] script.

# Domain Configuration Step 1 of 12

## Configuration Type



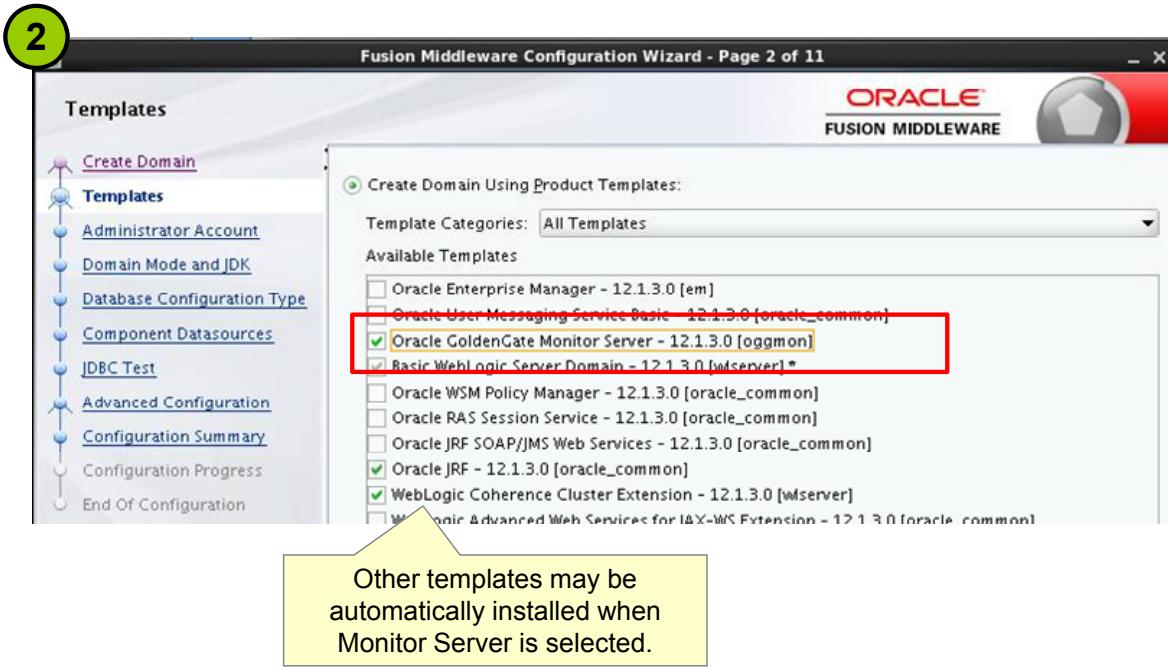
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The domain configuration wizard requires a number of steps. On the Configuration Type screen, select either “Create a new domain” or “Update an existing domain.” If the WebLogic Server installation is the correct version and the ADF infrastructure has been installed, an existing domain may be updated to include GoldenGate Monitor Server.

1. Select “Create a new domain” or “Update an existing domain” and enter or browse to the fully qualified domain name. Click **Next**.

## Domain Configuration Step 2 of 12 Templates



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2. Select the Oracle GoldenGate Monitor Server and click **Next**.

Additional templates, including JRF and Coherence, are automatically selected when Monitor Server is selected.

## Domain Configuration Steps 3, 4 of 12 Administrator, Mode, and JDK

The screenshot shows two configuration steps:

**Step 3 (Administrator Account):** A dialog box titled "Administrator Account" with a sidebar menu. The sidebar includes "JDBC Test", "Credentials", "Advanced Configuration", and "Configuration Summary". The main area shows fields for "Name" (weblogic), "Password", and "Confirm Password". A green circle with the number "3" is overlaid on the top-left corner of the dialog.

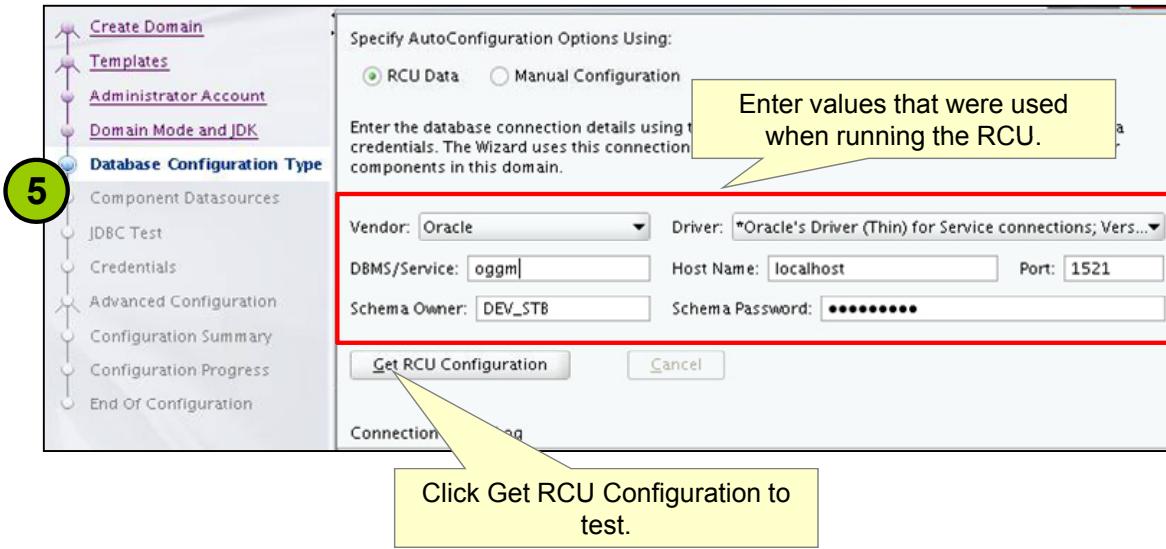
**Step 4 (Domain Mode and JDK):** A dialog box titled "Domain Mode and JDK". The sidebar menu includes "Create Domain", "Templates", "Administrator Account", "Domain Mode and JDK" (which is selected and highlighted in blue), "Database Configuration Type", "Component Datasources", "JDBC Test", "Credentials", and "Advanced Configuration". The main area has sections for "Domain Mode" (with "Development" selected) and "JDK" (with "Oracle HotSpot 1.7.0\_55 /usr/java/jdk1.7.0\_55" selected). A green circle with the number "4" is overlaid on the top-left corner of the dialog.

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3. On the standard Administrator Account screen, enter a username and password for the WebLogic account and click **Next**.
4. On the Domain Mode and JDK screen, select a mode and a JDK, and then click **Next**. For this class, Development mode and 1.7 JDK were used.

## Domain Configuration Step 5 of 12

### Database Creation Type



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5. Enter the values that were used when running the RCU. When you have finished, click the Get RCU Configuration button to test the database connection by using the entered values. Click **Next** when the process is complete.

## Domain Configuration Steps 6, 7 of 12

### JDBC Components and Testing

**6**

JDBC Component Schema

Validate Components.

RAC multi data source  Don't convert

Edits to the data above will affect all checked rows in the table below.

Component Schema	DBMS/Service	Host Name	Port	Schema Owner	Schema Password
LocalSvcTbl Schema	OGGM	localhost	1521	DEV_STB	*****
Monitor Server Schema	OGGM	localhost	1521	DEV_OGGMON	*****
OPSS Audit Schema	OGGM	localhost	1521	DEV_IAU_APPE	*****
OPSS Audit Viewer Sch	OGGM	localhost	1521	DEV_IAU_VIEW	*****
OPSS Schema	OGGM	localhost	1521	DEV_OPSS	*****

**7**

JDBC Component Schema Test

Click Test Selected Connections to test connection details.

JDBC Connection URL

Test Selected Connections

Connection Result Log

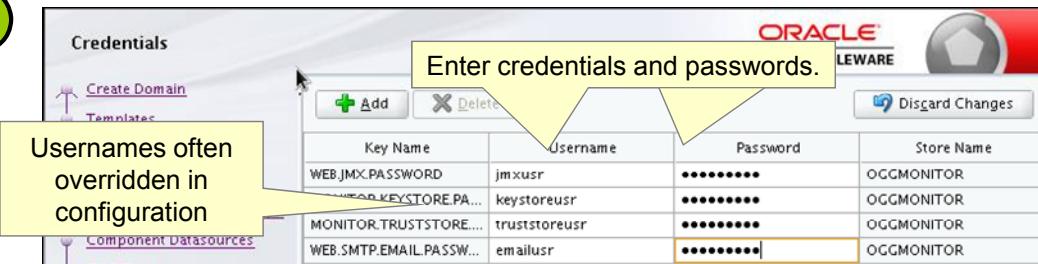
Component Schema=LocalSvcTbl Schema

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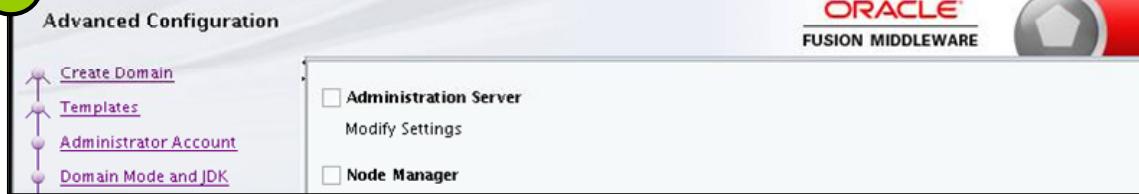
6. Use the JDBC Component screen to validate components, and then click **Next**.
7. Use the JDBC Component Schema Test screen to test the connection details. Click **Next** when the test passes.

## Domain Configuration Steps 8 to 10 of 12 Credentials, Advanced Configuration, and Summary

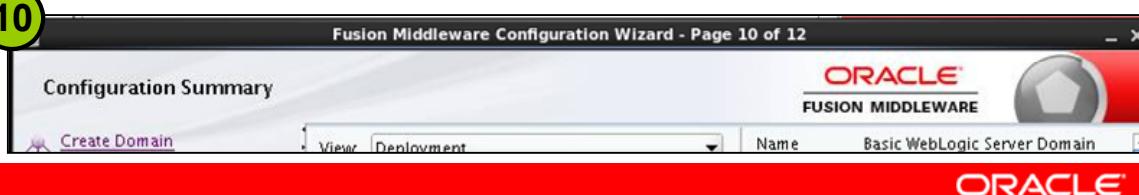
8



9



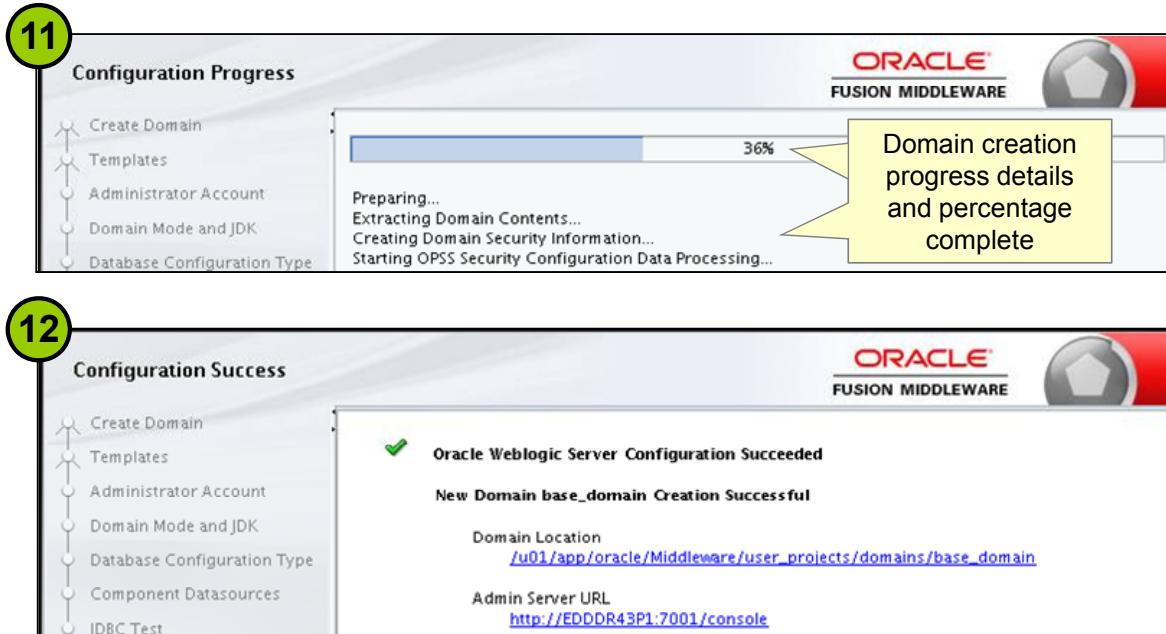
10



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8. Credentials: Enter a username and password for each required user. Note that usernames are overridden in the configuration later. Click **Next** when you have finished.
9. Make any advanced configuration changes. Note that selecting any of the various check boxes in Advanced Configuration causes additional wizard screens to display, which are not covered in this course. See the WebLogic Server documentation for more information about Advanced Configuration. Click **Next** when you have finished. It would not be uncommon to select Administration Server and change the port and other details of the Administration Server that is associated with the domain.
10. Examine the configuration summary details. Click **Create** when you have finished. The wizard then begins creating the domain.

## Domain Configuration Steps 11, 12 of 12 Progress and Success



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11. The Configuration screen shows the progress and details of the domain that is being created. Click **Next** when the configuration is complete.
12. The Configuration Success screen shows the URL and other details of the newly created domain. Click **Finish** to complete the creation of the domain and close the wizard.

## Monitor Server Credentials

- Server credentials, such as `jmxusr`, `keystoreusr`, or others can be updated.
- WLST must be used when server credentials are updated.
- To change credentials use WLST command similar to:

```
# Start WLST:  
$ cd ${MIDDLEWAREHOME}/wlserver/common/bin  
$ ./wlst.sh  
#Connect to an instance:  
wls:/base_domain/serverConfig> connect('weblogic','pwd')  
# Create a credential:  
wls:/base_domain/serverConfig> createCred(map='OGGMONITOR',  
key='WEB.JMX.PASSWORD',  
user='jmxusr',  
password='jmxuserpwd',  
desc='JMX Password')  
#Update a credential  
wls:/base_domain/serverConfig> updateCred(map='OGGMONITOR',  
key='MONITOR.TRUSTSTORE.PASSWORD',  
user='tsusr',  
password='tsuser1',  
desc='Truststore Password')
```



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GoldenGate Manager Server credentials must be updated by using WebLogic Scripting tool or WLST. Using WLST is outside the scope of this course. These examples are intended to assist the beginner in getting started. See the GoldenGate Server Monitor installation documentation for a complete description of all the keys associated with Monitor Server credentials.

## Starting Instances

WebLogic Server instances can be started either at the command line or by using Node Manager. The steps to start the servers include:

1. Starting the Administration Server
2. (Optional) Updating GoldenGate Manager server credentials
3. Starting a Managed Server instance

```
$ cd ${MIDDLEWARE_HOME}/user_projects/domains/DomainName
$ ./bin/startWebLogic.sh
$ ./bin/startManagedWebLogic.sh MONITORSERVER_server1
```

Typically Administration and Managed server instances are started after configuration is complete.



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Two instances of WebLogic Server are required for the Monitor Server application: an Administration Server and a Managed Server instance. Unless changed during domain creation, GoldenGate Monitor requires a single WebLogic Server managed instance, MONITORSERVER\_server1. To start the instances, use a command similar to the following:

```
$ cd ${MIDDLEWARE_HOME}/user_projects/domains/DomainName
$ ./bin/startWebLogic.sh >~/administration.log 2>&1 &
```

Which:

1. Changes directory to the domain root
2. Starts an instance of the Administration Server, ./bin/startWebLogic.sh
3. Pipes all output to the home directory to a file administration.log,  
 > ~/administration.log
4. Redirects standard error to standard out, 2>&1
5. And runs the command in the background, &

Consider using a command such as \$ tail -f ~/administration.log and looking for the status **RUNNING** before starting the Managed Server. On Windows, use a command similar to:

```
C:/path/to/MONITOR_DOMAIN>startWebLogic.cmd
```

The Managed Server is started with a command similar to:

```
$ bin/startManagedWebLogic.sh MONITORSERVER_server1
```

This command starts a single instance of the Managed Server MONITORSERVER\_server1.

Note that unless this server is provided with a boot.properties file that contains a username and password element, you will need to supply them at process start.

Consider creating the file `boot.properties` in

```
 ${MIDDLEWARE_HOME}/user_projects/domains/DomainName/servers/MONITOR  
 SERVER_server1/security/
```

Containing:

```
# username and password for weblogic administration account  
username=weblogic  
Password=password
```

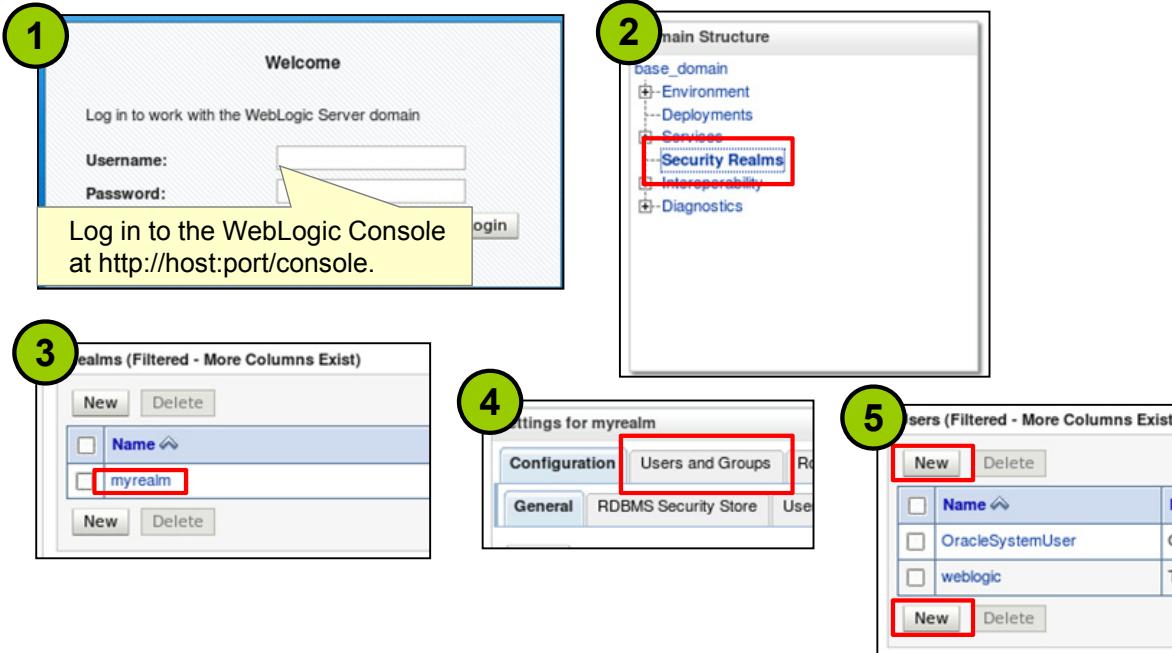
If a valid `boot.properties` file exists, it is used at startup, thus removing the requirement of supplying appropriate credentials at server start time.

See the WebLogic Server Administration documentation for more information about managed WebLogic Server instances and the Administration console.

On Windows, use a command similar to:

```
C:\path\to\bin>startManagedWebLogic.cmd MONITORSERVER_server1
```

# Creating GoldenGate Monitor Users



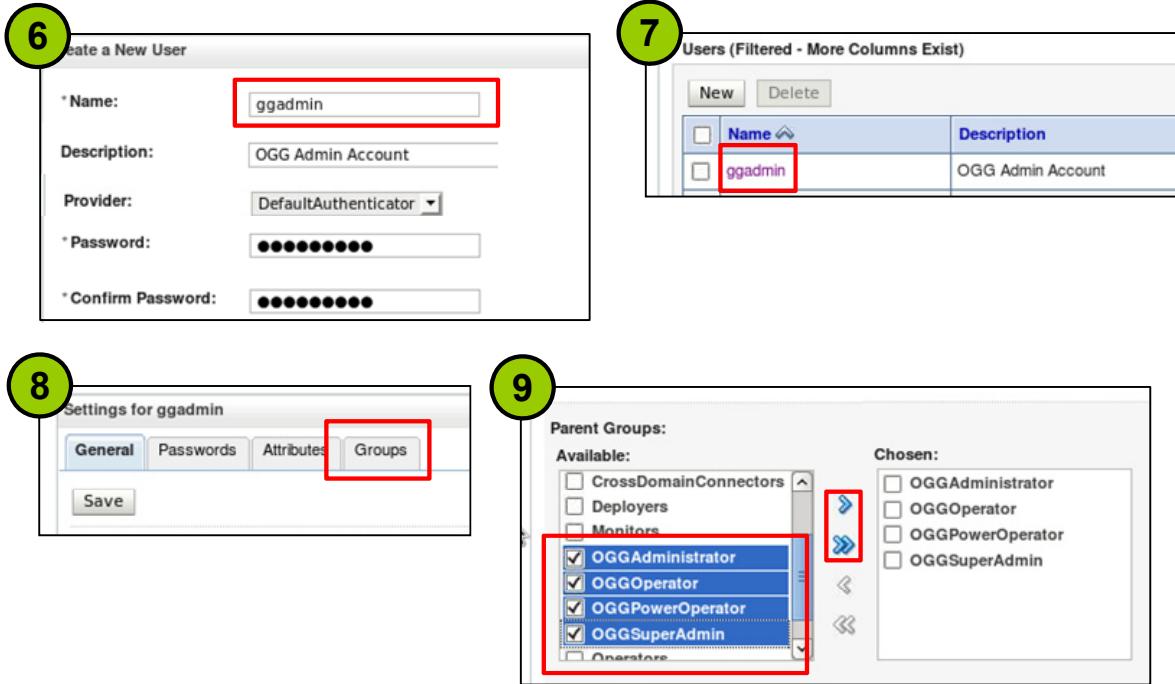
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After the users are created, the GoldenGate Monitor application may be used to start monitoring.

To create Oracle GoldenGate Monitor users, perform the following steps:

1. Log in to the WebLogic Server Administration console, typically using a URL that is similar to <http://host:port/console>.
2. In the Domain Structure pane, click **Security Realms**. All known security realms are displayed in the right pane.
3. Select **myrealm** from the **realms** list.
4. In "Settings for myrealm," click the **Users and Groups** tab.
5. Click **New** to create a new user.

# Creating GoldenGate Monitor Users



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6. Enter details in the required fields, including an account name and password. Enter an optional description and click **Save**. The new user is displayed in the Users list pane.
7. Click the newly added user to modify user details.
8. Click the **Groups** tab.
9. Select the various OGG prefixed groups and using the arrow buttons (> and >>), move the selected groups from the Available section to the Chosen section. Click **Save** when you have finished.

## Quiz

Once set during installation, Monitor Server credentials such as JMX username and password are fixed and immutable.

- a. True
- b. False



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### Answer: b

Various credentials, including JMX username and password, can be modified by using WLST.

## Practice 3-1 Overview: Installing Oracle GoldenGate Monitor

This practice covers the following topics:

- Verifying available ports
- Verifying Oracle Database
- Verifying Oracle GoldenGate Core
- Installing Oracle WebLogic Server Fusion Middleware Infrastructure
- Installing the Oracle GoldenGate Monitor Software



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# Roadmap

- Concepts and Prerequisites
- Installing Oracle GoldenGate Monitor
- Configuring Oracle GoldenGate Monitor Server
  - Configuring the JMX Server Properties
  - Starting GoldenGate Server Instances
- Creating Oracle GoldenGate Monitor Agent Instances



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In this section, we discuss configuring an Oracle GoldenGate Monitor installation, which includes configuring JMX properties, SMTP, SNMP, and CLI alert properties.

## GoldenGate Monitor Properties

- Define the properties used by the monitor server.
- Include properties for SNMP, Email, and CLI.
- These are defined in  
*DOMAINHOME/config/monitorserver/cfg/monitor.properties*.

```
#Copyright (c) 2009, 2014, Oracle and/or its affiliates.  
#All rights reserved.  
#Oracle GoldenGate Monitor  
#JMX  
monitor.jmx.server.enabled=true  
.  
.  
#SNMP  
#Sender's name/email Mr. Postman <foo@goldengate.com>  
monitor.smtp.from=Oracle GoldenGate Monitor <>  
.  
.  
#Whether CLI (Command Line Interface) alerts are enabled or not  
monitor.cli.alerts.enabled=false  
.  
.
```

monitor.properties



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GoldenGate Monitor is configured by using a configuration file, which is found in the domain-specific directory *DOMAINNAME/config/monitorserver/cfg/monitor.properties*.

The configuration file is read by the Monitor Server application, and contains settings for a number of areas, including:

- **JMX Properties:** Properties for the server name, port, and other JMX areas
- **SNMP Properties:** Properties for configuring the Simple Network Management Protocol
- **Database Properties:** Default of Oracle but includes properties for MySQL and MSSQL
- **SMTP:** Properties for configuring the Simple Mail Transport Protocol such as username
- **CLI Alerts:** Properties for configuring command-line interface alerts

## JMX Monitor Properties

- Use the prefix `monitor.jmx.server` and include:

Property	Description
<code>monitor.jmx.server.enable</code>	Enable or disable JMX; enabled by default
<code>monitor.jmx.server.host</code>	Host name of the JMX server; Default: <b>localhost</b>
<code>monitor.jmx.server.port</code>	Port to access the JMX server; Default: <b>5502</b>
<code>monitor.jmx.server.user</code>	Username for JMX access; Default: <b>oggmsjmxuser</b>



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The GoldenGate Monitor Server properties file contains a set of properties for JMX. All these properties are prefixed with `monitor.jmx.server` and include:

- **enable:** Specifies whether JMX monitoring is enabled or disabled; This property is enabled by default.
- **host:** Specifies the host name for the JMX server. This property defaults to **localhost**.
- **port:** Specifies the port to use when connecting to a JMX server. This property defaults to **5502**.
- **User:** Specifies the JMX user name, defaults to **oggmsjmxuser**.

Note that this property must match the name used during the installation process and must match the value of the property `monitor.jmx.username` in each agent configuration file.

## Practice 3-2 Overview: Installing Oracle GoldenGate Monitor

This practice covers the following topics:

- Verifying Environment
- Configuring GoldenGate Monitor Server



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# Roadmap

- Installing Oracle GoldenGate Monitor
- Configuring Oracle GoldenGate Monitor Server
- Managing GoldenGate Administration Users
- Creating Oracle GoldenGate Monitor Agent Instances
  - Create and configure Monitor Agent.
  - Create Wallet Credentials.
  - Start and validate the Oracle GoldenGate Monitor Agent.
  - Common .BASH variables
  - GoldenGate GLOBALS
  - Instance Config.properties configuration



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In this section, we discuss managing GoldenGate Administration users in a WebLogic Server domain.

## Creating an Agent Instance

- Monitor agent instances are created by using scripts.
- To create a monitor agent instance, execute the `create_ogg_agent_instance.[sh|cmd]` script.

```
# CD to the directory containing the create_ogg_agent_instance scripts.  
$ cd ${MIDDLEWAREHOME}/oggmon/ogg_agent  
  
# execute the create_ogg_agent_instance script.  
# provide a directory for the OGG instance.  
# provide a directory for the new OGG agent instance.  
  
$ ./create_ogg_agent_instance.sh  
Please enter absolute path of Oracle GoldenGate home directory :  
/u01/app/oracle/gg_euro  
Please enter absolute path of OGG Agent instance :  
/u01/app/oracle/gg_euro_agent  
Successfully created OGG Agent instance.
```



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After the Oracle GoldenGate Management Pack has been installed, monitor agents may be created. Each agent is associated with a single instance of GoldenGate Core, and is created by using the `create_ogg_agent_instance` script. This script is installed into the selected middleware home under the `oggmon/ogg_agent` directory. The script requires two inputs: the fully qualified path to the GoldenGate Core instance that the agent is associated with and the fully qualified path to the location where the agent instance will be created.

## Updating the Agent Wallet

- Agent passwords are stored in an Oracle wallet.
- Use the `pw_agent_util` script to create agent wallets.

```
# CD to the directory containing the create_ogg_agent_instance scripts.  
$ cd /u01/app/oracle/gg_euro_agent  
  
# Create required passwords.  
.bin/pw_agent_util.sh -create  
Please create a password for Java Agent: <password hidden>  
Please confirm password for Java Agent: <password hidden>  
Please enter Monitor Server JMX password: <password hidden>  
Please confirm Monitor Server JMX password: <password hidden>  
Sep 11, 2014 6:14:19 PM oracle.security.jps.JpsStartup start  
INFO: Jps initializing.  
Sep 11, 2014 6:14:21 PM oracle.security.jps.JpsStartup start  
INFO: Jps started.  
Wallet is created successfully.  
.
```



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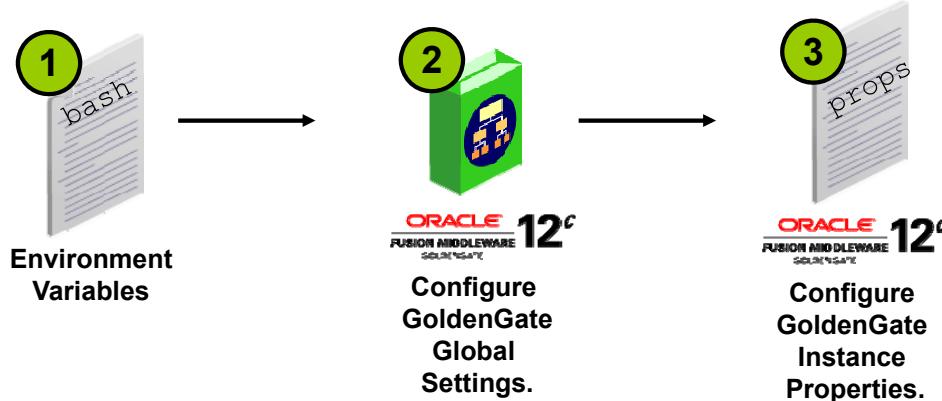
Agents interact with Monitor Server by using credential-based communication. Such communication is based on the username/password combinations that are stored within the Monitor Server instance, and the equivalent combinations that are stored with the Monitor Agent. Monitor Agents store credentials in files that are collectively referred to as an Oracle wallet.

