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# Managing Oracle WebLogic Server with Oracle Enterprise Manager Cloud Control 12c

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## Executive Overview

Oracle Enterprise Manager Cloud Control 12c is Oracle's integrated enterprise IT management product line and provides the industry's first complete cloud lifecycle management solution. Oracle Enterprise Manager's Business-Driven IT Management capabilities allow you to quickly set up, manage and support enterprise clouds and traditional Oracle IT environments from applications to disk. Enterprise Manager allows customers to achieve:

- Best service levels for traditional and cloud applications through management from a business perspective including Oracle Fusion Applications
- Maximum return on IT management investment through the best solutions for intelligent management of the Oracle stack and engineered systems
- Unmatched customer support experience through real-time integration of Oracle's knowledge base with each customer environment

## Introduction

Managing Oracle WebLogic Server – the core of your Oracle Fusion Middleware deployments – requires a broad end-to-end monitoring and management perspective as these application servers routinely are not only providing the external face of applications, but also handling the majority of their business logic. This often translates to IT organizations having multiple clusters of managed servers handling both presentation and business logic, as well as communicating with each other via RMI, Web Services, and other remote invocations in order to complete transactions for front-end processes. In order to properly manage these WebLogic environments, administrators need to keep track of performance, service levels, configurations, error/exception handling, patches, and general application life cycle activities such as scale out, cloning, or Java EE application provisioning.

Historically, many WebLogic application administrators attempt to manage and monitor these environments via command-line scripts such as the WebLogic Scripting Tool (WLST) or other APIs exposed by WebLogic. Using such scripting languages requires specialists who understand the language and who can spend time writing and maintaining these scripts. While these scripts can monitor and manage portions of the middleware architecture and

deployments, they do so with limited visibility and significant gaps in overall management and diagnostics. To properly manage the WebLogic environment, administrators require a more comprehensive, end-to-end management solution than what scripting tools can provide. Oracle offers such a solution via a single management console – Oracle Enterprise Manager Cloud Control 12c. This white paper describes how administrators can use Oracle Enterprise Manager Cloud Control Console 12c to effectively and efficiently manage Oracle WebLogic Server.

## Monitoring and Diagnostics

After adding your WebLogic Domains as managed targets to the console, Oracle Enterprise Manager immediately starts monitoring the environment with a predefined set of status and performance metrics. These metrics span WebLogic Servers, their deployed applications, and resources such as server data sources and JMS as well as any Fusion Middleware components, Coherence Clusters, or Exalogic deployed on those domains. Administrators can monitor these performance metrics in real-time or historically from various customizable performance summary pages within the console.



Figure 1. Customizable performance summary pages allow administrators to create their own dashboards in Oracle Enterprise Manager Cloud Control 12c

## Comprehensive System Monitoring and Notifications

Oracle Enterprise Manager includes a comprehensive set of monitoring and notification features to enable administrators to proactively detect and respond to potential IT problems across their entire

application stack. While Oracle Enterprise Manager provides out-of-box monitoring for newly discovered WebLogic targets, administrators can customize these monitoring settings to meet their unique data center needs. A common customization of these predefined monitoring settings includes configuring monitoring of specific log files associated with WebLogic Server as well as application deployment targets, such that when certain patterns are found in the log files, alert notifications are raised. Another common customization of the default monitoring settings is to specify critical and warning thresholds for the metrics being monitored. Easy access to a target's performance history is provided and enables administrators to determine appropriate threshold values based on the range of past performance data.

If there are conditions unique to the application or data center that need to be monitored, administrators can define new metrics for any target using metric extensions. If any alert has a well-known remediation solution, then administrators can configure corrective actions that, for example, could automatically execute a script in order to resolve the alert immediately after its detection, thereby eliminating the need for manual intervention. Alert history is also easily accessible to enable administrators to see what actions have been taken in previous occurrences of the alert.

To ensure consistent monitoring across the environment, administrators can edit and apply out-of-box monitoring templates to their WebLogic related targets. Doing so enables administrators to specify metric settings and configuration collection settings once and apply those settings across multiple targets in a single operation. When a set of monitoring templates for different target types are bundled together into a template collection and associated with an administration group, then the deployment of monitoring settings across targets is fully automated by Oracle Enterprise Manager. For example, whenever a WebLogic Server or Application Deployment target is added to an existing administration group, the monitoring settings associated with the group are automatically applied to the added targets, thereby streamlining and simplifying the process of monitoring setup for targets.

Once monitoring is in place and events are detected and raised on monitored targets, notifications for these events can be sent to the appropriate administrators. Notifications include email and/or page notifications, the execution of custom scripts, and the sending of SNMP traps. In addition, management connectors can also be used to open helpdesk tickets for incidents (based on important events) and/or send event information to other third party management systems. Finally, to support planned maintenance periods on targets, a blackout capability is provided to enable administrators to temporarily suspend monitoring of targets and prevent false alerts from being raised during the maintenance period.

## Composite Application Dashboard

The Composite Application dashboard in Oracle Enterprise Manager provides full visibility into both service-level metrics as well as critical component-level metrics across any composite application. As composite applications are routinely composed of both Java EE and SOA components as well as other key middleware technologies such as Oracle Coherence, Oracle Service Bus, and the database, it is critical to provide a single dashboard view across the application with key indicators of the application health as well as some quick diagnostics to identify bottlenecks in a proactive fashion.

Service tests can be setup to create synthetic transactions to supplement the proactive monitoring of the composite application with service levels tracking the health of those service tests. JVM, WebLogic Server, Application Deployments, and Host metrics are available at a glance along with an incident console tracking all of the alerts or violations to compliance rules that might occur on those tiers. Finally, the dashboard can be customized to include a wide range of specialized regions spanning many target types.

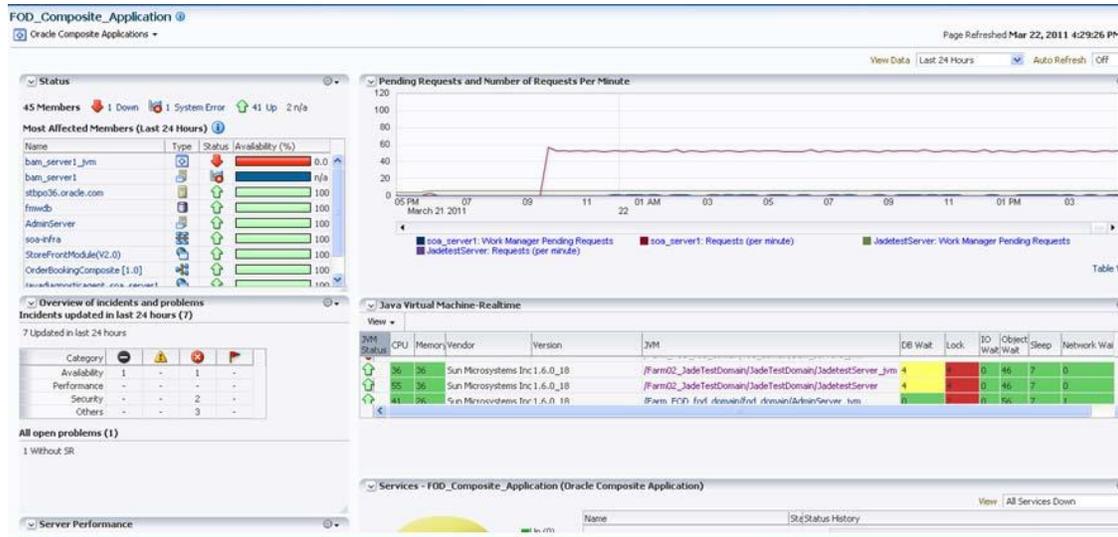


Figure 2. Full visibility of all components, tiers, and services across your Composite Application which is routinely composed of multi-tier components.

### Middleware Diagnostics Advisor

The Middleware Diagnostics Advisor (MDA) feature in Oracle Enterprise Manager combines full stack analysis of the dependencies among components, configuration of those components, and the components' performance metric data (both historical and real-time) in order to provide diagnostic findings. MDA enables you to easily identify the underlying states in the application server environment that are the causes for degradation in performance. These underlying states can manifest themselves as degradation in performance such as slow response time for a request, hung server, slow server, high memory utilization, and high disk I/O. MDA analyses the overall performance of an aspect in a runtime environment. When the overall performance of the aspect degrades beyond a certain limit, MDA diagnoses the issue to find the underlying cause. However, individual one-off issues which do not affect the overall performance are not isolated by MDA. MDA diagnoses performances issues in the following areas:

JDBC findings:

- Checks if the SQL execution takes a long time.
- Checks if the JDBC Pool size is small and if the wait time for connections is high.
- Checks if reclaimed connections are found for a data source and if the effective pool size is small.