To create a wallet, use the `pw_agent_util` script that is located in the `bin` directory of a given agent. The Script can be used in a number of ways. However, for the Monitor Server/Agent combination, both Java Agent and JMX passwords are required.

Create the wallet by using a command that is similar to the following:

```
$ bin/pw_agent_util.sh -create
```

# GoldenGate Instance Configuration Tasks



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There are three main tasks involved in configuring a GoldenGate instance for use with Monitor.

1. **Environment Variables**: Define a set of environment variables that point to the instance of GoldenGate. Then set PATH and Java CLASSPATH as required.
2. **GoldenGate Globals**: Configure variables that apply to all GoldenGate processes within an instance.
3. **GoldenGate Instance Properties**: Configure properties that are specific to a given GoldenGate instance.

# GoldenGate Global Settings

The GoldenGate GLOBALS file:

- Contains parameters that relate to the instance as a whole
- Is *NOT* process specific
- Is found in the root of the installation, for example:  
\$GG\_INSTANCE\_HOME/GLOBALS
- Supports **enablemonitoring**, which must be added to allow the instance to communicate with a Monitor agent

For example:

```
...  
checkpointtable GGUSER.GGS_CHECKPOINT  
ENABLEMONITORING  
...  
Case insensitive, must be  
on its own line  
...  
GLOBALSS
```



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The GLOBALS file is required but does not exist by default. You can create it with any text editor. Each instance that is being monitored must have its own GLOBALS file (uppercase, no extension) located in the root directory of the GoldenGate instance installation. After entering the keyword **ENABLEMONITORING** and saving the file, the Oracle GoldenGate instance must be restarted.

Restart the instance with the following commands:

```
$ cd $GG_INSTANCE_HOME/  
$ ggsci  
ggsci> stop *  
ggsci> stop manager  
ggsci> start manager  
ggsci> start *  
ggsci> info all  
ggsci> ...start sub process commands ...  
ggsci> exit
```

# Configuration Properties

- GoldenGate instances must be configured to communicate with a JMX server.
- JMX and other configuration can be found in:  
\$GG\_AGENT) INSTANCE\_HOME/cfg/  
**Config.properties**.
- JMX configuration includes:

```
jagent.jmx.port=5555
monitor.host=ogg.example.com
monitor.jmx.port=5502
monitor.jmx.username=jmxusr
jagent.username=jagentUser
```

- jagent.jmx.port must be unique for each instance.
- monitor.jmx.port must be the same for each administrative group.

- The GGSCI datasource directory is required by agents:

```
$ cd ${GOLDENGATEINSTANCE}
$ ./ggsci
GGSCI(...) > create datastore
```



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The Config.properties configuration files are used by Oracle GoldenGate Monitor, but are instance specific. If you have up to 20 instances, you have up to 20 Config.properties files, with 20 unique jagent.jmx.ports that all need to point to the same monitor.jmx.port.

Example:

- inst1 may have jagent.jmx.port=5555.
- inst2 may have jagent.jmx.port=5556.
- inst3 may have jagent.jmx.port=5557.
- ...and so on

The ports do not have to be contiguous and but the combination of IP address and port has to be unique, so theoretically you could have 20 different instances on 20 different hosts with 20 different IP addresses, with all of them having the same port. The only time the ports are required to be different is when they are on the same host.

The jmx and jagent usernames need not be unique.

## Quiz

How would you configure Monitor Agent passwords?

- a. At installation time via the installation wizard
- b. Before agent creation by using the `pw_agent_util` script
- c. After agent creation by using the `pw_agent_util` script



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### Answer: c

After agent creation, in the agent root directory, by using the agent-specific `pw_agent_util` script

## Summary

In this lesson, you should have learned how to:

- Install Oracle GoldenGate Monitor by using both the command line and the GUI installer
- Configure the files needed to communicate with existing Oracle GoldenGate instances
- Start Oracle GoldenGate Monitor background processes and the web browser GUI
- Create an administrator user



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## Practice 3-3 Overview: Configuring GoldenGate Monitor Agents

This practice covers the following topics:

- Creating agents for the AMER and EURO GoldenGate instances
- Configuring GoldenGate Monitor agents
- Configuring Oracle wallets for agent instances
- Enabling GoldenGate monitoring



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## Practice 3-4 Overview: Start GoldenGate Monitor Installation

This practice covers the following topics:

- Starting the Application Server instances
- Creating GoldenGate Administrator users
- Starting the GUI web-based browser interface
- Restarting the ggsci managers



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## Using Oracle GoldenGate Monitor



### Managing the Environment

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# Objectives

After completing this lesson, you should be able to:

- Enumerate GoldenGate Monitor Console features
- Navigate the Monitor Console
- Describe Monitor Console objects, attributes, and solutions
- Start, stop, and manage Monitor Console objects
- View object logs
- Create and manage Monitor views
- Examine and graph Monitor object data



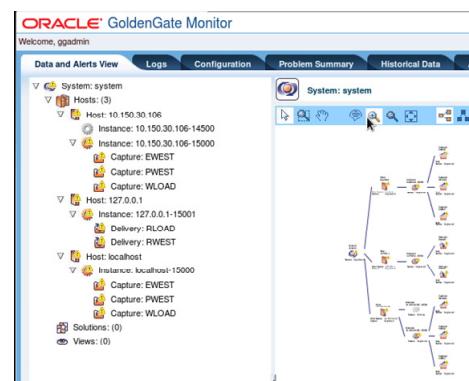
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You have the Oracle GoldenGate Monitor installed and you plan to keep it running on your desktop browser. Because it is always running, you can glance at it from time to time to see if there are any alerts that need attending to. You want to gather statistics to see the average lag time over the past 24 hours to spot trends. If there is a known trouble spot, you want to be able to make the alert fire no more than once per day, and then not check again until the next day.

# GoldenGate Monitor

Oracle GoldenGate Monitor:

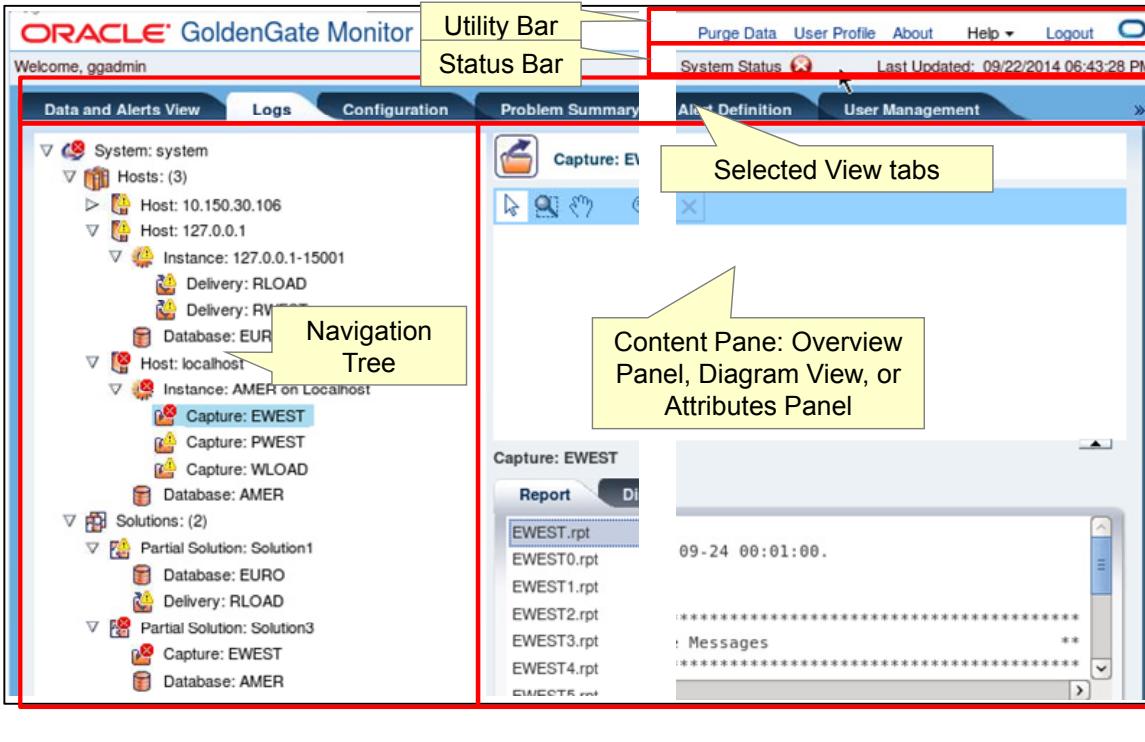
- Is accessible via `http://hostname:port/monitor`
- Discovers GoldenGate instances by using agent registration
- Supports real-time feedback and alert notification
- Integrates with SNMP, SMTP, and third-party applications



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The GoldenGate Monitor Console is accessible via URLs of the form <https://hostname:port/monitor>. For example, in the practice environment, the default URL for the Monitor Console is <https://localhost:7003/monitor>. Remember that during the installation process, you can change the port associated with the Monitor Console, which defaults to 7003.

# GoldenGate Monitor Console



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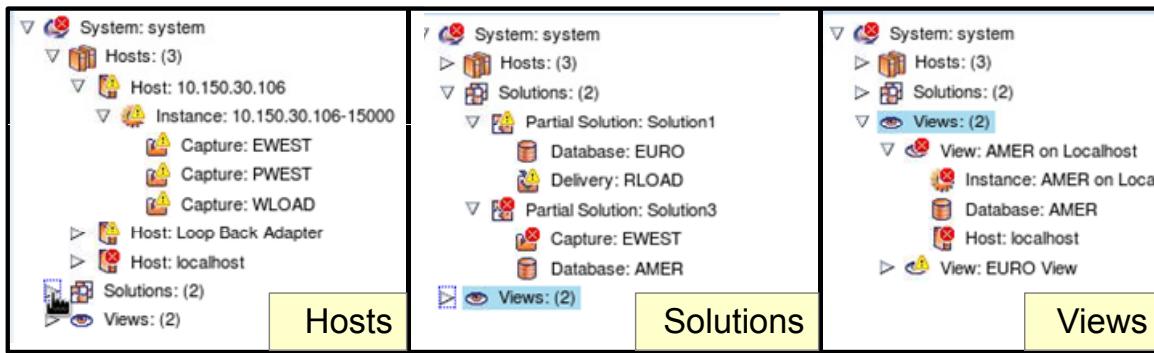
The GoldenGate Monitor user interface is divided into several sections, some of which change based on the tab that is selected.

- **Utility bar:** Provides general information and controls such as **Purge data** (available only to administrators), **User Profile** (information about the user and alerting), **About** information, Context sensitive **Help**, and **Logout**
- **Status bar:** Displays the name of the logged-in user (omitted from the screenshot in the slide) and overall system status information and the last updated date
- **Navigation tree:** Displays a hierarchical series of nodes that can be expanded to display GoldenGate instances and their components, topology views called Solutions, and customized Views. Most tabs contain a navigation tree on the left-hand side of the window.
- **Content pane:** Displays the Overview panel, the Diagram View, or the Alerts or Attributes panel depending on the tab selected

# Understanding Navigation

The navigation pane is a hierarchical list, which includes:

- **Hosts:** A list of machines and GoldenGate and Databases artifacts by IP address
- **Solutions:** Single or bi-directional GoldenGate flows
- **Views:** Selected components from existing hierarchies



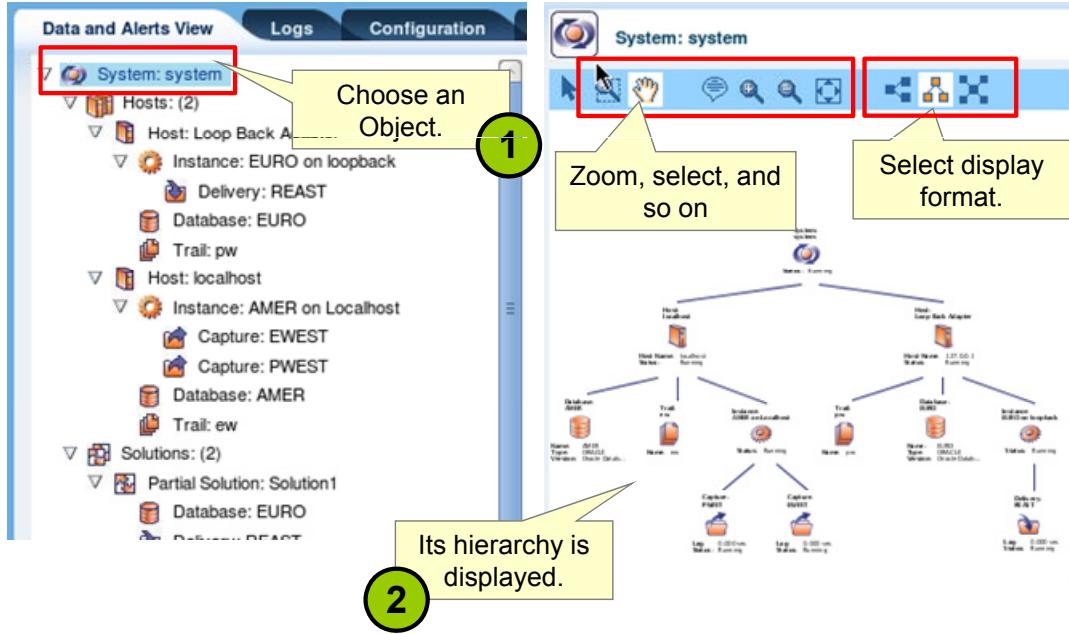
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Many of the Monitor Console tabs include a navigation pane. The navigation pane itself is hierarchical and divided into three distinct expandable sections:

- **Hosts:** The Hosts section represents the set of agents that have been discovered by Monitor Server based on the IP address reported by the agent itself. In the example in the slide, three specific agents are running on IP 10.150.30.106, 127.0.0.1, and localhost. Note that hosts can be renamed if desired.
- **Solutions:** Solutions represent end-to-end GoldenGate flows from Database through trail, extract, replicate, and into the target database. Solutions may be single or bi-directional, as well as partial. Partial solutions are those that are not continuously linked from the source to the target database.
- **Views:** Views represent components selected from elsewhere in the navigation pane. A view can be constructed to only show elements as required for a given window into a GoldenGate flow.

# Navigation

A hierarchy shows both working and non-working objects.



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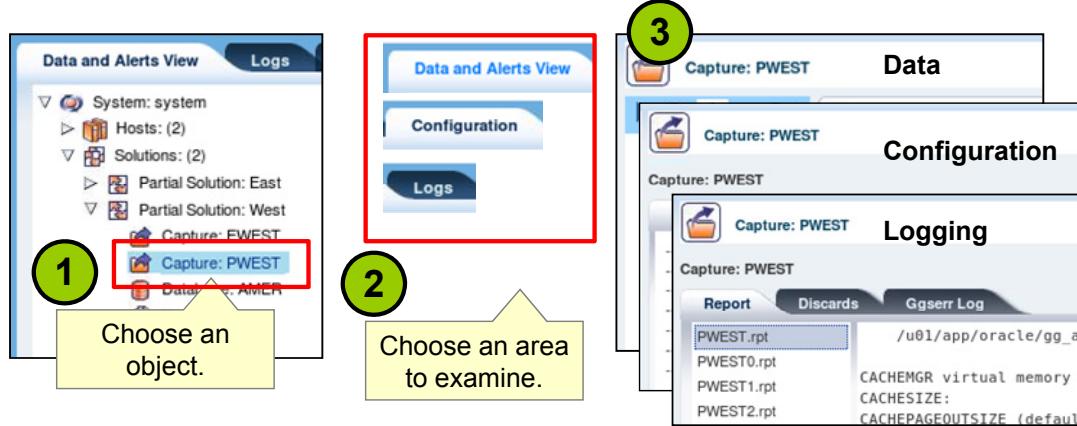
You can expand ( $\triangleright$ ) and collapse ( $\triangleright$ ) portions of the tree. If an object is permanently deleted, you can remove it from the tree by right-clicking the object and clicking **Remove**. The diagram refreshes every few seconds. The diagram is managed by the `ggsci` manager process in association with the agent.

Various levels, for example hosts, can be selected and renamed from their initial IP address to something more descriptive.

# Working with Objects: Management

Golden Gate objects:

- Can be started, stopped, killed, and otherwise managed
- Configuration can be examined and modified
- Can be reviewed, including logging, statistics, and other data



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GoldenGate objects can be managed at a variety of levels, including Core runtime management (starting, stopping, and killing processes), functional review (how many transactions were processed, for example), and logging and configuration.

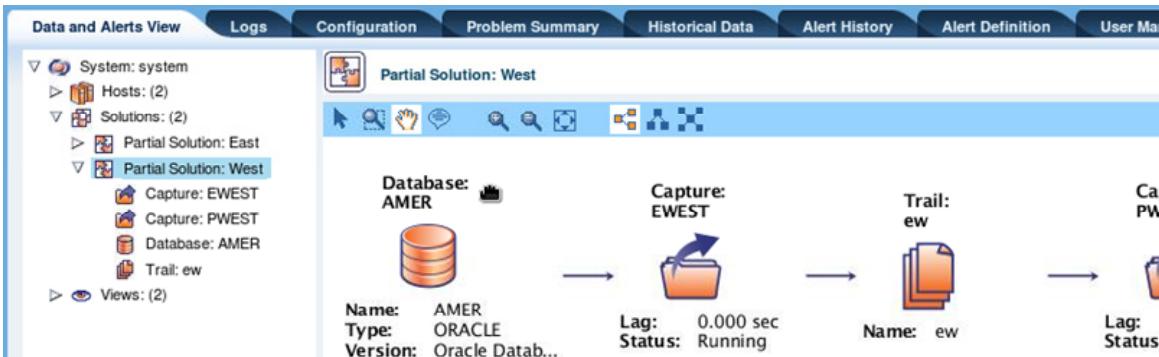
To examine an object, perform the following steps:

1. In any view that supports the navigation pane, select an object.
2. Select one of the object-specific panes: Data and Alerts, Configuration, or Logs.
3. Examine or modify the object characteristics in the associated right pane.

# Solutions

Solutions are collections of objects representing flows, and can be:

- Complete Solutions: Representing all steps from the source to the target database
- Partial Solutions: Representing incomplete or broken flows



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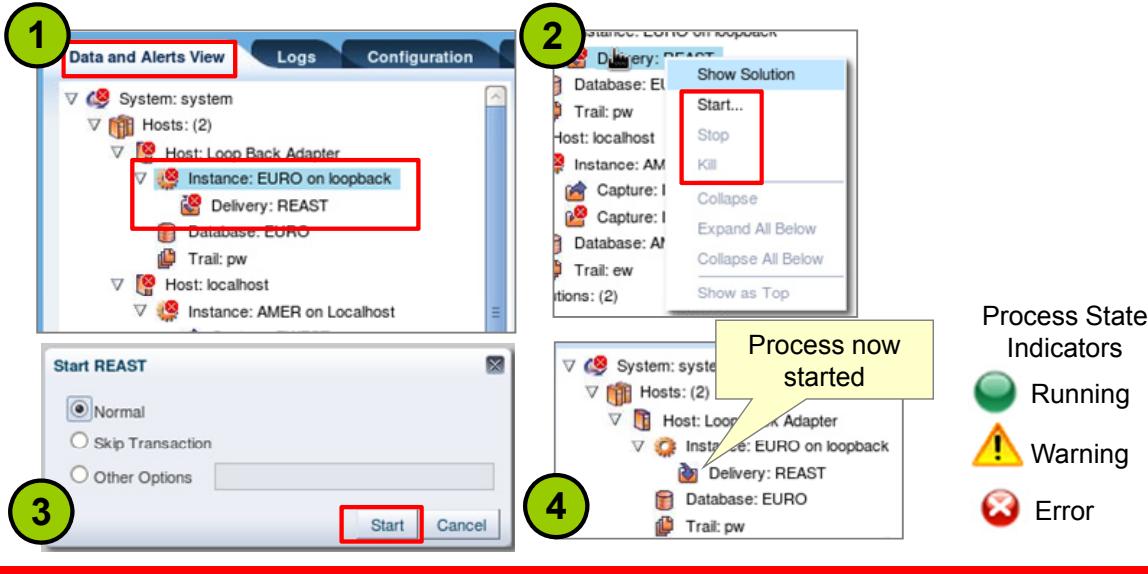
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Solutions represent end-to-end sets of objects representing a data flow from a source database to a target database. To be classified as a complete solution, there must be a continuous flow that captures and replicates changes from a source database to a target database. The discovery process looks for complete solutions that start from a source database, create a trail, and replicate the changes to a target database.

Partial solutions are solutions that are not continuously linked from the source database to the target database. Partial solutions occur in the Diagram View but have a default name starting with *Partial Solution*.

# Managing Processes

- GoldenGate Monitor supports starting, stopping, and removing processes.
- To manage process state:



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In order to perform management on any GoldenGate process by using the Monitor Console, the agent that is associated with the GoldenGate installation must be up and running (jagent). If the agent is not running, the associated process tree is disabled. Although GoldenGate processes can be managed remotely, the jagent instance must be started at the command line on the machine where it resides by using **ggsci**.

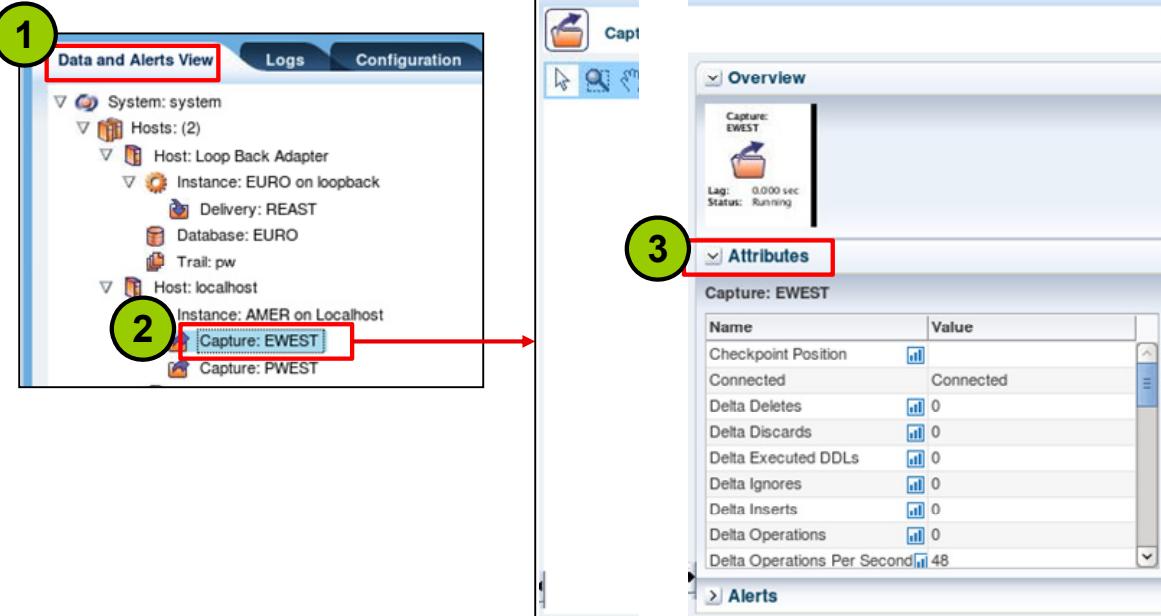
To start a process, perform the following steps:

1. On any tab that supports the navigation pane (Data and Alerts view is selected), navigate to a process. Note that the process shows the Error icon because it is not running. Also possibly shown is the Warning icon if the process is running but with some issue.
2. Right-click a process and select **start**. Note that if the specific process is selected, it could be started by using the right arrow icon in the details pane, which is displayed on the right when the process is selected. Other supported operations are stop and kill.
3. In the Start Process dialog box, select Normal or one of the other options and click **Start**.
4. The process starts, showing started (with no icon) when the operation completes.

The Running icon applies to a process tree as a whole and not to specific processes. You may also stop and kill the processes that are already running.

# Object Attributes

To view object attributes:



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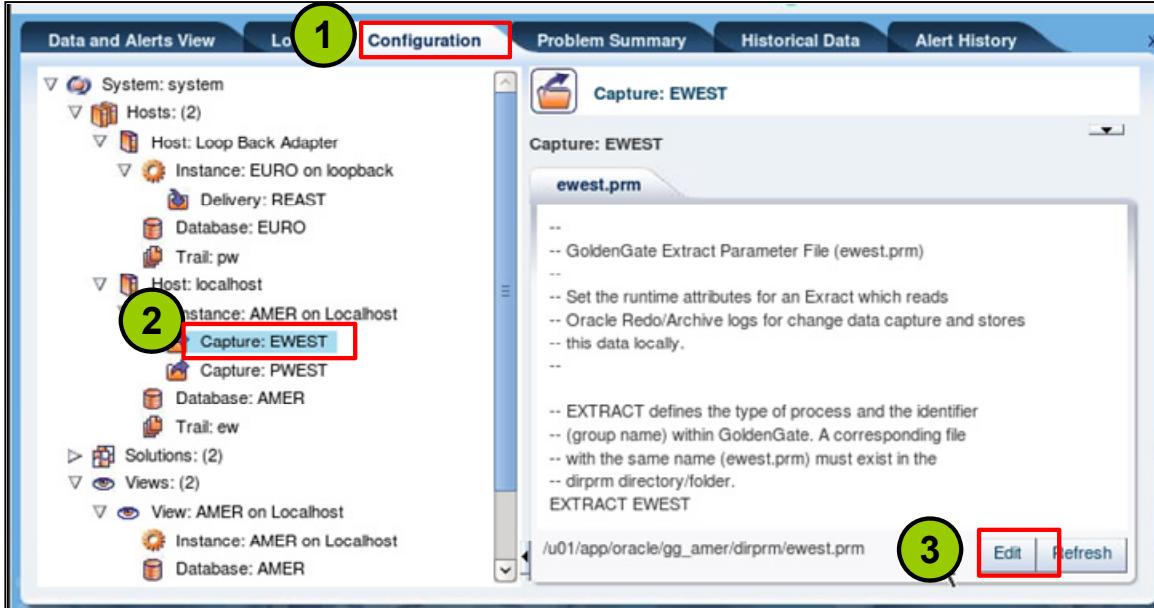
To view object attributes, perform the following steps:

1. Click the **Data and Alerts View** tab.
2. Select an object. The right pane changes to display the object's attributes.
3. Expand the **Attributes** area if required.

The center panel shows the most “interesting” attributes for this item; in this case, it is the lag and status for a capture. A database object would show other highlights.

# Editing Object Configuration

To edit an objects configuration:



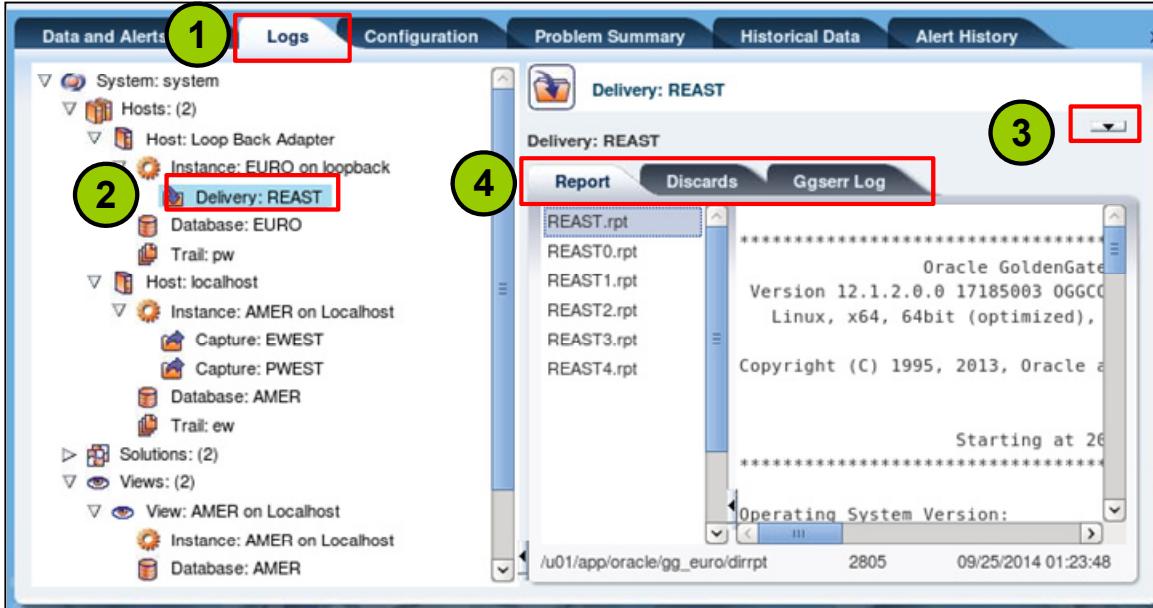
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To edit object attributes, perform the following steps:

1. Click the **Configuration** tab.
2. Select an object. The right pane changes to display the object attributes.
3. Click **Edit** to make the configuration changes.

# Examining Object Logs

To examine object logs:



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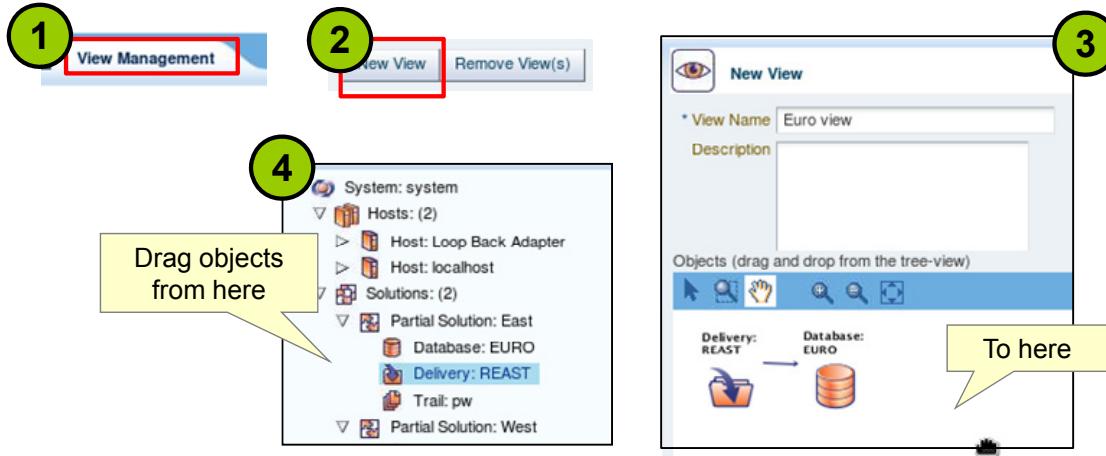
To examine an objects log, perform the following steps:

1. Click the **Logs** tab.
2. Select an object. The right pane changes to display the object logs.
3. Expand the log window if it is minimized.
4. Select a specific log file on the **Reports** tab or any other area for examination.

# View Management:

## Creating a View

- Views:
  - Are custom-created collections of objects
  - Are used to subset systems to meet specific needs
- To create a view:



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Views are custom named collections of objects. A view can contain any object with the exception of the system root.

Use views when the provided hierarchy does not provide a logical grouping of objects.

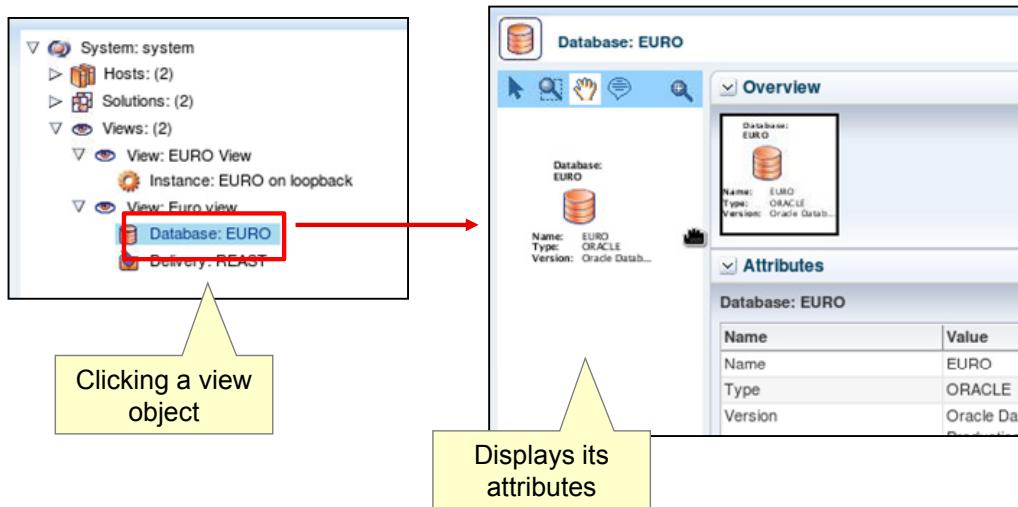
To create a view, perform the following steps:

1. Click the View Management tab.
2. Click New View.
3. Enter a name for the view, and optionally a description.
4. From the left pane, drag and drop objects.
5. Click Submit when complete.

You may modify an existing view later to add or remove objects. In addition, contiguous objects are shown collected with an arrow.

# Using Views

- Views are displayed in the Navigation pane.
- View objects can be used normally.



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Views are used identically to the stock hierarchical elements. Selecting an object in the view by using the Navigation pane causes its content to be displayed in the details pane on the right. In the example in the slide, the Data and Alerts View tab was used. Therefore, when an object was selected, its attributes were displayed. If another tab had been selected, for example Configuration, its content would have been displayed in the details pane on the right.

# Historical Data: Date Range

Different objects have different kinds of history.

The screenshot shows the Oracle GoldenGate Monitor interface. The top navigation bar includes 'Purge Data', 'User Profile', 'Help', and 'Logout'. Below the navigation bar, tabs for 'Data and Alerts View', 'Problem Summary', 'Historical Data' (which is selected), 'Alert History', 'Alert Definition', 'User Management', and 'View Management' are visible. On the left, a tree view displays system components: 'System: system' (with 'Hosts: (1)' containing 'localhost'), 'Instance: localhost-15001' (with 'Capture: EWEST', 'Capture: PWEST', 'Capture: SDLOAD', 'Capture: SELOAD', 'Capture: VLOAD'), and 'Solutions: (1)' (with 'Solution: Solution1' containing 'Capture: EWEST', 'Capture: PWEST', 'Database: AMER', 'Database: EURO', 'Delivery: RLOAD', 'Delivery: RWEST', 'Delivery: TDLOAD', 'Delivery: TELOAD', 'Trail: ew', 'Trail: pw'). At the bottom, there are sections for 'Views: (2)'. A central panel titled 'Capture: EWEST' shows various status metrics like 'Checkpoint Position', 'Current read position', and 'Current write position'. A dropdown menu for 'Date Range Type' is open, with 'Latest 24 Hours' selected. A yellow callout box points to this dropdown with the text 'Click here...'. Another yellow callout box points to the 'Get Data' button with the text '...to see history within a time range.' A timestamp '06/22/2011 08:50:31 AM' is also visible.

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One of the differences between messages and reports is that reports are based on report files. They recycle by using the names `report0` through `report9`, and then they overwrite the oldest report. This is in contrast to the messages that are stored in a database. Messages are never overwritten and will persist forever until you purge them based on criteria (date, severity, and so on.)

# Attribute Historical Data

The Historical Data tab:

- Displays attribute-based historical data
- May include graphs depending on the object selected

The screenshot shows the Oracle GoldenGate Management Pack interface. The 'Historical Data' tab is selected (Step 1). In the left navigation pane, under the 'Hosts' section (Step 2), the 'Capture: EWEST' object is selected. On the right, a table displays historical data for the 'Capture: EWEST' object, with the 'Total Updates' attribute selected (Step 3). A red box highlights the 'Graph' icon (Step 4) in the top right corner of the data panel.

Value	Timestamp
4204	09/26/2014 02:32:58 PM
3144	09/26/2014 02:31:58 PM
2275	09/26/2014 02:30:58 PM
2120	09/26/2014 02:29:58 PM
1060	09/25/2014 07:10:55 PM
0	09/25/2014 06:45:55 PM

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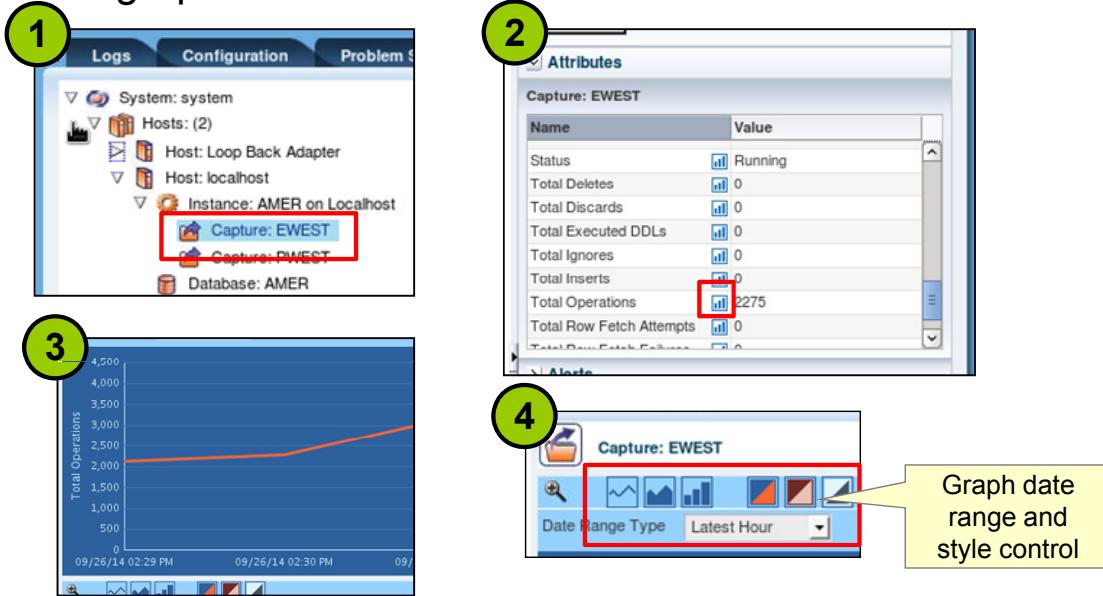
The Historical Data tab displays tabular or graphical data depending on the object shown. In the example in the slide, an Extract object was selected and the Total Updates attribute was selected. Click the Graph or Table icon to display data. Depending on the attribute selected, a graph or table may be displayed.

To display historical data, perform the following steps:

1. Click the Historical Data tab.
2. Select an object.
3. Select an attribute.
4. Click the Graph or Table icon.
5. Optionally, select a date range.

# Graphing Data

- Object data can be graphed.
- To graph data:



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Object attribute values can be graphed. To graph attribute values, perform the following steps:

1. On the Data and Attributes tab, navigate to an object of interest.
2. Select an attribute to graph and click the Graph icon.
3. The graph is displayed.
4. Modify the default graph by selecting a style, color, and date range.

## Summary

In this lesson, you should have learned how to:

- Enumerate GoldenGate Monitor Console features
- Navigate the Monitor Console
- Describe Monitor Console objects, attributes, and solutions
- Start, stop, and manage Monitor Console objects
- View object logs
- Create and manage Monitor views
- Examine and graph Monitor object data



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## Practice 4-1 Overview: Exploring GoldenGate Monitor Console

This practice covers the following topics:

- Examining a running system
- Viewing Hosts, Captures, Delivery, and other objects
- Examining object information, configuration, and logs



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# Using Oracle GoldenGate Monitor

## Reporting Statistics and History



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## Objectives

After completing this lesson, you should be able to:

- Enumerate alert concepts
- Create alerts for various events
- Display history of past events
- Describe the behavior of recurring events and alerts as it relates to suppression time



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# Alerts

- Are notifications of an event or a condition
- Are specified against one or more GoldenGate components such as users, types, and objects
- Can be of type warning (🔔) or error (🚨)
- Are logged and can be viewed historically
- Can be delivered to the Monitor Console, SNMP, SMTP, or via command-line tools

Alert Name	Notification Message	T
mylag	The alert was triggered because: Lag = 6.080 sec.	0
mylag	The alert was triggered because: Lag = 6.080 sec.	0
mylag	The alert was triggered because: Lag = 7.020 sec.	0
mylag	The alert was triggered because: Lag = 7.020 sec.	0

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System Status represents something that is not correctly functioning, such as a dead process or an abend or a database offline.

An alert is a message that notifies you when a specified event or condition occurs for one or more Oracle GoldenGate objects. It is typically defined based on business rules. For example, an alert may be defined for Lag > 2 seconds or when Total Deletes > 10000.

Alerts can be of two severities: warning or error. For example, Lag > 2 seconds may be a warning, but Lag > 10 seconds may be an error.

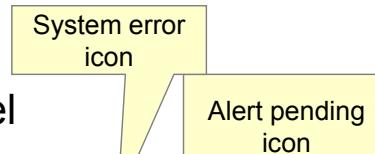
Alerts are created by administrators based on error or warning conditions related to one or more GoldenGate objects. After they are created, alerts are assigned to a user, and then delivered by using the Monitor Console, SNMP, SMTP, or via one of the command-line extensions.

A complete UI exists for adding, deleting, updating, and managing alert definitions, as well as reviewing, discarding, and otherwise managing alerts.

# Alert History

## Alerts:

- Are indicated by the alert icon
- Are displayed at the selected level



The screenshot shows the ORACLE GoldenGate Monitor interface. The top navigation bar includes "Welcome, ggadmin", "System Status", "Alerts", and "Last Updated: 10/06/2014". Below the navigation bar are tabs: "Problem Summary", "Historical Data", "Alert History" (which is selected and highlighted in blue), "Alert Definition", "User Management", and "View Management". On the left, there is a tree view under "Hosts: (2)" showing "Host: Loop Back Adapter" and "Host: localhost". Under "Host: localhost", there are "Instance: AMER on Localhost" and "Capture: EWEST" (which is highlighted with a red box). On the right, the "Alert History View" is displayed in a table format:

Alert Name	Notification Message	Timestamp
Down Capture	The alert was triggered because: Status = STOPPED_STATE. Additional Information: Group Name: EWEST Status: STOPPED_STATE Connected: CONNECTED	10/06/2014 0
Excessive Operations	The alert was triggered because: Total Operations = 4204.	10/06/2014 0
Down Capture	The alert was triggered because:	10/06/2014 0

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The Alert History view shows information about all the alerts that have been generated since the previous alert purge.

There is no mechanism for indicating which alerts have been resolved (dealt with), or for indicating whether the alert durations are sporadic (spikes) or one continuous event. If the alert is no longer active, the bell or red circled-X icon is removed from the item in the tree.

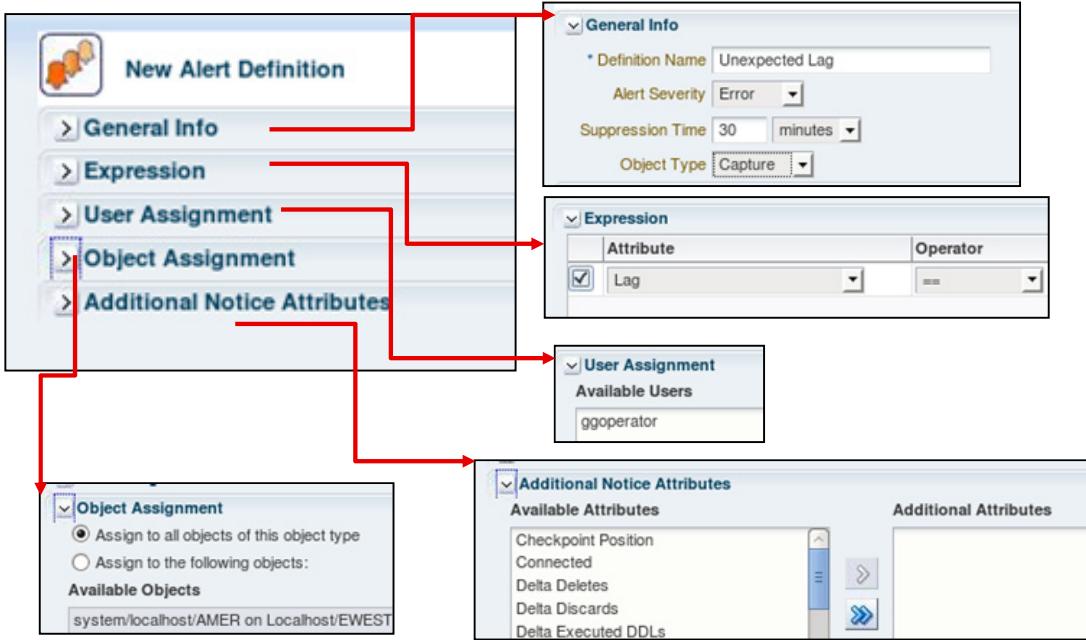
If System Status shows a red circled-X icon on the top bar, at least one (or more) red circled-X icons will appear in the tree, and all higher-level objects are marked “broken.” For example, Delivery TDLOAD is not functioning properly; that is the root problem. Because TDLOAD has a problem, all items up the tree from it are also marked as such: instance 15001, Host: localhost, and system. If some parts of the tree are collapsed for display, you may have to expand them to see the root cause of the problem.

Columns can be sorted in ascending or descending order by clicking the column headings. Look for the  $\Delta$  and  $\nabla$  icons to indicate sorting.

Purge Data (top-left) allows you to remove older entries of history, alerts, or both from the database.

# Alert: Overview

Alerts are composed of five distinct sections:



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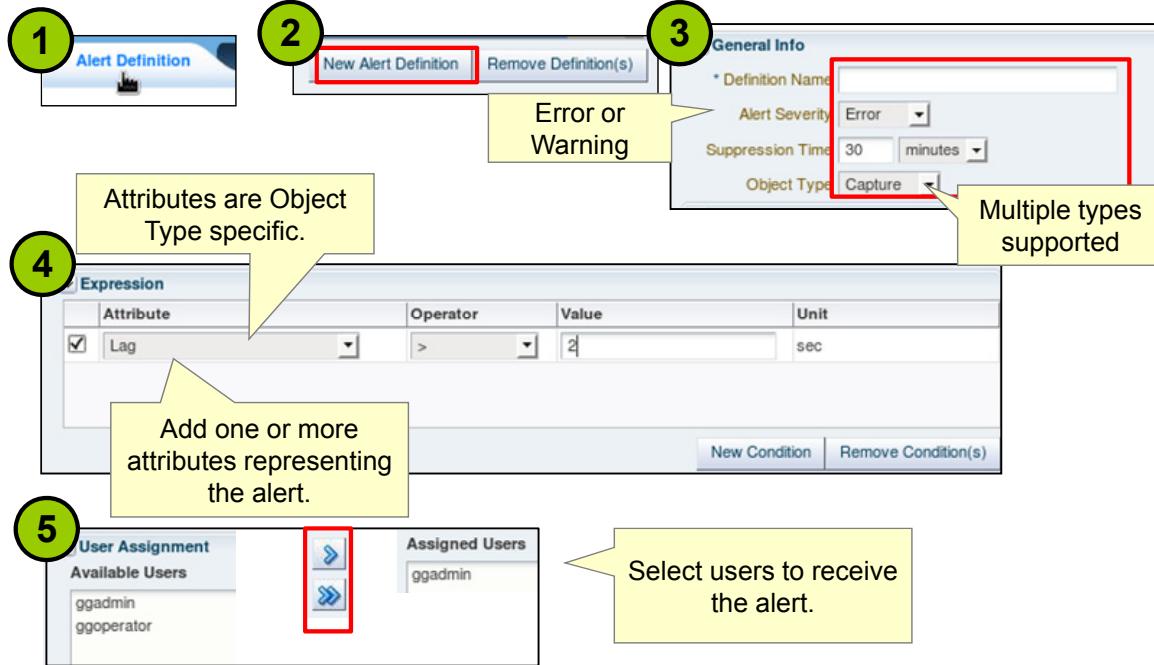
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Alert definitions are composed of five major sections:

- **General Information:** Information about the alert itself, including its name, severity, suppression time, and target object type
- **Expressions:** One or more conditions representing the object start that is required to fire the alert. Note that multiple expressions are logically ‘and’ed together.
- **User Assignment:** The list of users who will receive this alert
- **Object Assignment:** A list of all objects of the selected type on which the alert might be based. If multiple instances exist, one or more may be selected.
- **Additional Notice Attributes:** Attributes associated with the object, which may also be included in the alert itself

# Alert Definition

To define an alert:



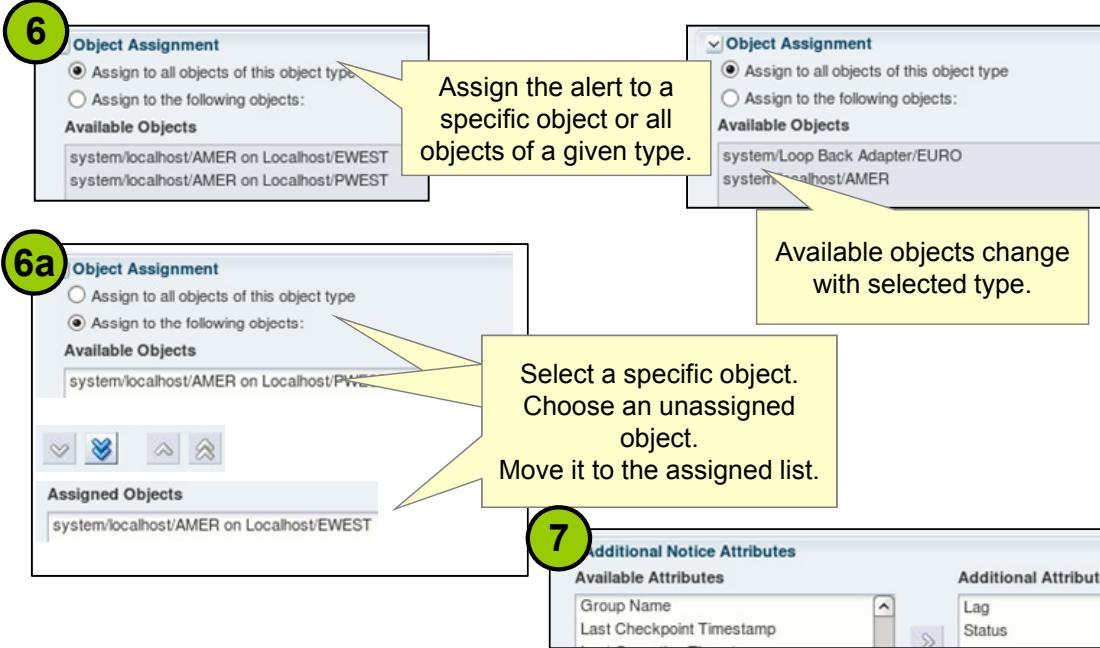
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To define an alert, perform the following steps:

1. Click the Alert Definition tab.
2. On the lower-right, click New Alert Definition. You can also delete or edit an existing alert.
3. Complete the General Info section, defining the alert name, severity (warning or error), suppression time, and object type. Object type may be Capture, Database, Delivery, Host, Instance Solution, System, Trail, or View.  
Suppression Time is a user-defined interval when alerts are not re-sent. Suppression time is discussed in detail in a later slide.
4. After selecting an Object Type, select one or more attributes on which the alert is based. The type of attributes available varies based on the object type that is selected. Select an operator and a value. Note that units are defined by the attribute itself. The example in the slide shows an error when Lag > 2.
5. Select the users who will receive the alert by selecting a name in the Available Users pane and clicking the add (single right arrow) or add all (double right arrow) button to add a user or a set of users, respectively. (Not shown) Additionally, select a user or a set of users from the Assigned Users pane and use the left arrows to remove that user or set of users.

# Alert Definition



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6. Select all objects of a particular type or a specific object to assign an alert only to that object. The list of available objects varies by object type. In the example in the slide, the left represents capture objects and the right, database objects. Alternatively, you may select “Assign to the following objects,” and then select a specific object on which the alert will be based.
7. Optionally, select additional attributes to be included in the alert.
8. When complete, click Submit to finalize the alert or cancel to quit.

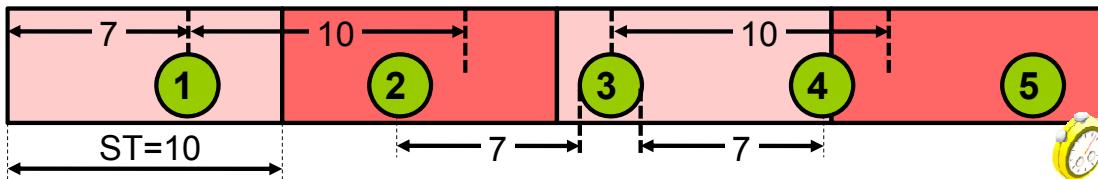
# Understanding Suppression Time

Suppression Time is a user-defined limit on how often an alert is sent.

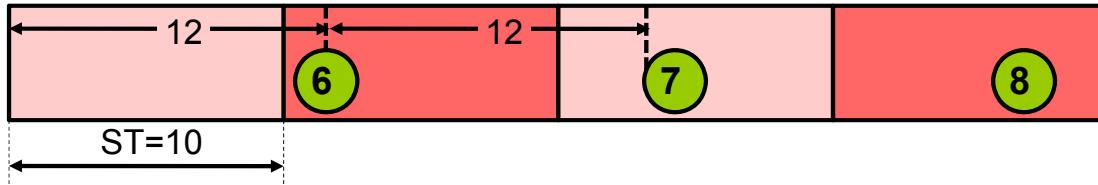
Example: Configure Suppression Time (ST) for this event to 10 units:

Units can be minutes, hours, or days.

- Example A: Events occur regularly, spaced less than ST.



- Example B: Events occur regularly, spaced more than ST.



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Suppression Time (ST) is a user-defined value to limit how often alerts are sent. Suppose that Monitor samples the measured attribute once per unit, and each event is a spike of short duration: for example, only one unit long (compared to the suppression time of 10 units). Immediately after the event, the condition clears. So for example A, there were 10 samples in the first ST block, and only sample number 7 exceeded the threshold. That is labeled with the green circle (1).

## Example A

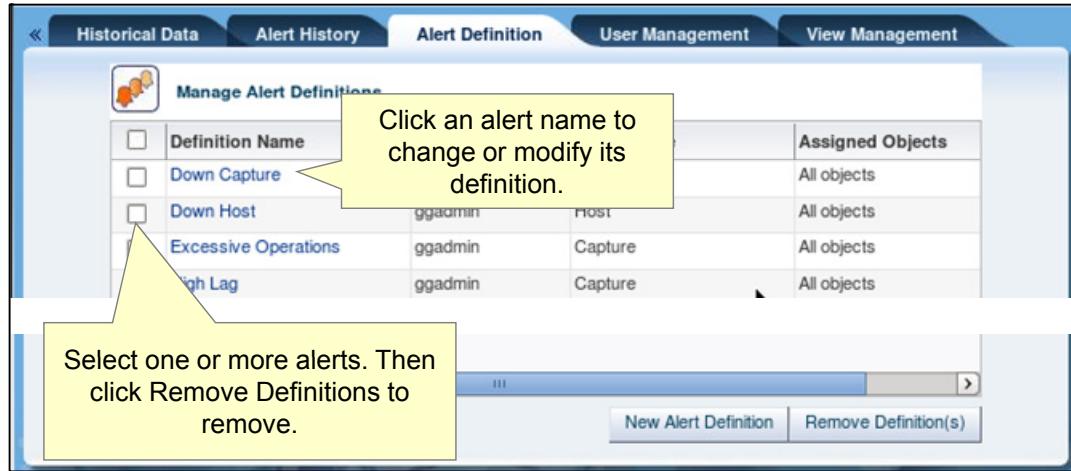
The first event is always a trigger for an alert, so (1) shows on the Alerts tab. Then the suppression time starts, and since the second event (2) occurs within that window, the second event does not show. The third event (3) is now 14 units after the first, so the suppression window has expired, the third event shows, and a new suppression window starts. The next event (4) is within that suppression window, so it does not show. Basically, this scenario alternates which events show on the Alerts tab, so you would see (1), (3), (5), and so on. If the events are long term so that (1) never “clears,” the situation is still like Example A.

## Example B

The first event is always a trigger for an alert, so (6) shows on the Alerts tab. Then the suppression time starts, and since all subsequent events are spaced further apart than the suppression window, they all show as alerts: (6), (7), (8), and so on.

# Managing Alerts

Alerts can be purged, modified, removed, and otherwise managed:



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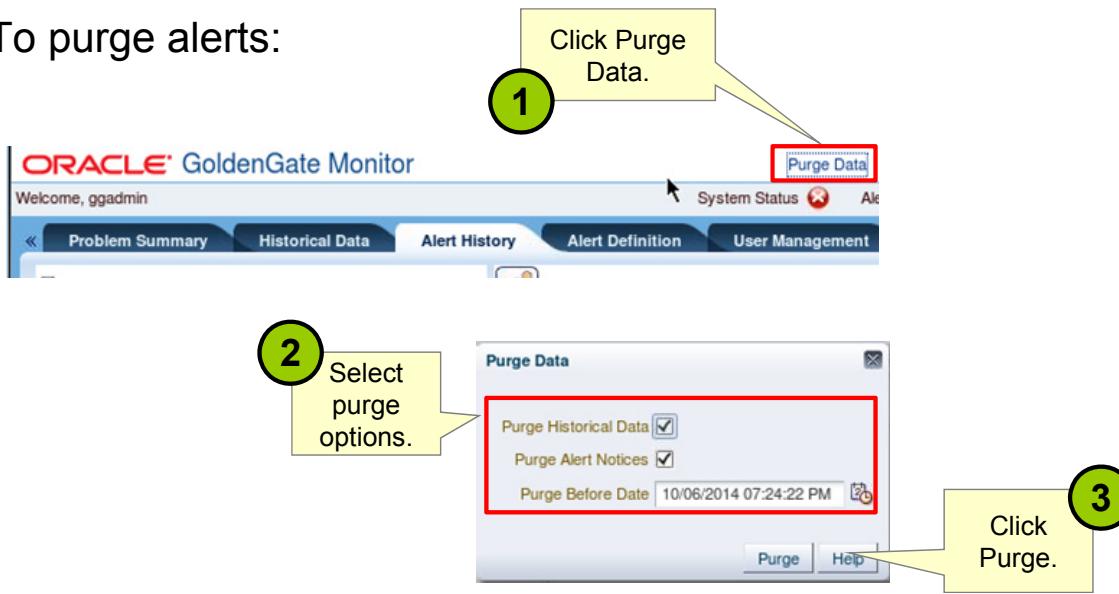
Alerts can be modified, added, or removed. To delete an alert, select the associated check box and click Remove Definitions. Modify an existing alert by clicking its name, making modifications, and clicking submit.