JMS findings:

- Checks if the message processing is slow.
- Checks if the number of messages reprocessed due to transaction timeout is high.
- Checks if the number of messages reprocessed due to transaction rollback is high
- Checks if the message delivery is delayed.
- Checks if the queue slowed down due to a large number of messages.
- Checks if the queue slowed down due to a large size of messages.

EJB findings:

- Checks if the remote call made by the EJB takes too long to return.
- Checks if the EJB takes too long to execute.

Thread findings:

- Checks if there are locks that are being waited on by other threads.

For example, if you were to analyze a server that showed that the request processing time for the front end JSP/Servlet page requests was increasing to a point that the warning or critical threshold was being violated as well as an increase in key data source metrics such as the JDBC connection pool wait success percentage, metrics would automatically be correlated. The actual JDBC connection pool size and database configuration would then be used to determine whether a diagnostic finding should be generated recommending that the JDBC connection pool size needs to be increased in regards to a particular data source. In the diagnostic finding detail, a link will also be provided directly to resolve the configuration quickly for the inflicted WebLogic Domain. These and other key findings related to common issues like EJB behavior and thread lock speed up the overall time to resolution in order to ensure operational teams can easily maintain service levels for critical business applications.



Figure 3. Middleware Diagnostics Advisor SQL execution diagnostic finding provides a detailed analysis of slow SQL impacting your application with links to further analyze and tune the SQL

## JVM Diagnostics

Oracle Enterprise Manager provides deep diagnostics for any JVM within the application infrastructure providing immediate insight into actual thread stack or other common JVM issues. Oracle Enterprise Manager’s deep diagnostic capability operates at a native level, which makes it possible to have extremely low performance overhead (<1%) making it suitable for 24/7 real-time production diagnostics.

### Cross-tier Diagnostics

Oracle Enterprise Manager correlates Java threads to database sessions (and vice versa) making it possible to do cross-tier analysis from the application administrator, developer, and DBA perspectives. Administrators can find the status and call stack of all active threads in the JVM. They can also see the threads in context of a user request. If a particular thread is waiting for a database lock, administrators can find the java code line the thread is stuck in, the SQL the thread is trying to run and the SQL that resulted in the table lock. Database administrators can take necessary steps to release the table lock and the stuck thread will then continue to run. Without such native monitoring capability, it may take hours or days to figure out where exactly the problem is and by that time administrators would lose the execution context.

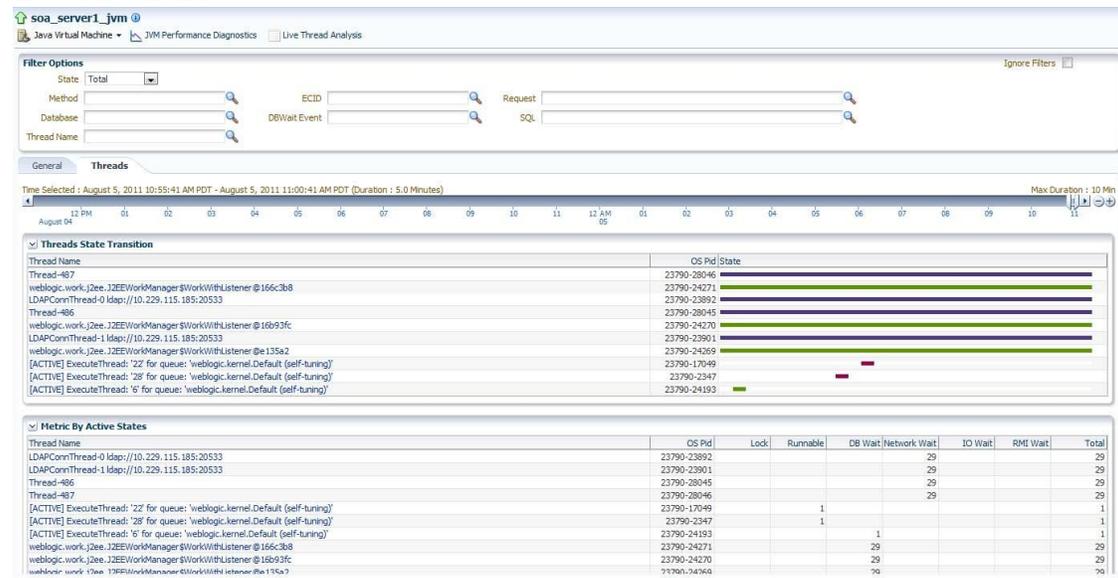


Figure 4. Find cross-tier issues using Oracle Enterprise Manager’s JVM Diagnostics