Consider the name conventions XYZZZZZZ where:

- **X:** E=Error and W=Warning
- **Y:** C=Capture and D=Delivery
- **Z:** Attributes such as lag, abend, status, and so on

## Purging Alerts

To purge alerts:



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Older alerts may be removed by using the Purge Data link. The Purge Data dialog box can be used to (selectively) purge alert data. Note that you can use the Purge Before Date element to select an older range of data to remove. Purged data is not retrievable after the purge.

## Quiz

What roles can receive an alert?

- a. Only administrators
- b. Administrators and power operators
- c. Anyone
- d. Nobody. You must fetch it manually from the web interface.



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### Answer: c

Only administrators and power operators can define an alert, but anyone can receive or view alerts.

## Summary

In this lesson, you should have learned how to:

- Enumerate alert concepts
- Create alerts for various events
- Display history of past events
- Describe the behavior of recurring events and alerts as it relates to suppression time



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## Practice 5-1 Overview: Viewing Default Historical Data

This practice covers the following topics:

- Viewing system, host, and instance statistics
- Viewing various Capture, Delivery, Trail, and Database statistics



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## Practice 5-2 Overview: Creating and Viewing Alerts

This practice covers the following topics:

- Creating a globally visible alert
- Creating a user-specific alert
- Testing the alerts



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## Practice 5-3 Overview: Purging History Data

This practice covers purging alert and historical data.



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# Using GoldenGate Monitor

## 6

### Configuring and Using External Alerts

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# Objectives

After completing this lesson, you should be able to:

- Configure Oracle GoldenGate Monitor to send alerts via:
  - Command Line Interface
  - Email
  - SNMP
- Configure individual users to receive a combination of CLI, email, and SNMP alerts



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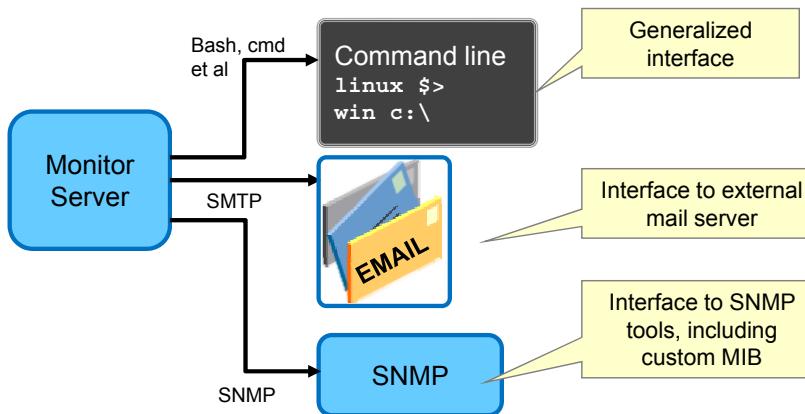
You have identified several business processes that are mission-critical and depend on Oracle GoldenGate. While you are at work, you can see alerts on your PC, but when at home, you would like to be notified automatically if something critical goes down. The alerts are already defined; you only need to enable them for email transmission. You would also like to copy your boss on some but not all of these emails. Because you carry your phone, and your phone chirps with incoming email, this replaces the traditional pager/beeper system.

Your company has also contracted with a Network Operations Center offshore for monitoring your systems during second and third shifts. The NOC monitors thousands of systems, so email is not the right vehicle for them. The NOC is requesting that alerts be sent to them as SNMP traps, which display on a large war-room type of screen.

## External GoldenGate Alert Interfaces

GoldenGate Monitor Server supports external alerting interfaces, including:

- Simple Mail Transfer Protocol, or email-based alerts
- Simple Network Management Protocol alerts
- Command-Line Interface (general external interface)



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GoldenGate Monitor supports several external alerting mechanisms, including:

- **Email:** Delivery of alerts by using standard Simple Mail Transport Protocol or SMTP to an external email server for final delivery
- **SNMP, Simple Network Management Protocol:** Delivery to an SNMP console, including associated Management Information Base or MIB
- **Command Line Interface:** The ability to execute arbitrary command-line commands, which are provided with the information about alerts

## Monitor Server Alert Properties

- Are enabled and disabled by using properties
- Are defined in *DOMAINHOME/config/monitorserver/cfg/monitor.properties*

```
#Copyright (c) 2009, 2014, Oracle and/or its affiliates.  
#All rights reserved.  
#Oracle GoldenGate Monitor  
#JMX  
...  
monitor.cli.alerts.enabled=false  
...  
monitor.smtp.alerts.enabled=false  
...  
monitor.snmp.alerts.enabled=false  
...
```

Alert properties are disabled by default.  
Other properties exist by alert area.

monitor.properties



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Alerts are enabled and disabled by a common **monitor.properties** file. This file is found in the **config/monitorserver/cfg** directory of the WebLogic Server domain that is configured for GoldenGate monitoring.

In the slide, only the properties for enabling monitoring are shown. Depending on the area, such as email, CLI, or SNMP, other properties must be configured.

Oracle GoldenGate Monitor itself, however, cannot be monitored. That is, if Oracle GoldenGate Monitor is stopped, it does not trigger an alert. The agents at the instances are dependent on Oracle GoldenGate Monitor to relay their alerts. Therefore, if Oracle GoldenGate Monitor goes down, and then a database goes down, no alerts are sent.

## Roadmap

- Configuring Simple Mail Transfer Protocol Alerts
  - Configuring Monitor Server
  - Configuring User Profiles for Email Alerts
- Configuring Simple Network Management Protocol Alerts
- Configuring Command Line Alerts



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## Simple Mail Transport Protocol Properties

- Are defined in `monitor.properties`
- Use the prefix `monitor.smtp` and include:

Changes require a Monitor Server application restart.

Property	Description
<code>monitor.smtp.from</code>	Name and email address associated with the sent email; defaults to Oracle <b>GoldenGate Monitor &lt;&gt;</b>
<code>monitor.smtp.host</code>	Host name of SMTP host; no default
<code>monitor.smtp.port</code>	Port to access SMTP server; default of <b>25</b>
<code>monitor.smtp.secure</code>	Whether to use secure connection; defaults to <b>false</b>



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The GoldenGate Monitor Server properties file contains a set of properties for SMTP. These properties are prefixed with `monitor.smtp` and include:

- **from:** Is the email address used when sending an email. Note that an email address should be inserted between <>, such as `ogg.monitor.example.com`.
- **host:** Specifies the host name for the SMTP server. There is no default.
- **port:** Specifies the port to use when connecting to an SMTP server. This defaults to **25**.
- **secure:** Specifies whether the SMTP should use secure connections or not. This defaults to `false`.
- **user:** (not shown) Specifies the SMTP user used in combination with the **secure** setting

Any change to the monitor properties file requires a Monitor Server instance or Monitor Server application restart.

## Secure Email Credentials

- When using a secure email connection, WLST must be used to store the email password.
- To change the email password, use WLST commands that are similar to:

```
# Start WLST:  
$ cd ${MIDDLEWAREHOME}/wlserver/common/bin  
$ ./wlst.sh  
#Connect to an instance:  
wls:/base_domain/serverConfig> connect('weblogic', 'pwd')  
# Create an email credential:  
wls:/base_domain/serverConfig> createCred(map='OGGMONITOR',  
key='WEB.SMTP.EMAIL.PASSWORD',  
user='<email user id>',  
password='<email password>',  
desc='SMTP EMAIL Password')  
#Update a credential:  
wls:/base_domain/serverConfig> updateCred(map="OGGMONITOR",  
key='WEB.SMTP.EMAIL.PASSWORD',  
user='<email user id>',  
password='<email password>',  
desc='SMTP EMAIL Password')
```

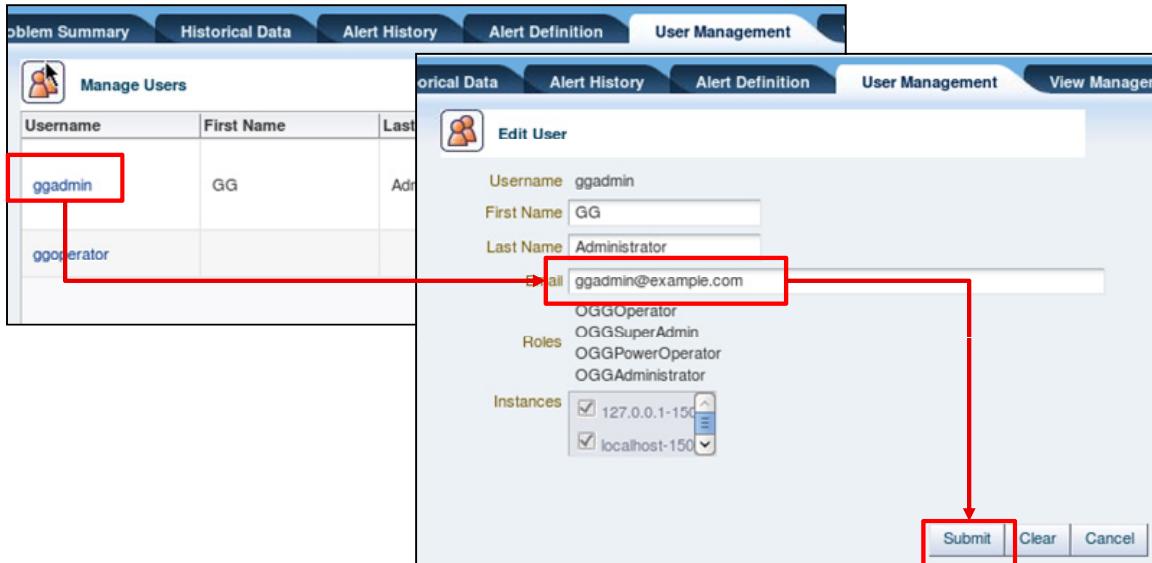


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When accessing a secure email server, a password must be provided. Use WLST as shown in the slide to set or update the SMTP email password that is used with a remote email server.

# Specifying a Target Email Address

Specify user email by using the **User Management** tab.



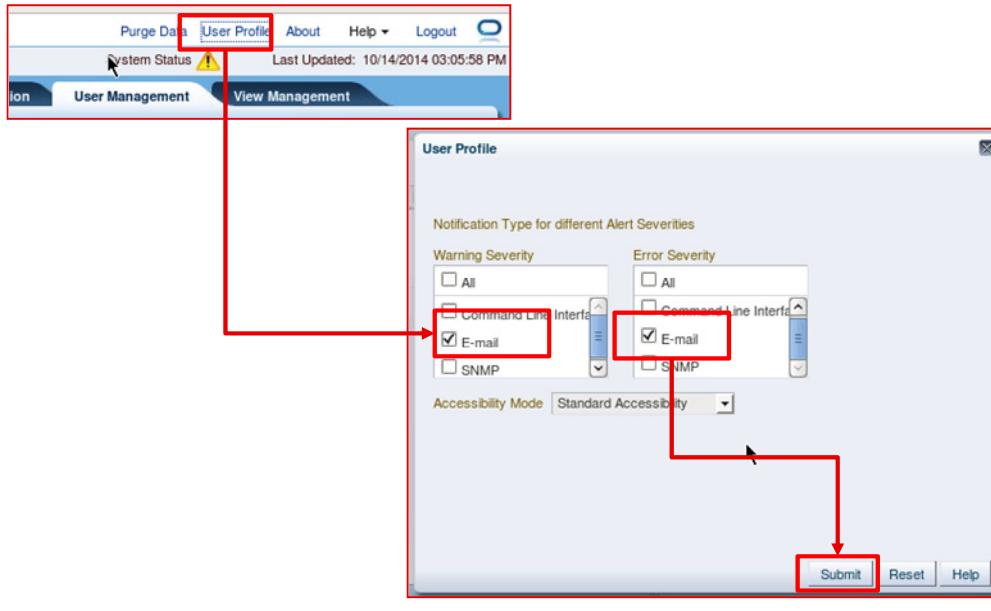
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The User Management page is used to specify the recipient's email. Select any user and click the user's name to open the edit page. Enter an appropriate email address and click Submit. The user will now receive email notification when alerts are raised.

# Controlling Alerts

- Alerts are managed by using User Profiles.
- Users can select CLI, Email, SNMP, or all.



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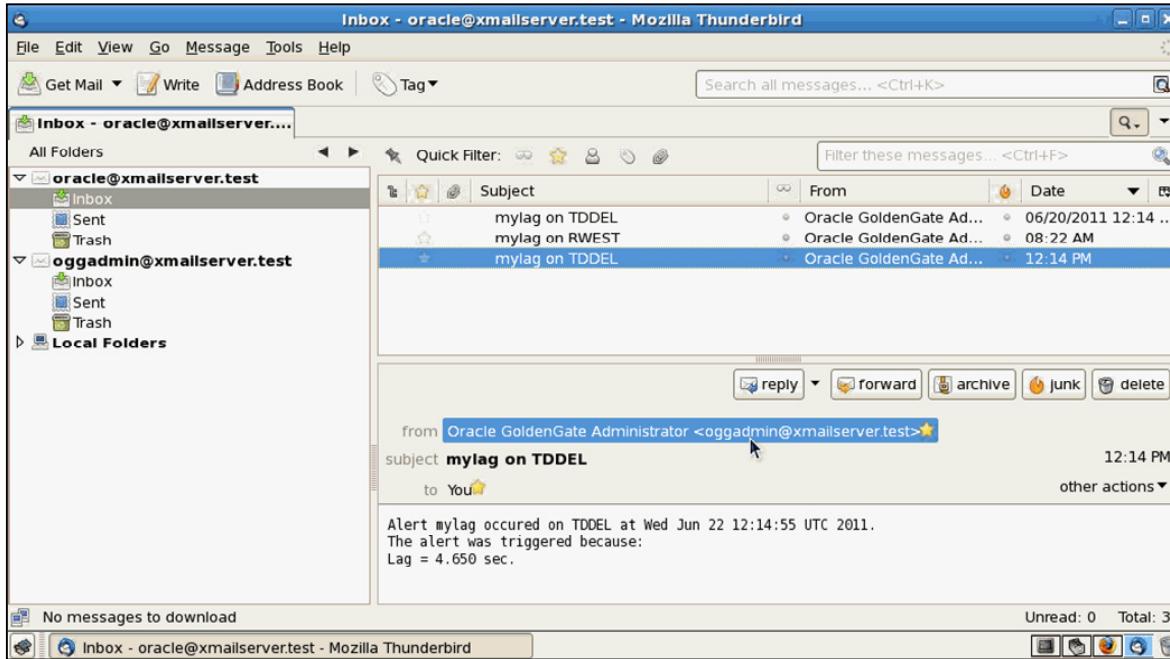
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Users can select which types of alerts they receive, as well as with what severities. To configure or include specific alerts, perform the following steps:

1. Click **User Profile**.
2. Select specific alerts to receive using the severity and type options. In the example in the slide, email alerts will be delivered for both warning and errors.
3. Click **Submit**.

Alerts are displayed on demand in Oracle GoldenGate Monitor on the various tabbed pages: Views, Alerts, Statistics, History, and so on. You can specify that alerts should be forwarded beyond Oracle GoldenGate Monitor by using either the command-line interface (CLI), email (using SMTP), or a network management center (using SNMP). This affects all alerts for a given user. Each user can independently receive any or all forms of delivery. A logged in user can change only his or her specific alert types.

## Email Alert Example



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The information contained in the email is very similar to the information in an SNMP trap, and on the Alert tab of the Oracle GoldenGate Monitor software.

## Quiz

Can Oracle GoldenGate Monitor send alerts to multiple email addresses?

- a. Yes
- b. No
- c. Only if Windows is being run
- d. Only if Linux is being run
- e. Only if SMTP is using POP



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### Answer: a

The alerts can originate from only one user, but can be sent to all users who choose to receive email alerts.

# Roadmap

- Configuring Simple Mail Transfer Protocol Alerts
- Configuring Simple Network Management Protocol Alerts
  - SNMP Overview
  - SNMP Alert Properties
- Configuring Command-Line Alerts

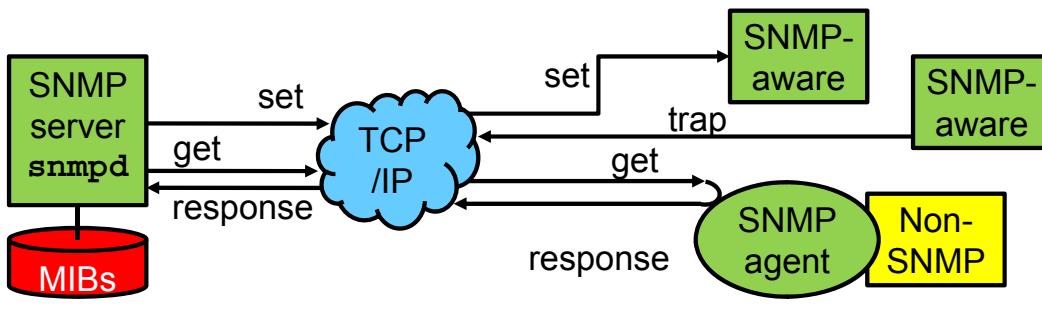


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# SNMP Terms and Architecture

- SNMP: Simple Network Management Protocol
- Client/Server: snmp, snmpd, snmptrapd
- Commands: get, response, set, trap
- OID: Object Identification
- MIB: Management Information (data)Base
- ASN.1: Abstract Syntax Notation One
- Versions: 1, 2, 3



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SNMP is a protocol for managing devices over a network, not necessarily for managing network devices. The client, or agent, responds to requests from the server. The agent can also send an alert, or trap, unsolicited. Traps often go to multiple destinations.

There are very few SNMP commands:

- **get**: Comes in several flavors, which reads values from the device. The values could be numeric, Boolean, character, and so on. The meaning of the values is not universally defined. Permissions aside, all items should be **get-able** (readable).
- **response**: Is the reply to a **get**
- **set**: Puts (writes) a value. Not all items can be **set**. You can **set** a name, but it does not make sense to **set** a meter reading.
- **trap**: Is an unsolicited alert with additional information

The information about the device is located in a tree structure. The tree is numeric. According to the Internet Assigned Numbers Authority (IANA), 1.3.6.1.4.1 (iso.org.dod.internet.private.enterprise) is for private companies, and after that, the string .18657 belongs to Oracle. How Oracle (or any company) decides to use the numbers below 18657 is entirely up to them.

At the end of the tree is an object, such as the name of the device, or its status. All these objects have an Object Identifier (OID), which is the long string of numbers. The complete collection of OIDs for a device is stored in a Management Information Base (MIB). There is no good reason why it is not called a Management Information Database. There are utilities for “walking the MIB,” which allow you to traverse the tree, browsing, examining, and possibly setting values of the OIDs. This may be of limited usefulness because the values have no universal meaning. For example, if you read that the status of a device = 1, what does that mean? The programmer could have decided that 1 means on, or means off, or standby, or booting, or anything.

The MIBs are written in a language called Abstract Syntax Notation One (ASN.1) and need to be compiled to be accessible to the server. Many servers ship with a MIB library of common devices. Even without the MIB, the server can report a trap in its raw format (as is the case with Oracle GoldenGate and WebLogic Server).

Often the SNMP set can be used to stop and start a device or program. If that is the intent, there needs to be a separate agent (or daemon) that stays awake after the device or program is shut down. Agents can be used to manage devices that would not otherwise be SNMP-aware.

Because SNMP can be used to start and stop a device, this is a very powerful function that needs to be protected by security authorization and authentication. Each version of SNMP provides increased levels of security, with version 1 being the least secure and version 3 (the latest level) being the most secure.

# Simple Network Management Protocol Properties

GoldenGate Monitor Simple Network Management Protocol (SNMP) interface:

- Sends alerts in the form of datagrams
- Is enabled by using  
monitor.snmp.alerts.enabled=true
- Includes MIB, which can be imported on targets
- Is configured by using **SNMPJMXMapping.xml**
- Should only modify **notifications**

```
<?xml version="1.0" encoding="UTF-8"?>
<MappingConfig xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.goldengate.com/snmpjmxmapping">
    <Mbeans>
        .
        .
        <notifications type="NOTIFICATIONS">
            <notification version="2" enabled="true">
                <targets> . . .
```

SNMPJMXMapping.xml

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The SNMP alert is configured in the *DOMAINNAME*/config/monitorserver/cfg/SNMPJMXMapping.xml SNMPJMXMapping.xml file.

Any changes to the **SNMPJMXMapping.xml** file must be made outside of the Oracle GoldenGate Monitor user interface by the host administrator that installed the Oracle GoldenGate Monitor Server software. Care should be taken to only change the sections of the **SNMPJMXMapping.xml** file that set the SNMP version and define targets.

**SNMPSecurity.xml**: SNMP security is optional; you do not have to do anything to this file if you do not want or need security. However, if you want security, the configuration is different for SNMP version 1 and version 2. At the simplest level, version 1, you can specify a community string, which is a clear-text identifier (it is not really fair to call it a “password”) that is blank by default but is often **public** (read-only) and **private** (read-write) by convention. The file is bigger than the snippet shown in the slide. Your SNMP administrator will tell you what needs to go in this file.

# SNMP JMX Mapping

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
. . .
<MBeans>
    <OID1.3.6.1.4.1.18657.10.1.21.1
        MBeanType="com.goldengate.monitor.backend.mbeans.impl.SystemObj"
            name="alertEntry" type="TABLEENTRY"/>
    <OID1.3.6.1.4.1.18657.10.1.21.1.2 index="true"
        name="alertName" type="DisplayString"/>
    <OID1.3.6.1.4.1.18657.10.1.21.1.3
        name="alertTime" type="DateAndTime"/>
. . .
</MBeans>
. . .
<notifications type="NOTIFICATIONS">
. . .
    <notification enabled="true" version="1">
        <targets>
            <target>target.host/targetport</target>
        </targets>
    </notification>
</notifications>
. . .

```

Attribute to OID mappings; do not change.

Enable only one section; for version="1" or version="2" not both.

Specify host and port of the SNMP console.

SNMPJMXMapping.xml



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Object Identifiers (OIDs) are self-explanatory, except for Severity, where 1=Error and 2=Warning.

- **Name:** Alert name
- **Time stamp:** Time of alert
- **Object:** Object that generated the alert
- **Severity:** The defined severity
- **Message:** The associated message

There are three other sections for defining the ports for version 1 or version 2 (version 3 is not supported). For each version to be enabled, set `enabled="true"`. The default port is 162; any port under 1024 requires the `snmpd` daemon to run as root. The SNMP server needs to be listening on the same target port. Multiple Oracle GoldenGate Monitor Server instances can report back to the same `snmpd` service target port.

## SNMP JMXMapping.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<MappingConfig
    xmlns:xsd=http://www.w3.org/2001/XMLSchema
    xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
    xsi:schemaLocation=
        "http://www.goldengate.com/snmpjmxmapping">

<MBeans>
    <OID1.3.6.1.4.1.18657.10.1 name="system"
        type="OID"
        MBeanType=
            "com.goldengate.monitor.backend.mbeans.impl.SystemObj"
        MBeanName="system"
        Description="Represents Monitor top level system object">
        <OID1.3.6.1.4.1.18657.10.1.21 name="alertTable"
            type="TABLE" ACCESS="read-only">
            <OID1.3.6.1.4.1.18657.10.1.21.1
                name="alertEntry"
                type="TABLEENTRY" ACCESS="not-accessible"
                MBeanType=
                    "com.goldengate.monitor.backend.mbeans.impl.SystemObj"
                    attr="alerts">
                    <OID1.3.6.1.4.1.18657.10.1.21.1.2 name="alertName"
                        ACCESS="read-only" type="DisplayString" index="true"
                        attr="name" />
                    <OID1.3.6.1.4.1.18657.10.1.21.1.3 name="alertTime"
                        ACCESS="read-only"
                        type="DateAndTime" attr="time"/>
                    <OID1.3.6.1.4.1.18657.10.1.21.1.4 name="alertObjectName"
                        ACCESS="read-only" type="DisplayString"
                        attr="objectName"/>
                    <OID1.3.6.1.4.1.18657.10.1.21.1.5 name="alertSeverity"
                        ACCESS="read-only" type="INTEGER" attr="severity" />
                    <OID1.3.6.1.4.1.18657.10.1.21.1.6 name="alertMessage"
                        ACCESS="read-only" type="DisplayString" attr="message"/>
                </OID1.3.6.1.4.1.18657.10.1.21.1>
            </OID1.3.6.1.4.1.18657.10.1.21>
        </OID1.3.6.1.4.1.18657.10.1>
    </Mbeans>
```

## Complete listing of SNMPJMXMapping.xml

```
<MIBTree>
  <alertTable OID="1.3.6.1.4.1.18657.10.1.21"
    Description="alert table"
    ACCESS="read-only" type="TABLE">
    <alertEntry OID="1.3.6.1.4.1.18657.10.1.21.1"
      Description="alert table entry"
      ACCESS="not-accessible"
      INDEX="alertID">
      <alertID OID="1.3.6.1.4.1.18657.10.1.21.1.1"
        ACCESS="read-only" type="INTEGER"/>
      <alertName OID="1.3.6.1.4.1.18657.10.1.21.1.2"
        ACCESS="read-only" type="DisplayString"/>
      <alertTime OID="1.3.6.1.4.1.18657.10.1.21.1.3"
        ACCESS="read-only" type="DateAndTime"/>
      <alertObjectName OID="1.3.6.1.4.1.18657.10.1.21.1.4"
        ACCESS="read-only" type="DisplayString"/>
      <alertSeverity OID="1.3.6.1.4.1.18657.10.1.21.1.5"
        ACCESS="read-only" type="INTEGER"/>
      <alertMessage OID="1.3.6.1.4.1.18657.10.1.21.1.6"
        ACCESS="read-only" type="DisplayString"/>
    </alertEntry>
  </alertTable>
```

```
<notifications type="NOTIFICATIONS">
  <notification version="2" enabled="true">
    <targets>
      <target timeout="200" retry="0">
        localhost/162</target>
    </targets>
    <alertEvent OID="1.3.6.1.4.1.18657.10.0.1" type="trap"
      ObjectName=":type=alert, name=*>
      <alertName OID="1.3.6.1.4.1.18657.10.1.21.1.2"
        type="DisplayString"/>
      <alertTime OID="1.3.6.1.4.1.18657.10.1.21.1.3"
        type="DateAndTime"/>
      <alertObjectName OID="1.3.6.1.4.1.18657.10.1.21.1.4"
        type="DisplayString"/>
      <alertSeverity OID="1.3.6.1.4.1.18657.10.1.21.1.5"
        type="INTEGER"/>
      <alertMessage OID="1.3.6.1.4.1.18657.10.1.21.1.6"
        type="DisplayString"/>
    </alertEvent>
  </notification>
  <notification version="1" enabled="false">
    <targets>
      <target>localhost/162</target>
    </targets>
    <alertEventv1 OID="1.3.6.1.4.1.18657.10.6.1"
      type="trap"
      ObjectName=":type=alert, name=*>
      <alertName OID="1.3.6.1.4.1.18657.10.1.21.1.2"
        type="DisplayString"/>
      <alertTime OID="1.3.6.1.4.1.18657.10.1.21.1.3"
        type="DateAndTime"/>
      <alertObjectName OID="1.3.6.1.4.1.18657.10.1.21.1.4"
        type="DisplayString"/>
      <alertSeverity OID="1.3.6.1.4.1.18657.10.1.21.1.5"
        type="INTEGER"/>
      <alertMessage OID="1.3.6.1.4.1.18657.10.1.21.1.6"
        type="DisplayString"/>
    </alertEventv1>
  </notification>
</notifications>
</MIBTree>
</MappingConfig>
```

## Sample SNMP Trap

Partial example:

```
:  
RawTrapOID      : 1.3.6.1.4.1.18657.10.6.0.1  
Trap Objects    : {  
{ enterprises.18657.10.1.21.1.2=mylag }  
{ enterprises.18657.10.1.21.1.3=06202011081923392 }  
{ enterprises.18657.10.1.21.1.4=RWEST }  
{ enterprises.18657.10.1.21.1.5=1 }  
{ enterprises.18657.10.1.21.1.6=The alert was  
triggered because:  
Lag = 7.020 sec.  
:
```

The trap is laid out in the same format as the MIB.



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Even though this is “raw” trap data, the meaning is very plain:

2=AlertName=mylag  
3=Timestamp=June 20, 2011, 08:19:23  
4=Object=RWEST  
5=Severity=1  
6=Message=Lag was 7.020 seconds.