### Differential Heap Analysis

Using Oracle Enterprise Manager, administrators can take heap dumps and analyze the classes for memory consumption. Administrators can easily perform differential heap analysis of heap dumps taken at two different times. Oracle Enterprise Manager quickly pinpoints the cause of memory leaks by showing the classes and their fields that have grown in size. Without Oracle Enterprise Manager finding memory leaks could take a significant amount of man-hours resulting in higher maintenance costs and lower application service levels.

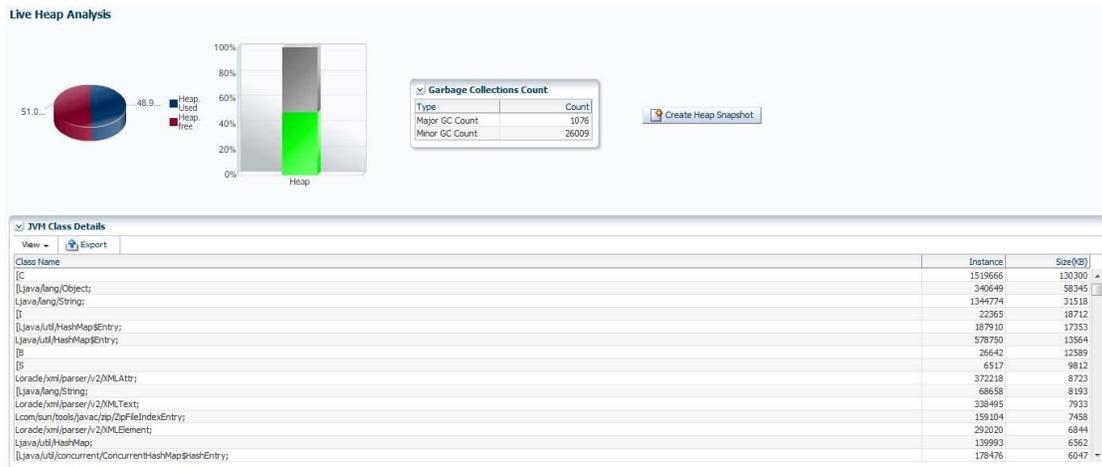


Figure 5. Analyze both live and historical heap details and compare different time periods

## Diagnostic Snapshots

When a problem occurs in a production environment, administrators often do not have the luxury of time to fully understand the problem or analyze every bit of diagnostic data to determine root cause. Rather, they must act quickly to resolve the problem before it negatively impacts business. In many cases, the fix is a temporary solution until further analysis can be done. To assist administrators who experience this type of situation, Oracle Enterprise Manager provides a Diagnostic Snapshot feature which enables administrators during times of production environment problems to create a Diagnostic Snapshot that will quickly capture the JVM state (threads, garbage collection, memory, CPU) and the WebLogic log files (both active as well as archived) across managed servers supporting the production environment. This snapshot can then be analyzed at a later time in order to determine a permanent solution to the earlier problem. The same snapshot can also be exported to another Oracle Enterprise Manager environment or sent directly to Oracle support for analysis in relation to a new or existing service request (SR).

## Administration

IT organizations typically have several WebLogic Domains – spanning test, stage and production environments – to manage and administer on a regular basis. Remembering details (such as URLs and credentials) for each of these domain’s administration consoles can be difficult, and logging on to the appropriate console each time an administrative operation needs to be performed can be tedious. Oracle Enterprise Manager Cloud Control 12c addresses these challenges by exposing common WebLogic administration operations via its console directly; thereby, removing the need to drill down to the Oracle WebLogic Server Administration Console or to the Oracle Enterprise Manager Fusion Middleware Control console. Administration operations available directly from the Oracle Enterprise Manager Cloud Control 12c console include the following:

- Locking a domain configuration via the Change Center prior to making changes to prevent other administrators from making changes during their edit session. Administrators can continue to

manage the changes via the Change Center by understanding which server instances need to be restarted for configuration changes to take effect, by releasing a lock, by activating changes, or by undoing changes.

- Viewing, configuring and using MBeans for a specific Oracle WebLogic Server or Application Deployment target via the System MBean Browser.
- Creating, editing, deleting, controlling, or testing JDBC data sources.
- Recording configuration actions performed from within the Oracle Enterprise Manager Cloud Control 12c console as a series of WebLogic Scripting Tool (WLST) commands, and then using WLST to replay the commands to help automate the task of configuring a domain.
- Configuring log file settings such as log file location, format, log level and rotation policy.
- Performing selective tracing to gain more fine-grained logging data that is limited to a specific application name or other specific attributes of a request (e.g. user name or client host).
- Starting, stopping or restarting managed servers, clusters, or other Fusion Middleware components (e.g. Oracle HTTP Server) immediately or scheduling the operation to occur at a future point in time. Oracle Enterprise Manager Cloud Control 12c provides flexibility in terms of how to control such processes; they can choose to control processes via Node Manager, default scripts located in the domain home, or custom scripts.

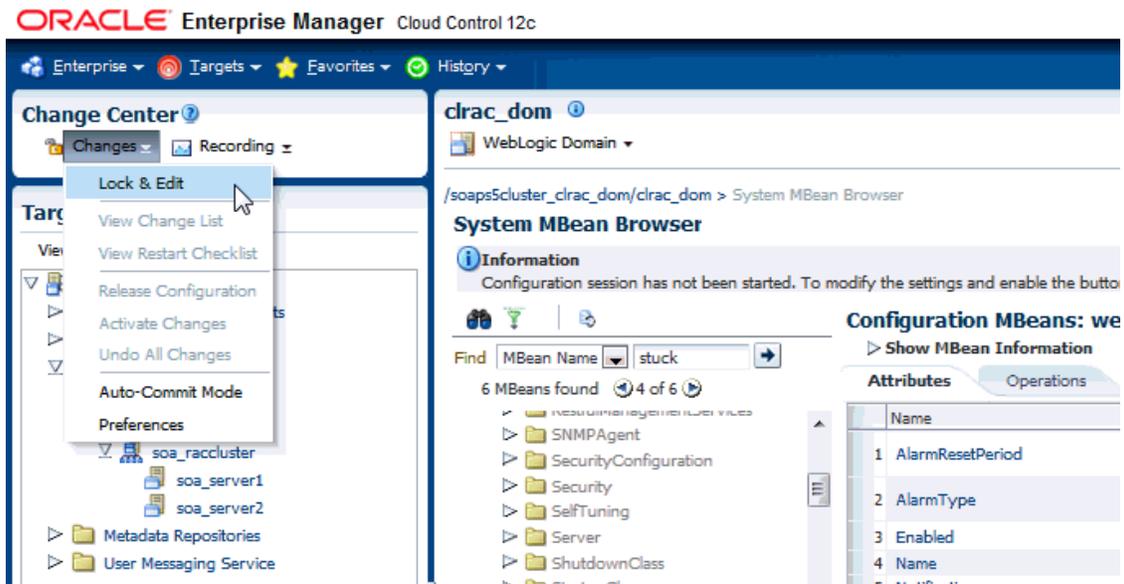


Figure 6. Lock the domain prior to making configuration changes via Change Center in the Oracle Enterprise Manager Cloud Control 12c console

## Configuration Management

Many performance degradation issues in production application environments occur due to unauthorized configuration change. IT organizations routinely struggle with managing their

middleware configurations as well as enforcing compliance standards across those configurations. Oracle Enterprise Manager Cloud Control 12c provides comprehensive configuration management capabilities that help customers maximize value of their IT assets, increase the quality of IT services, reduce the cost of managing IT, and meet IT compliance requirements.

### Automating Discovery and Tracking of Assets

Traditionally, tracking assets and configuration items across the IT environment relies upon the knowledge of key individuals, time-consuming ad-hoc processes, and manual, error-prone spreadsheets. In contrast, Oracle Enterprise Manager automatically collects deep configuration information about Oracle WebLogic Server as well as its underlying hardware and operating system. Monitoring templates specifying what configuration items should be collected for Oracle WebLogic Server and its underlying operating system are available out-of-the-box and can be customized to collect only the relevant configuration items that IT personnel require. Examples of information collected at regular intervals include:

- Oracle WebLogic Server software installations, including applied patches
- Oracle WebLogic Server configuration parameters (e.g. ports, JVM information, JDBC and JMS resources, startup and shutdown classes) and configuration files
- Operating system patches, kernel parameter settings, and installed packages
- Hardware components including CPU, memory, storage, and network devices

### Tracking and Detecting Configuration Changes

Oracle Enterprise Manager also provides the ability to track configuration changes over time across the stack—from the application down to the hardware—allowing administrators to easily monitor all changes for a specific configuration at any point in time. This enables users to quickly identify any changes that were applied to an environment that previously worked fine, but is suddenly not performing at an acceptable level.