Additional information on the next page indicates the source host of the trap (localhost via loopback), the port (5162), and the version of the trap (v1).

```
Listening on port:5162
--- Snmp Trap Received ---
Version      : v1
Source       : UdpEntity:127.0.0.1:1161
Community    : public
Enterprise   : enterprises.18657.10.6
AgentAddr    : 0.0.0.0
TrapOID      : enterprises.18657.10.6.0.1
RawTrapOID   : 1.3.6.1.4.1.18657.10.6.0.1
Trap Objects : {
{ enterprises.18657.10.1.21.1.2=mylag }
{ enterprises.18657.10.1.21.1.3=06202011081923392 }
{ enterprises.18657.10.1.21.1.4=RWEST }
{ enterprises.18657.10.1.21.1.5=1 }
{ enterprises.18657.10.1.21.1.6=The alert was triggered because:
Lag = 7.020 sec.
}
}
Raw VarBinds : {
{ enterprises.18657.10.1.21.1.2=mylag }
{ enterprises.18657.10.1.21.1.3=06202011081923392 }
{ enterprises.18657.10.1.21.1.4=RWEST }
{ enterprises.18657.10.1.21.1.5=1 }
{ enterprises.18657.10.1.21.1.6=The alert was triggered because:
Lag = 7.020 sec.
```

## Quiz

UserA receives an email for Alert1. Can UserA suppress email for Alert2, yet still receive SNMP traps for Alert2?

- a. Yes
- b. No
- c. Only if Windows is being run
- d. Only if Linux is being run
- e. Only if SNMP is using version 3



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### Answer: b

The type of alerts that you receive is configured at the user level, not the alert level.

## Roadmap

- Configuring Simple Mail Transfer Protocol Alerts
- Configuring Simple Network Management Protocol Alerts
- Configuring Command-Line Alerts



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## Command-Line Interface Alerts

Command-line alerts:

- Can be used to extend alerting to arbitrary external applications
- Are enabled by using the monitor.cli.alerts.enabled=true property

```
...  
monitor.cli.alerts.enabled=true  
...
```

monitor.properties

- Use CommandLineHandlers.xml to map alerts to applications:

```
<?xml version="1.0" encoding="UTF-8"?>  
<CommandLineHandlers . . . >  
  <CommandLineHandler . . . >  
    . . .  
  </CommandLineHandler>  
  . . .  
</CommandLineHandlers>
```

CommandLineHandlers.xml

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Command-line alerts are configured by using a combination of properties, to enable the CLI alerting mechanism, and the command-line handlers, which can be used to execute arbitrary scripts or executables to forward alert information.

# Mapping CLI Handlers

Command-line handlers are nested instances as shown:

```
<?xml version="1.0" encoding="UTF-8"?>
<CommandLineHandlers xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.oracle.com/goldengate/monitor/commandlineh
        andlers/CommandLineHandlers.xsd">
    <CommandLineHandler ... >
        <externalCommand> ... </externalCommand>
        <arguments> ... </arguments>
        <alertMappings> ... </alertMappings>
    </CommandLineHandler>
    <CommandLineHandler ... >
        <externalCommand> ... </externalCommand>
        <arguments> ... </arguments>
        <alertMappings> ... </alertMappings>
    </CommandLineHandler>
</CommandLineHandlers>
```

Each command-line handler has a separate element.



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Note the mixed-case file names. Before you modify any configuration files, make a backup copy:

```
cp someconfig.xml someconfig.xml.BACKUP
```

In addition to configuring the monitor.properties (previous page) setting monitor.cli.alerts.enabled=true, you can configure multiple CommandLineHandler stanzas.

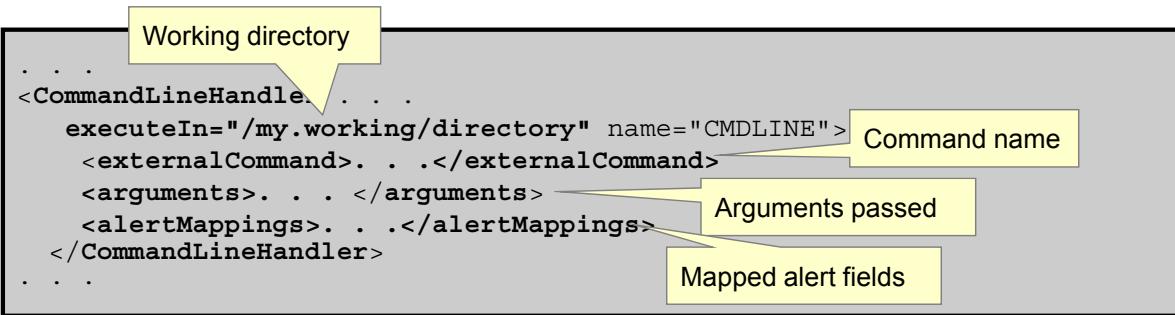
As part of the installation, two example files are created: one for UNIX and one for Windows.

## CommandLineHandlers

- Is a nested instance within CommandLineHandlers :

```
<?xml version="1.0" encoding="UTF-8"?>
<CommandLineHandlers. . . >
  <CommandLineHandler . . .>
    . . .
  </CommandLineHandler>
</CommandLineHandlers>
```

- Contain command definition elements, including working directory, command name, arguments, and alert mappings

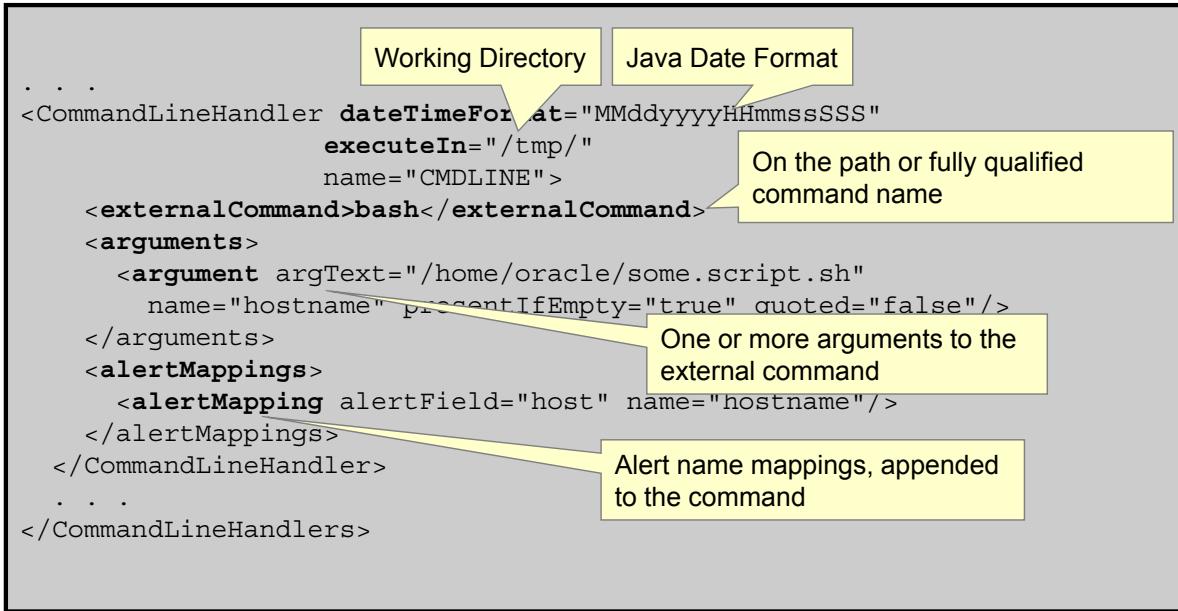


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```
<CommandLineHandlers . . . >
  <CommandLineHandler dateFormat="MMddyyyyHHmmssSSS"
    executeIn="<your working directory path>" name="CMDLINE">
    <externalCommand>bash</externalCommand>
    <arguments>
      <argument argText="<absolute path/yourscript.sh>"
        name="hostname" presentIfEmpty="true"
        quoted="false"/>
    </arguments>
    <alertMappings>
      <alertMapping alertField="host" name="hostname" />
    </alertMappings>
  </CommandLineHandler>
</CommandLineHandlers>
```

## CommandLineHandler Elements



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CommandLineHandlers contain several attributes and elements:

- `dateTimeFormat`: Java Date Time format associated with the command
- `externalCommand`: The fully qualified path to the command or the command itself, if in Monitor Server's path
- `Arguments`: One or more instances of the `argument` element, which contains arguments to the command
- `alertMappings`: One or more instances of the `alertMapping` element, which generates name-value pairs appended to the command after the arguments

See the documentation [http://docs.oracle.com/goldengate/1213/gg-monitor/GMNAD/mon\\_adm\\_alerts.htm](http://docs.oracle.com/goldengate/1213/gg-monitor/GMNAD/mon_adm_alerts.htm) for details on configuring command-line handlers.

## Restarting Monitor Server

- After any `monitor.properties` change, Monitor Server must be restarted.
- Stop a running Monitor Server instance:

```
$ cd ${MIDDLEWARE_HOME}/user_projects/domains/DomainName
$ ./bin/stopManagedWebLogic.sh MONITORSERVER_server1
```

- Start an instance:

```
$ cd ${MIDDLEWARE_HOME}/user_projects/domains/DomainName
$ ./bin/startWebLogic.sh # if required
$ ./bin/startManagedWebLogic.sh MONITORSERVER_server1
```



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After any Monitor properties change, you must restart the Monitor Server instance. The slide shows the correct sequence for stopping and restarting the Monitor Server instance. Note that the second set of commands also shows restarting the administration server, which may not be required.

## Example

Calls sample\_cli.sh with an argument of host:

```
<?xml version="1.0" encoding="UTF-8"?>
<CommandLineHandlers
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation=
    "http://. . . /monitor/commandlinehandlers/CommandLineHandlers.xsd">
  <CommandLineHandler dateFormat="MMddyyyyHHmmssSSS"
    executeIn="/home/user" name="CMDLINE">
    <externalCommand>bash</externalCommand>
    <arguments>
      <argument argText="/home/user/sample_cli.sh"
        name="hostname" presentIfEmpty="true" quoted="true"/>
    </arguments>
    <alertMappings>
      <alertMapping alertField="host" name="hostname"/>
    </alertMappings>
  </CommandLineHandler>
</CommandLineHandlers>
```



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Suppose your host name is ogg. The quoted option determines whether the example command shown in the slide is run with:

sample\_cli.sh ogg

Versus

sample\_cli.sh "ogg"

adding the quotation marks around the returned value. The script can contain anything. If the script produces standard output, make sure that the output is captured somewhere.

## Summary

In this lesson, you learned how to:

- Briefly describe the architecture of SNMP
- Configure Oracle GoldenGate Monitor to send alerts via CLI, email, and SNMP
- Configure individual users to receive combinations of CLI, email, and SNMP alerts



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## Practice 6-1 Overview: Configuring Monitor to Forward Email Alerts

This practice covers the following topics:

- Configuring Monitor Server to send email alerts
- Configuring a user to receive SMTP emails
- Configuring an alert to send SMTP emails
- Testing SMTP by using Thunderbird
- Generating an email alert



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## Practice 6-2 Overview: Configuring Monitor to Generate SNMP Traps

This practice covers the following topics:

- Configuring Monitor Server to send SNMP traps
- Configuring a user to receive SNMP traps
- Testing SNMP by using WebLogic Server
- Generating an SNMP trap



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# Enterprise Management Cloud Control

Introducing EMCC and Installing the GoldenGate EMCC  
Plug-In



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# Objectives

After completing this lesson, you should be able to:

- Enumerate the components of the EMCC architecture
- Configure GoldenGate to run with EMCC
- Install, configure, and deploy the GoldenGate plug-in
- Discover and promote GoldenGate targets



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# Roadmap

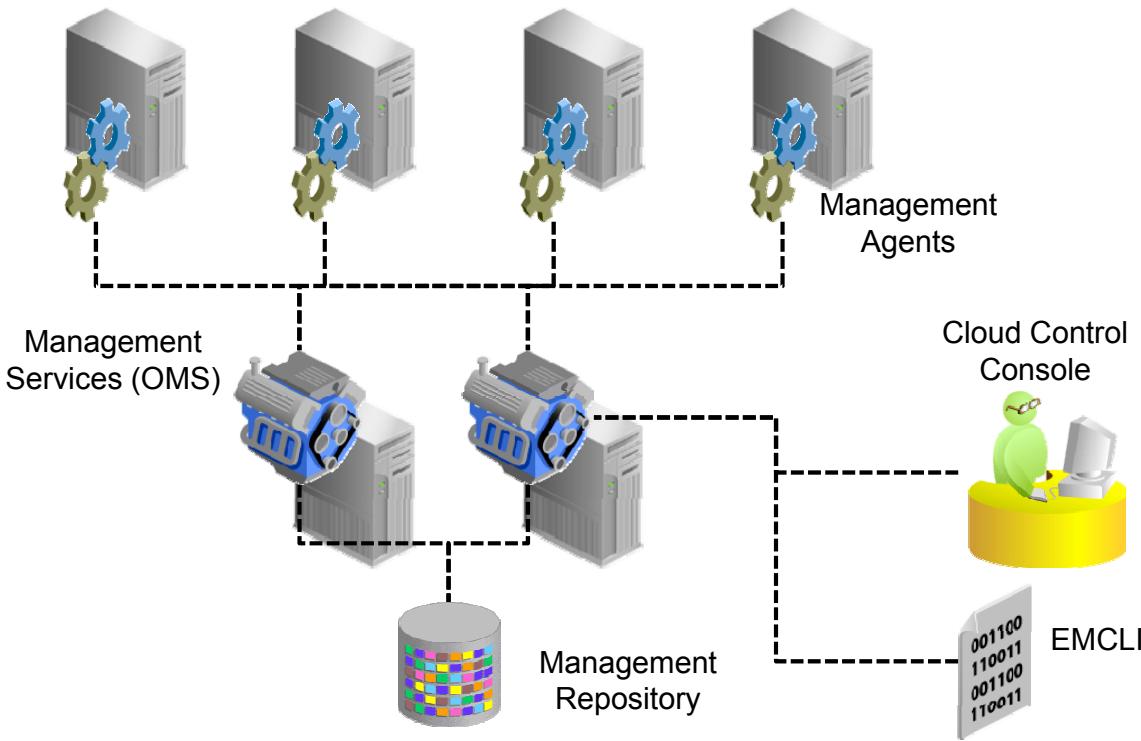
- Enterprise Manager Cloud Control
  - Architecture
  - Oracle Management Server
  - Oracle Management Agents
  - Targets
  - EMCTL/EMCLI
- EMCC and the GoldenGate Plug-In
- Discovering GoldenGate Instances



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# Enterprise Manager Cloud Control Architecture



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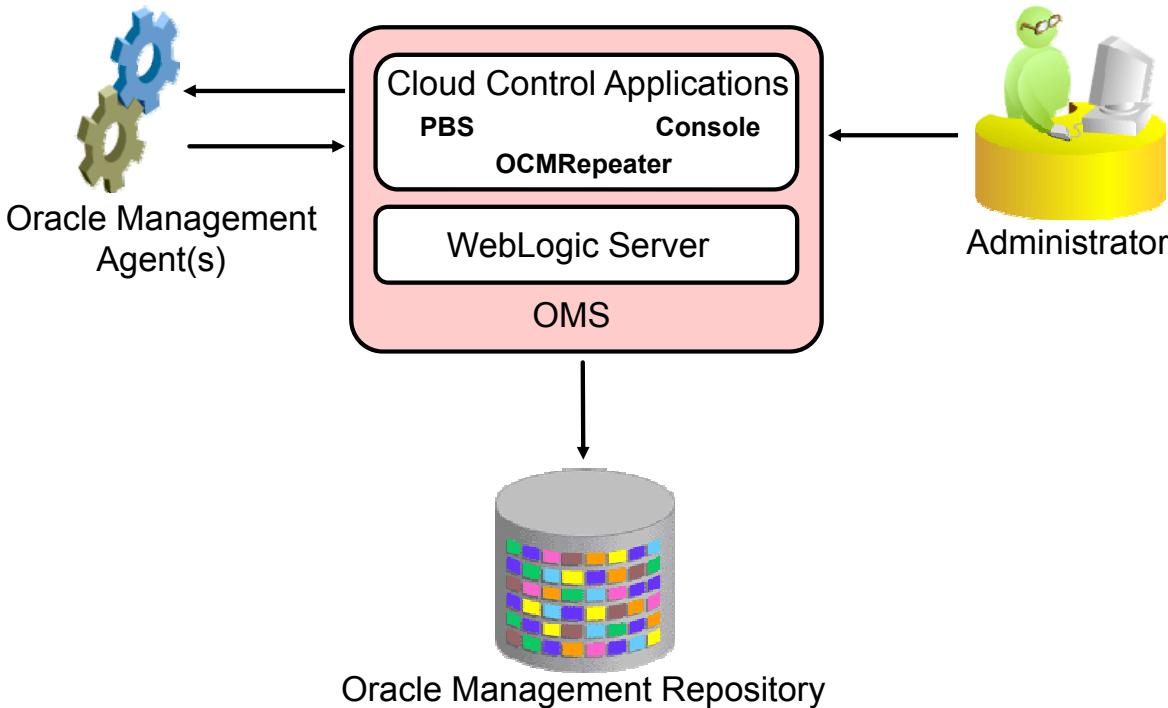
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The Oracle Management Agent is an integral software component that is deployed on each monitored host. It is responsible for monitoring all the targets that are running on those hosts, communicating that information to the middle-tier Oracle Management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

The Oracle Management Service is a Java application that runs on WebLogic Server and works with the Management Agents and the Management plug-ins to discover targets, monitor and manage those targets, and store the collected information in a repository for future reference and analysis. Oracle Management Service also renders the user interface for Enterprise Manager Cloud Control and supports the Enterprise Manager Command Line Interface (EMCLI).

The Oracle Management Repository (Management Repository) is a database where all the information collected by the Management Agent is stored. It consists of objects such as database jobs, packages, procedures, views, and tablespaces. At the time of installation, the Enterprise Manager Cloud Control Installation Wizard configures the Management Repository in your existing, certified database. The wizard, however, does not install a new database.

# Oracle Management Service (OMS)



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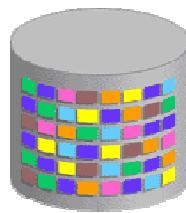
As the illustration in the slide shows, the OMS is actually composed of J2EE applications deployed on Oracle WebLogic Server:

- The Console serves up all the /em URLs. It can be considered to be the Cloud Control Console.
- Platform Background Services (PBS) serves up all the /empbs URLs. It is where agents upload their metrics.
- OCMRepeater is the link between EMCC and My Oracle Support for consolidating the configuration data that is collected from agents.

The OMS communicates with the agents that are deployed throughout the enterprise, receiving uploaded metric data from them and storing it in the Oracle Management Repository for future reference. The OMS also applies built-in and user-defined rules against received metrics to determine whether a condition exists that needs to be raised as an alert. There is also communication from the OMS to the agents of instructions to execute against their monitored targets, as a result of either a job within the OMS or the actions of an administrator. Cloud Control administrators and users interact with the OMS via the Cloud Control Console web pages.

## Oracle Management Repository

- Resides in an Enterprise Edition Oracle database
- Includes schema objects belonging to SYSMAN
- Is installed in a certified database instance that has been created before installation



Oracle Management Repository

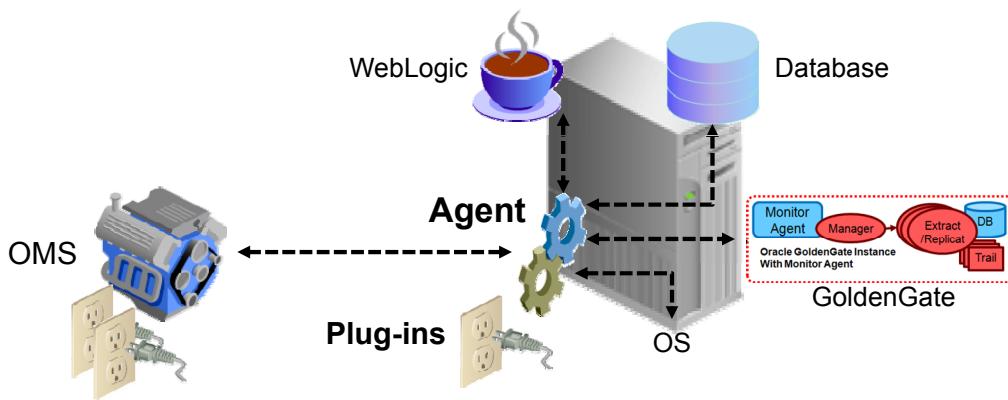
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The Oracle Management Repository (OMR) is installed in an Enterprise Edition Oracle database as a group of approximately 4,000 schema objects belonging to the SYSMAN user and stored in three tablespaces: MGMT\_ECM\_DEPOT\_TS, MGMT\_TABLESPACE, and MGMT\_AD4J\_TS. These schema objects contain information about Cloud Control users and administrators, targets and applications that are monitored and managed by Cloud Control, and groups, systems, incidents, and other Cloud Control artifacts. The OMR is created during installation in a database that you create before running the installer, and, for scalability requirements, it can be installed in a Real Application Clusters (RAC) database.

# Oracle Management Agents

- Are stand-alone Java applications that run on the hosts that you want to monitor and manage
- Gather configuration data and runtime metrics, and publish these to the management service
- Include one or more *plug-ins* that are capable of monitoring and managing certain resource types



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The Oracle Management Agent is a Java application that runs on a host, gathering metric data about the host environment, as well as using plug-ins to discover, monitor, and manage the targets running on that host. The plug-ins gather configuration information from their targets and monitor their availability and performance, in addition to managing those targets as directed by the OMS.

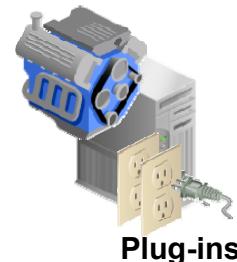
A target is any software or system for which there is a plug-in. The list of targets includes entities such as Oracle Database, WebLogic Server, Fusion Applications, SOA, Exadata, and Exalogic. To discover, monitor, and manage any given target, the agent must have the appropriate plug-in installed. Most plug-ins are included in the standard Enterprise Manager Cloud Control installation, but some must be downloaded and installed separately.

Some plug-ins are not necessarily used for monitoring and managing remote targets, and simply provide additional functionality on the Oracle Management Service (OMS). For example, the Oracle MOS (My Oracle Support) plug-in enables MOS-related features in Enterprise Manager Cloud Control, such as patch recommendations.

# Plug-Ins

Enterprise Manager Cloud Control Plug-ins:

- Are modules that can be plugged into an existing Enterprise Manager Cloud Control deployment
- Extend target management or other functionality
- Are archives containing metadata, sql, javacode, and other artifacts for monitoring and discovering OMS instances and Management Agents



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Plug-ins are modules that can be plugged into an existing Enterprise Manager Cloud Control deployment to extend target management or other vertical functionality in Enterprise Manager.

At a high level, plug-ins contain archives for monitoring and discovering OMS instances and Management Agents. The archives contain Java and SQL codes, and metadata.

As a part of Enterprise Manager Cloud Control installation, a set of basic plug-ins is deployed by default. You can deploy other plug-ins to extend the basic functionality of Enterprise Manager Cloud Control.

The plug-ins that are deployed by default, or are shipped out of box, are as follows:

- Oracle Database
- Oracle Fusion Middleware
- Oracle MOS (My Oracle Support)
- Oracle Exadata
- Oracle Cloud Framework

Plug-ins differ from agents in that agents run against a specific component such as GoldenGate or WebLogic Server. Plug-ins, on the other hand, are integrated into the OMS and provide the functionality to examine and interact with an agent.

## GoldenGate EMCC Plug-In

The EMCC plug-in for Oracle GoldenGate adds support for monitoring and managing Oracle GoldenGate processes, and includes features for the following:

- Visually monitoring GoldenGate metrics and trends
- Generating alerts and incidents based on thresholds
- Managing processes
- Modifying existing configuration files
- Viewing error logs, report files, and discard files
- Auditing user access of privileged plug-in features



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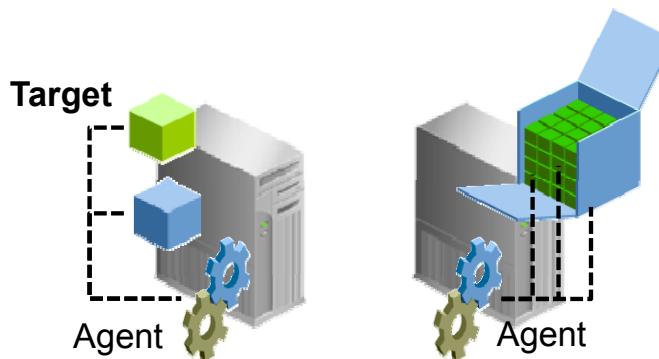
The GoldenGate EMCC plug-in, and the EMCC plug-ins in general, extend EMCC by adding features and functions for a given functional area. The GoldenGate plug-in supports adding features to EMCC that are similar to those found in GoldenGate Monitor, including a visual display of GoldenGate objects, alerting, process management, configuration management, and error logging and reporting, as well as user feature auditing.

The Oracle GoldenGate plug-in supports the following product versions:

- Enterprise Manager Cloud Control 12c Release 3 (12.1.0.3) and later
- Oracle GoldenGate versions, including:
  - Oracle GoldenGate 12c (12.1.2.1.0), which is the minimum version required to support the START, STOP, KILL, and EDIT features
  - Oracle GoldenGate 12c (12.1.2.0.1)
  - Oracle GoldenGate 12c (12.1.2.0.0)
  - Oracle GoldenGate 11g Release 2 (11.2.1.0.10) and later

# Targets

- Represent hardware and/or software entities that Enterprise Manager Cloud Control can monitor or manage
- Are associated with agents that are responsible for monitoring their health and performance
- Can be collections of related targets



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After the agent has been installed on a host, it must look for targets that it can manage. As an Enterprise Manager Cloud Control administrator, you can guide that process from the Cloud Control Console. Guided discovery allows you to nominate a family of target types that you want to search for, such as WebLogic domains, and then the agents where you want that search to be executed. If any new targets are discovered, the appropriate plug-in will be pushed from the OMS if it is not already installed on the agent, the target will be recorded in the repository, and monitoring will commence.

If auto-discovery is configured, Enterprise Manager Cloud Control will periodically search for potential targets. After they are discovered, targets must be promoted from the “unmanaged” status to the “managed” status. In this process, management agents are assigned to each target, enabling Enterprise Manager Cloud Control to collect the data needed to monitor the target. Alternatively, you can manually add targets as well.

By default, a target is monitored and managed by an agent running on the same host as the target. This approach is recommended but not strictly required. During the target registration process, you can associate a target with some other remote agent if desired.

# Browser Interface Layout



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- Use the Enterprise menu to view a summary of all targets, or to view all incidents or jobs. In addition, use this menu to work with reports, comparison templates, provisioning, patching, clouds, or My Oracle Support.
- Use the Targets menu to monitor and manage specific types of targets (such as databases or middleware) or to monitor custom collections of targets in the form of groups, systems, services, or business applications.
- Use the Favorites menu to access the list of pages in EM Cloud Control that you previously bookmarked.
- Use the History menu to access the list of pages that you visited most recently.
- Use the Setup menu to add new targets and to configure EM Cloud Control security, notifications, cloud infrastructure, software library, and the diagnostic advisor. In addition, use this menu to monitor and manage the EM Cloud Control infrastructure itself, including management services, agents, and the repository.
- Use the Help menu to access EM Cloud Control documentation, videos, and forums.
- Use the Account menu (your username) to verify your access rights, to change your password or email address, or to customize the layout and contents of the current page for subsequent visits.

## Enterprise Manager Control (EMCTL)

- Is a command line tool included with each OMS and agent installation
- Allows you to quickly start and stop management services and agents

```
$ORACLE_HOME/bin/emctl
```

```
$AGENT_INST_HOME/bin/emctl
```

```
emctl start oms|agent
emctl stop oms|agent [-all] [-force]
emctl status oms|agent [-detail]
```



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Each OMS consists of a number of components, including an administration server, managed servers, and web servers. All these can be started or stopped by using the EMCTL utility from the OMS home. The command `emctl stop oms` stops only the Enterprise Manager Cloud Control applications, whereas `emctl stop oms -all` stops all the Enterprise Manager Cloud Control server processes as well. You can determine whether OMS is started or stopped by using the `emctl status` command.

Log files for the OMS are in the following locations:

`gc_inst/em/EMGC_OMS1/sysman/log`

`gc_inst/user_projects/domains/GCDomain/servers/EMGC_OMS1/sysman/log`

`gc_inst/user_projects/domains/GCDomain/servers/EMGC_OMS1/logs`

Log files for the central agent (the agent installed on the OMS server) are in the following location:

`<agent_base_directory>/agent_inst/sysman/log`

## Enterprise Manager Command Line Interface (EMCLI)

- Is included in the OMS installation
- Can be downloaded to and run from other locations
- Provides equivalent command-line functionality for most browser-based activities
- Enables further automation of tasks through scripting
- Also supports a Jython-based interactive mode