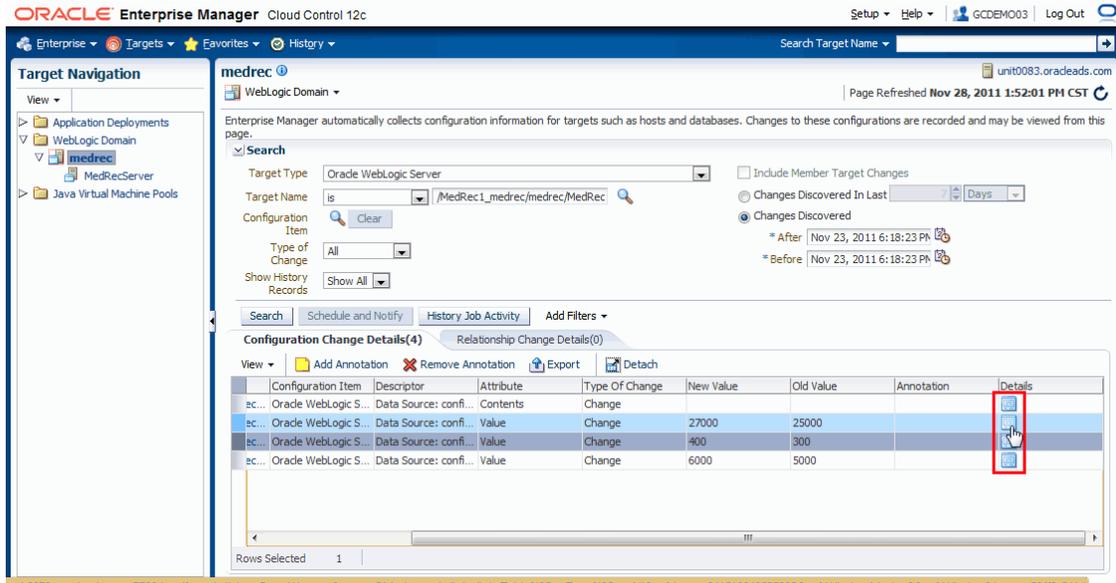


Figure 7. Track Oracle WebLogic Server configuration changes over time

In addition to tracking configuration changes historically, Oracle Enterprise Manager enables administrators to detect changes in real time as well. By integrating with a change management system, it can inform you if a configuration change was authorized or unauthorized. Detection of real-time change automates the audit trail and minimizes the time it takes to uncover compliance breaches.

### Comparing and Synchronizing Configurations

By keeping systems configured to a standard baseline and identifying any configuration changes that occur, Oracle Enterprise Manager helps organizations reduce “configuration drift” and confirm if and when a planned change takes place. Oracle Enterprise Manager provides a suite of comparison capabilities that allows administrators to quickly and easily pin point any configuration differences across the application life cycle – from development to test to production. In addition, administrators can create a baseline from an existing configuration and use that gold standard configuration or a current system to perform an ad hoc or scheduled, one-to-one or one-to-many comparison.

Whether comparing current configurations or a combination of saved configurations with current configurations, Oracle recommends using configuration comparison templates while performing comparisons. Using such templates allows operations teams to define meaningful comparison settings that apply to their unique environment. For instance, operations teams may be sensitive to JVM memory settings in the WebLogic config.xml, while differences between servers in regards to port and host information is probably less significant and can be ignored.

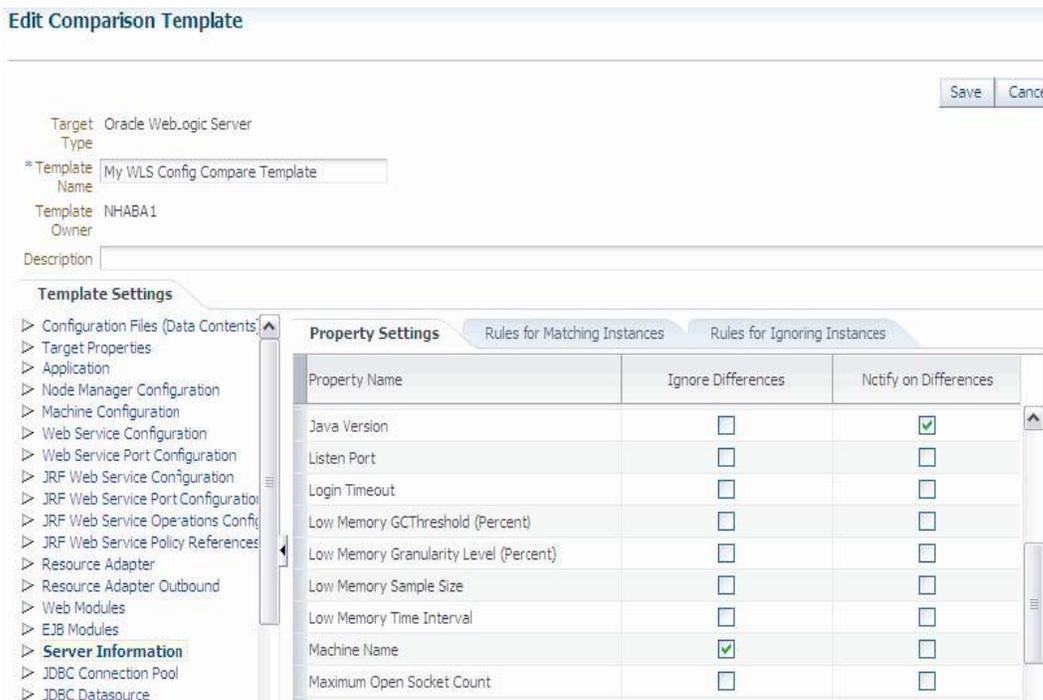


Figure 8. Define meaningful settings in comparison templates to narrow critical configuration drift issues across WebLogic Domains and Servers

When unexpected configuration differences across environments are detected, Oracle Enterprise Manager can be used to synchronize the configuration files such that the environments are no longer different. This reduces the amount of time administrators need to devote to resolving problems due to configuration issues.

### Ensuring Compliance with Standards

Ensuring compliance with standards such as SOX, ITIL, and PCI, as well as with unique business standards, is a challenge. Oracle Enterprise Manager ships with several predefined rules for Oracle WebLogic Server (including the integrated Guardian Signature Rules) and also enables administrators to define their own custom compliance rules and compliance standards (i.e. groups of rules that can be applied to managed targets) to quickly demonstrate compliance with various regulations.

Oracle Enterprise Manager tracks violations of these compliance standards in a manner similar to performance metrics such that notifications can be received and corrective actions can be initiated for non-compliant targets. For example, if debug mode remains enabled for a WebLogic log file far too long, Oracle Enterprise Manager can detect this and send a notification informing administrators, or if WebLogic Server is running on an Exalogic Elastic Cloud system, Oracle Enterprise Manager can ensure that all of the underlying optimizations are enabled.