```
emcli help
emcli setup -url=http://myhost:7301/em -username=myuser
emcli login -username=myuser

emcli list_add_host_platforms -all
emcli get_targets -targets="host"
emcli get_targets -targets="weblogic_domain"
```



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EMCLI enables you to access Enterprise Manager Cloud Control functionality from text-based consoles (shells and command-line windows) for a variety of operating systems. EMCLI is fully integrated with Enterprise Manager's security and user administration functions, enabling you to carry out operations by using EMCLI with the same security and confidentiality as the Enterprise Manager Cloud Control console. For example, you can see and operate only on targets that you are authorized to work on.

A verb is a task or an action in the form of a user command that exposes some Enterprise Manager functionality. Some verbs can include one or more parameters, which are arguments to the user command. Some of the parameters are required, and some are optional.

Default mode provides a simple interface to Enterprise Manager, and supports the execution of one verb at a time from the command line. Interactive mode enables you to create an interactive session with the OMS server, where you can type in commands, view the output, and potentially respond to or manipulate the output. Interactive mode opens a Jython shell, where you can provide Jython scripts by using EMCLI verbs as Jython functions. Jython is a Java implementation of the Python programming language. Finally, script mode allows you to pass a Jython script file to EMCLI.

You can run EMCLI from your OMS installation or you can download EMCLI from Cloud Control to another remote machine. From the Setup menu, select Command Line Interface.

# Management Packs

- Management packs:
  - Are used to license different features and plug-ins in Enterprise Manager Cloud Control
  - Are not software distributions
- There are many management packs:
  - Database
  - WebLogic Server
  - Coherence
  - GoldenGate
  - Fusion Applications
  - Others



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Oracle offers several management packs, management plug-ins, and other products that enhance the capabilities of Oracle Enterprise Manager for specific purposes. You cannot use these features, packs, reports, licensed repository views, or EMCLI verbs without appropriate licenses. Although these options, management packs, or products may be included in product CDs or downloads, or described in the documentation that you receive, it does not authorize you to use them without appropriate licenses.

Enterprise Manager includes a restricted-use license of the Oracle Database that enables its use only with the Oracle Management Repository or other complementary repositories that are included with Enterprise Manager (such as Ops Center, Real User Experience Insight, Load Testing, and Test Manager). Similarly, Enterprise Manager includes a restricted-use license of WebLogic Server.

The Enterprise Manager Cloud Control console includes a Management Pack Access page (Setup > Management Packs > Management Pack Access), which allows you to enable or disable access for each Management Pack and on individual targets.

## Quiz

Which is not a component of Enterprise Manager Cloud Control?

- a. Software Network
- b. Management Agent
- c. Management Service
- d. Management Repository



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**Answer: a**

# Roadmap

- Enterprise Manager Cloud Control
- EMCC and the GoldenGate Plug-In
  - Download the GoldenGate plug-in.
  - Deploy plug-ins into the EM Console.
  - Deploy plug-ins to a Management Server.
- Discovering GoldenGate Instances



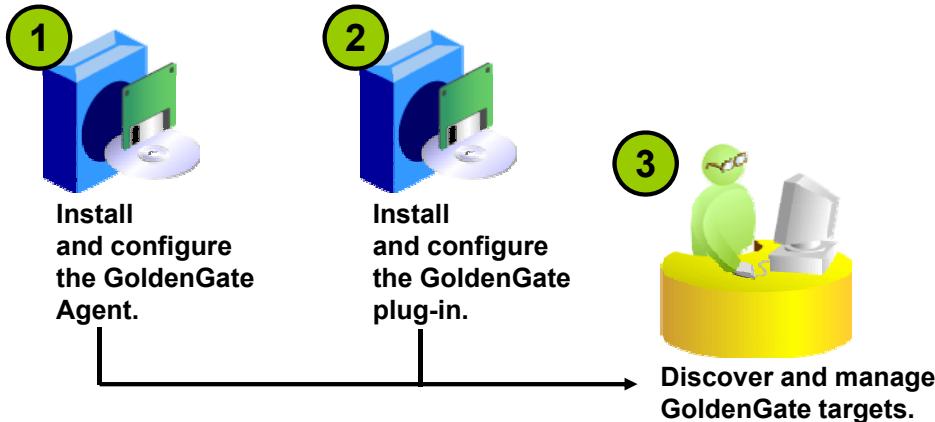
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# GoldenGate and Enterprise Manager Cloud Control

Configuring EMCC and GoldenGate requires three steps:

1. Install and configure the GoldenGate Agent.
2. Install and configure the EMCC GoldenGate plug-in.
3. Discover and manage GoldenGate targets.



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GoldenGate and Enterprise Manager Cloud Control require three distinct processes or steps in order to be used.

1. You must install and configure the GoldenGate agent. The EMCC GoldenGate agent is basically the same agent that is used for GoldenGate Monitor but configured slightly differently.
2. You must install and configure the GoldenGate plug-in for EMCC.
3. Use EMCC to discover instances of GoldenGate and manage them similarly to GoldenGate Monitor Server Console.

The next few sections in this lesson detail each of these tasks.

# GoldenGate Agent

To configure the GoldenGate agent for EMCC:

- Install the GoldenGate Management Pack
- Create agent instances

As previously covered

```
$ cd ${MIDDLEWAREHOME}/oggmon/ogg_agent  
$ ./create_ogg_agent_instance.sh  
...
```

- Create wallet credentials

```
$ cd /.../gg.../agent  
./bin/pw_agent_util.sh -jagentonly  
...
```

Only Java Agent credentials required

- Configure JAgent and GoldenGate for EMCC
  - Configure GoldenGate Core.
  - Configure GoldenGate agent.
  - Start GoldenGate Java Agent.



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To configure GoldenGate for use with EMCC you need to perform a few steps.

First, install the GoldenGate Management Pack as described in the earlier lessons. The GoldenGate Management Pack contains the common agent that is used by both GoldenGate Monitor Server and EMCC. Next create wallet credentials. These credentials are used to communicate between the GoldenGate agent and EMCC. Unlike GoldenGate Monitor Server, only Java Agent credentials are required. Use the `pw_agent_util` script to create the wallet, specifying `-jagentonly` if the wallet does not exist. Use `-updateJMXAgent` to update existing credentials.

After the preceding steps, you must perform the following:

1. Configure the GoldenGate Core, for example, by specifying `ENABLEMONITORING` in the `GLOBALS` file.
2. Configure the GoldenGate agent (both are covered in the following slides).
3. Start the GoldenGate agent.

# Configure JAgent and GoldenGate for EMCC

- Configure Java Agent properties.

agent.type.enabled=OEM	Defaults to OGGMON
jagent.jmx.port=5555	Machine where EMCC is running
jagent.host=localhost	Any name; defaults to root
jagent.rmi.port=5599	
jagent.username=root	\$GG_AGENT_HOME/cfg/Config.properties

- Enable ENABLEMONITORING.

```
...  
ENABLEMONITORING  
...
```

\$GG\_INSTANCE\_HOME/GLOBALS

- Start JAgent.

```
./ggsci  
GGSCI(....) > stop manager  
GGSCI(....) > create datastore  
GGSCI(....) > start manager  
GGSCI(....) > start jagent
```



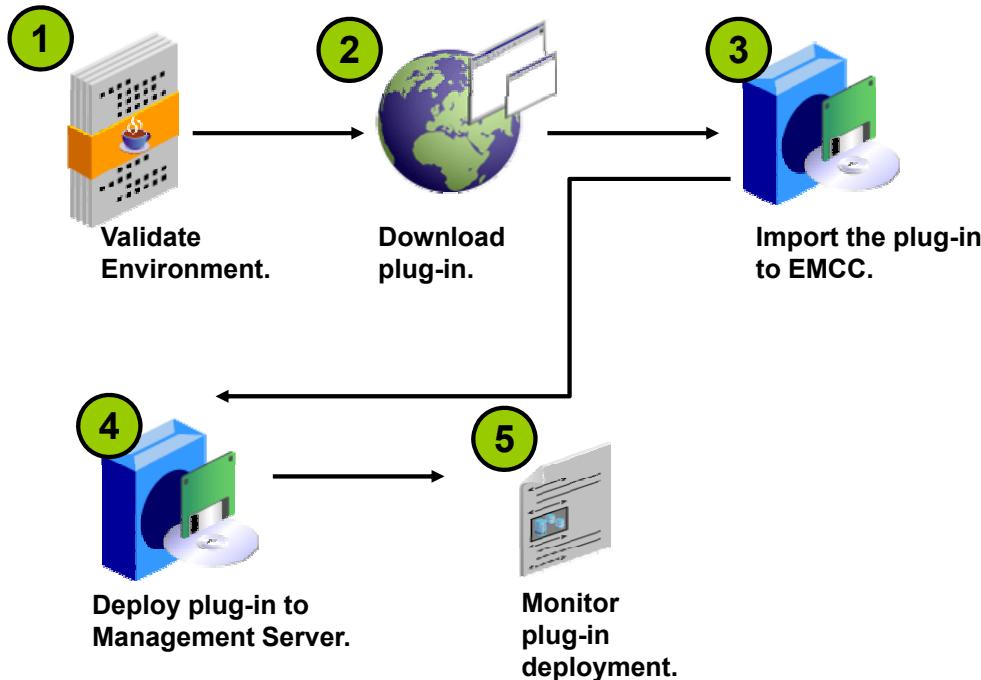
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The Java Agent must be configured similar to when it is used by GoldenGate Monitor Server, with one exception. By default, the `agent.type.enabled` property is set for use with GoldenGate Monitor and is set to a value of OGGMON. This field must be changed to OEM for use with EMCC. The remaining properties must be configured appropriately. The default Java RMI port for EMCC is 5599 as shown in the slide.

The GLOBALS file is required but does not exist by default. You can create it with any text editor. Each instance that is being monitored must have its own GLOBALS file (uppercase, no extension), which is located in the `root` directory of the GoldenGate instance installation. After entering the `ENABLEMONITORING` keyword and saving the file, the Oracle GoldenGate instance must be restarted.

After the preceding changes are complete, start the jagent as shown in the slide. Notice the `create datastore` command, which is not created by default when initializing the GoldenGate directory structure and is required for Java Agents.

# Installing and Configuring the EMCC GoldenGate Plug-In



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To install and configure the EMCC GoldenGate plug-in, perform the following steps:

1. Validate the environment. This includes the product and Java versions.
2. Download the plug-in, either offline (or directly from the console).
3. Deploy the plug-in to the EM Console.
4. Deploy the plug-in to the Management Server.
5. Optionally, monitor plug-in deployment.

## Validating the Environment

The Oracle GoldenGate plug-in supports monitoring of all platforms where the following are supported:

- GoldenGate Release 11.2.1 or later
- Oracle Enterprise Manager Cloud Control 12c agent or later instances

The general requirements include:

- Enterprise Manager Cloud Control 12c Release 3 (12.1.0.3) and later
- Oracle GoldenGate versions 12c (12.1.2.[1.0,0.1, 0.0])
- Oracle GoldenGate 11g Release 2 (11.2.1.0.10) and later
- JDK 1.7 or later



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The Oracle GoldenGate plug-in supports monitoring of all platforms where both Oracle GoldenGate Release 11.2.1 or later and Oracle Enterprise Manager Cloud Control 12c agent or later instances can run.

The Oracle GoldenGate agent has a local dependency on the Enterprise Manager agent. Therefore, the system monitoring plug-in for Oracle GoldenGate is not supported on the following platforms: HP NonStop, IBM System z, IBM z/OS, and IBM i (AS400). For a complete list, see the Certifications tab on My Oracle Support for details:  
<https://support.oracle.com>

# Downloading the Plug-In

- 1 Download the plug-in.

The screenshot shows a web browser window with two tabs open: "Oracle® Enterprise Manager" and "Oracle GoldenGate Downlo...". The URL in the address bar is "www.oracle.com/technetwork/middleware/goldengate/downloads/index.html". Below the address bar, there are navigation links: Overview, Downloads, Documentation, Community, and Learn More. The main content area is titled "Oracle GoldenGate Downloads". Under this title, there is a section for "Management Pack for Oracle GoldenGate" with a link to "Oracle GoldenGate Plug-in for Oracle Enterprise Manager V12.1.0.2 on Linux x86-64, Windows x64, Solaris on x86-64, Solaris on Sparc, IBM AIX, HP-UX Itanium (1.7 MB)".

- 2 Unzip the .opar plug-in file.

```
$ cd /stage  
$ unzip -d /home/oracle/ /stage/12.1.0.2.0_oracle.fmw.gg_2000_0.zip  
Archive: /stage/12.1.0.2.0_oracle.fmw.gg_2000_0.zip  
...  
inflating: /home/oracle/archives/12.1.0.1.0_oracle.fmw.gg_2000_0.opar  
...
```

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You can download and deploy the plug-in as follows:

1. First download the zipped version of the plug-in, which can be found on the GoldenGate download page of [www.oracle.com](http://www.oracle.com). In this example, the file was downloaded to /stage.
2. After download, unzip the file. A number of files are included in the zip, including the .opar file, which represents the plug-in itself. Also included in the archive are several files that describe the plug-in, the version information, and other files. See the file OGG-EM-12.1.0.2.0.pdf for details about the plug-in, including additional installation information, patch information, platform support, and other useful data.

# Importing the Plug-in to EMCC

## 3 Prepare the environment.

```
$ export OMS_HOME=/u01/app/oracle/MiddlewareEMCC/oms  
$ export PATH=$PATH:$OMS_HOME/bin  
$ which emcli  
/u01/app/oracle/MiddlewareEMCC/oms/bin/emcli
```

## 4 Import the plug-in by using emcli.

```
$ emcli login -username=sysman -password=oracle_4U  
$ emcli sync  
$ emcli import_update  
-file=/stage/12.1.0.2.0_oracle.fmw.gg_2000_0.zip -omslocal
```

Note the use of the downloaded, staged zip,  
not the unpacked .opar file.



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Before running the EMCLI command, the environment must be prepared. Primarily, this involves setting the path. Step 3 in the slide shows the necessary steps to add the `OMS_HOME` directory to the path. Note that you can also execute the `emcli` commands directly by changing directory to `$OMS_HOME/bin` and running the command as `./emcli`.

To deploy the plug-in, you must have an existing session, sync the session with the OMS server, and then import the plug-in. This is done in three steps:

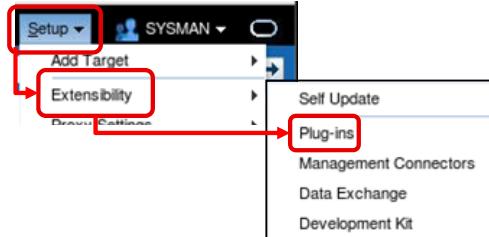
- Log in: `emcli login -username sysman -password oracle_4u` # or whatever the password actually is
- Synchronize: `emcli synch` # synchronize the current session with OMS
- Import: `emcli import_update -file=/fully/qualified/path/to/plug-in.zip -omslocal`

# Deploying the Plug-in to the Management Server

- 1 Log in to the EMCC console at <https://host:port/em>.



- 2 Choose **Setup > Extensibility > Plug-ins**.



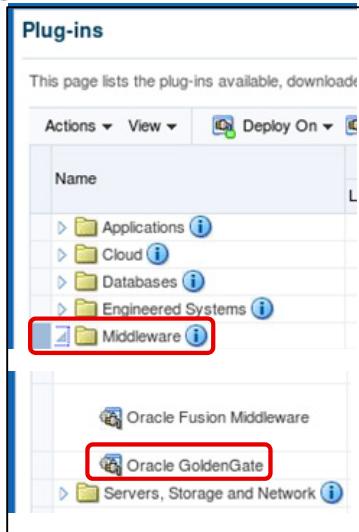
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1. To deploy a new plug-in, log in to the EM Console at <https://fully.qualified.host:port/em>; for example, <https://ogg.example.com:7802/em>. Use the sysman username and password that were specified during the installation.
2. After you are logged in, use the setup menu that is located on the top-right corner of the EM Console. Select Setup > Extensibility > Plug-ins. The bottom pane is replaced with a hierarchical list of plug-ins.

# Deploying the Plug-in to the Management Server

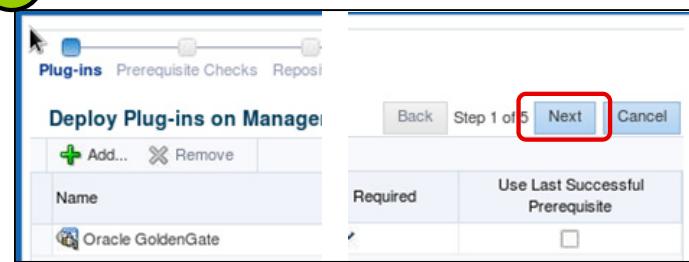
- 3 Select **Middleware > Oracle GoldenGate**.



- 4 Right-click and select **Deploy On > Management Servers**.



- 5 Click **Next**.



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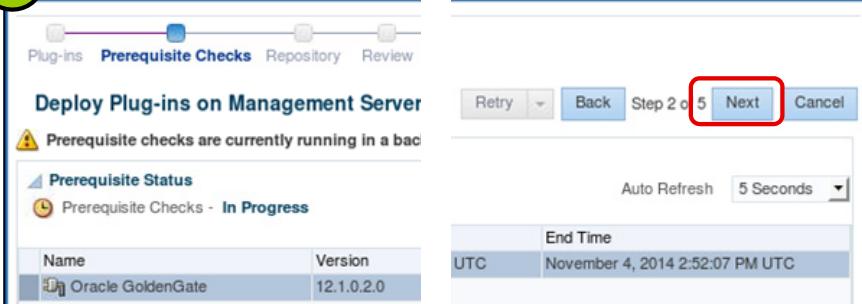
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3. Expand **Middleware** and find the **OracleGoldenGate** plug-in. This is the plug-in that was added by using `emcli` earlier.
4. Select the plug-in, right-click, and select **Deploy On > Management Servers** to start the deployment wizard.
5. Click **Next** on the first step of the deployment wizard.

# Deploying the Plug-in to the Management Server

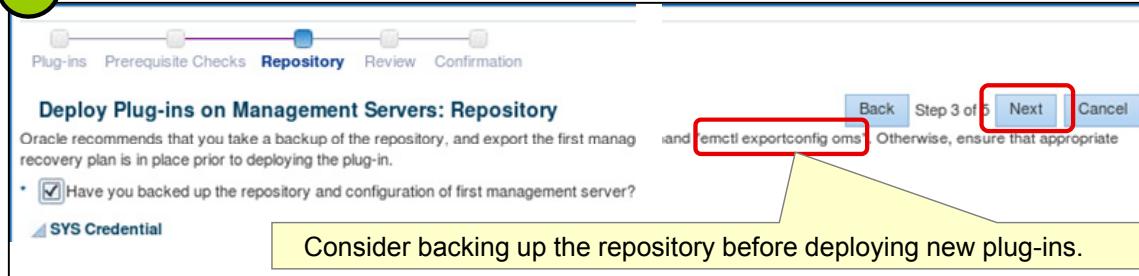
6

The Prerequisite Checks will run. When complete, click **Next**.



7

Select "Have you backed up..." and click **Next**.



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6. The Prerequisite Checks step confirms that the plug-in meets EM versioning and other requirements. The **Next** button is enabled when the plug-in has passed all required checks.  
Credentials are required to deploy a plug-in. The next slide discusses selecting credentials.
7. The callout in the slide shows the command to back up the EM repository configuration, which is recommended.

## Deploying the Plug-in to the Management Server: Credentials

- When adding a plug-in, credentials are required.
- Credentials can be created and saved for re-use.

**6a**

Enter or select existing credentials.

The screenshot shows a dialog box titled "Specify repository SYS credentials". It contains the following fields:

- Credential: Radio buttons for "Named" and "New", with "New" selected.
- Username: Text input field containing "sys".
- Password: Masked password input field.
- Confirm Password: Masked password input field.
- Role: Drop-down menu showing "SYSDBA".
- Save As: Text input field containing "SYS-credentials".

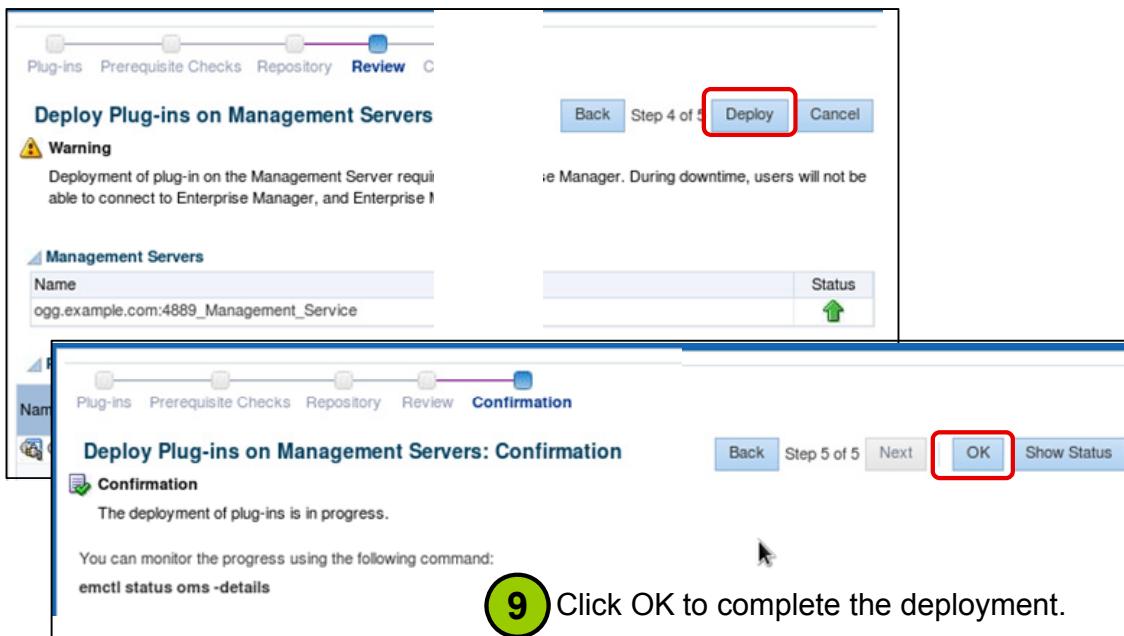
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When adding plug-ins, database credentials are required. Credentials can be added and reused later with a specific name. In the example in the slide, a new set of credentials is created and named for later use.

# Deploying the Plug-in to the Management Server

- 8 Click **Deploy** to complete the plug-in deployment.



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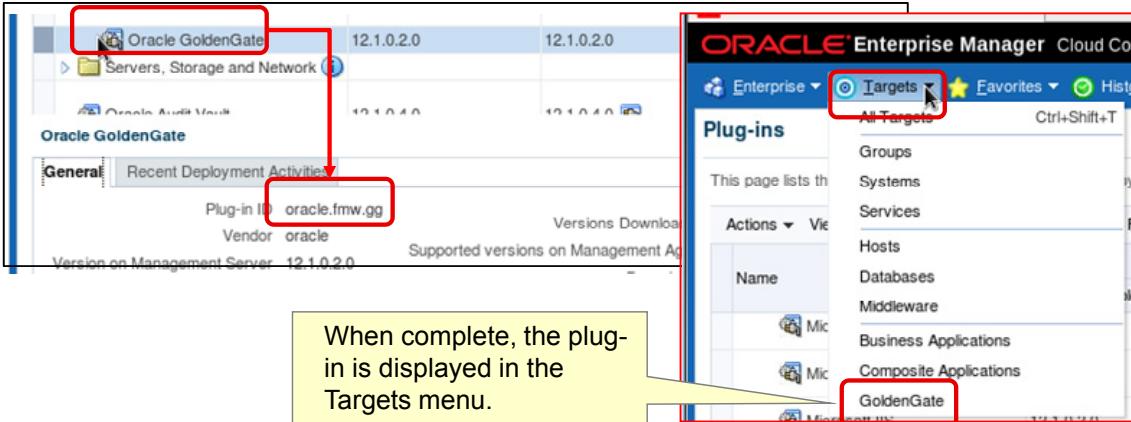
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8. Click **Deploy** to move to the final step before the plug-in is deployed. Note the downtime required field. When the plug-in is deployed, the EMCC console goes offline briefly. This downtime is a requirement for deploying the new plug-in and occurs when the deployment is finalized in the confirmation step.
9. Click **OK** to complete the deployment.

# Monitoring Deployment Status: EM Command-Line Interface

- Plug-ins can take several minutes to deploy.
- Status can be tracked at the command line with emcli.

```
$ emcli login -username=sysman -password=password
$ emcli sync
$ emcli get_plugin_deployment_status -plugin_id=oracle.fmw.gg
```



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Plug-in deployment status can be tracked by using emcli. The specific plug-in is specified by using the `-plugin_id` parameter to the `get_plugin_deployment_status` command. The plug-in ID can be obtained by selecting the name of the plug-in and examining its details from the main plug-in page. For example:

```
$ emcli login -username=sysman -password=oracle_4U
$ emcli sync
$ emcli get_plugin_deployment_status -plugin_id=oracle.fmw.gg
```

Displaying status for the latest deployment activity(de... ID 3)

Plug-in Deployment/Undeployment Status

Destination	: Management Server -
ogg.example.com:4889_Management_Service	
Plug-in Name	: Oracle GoldenGate
Version	: 12.1.0.2.0
ID	: oracle.fmw.gg
Content	: Plug-in
Action	: Deployment
Status	: Success
Steps Info:	

Step	Start Time	End Time	Status
Submit job for deployment	11/4/14 3:01:13 PM UTC	11/4/14 3:01:13 PM UTC	Success
Initialize	11/4/14 3:01:14 PM UTC	11/4/14 3:01:24 PM UTC	Success
Install software		11/4/14 3:01:24 PM UTC	11/4/14
3:01:26 PM UTC Success			
Validate plug-in home		11/4/14 3:01:27 PM UTC	11/4/14
3:01:27 PM UTC Success			
Perform custom preconfiguration	11/4/14 3:01:27 PM UTC	11/4/14 3:01:27 PM UTC	Success
Check mandatory patches	11/4/14 3:01:27 PM UTC	11/4/14 3:01:27 PM UTC	Success
Generate metadata SQL	11/4/14 3:01:27 PM UTC	11/4/14 3:01:28 PM UTC	Success
Preconfigure Management Repository		11/4/14 3:01:28 PM UTC	11/4/14
3:01:28 PM UTC Success			
Stop management server		11/4/14 3:01:28 PM UTC	11/4/14
3:03:03 PM UTC Success			
Configure Management Repository	11/4/14 3:03:03 PM UTC	11/4/14 3:05:02 PM UTC	Success
Configure middle tier		11/4/14 3:03:04 PM UTC	11/4/14
3:06:12 PM UTC Success			
OPSS jazn policy migration		11/4/14 3:06:15 PM UTC	11/4/14
3:06:28 PM UTC Success			
Register metadata		11/4/14 3:06:28 PM UTC	11/4/14
3:06:33 PM UTC Success			
Perform custom postconfiguration		11/4/14 3:06:33 PM UTC	11/4/14
3:06:33 PM UTC Success			
Update inventory	11/4/14 3:06:33 PM UTC	11/4/14 3:06:35 PM UTC	Success
Start management server	11/4/14 3:06:35 PM UTC	11/4/14 3:12:07 PM UTC	Success

# Roadmap

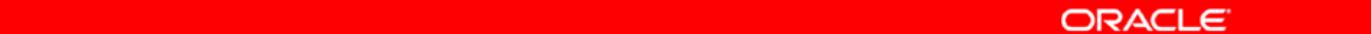
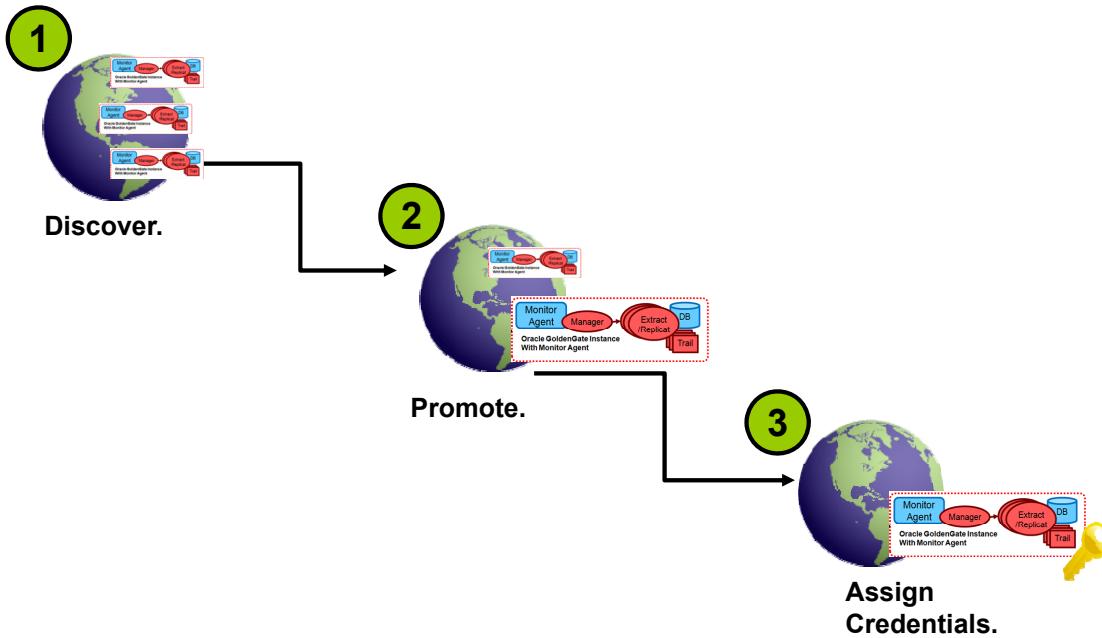
- Enterprise Manager Cloud Control
- EMCC and the GoldenGate Plug-In
- Discovering GoldenGate Instances



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# Discovering, Promoting, and Assigning Credentials



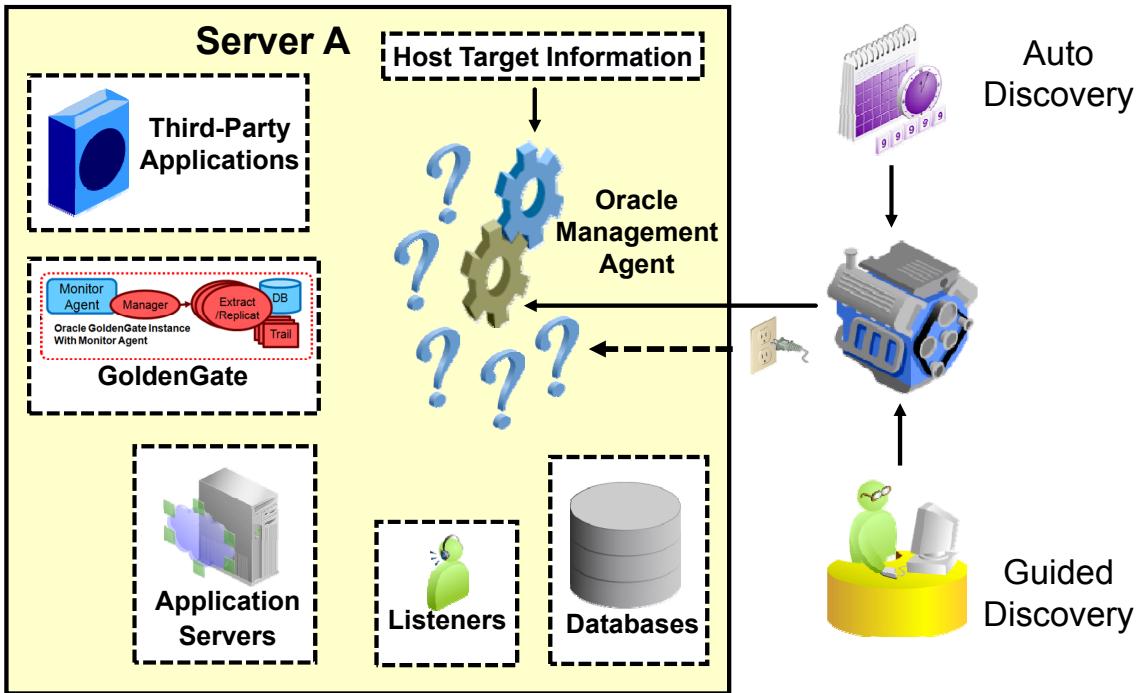
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After the GoldenGate JAgent instances are configured and started, and the plug-in is installed and deployed, GoldenGate targets may be added to the EM Console. Adding targets is a three-step process.

1. The targets must be found by using the discovery process.
2. After they are discovered, the targets are examined, and selected targets are promoted so that they may be viewed in the console.
3. Credentials are assigned to the targets so that they can be managed (started, stopped, and so on).

# Target Discovery



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After an agent is installed on a host, it needs to look for targets that it can manage. As a Cloud Control administrator, you can guide this process by using Cloud Control Console wizards. Guided discovery allows you to nominate a family of target types to search for, such as database and listeners, and then the agents where you want that search to be executed. When any new targets are discovered, the appropriate plug-in is pushed from the OMS if required, the target is recorded in the OMR, and monitoring commences.

You can also configure auto discovery to run at regular intervals and get agents to search for known targets unattended, allowing you to review the results at a later stage and promote discovered targets to become managed targets.

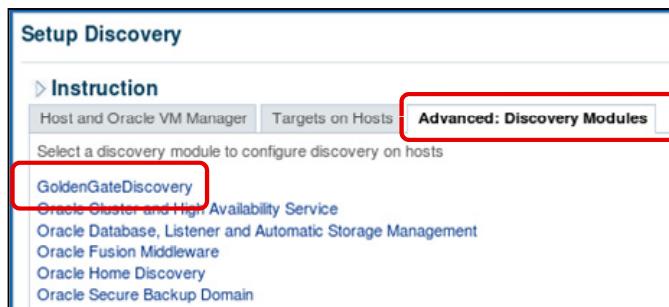
# Discovering GoldenGate Targets

## Configuring Targets

- 1 Log in to the EMCC console at <https://host:port/em>.
- 2 Select **Setup > Add Target > Configure Auto Discovery**.



- 3 Click the **Advanced: Discovery** tab.



- 4 Select **GoldenGate**.

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GoldenGate targets are discovered by using Advanced discovery. To discover GoldenGate targets, perform the following steps:

1. Log in to the EM Console.
2. Select **Setup > Add Target > Configure Auto Discovery**.
3. Click the **Advanced: Discovery Modules** tab.
4. Click **GoldenGate**.

# Discovering GoldenGate Targets

## Configuring Targets

5 Click Add.

The screenshot shows the Oracle Enterprise Manager (EM) console interface for the GoldenGateDiscovery module. At the top, there's a toolbar with buttons for View, Add (highlighted with a green circle), Edit Parameters, Remove, Detach, and Discovery Parameters. Below the toolbar, it says 'Agent Host Name' and 'No data found.' In the main area, there's a search panel with fields for Target Type (Host), Target Name, On Host, and Configuration Search. Below the search panel is a table with one row, which is highlighted with a red box. The table columns are Target Name, Target Type, On Host, and Status. The data in the table is:

Target Name	Target Type	On Host	Status
ogg.example.com	Host	ogg.example.com	Up

6 Select a target and click **Select**.

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There are a variety of ways to discover targets, including searching. See the EM console documentation for descriptions of discovery in general and specific discovery mechanisms.

# Discovering GoldenGate Targets

## Configuring Targets

- 7 For the newly added Target, click **Edit Parameters**.



- 8 Enter the appropriate connection information for discovering GoldenGate JAgents, and then click **OK**.



- 9 Click **OK**.



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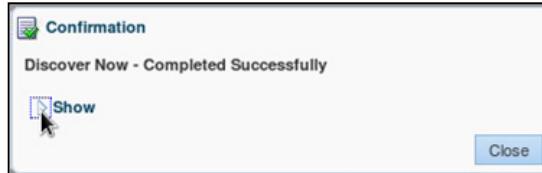
8. Configure the JAgent username, password, and port. When the target is added, click **OK**.

# Discovering GoldenGate Targets Forcing Discovery

- 1 Click the **Targets on Hosts** tab.

The screenshot shows the 'Setup Discovery' interface. The 'Instruction' section has the 'Targets on Hosts' tab selected, indicated by a red box. Below it, the 'Search' section shows an agent host named 'ogg.example.com' with a collection schedule of 'Every 1 Day'. A red box highlights the 'Discover Now' button, which is also highlighted with a red arrow pointing from the 'ogg.example.com' row.

- 2 Select a target and click **Discover Now**.
- 3 Close the Confirmation dialog box.



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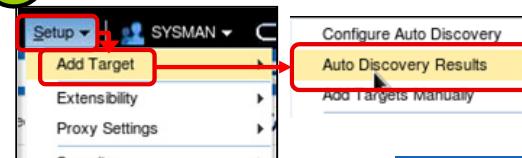
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After a target is specified, discovery happens based on a schedule. However, discovery can be started immediately by selecting a scheduled discovery and clicking **Discover Now**.

# Promoting Discovered Targets

## Reviewing Discovery Results

- 1 Select **Setup > Add Target > Auto Discovery Results.**



- 2 Click the **Targets On Hosts** tab.

- 3 Select a target and click **Promote**.

- 4 Add or remove individual subtargets and click **Promote**.

The screenshot shows the 'Auto Discovery Results' page with the 'Targets on Hosts (13)' tab selected. The interface includes a search bar and buttons for Promote, Rename, Delete, Ignore, and Detach. A table lists targets with their names and types. One target, 'ogg:10.150.30.78:5560', is highlighted with a red box and has a yellow background.

Target Name	Target Type
Farm_GCDomain GCDomain_ogg.example.com	Oracle WebLogic Domain
amer.us.oracle.com	Database Instance
euro.us.oracle.com	Database Instance
manager:10.150.30.78:5560:MGR	Oracle GoldenGate Manager
<b>ogg:10.150.30.78:5560</b>	<b>Oracle GoldenGate</b>
oggm.us.oracle.com	Database Instance
oggm_ogg.example.com	Database Instance
replicat:10.150.30.78:5560:REAST	Oracle GoldenGate Replicat
replicat:10.150.30.78:5560:READ	Oracle GoldenGate Replicat

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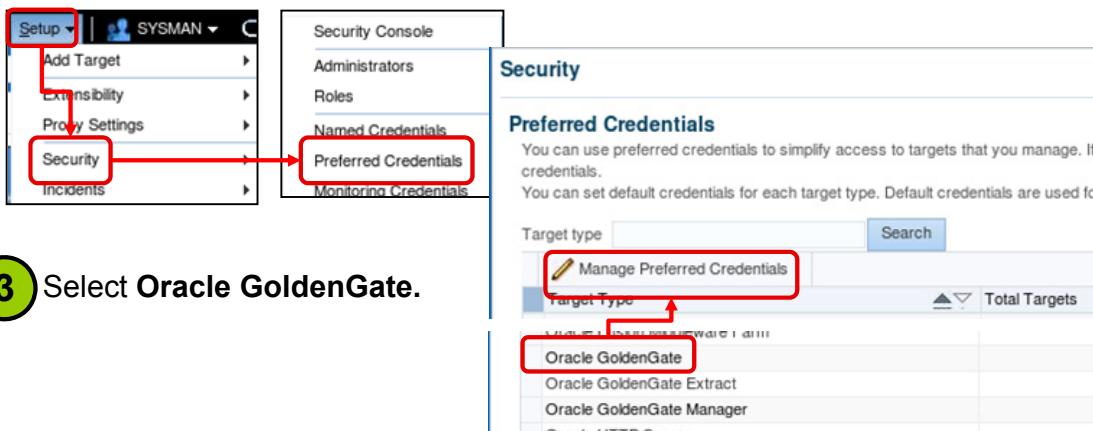
After they are discovered, targets must be promoted to use the management features of the EM Console. The newly discovered but not yet promoted targets are found on the Auto Discovery Results page. Select the page as described in the slide, select a specific target, and click Promote. In the example in the slide, the overall GoldenGate target and all its associated children are promoted. The final step of sub-setting child targets is not shown.

# Preferred Credentials

Preferred credentials grant access rights to OMS targets.

To grant preferred credentials, perform the following steps:

- 1 Log in to the EMCC console at <https://host:port/em>.
- 2 Choose **Setup > Security > Preferred Credentials**.



- 3 Select **Oracle GoldenGate**.

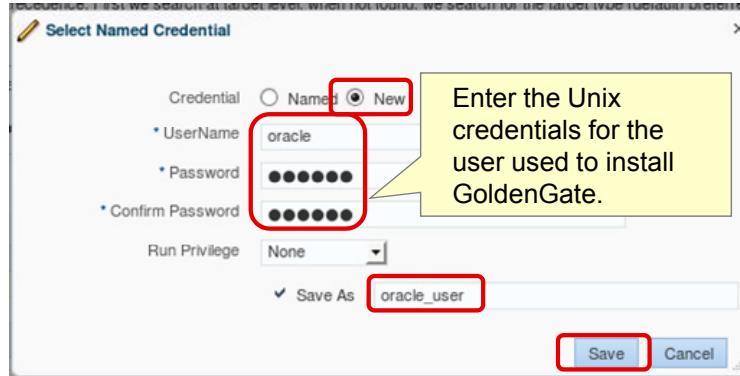
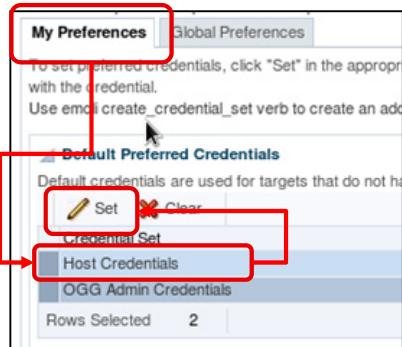
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Credentials are used to grant access rights to various OMS targets. GoldenGate operations such as start, stop, kill, and edit configuration are protected and require preferred credentials. Use the EM Console to grant preferred credentials as shown in the slide.

# Preferred Credentials Default Host Credentials

- 4 Click the **My Preference** tab.



- 4 Under Default, select **Host Credentials** and click **Set**.

- 5 Enter the credentials and click **Save**.

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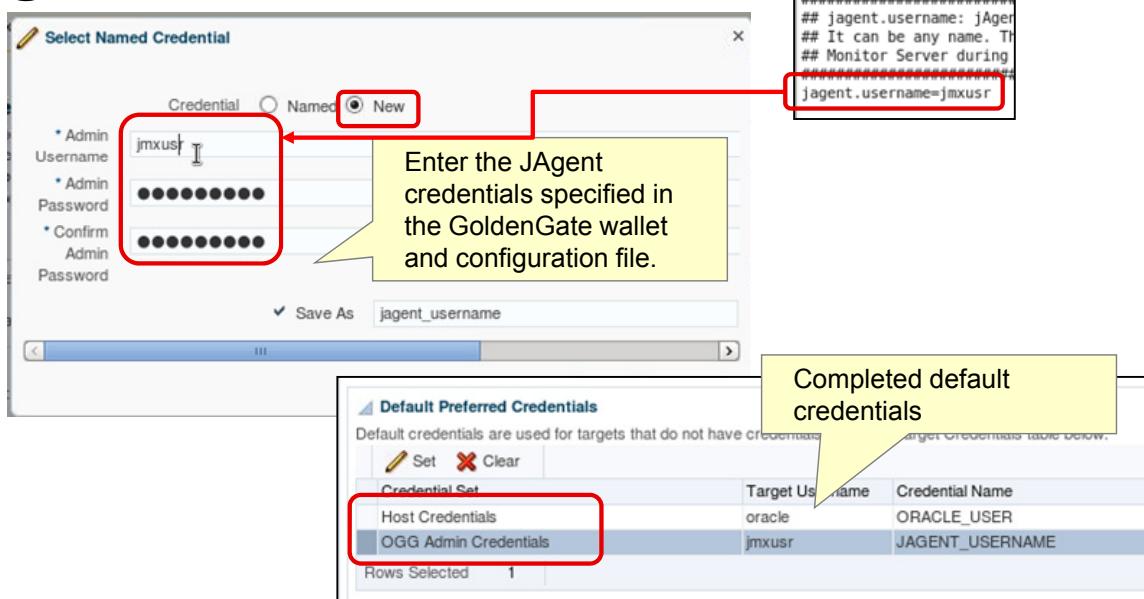
Both default and target preferred credentials are added. Host Credentials are used to access a specific host and should be entered as the user that was used to install GoldenGate. Enter a name to be used as an identifier for the credential set.

## Preferred Credentials

### Default OGG Admin Credentials

**6** Under Default, select **OGG Admin Credentials** and click **Set**.

**7** Enter the credentials and click **Save**.



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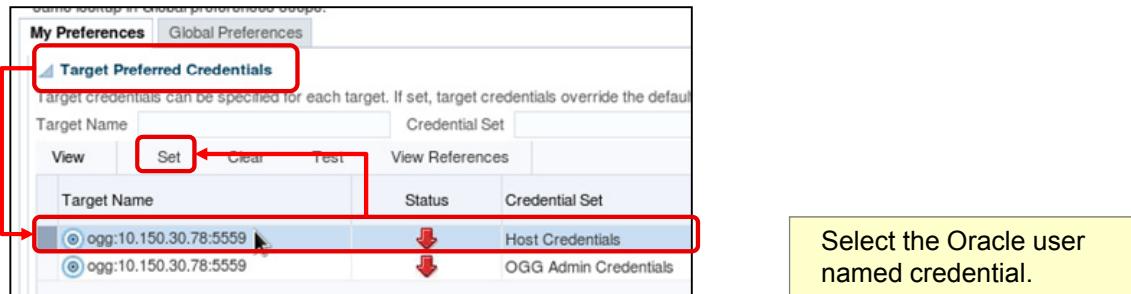
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OGG Admin Credentials are used to access the GoldenGate JMX JAgent and must match those defined in the JAgent's cfg/Config.properties file.

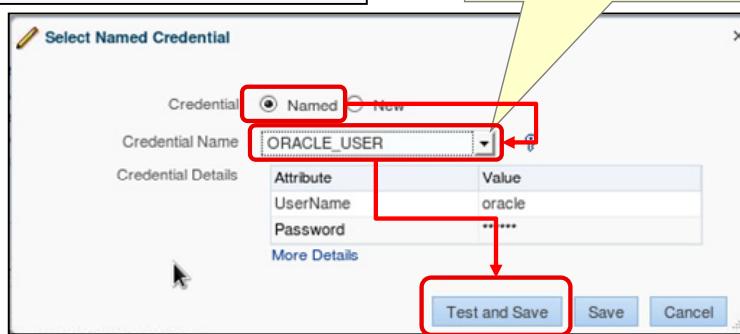
# Preferred Credentials

## Assigning Target Credentials Host

- 8** Under Target, select the **Host Credentials** row and click **Set**.



- 9** Select Named, select ORACLE\_USER, and then click **Test and Save**.



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Use the Target Preferred Credentials section to assign previously created credentials to known targets (Host to Host and OGG Admin to OGG Admin objects).

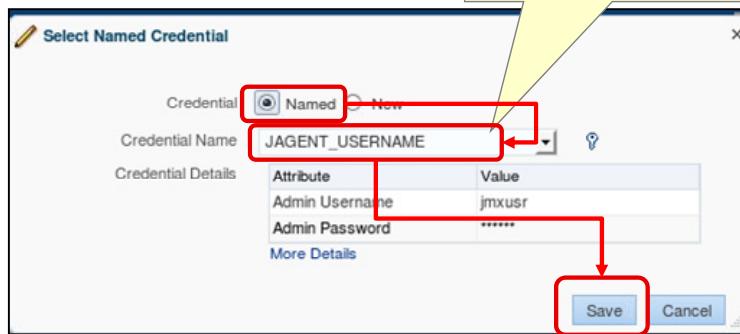
# Preferred Credentials

## Assigning Target Credentials Host

- 10** Under Target, select the **OGG Admin Credentials** row and click **Set**.

The screenshot shows the 'Target Preferred Credentials' section of the Oracle GoldenGate Management Pack. It includes a search bar, a 'View' dropdown, and a 'Set' button. Below is a table with columns 'Target Name', 'Status', and 'Credential Set'. Two rows are visible: 'ogg:10.150.30.78:5559' and 'OGG Admin Credentials'. A yellow callout points to the 'OGG Admin Credentials' row with the instruction: 'Select the Oracle user named credential.'

- 11** Select **Named**, select the JAgent user, and then click **Save**.



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As with Host Credentials, assign the previously created GoldenGate JAgent credentials to the OGG Admin Credentials object.

## Summary

In this lesson, you should have learned how to:

- Enumerate the components of the EMCC architecture
- Configure GoldenGate to run with EMCC
- Install, configure, and deploy the GoldenGate plug-in
- Discover and promote GoldenGate instances



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## Practice 7-1 Overview: Configuring GoldenGate to Support EMCC

This practice covers the following topics:

- Configuring Oracle GoldenGate Agent Wallet
- Configuring Oracle GoldenGate Agent to Interface with Enterprise Manager
- Importing the Oracle GoldenGate Plug-In into Enterprise Manager
- Deploying the Oracle GoldenGate Plug-In to a management server



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## Practice 7-2 Overview: Configuring, Discovering, and Promoting Instances

This practice covers the following topics:

- Discovering GoldenGate targets
- Promoting GoldenGate so that targets are trackable
- Assigning Target Credentials so that targets are fully manageable



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# Enterprise Management Cloud Control

8

## Managing GoldenGate Instances Using EMCC

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# Objectives

After completing this lesson, you should be able to:

- Enumerate GoldenGate plug-in management features
- Navigate GoldenGate targets
- Manage GoldenGate targets
- Create monitoring templates
- Enumerate notification concepts and processes

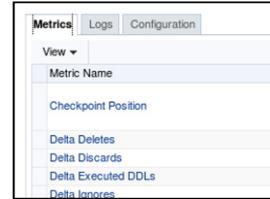
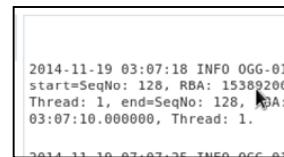


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## GoldenGate and EMCC Features

Enterprise Manager with the GoldenGate Plug-in supports:

- Instance management: Starting, stopping, and otherwise managing GoldenGate instances
- Logging and configuration: Viewing logs, discards, and editing configuration
- Access auditing: Logging operations such as start, stop, kill, view, and others
- Metrics: Various metrics on the extract, replicat, and manager processes



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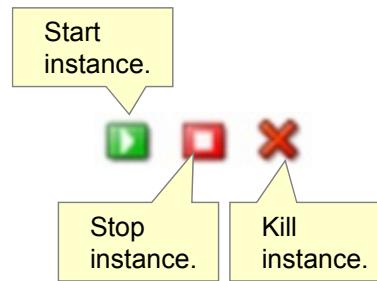
Oracle GoldenGate and Enterprise Manager provide a number of features and functions for managing GoldenGate sites, including:

- **Instance management:** Assuming later versions of the GoldenGate Core (12.1.2.1.0 and later), EMCC can start, stop, and kill GoldenGate processes.
- **Logging and configuration:** Again, assuming later versions of the GoldenGate Core, EMCC can view logs at a variety of levels (discards, the equivalent of **view report object**, and the GoldenGate general error log).
- **Access auditing:** EMCC can be configured to track access to GoldenGate operations such as starting and stopping instances. Such audit entries are added to the normal EMCC logs.
- **Metrics:** EMCC can track a variety of metrics associated with GoldenGate instances, similar to the metrics tracked with GoldenGate Monitor Server.

# Managing GoldenGate Instances

- 1 Log in to the EMCC console at <https://host:port/em>.
- 2 Choose **Targets > GoldenGate**.
- 3 Select a row and select an operation.

Oracle GoldenGate					
Status	All	Lag	All	Customize	
Target Name	Target Type	Status	Lag (Sec)	Lag Trend	Total Oper.
10.150.30.78:5559	Oracle GoldenGate	Down	1060	Up	1060
10.150.30.78:5560	Oracle GoldenGate	Down	1060	Up	1060
MGR	Manager	Up	0	Up	0
REAST	Replicat	Up	0	Up	1060
RELOAD	Replicat	Down	1060	Up	1060



- 4 Click Yes to complete the operation.



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GoldenGate instances can be managed via two different screens. From the GoldenGate targets list, you can select a row and select an operation. Additionally, you can manage instances via the Target details page, which is displayed when you click an instance name.

# Target Details

Target Details includes:

- Metrics: Details about the object by type
- Logs: Various logs, including process and overall
- Configuration: Contents of the associated .PRM file

The screenshot shows the Oracle GoldenGate Management Pack interface. A red box highlights the 'EWEST' row in a list of targets. A green circle labeled '1' points to this row. A yellow box labeled 'Details Displayed' points to a detailed view of the 'EWEST' target. A green circle labeled '2' points to this detailed view. The detailed view shows the following information:

Metric Name	Metric Value	Last Updated
Checkpoint Position	Current read position: Redo thread #: 1 Sequence #: 124 RBA: 23229440 Timestamp: 2014-11-18 16:51:21.000000 SCN: 0.3263463	Tue Nov 18 16:52:58 UTC 2014
Delta Deletes	0	Tue Nov 18 16:52:58 UTC 2014

At the bottom right of the interface is the ORACLE logo.

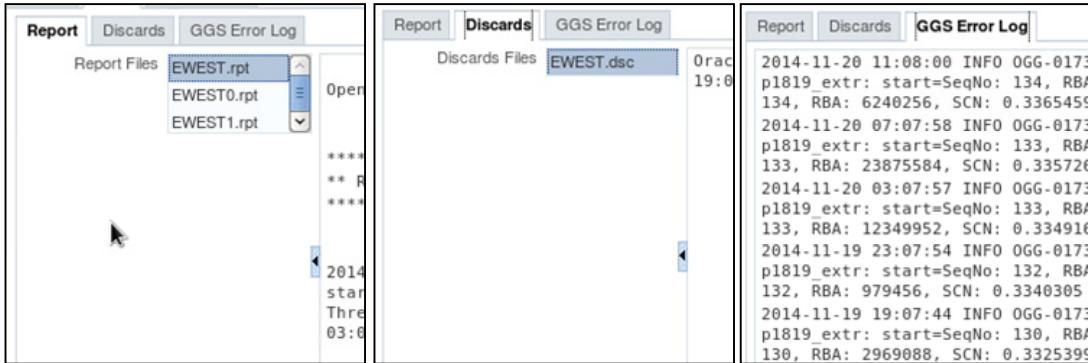
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Select any subtarget name and click it to see its details. Target Details includes three specific tabs:

- Metrics tab:** The metrics tab displays metrics that are common to the object selected, and supports content that is specific to the manager, extract, and replicat processes.
- Logs tab:** The logs tab contains up to three subtabs, information about the process, GoldenGate overall errors and log, and possibly information that is specific to the process (for example, discards).
- Configuration tab:** The configuration tab contains the contents of the associated object's .PRM file. This tab may be used to edit an object's configuration and save the changes. Be aware that changes to configuration files take effect only after the process has been restarted.

# Logging

- Is managed via the **Logs** tab
- Supports viewing process-specific logs, discards, and the global GoldenGate error log file



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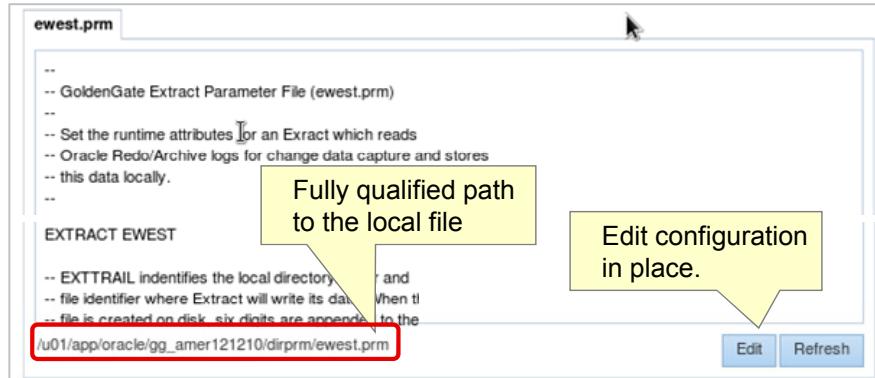
GoldenGate process logs can be viewed by clicking the Log tab of a specific GoldenGate object. Three specific subtabs are supported:

- **Report:** The Report tab allows operators to view the current and previously stored logs for each process. The tab defaults to showing the most recent report, but previous report files can be displayed by selecting their name in the Report Files list.
- **Discards:** The Discards tab shows GoldenGate discard information. On the lower-right corner of the Discards tab is the name of the file that is used to store discards (not shown).
- **GGS Error Log:** The error log tab shows the global GoldenGate Error log.

# Managing Configuration

## Configuration:

- Is managed via the **Configuration** tab
- Supports viewing, editing, and saving configuration changes



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Configuration for a given GoldenGate object can be managed by using the configuration tab. The tab shows the current contents of the associated PRM file, which can be changed as required. Changes to configuration are *not* applied until a process is restarted.

# Incident Rules and Notifications

## Incident Rules:

- Define unusual or unexpected incidents or problems
- Can be by target, group of targets, or based on template
- Are defined by using monitoring templates

## Notifications:

- Notifies administrators about incidents and problems
- Supports GUI, Email, CLI, SNMP, and other forms of notification

Monitoring-based incidents are delivered by using Notification mechanisms.



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Enterprise Manager Cloud Control support incidents rather than Oracle GoldenGate Monitor alerts. EMCC incidents are similar conceptually to OGG alerts but are defined and configured differently.

*Incident rules* define criteria that are used to raise fatal, critical, or warning level incidents, which can then be forwarded by using a variety of notification mechanisms.

*Notifications* define how incidents are delivered and support email, SNMP, command-line applications, and other mechanisms.

# Monitoring Templates

- Standardize monitoring settings
- Define all parameters required to monitor a target
- Use metrics to determine monitoring thresholds
- Can be applied to target types, groups of targets, or specific targets
- Can apply *corrective action* against targets that raise issues



The screenshot shows a software interface for managing monitoring templates. At the top, there's a toolbar with buttons for Actions (dropdown), View (dropdown), Create, Edit, Delete..., Apply..., Compare Settings..., and View Past Apply Operations... (highlighted in blue). Below the toolbar is a table with the following columns: Name, Target Type, Owner, and Status (Pending, Failed, Aborted). There are two rows of data:

Name	Target Type	Owner	Status
			Pending Failed Aborted
OGG_Extract_MT	Oracle GoldenGate Extract	SYSMAN	0 0 0
OGG_Instance_Down	Oracle GoldenGate	SYSMAN	0 0 0

A description column is visible on the right side of the table.

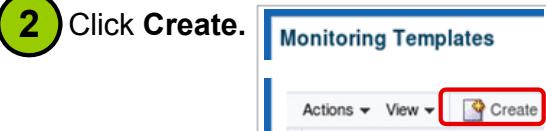
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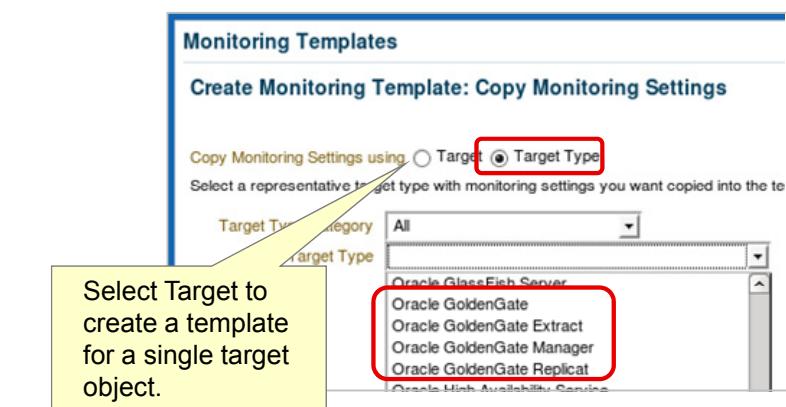
Monitoring templates are used to define incident rules. Monitoring templates can be applied to a single target, groups of targets, or classes of target objects. For example, a template can be defined that applies to all GoldenGate extracts. Monitoring templates are based on one or more metrics, which can be used to both raise an incident, as well as to execute corrective action. For example, a template could be created, which when it discovers that an extract is down executes an OS-level command or script to restart the extract. After they are defined, monitoring templates raise incidents as problems occur, which can then be forwarded via email, SNMP, or other mechanisms.

# Defining Monitoring Templates

**1** Choose Enterprise > Monitoring > Monitoring Templates.



**2** Click **Create**.



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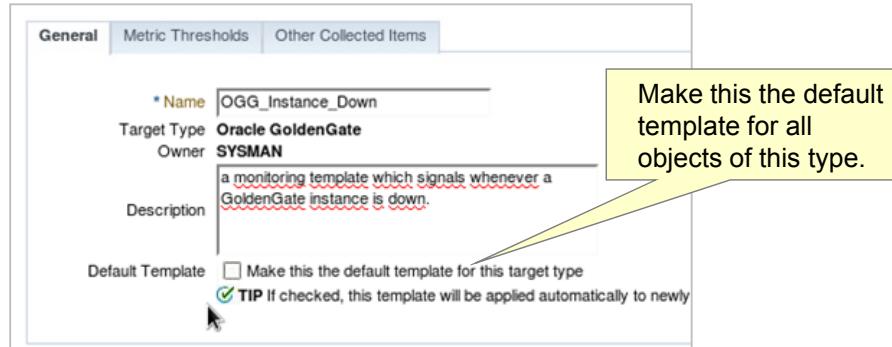
Monitoring templates are a way to apply the same monitoring to a variety of targets. To create a monitoring template, perform the following:

0. Log in to EM Console (not shown).
1. Select Enterprise > Monitoring > Monitoring Templates.
2. Click Create.
3. Select Target Type, and then from the Target Types list, select one of the Oracle GoldenGate target types. Click **Continue**.

# Defining Monitoring Templates

4

- Click the **General** tab and enter a name and an optional description.



5

- Select the **Metrics** tab and select metrics to be monitored



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4. Click the **General** tab and enter a name and description (optional) for the monitoring template. The Default Template check box should be selected if the monitoring template is intended to be used by all objects of a given type. For example, having a GoldenGate instance down default template would be a reasonable approach for all objects.
5. Click the **Metrics** tab. Metrics are the heart of the template and define the conditions on which notifications are generated. Metrics are divided into different categories. Metric classes are: all, metrics with thresholds, metrics with adaptive thresholds, and time-based metrics.

# Selecting Metrics

## Metrics:

- Are the basis of a monitoring template
- Vary by object type selected

6 Select and configure specific metrics.

The screenshot shows the Oracle GoldenGate Management Pack interface. The 'Metric Thresholds' tab is selected. In the 'Metric' column, 'OGG\_Extract\_MT' is expanded, showing 'Extract' and 'Response' metrics. 'Extract' is collapsed, indicated by a minus sign. 'Status' is also listed. A red box highlights the 'OGG\_Extract\_MT' row. A yellow callout box points to the 'Extract' row with the text 'Extract specific metrics.'. Another yellow callout box points to the 'Response' row with the text 'Response is common to all GoldenGate objects.'. A tip at the bottom left of the grid area says 'TIP Empty Thresholds will disable alerts for that metric'.

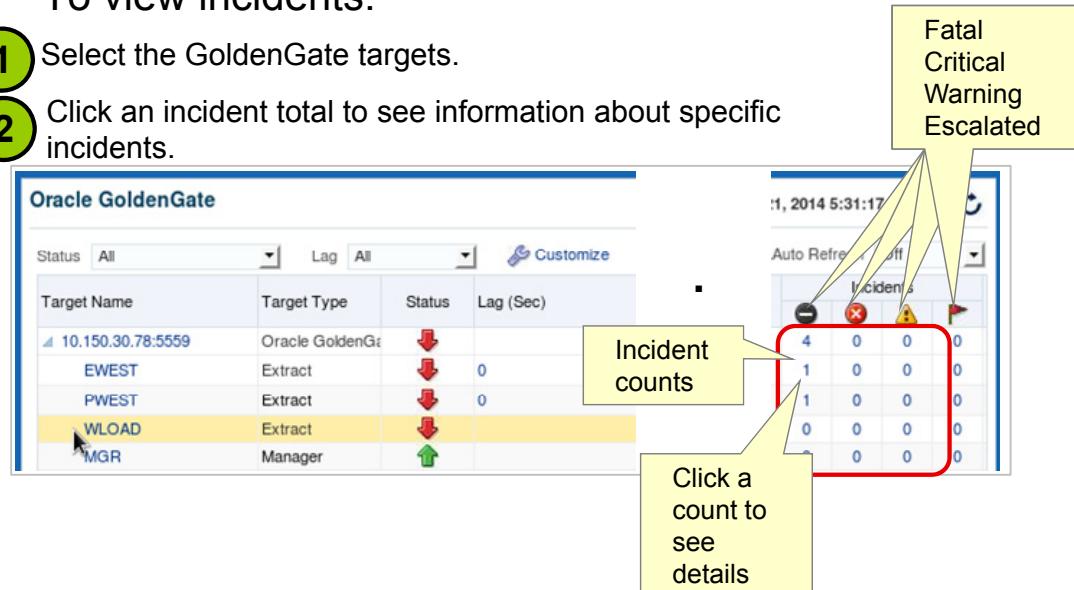
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Metrics are lists of values associated with objects and object types, which can have values and are typed—for example, string, integer, and so on. For a given object type, the metrics are listed and can be selected for monitoring. Shown in the slide are common and extract-specific metrics. Extract is shown collapsed in the slide. Response metrics are common to all GoldenGate objects. Select a metric, configure it by using the Pencil icon, and click Ok.

# Viewing Incidents

- After monitoring templates are defined, incidents can be raised.
- To view incidents:
  - 1 Select the GoldenGate targets.
  - 2 Click an incident total to see information about specific incidents.



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After monitoring templates are defined, incidents are raised and can be examined. Select the GoldenGate targets, and then a specific incident count to view all the incidents raised for that count. Incidents come in four types, based on their definition: fatal, critical, warning, and escalated.

# Notifications

The EMCC notification system:

- Notifies administrators about incidents and problems
- Supports GUI, Email, CLI, SNMP, and other forms of notification

## Notification Methods

Notification Methods allow you to globally define different mechanisms for sending notifications. These include Notification Methods are used by Incident Rules to send notifications to administrators for events, incidents, or

### Mail Server

Enterprise Manager requires the following information to send email notifications by means of Incident Rules.

## Scripts and SNMPv1 Traps

Before Enterprise Manager can send notifications by means of OS commands, PL/SQL procedures, or SNMP, use these methods in Incident Rules.

 For sending notifications by means of SNMPv3 traps, go to [SNMPv3 traps page](#).

Name	Type
No notification methods found.	

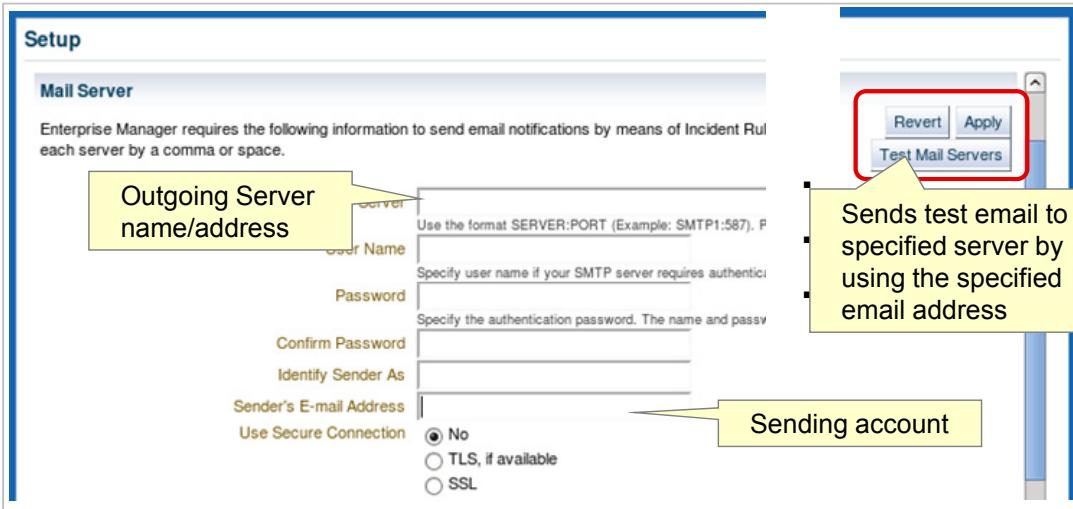
**TIP** Remember to create Incident Rules in order to send notifications by means of these methods.

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# Configuring Email Notifications

- 1 Select **Setup > Notifications > Notification Methods**.
- 2 In the Setup window, configure the email server details.
- 3 Click **Apply**.



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Configuring email requires three steps:

1. Select **Setup > Notification > Notification Methods**.
2. Enter Mail Server details. The minimum required details are outgoing server name, which uses the default port 25 and Sender's E-mail Address.
3. Click **Apply** to apply the changes.

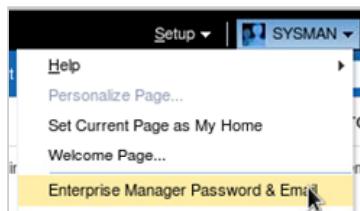
You may use the **Test Mail Servers** button to send a test email from EMCC to the mail server. The test message is sent to the email address specified in the Sender's E-mail Address field.

# Configuring Email Notifications

To receive email incident reports, perform the following:

1. Define email addresses.
2. Set up a Notification Schedule.
3. Subscribe to incident rules.

- 1** Select **Username > Enterprise Manager Password & Email**.



**E-mail Addresses**  
These addresses are used to send notifications to you. You can specify multiple addresses if you want to be notified of incidents. You can also define a Notification Schedule before any e-mail notifications can be sent to you.

Select	E-mail Address	Email Type (Message Format)
<input checked="" type="checkbox"/>	oracle@example.com	Email (Long) ▾
<a href="#">Add Another Row</a>		Email (Long) Email (Short) Pager (Short)

**TIP** Refer to on-line help for message format sample.

- 2** Enter one or more emails and formats.

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The first step in receiving email notifications is to define one or more email addresses to receive email. To define these email addresses, perform the following:

1. Select *Username > Enterprise Manager Password & Email*.
2. Add one or more rows, defining the email address for a given set of users. Notice that you can select one of many formats: long email, short email, and short pager. You may enter several email addresses and select the notification style and size by using the Message format.
3. Click *Apply* when you have completed.

# Notification Schedule

- Specify user on-call schedules
- Are used by Enterprise Manager to send notifications
- Are one-to-one with users

- 1 Select **Setup > Notifications> My Notification.**
- 2 Modify the schedule to represent the users on-call.

The screenshot shows the 'Setup' section of the Oracle Enterprise Manager interface. Under 'Notification Schedule', it says: 'You need to set up your notification schedule in order to receive e-mail notifications for alerts. For example, you can use this screen to define which users receive notifications for specific alert types.' Below this is a grid table with three columns representing dates: Nov 24, 2014 (Monday), Nov 25, 2014 (Tuesday), and Nov 26, 2014 (Wednesday). The grid has four rows representing time intervals: 12:00 am - 1:00 am, 1:00 am - 2:00 am, 2:00 am - 3:00 am, and 3:00 am - 4:00 am. Each cell contains an email address: 'sysman@example...'. A cursor arrow is pointing at the top-left corner of the grid.

	Nov 24, 2014 Monday	Nov 25, 2014 Tuesday	Nov 26, 2014 Wednesday
12:00 am - 1:00 am	sysman@example...	sysman@example...	sysman@example...
1:00 am - 2:00 am	sysman@example...	sysman@example...	sysman@example...
2:00 am - 3:00 am	sysman@example...	sysman@example...	sysman@example...
3:00 am - 4:00 am	sysman@example...	sysman@example...	sysman@example...

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Notifications schedules define which users should receive what emails based on a known schedule. Complete coverage of notification schedules is beyond the scope of this course. However, these schedules can be entered by performing the following:

1. Select **Setup > Notifications > My Notifications.**
2. Modify the schedule to reflect a given users on-call hours.

# Incident Rules

Incident rules:

- Are user-defined rules
- Specify the criteria by which notifications are sent
- Are specific to a given incident type

- 1 Select **Setup > Incidents > Incident Rules**.
- 2 Select an existing rule set or click **Create Rule Set** to create a new rule set.

Incident rule sets consist of one or more rules associated with the same incident.



- 3 Name the rule set and create appropriate definitions for sending notifications.

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An incident rule is a user-defined rule that specifies the criteria by which notifications should be sent for the specific events that make up the incident. An incident rule set, as the name implies, consists of one or more rules associated with the same incident.

When creating an incident rule, you specify criteria such as the targets you are interested in and the types of events to which you want the rule to apply. Specifically, for a given rule, you can specify the criteria you are interested in and the notification methods (such as email) that should be used for sending these notifications. For example, you can set up a rule that when any database goes down or any database backup job fails, an email should be sent and the “log trouble ticket” notification method should be called. Or you can define another rule such that when the CPU or Memory Utilization of any host reaches critical severities, SNMP traps should be sent to another management console.

Notification flexibility is further enhanced by the fact that with a single rule, you can perform multiple actions based on specific conditions. For example: When monitoring a condition such as machine memory utilization, for an incident severity of “warning” (memory utilization at 80%), send the administrator an email; if the severity is “critical” (memory utilization at 99%), page the administrator immediately.

## Summary

In this lesson, you should have learned how to:

- Enumerate GoldenGate plug-in management features
- Navigate GoldenGate targets
- Manage GoldenGate targets
- Create monitoring templates
- Enumerate notification concepts and processes



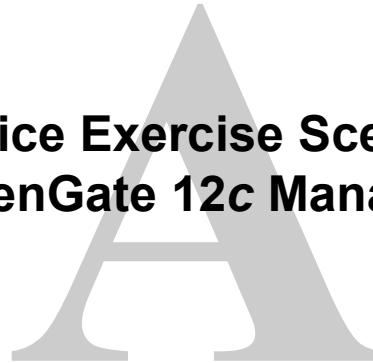
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# **Practice Exercise Scenarios**

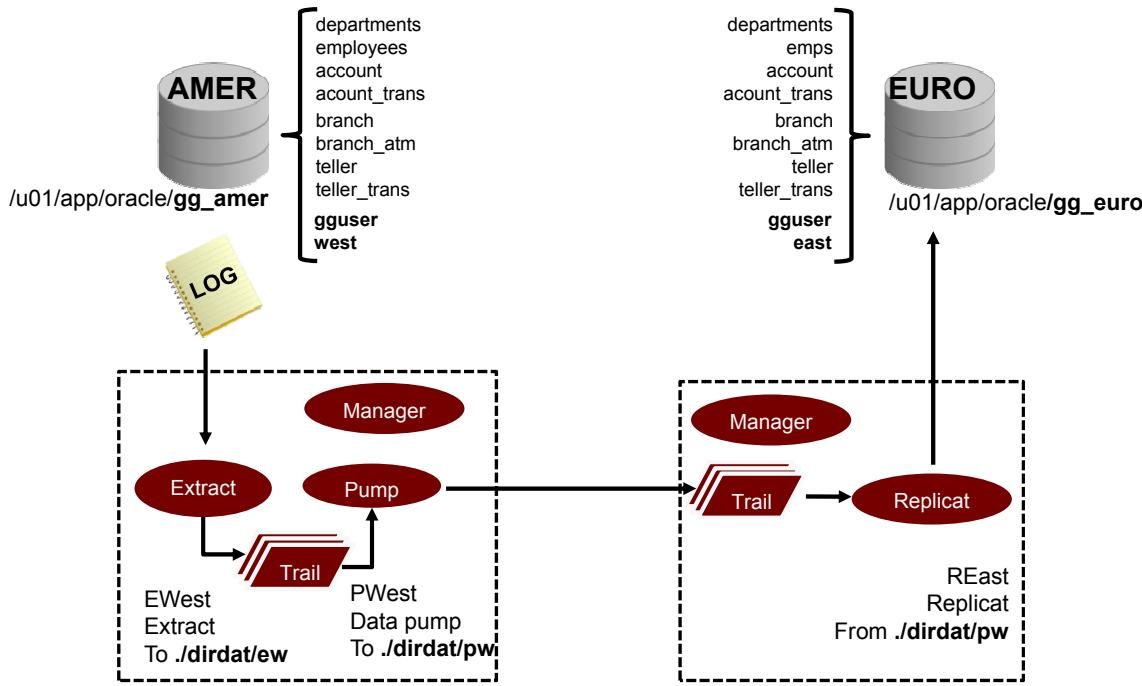
## **Oracle GoldenGate 12c Management Pack**



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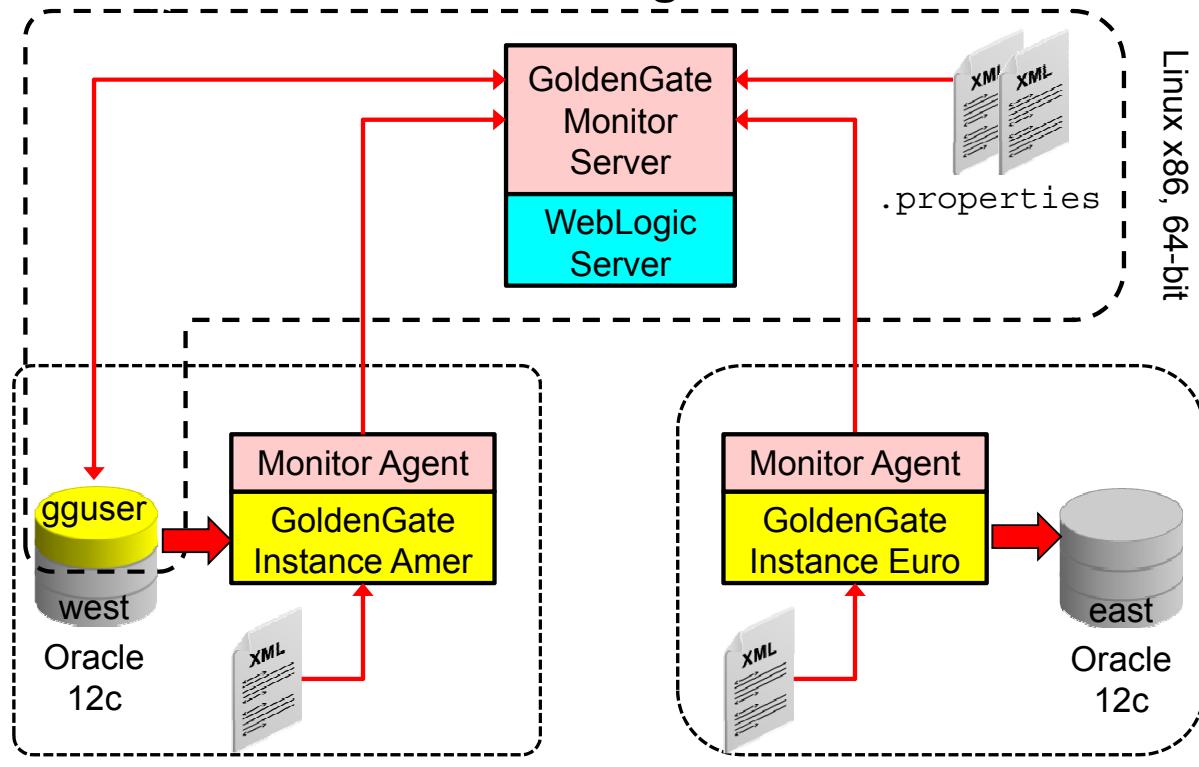
## Classroom Scenario



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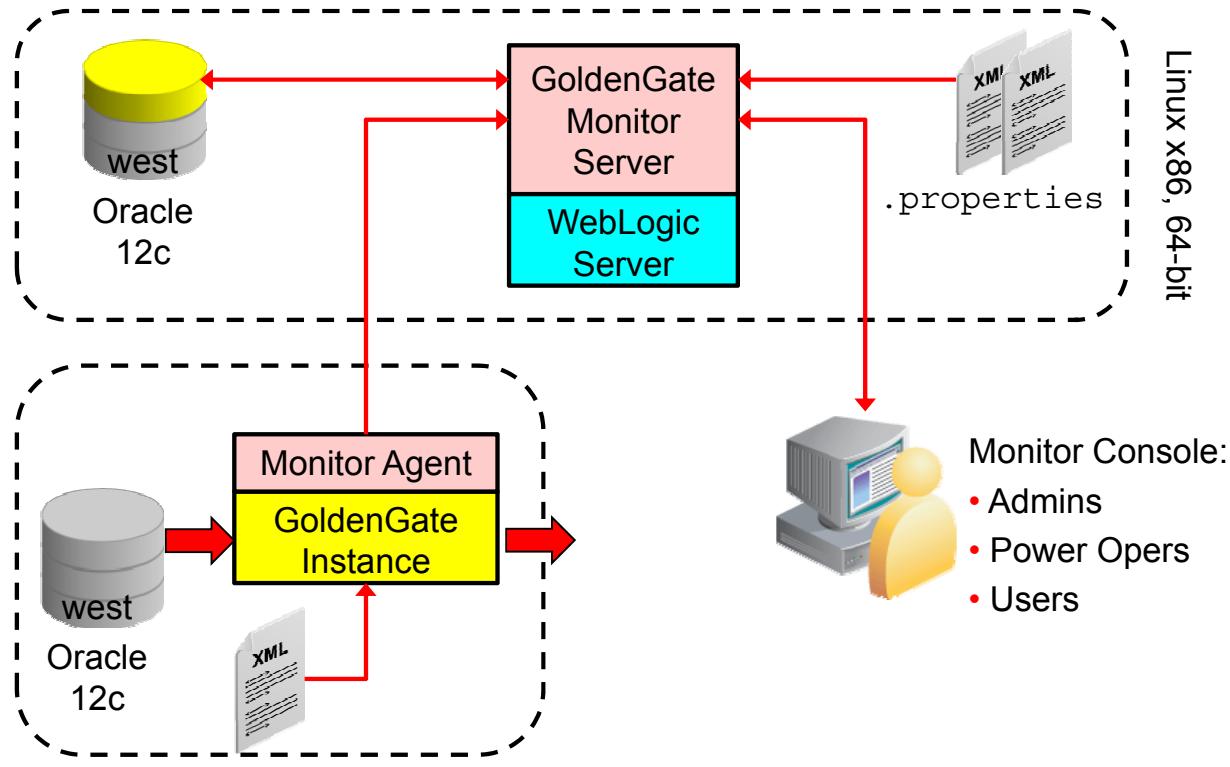
## Scenario Practice 4: Install and Configure Monitor



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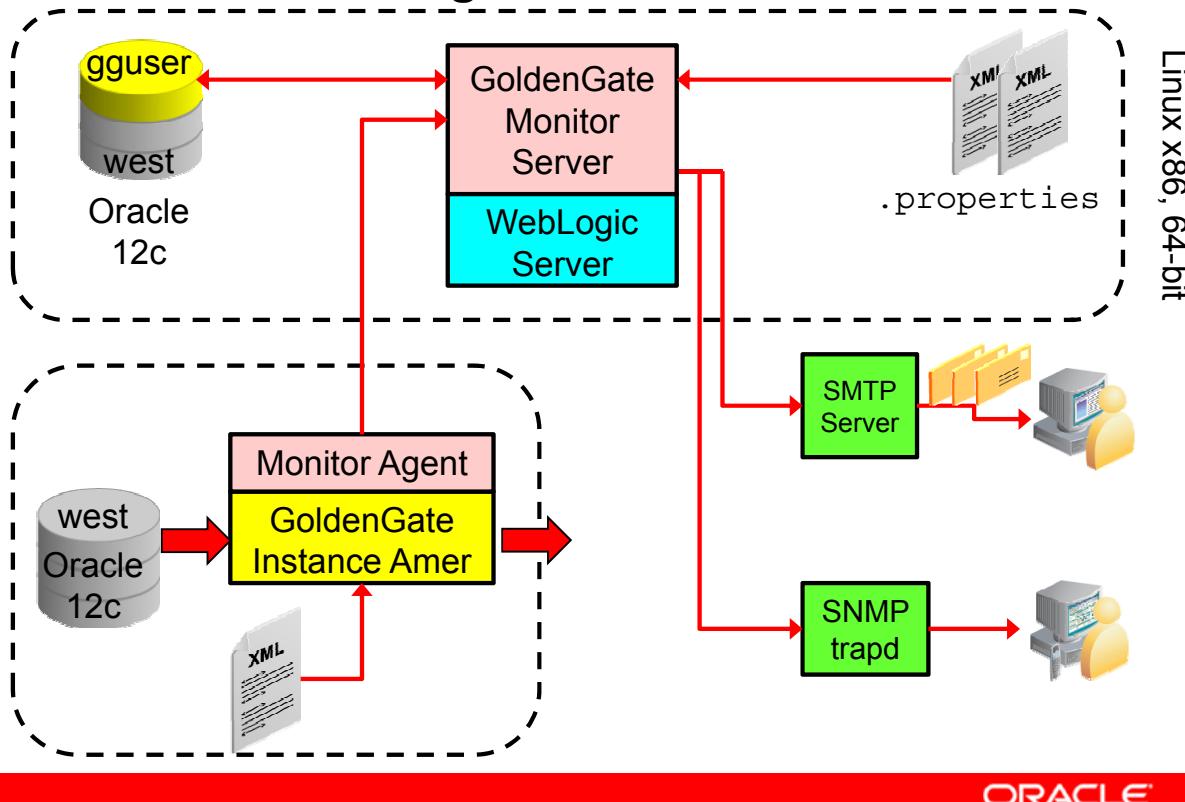
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## Scenario Practice 4: Monitor Statistics and Alerts



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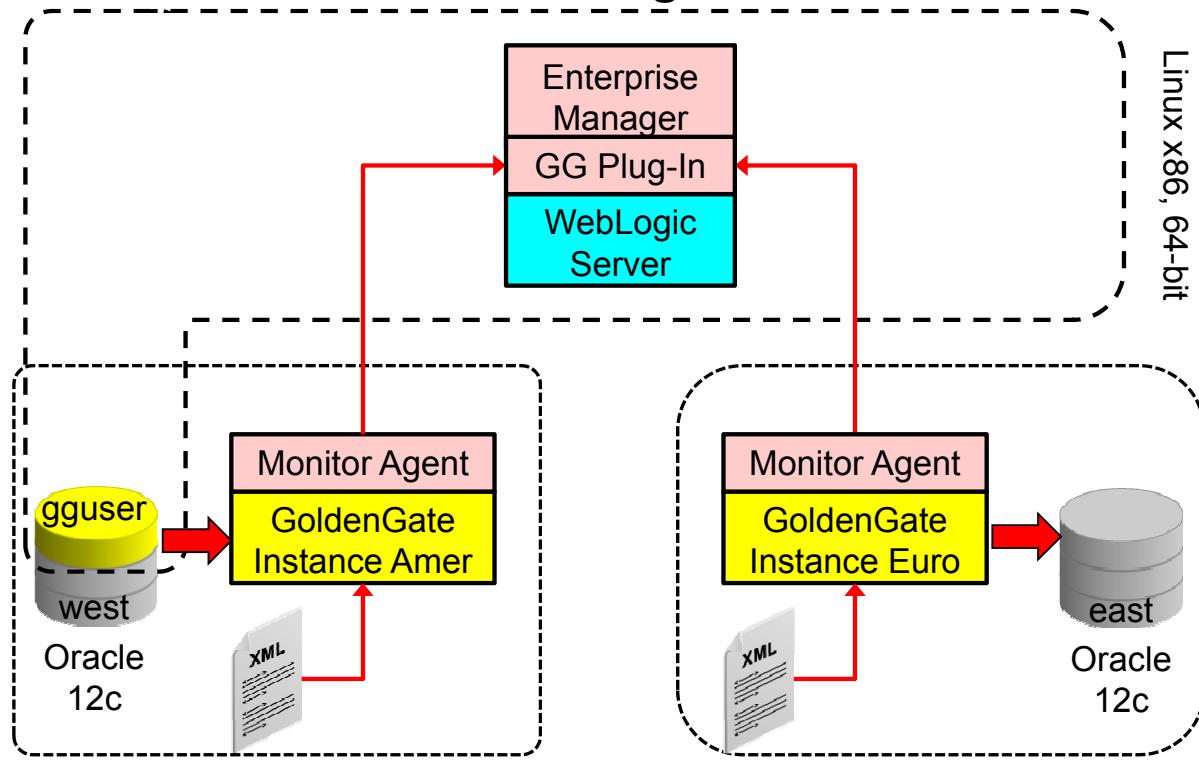
## Scenario Practice 6: Monitor Sending Alerts via SNMP and SMTP



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## Scenario Practice 7: Install and Configure Monitor



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