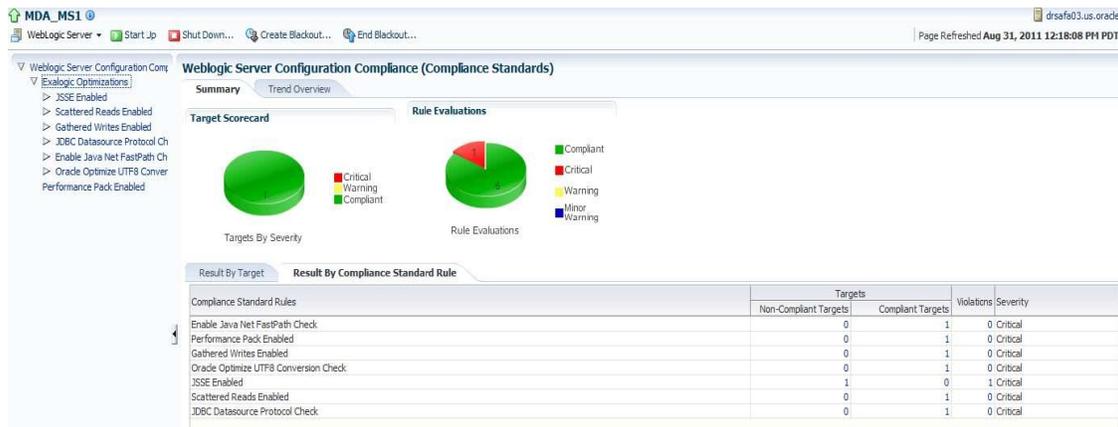


Figure 9. Dashboard showing level of compliance to standards

## Lifecycle Management

Rather than spend resources on manually installing and configuring Oracle Fusion Middleware software, administrators would rather invest time and money on more strategic initiatives. To help achieve this, Oracle Enterprise Manager Cloud Control 12c has automated common provisioning operations such as cloning Oracle WebLogic Domains, scaling out existing WebLogic Clusters, deploying Java EE applications, and patching WebLogic Server software. Having these data center operations performed in a more automated fashion greatly improves efficiency and results in lower operational risk and lower cost of ownership.

### Cloning from Test to Production

Typically, creating a WebLogic environment to support a new application or new business segment entails several manual, error prone installation and configuration steps. With Oracle Enterprise Manager this can be accomplished with very little effort and time via predefined, customizable deployment procedures. Such deployment procedures clone an existing WebLogic Domain environment to a new set of hardware per a hierarchical series of steps. These predefined steps can be edited or disabled and new steps or custom scripts can be added to the deployment procedure to satisfy unique business needs. While running the deployment procedure, administrators can specify not only what destination host targets the middleware software should be installed to but also specify domain configuration settings such as the domain name, credentials for the administration console, the number and configuration of clusters and managed servers in the destination domain (including but not limited to specifying the managed server names, port values and whether SSL should be enabled), and JDBC data sources. After the cloning operation completes and the relevant middleware processes are started, the newly created WebLogic environment is discovered and automatically added to the console for centralized management and monitoring.

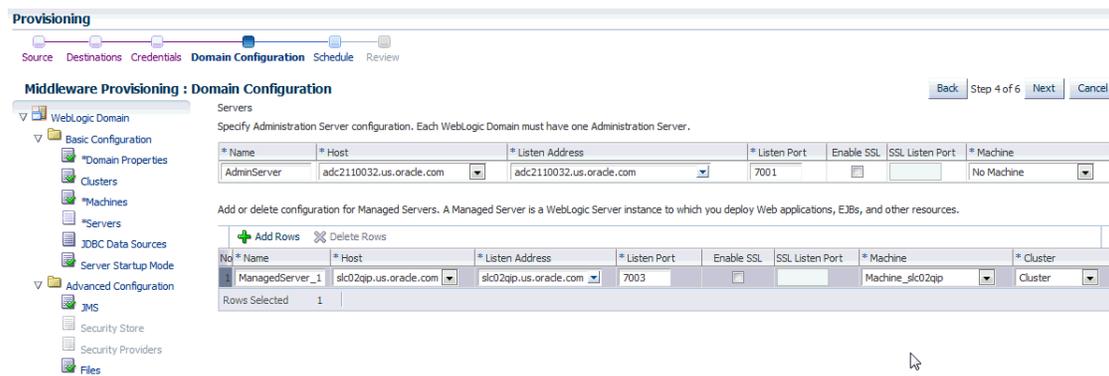


Figure 10. Customize domain configuration when cloning a WebLogic Domain from test to production

## Scaling Out WebLogic Clusters

To address growing business demands, modern data centers must augment and relocate resources quickly. Using Oracle Enterprise Manager, administrators can rapidly scale out an Oracle WebLogic Domain or Cluster with additional managed servers to accommodate an increase in application load.

## Deploying, Redeploying and Undeploying Java EE Applications

In order to manage Java EE applications across domains in the data center, Oracle Enterprise Manager includes the ability to store Java EE application components within the Oracle Enterprise Manager software library. Each Java EE application component in the software library can be versioned and contain related application files including standard Java EE archive files (i.e. .ear, .war, .jar, .rar, or .gar), deployment plans, pre-deployment scripts, post-deployment scripts, or additional application-related files. Once application related files are stored in the software library, a predefined and fully customizable deployment procedure can be submitted to deploy the Java EE application components from the library. The deployment operation can be performed immediately or scheduled for a future point in time. In addition, the entire process – from creating the Java EE application component to submitting the procedure to deploy the application – can be automated end-to-end by leveraging the Enterprise Manager Command Line Interface (EMCLI). If an issue arises after initial deployment, administrators can leverage the same procedure to either undeploy the Java EE application or redeploy an earlier, working version of the Java EE application.

## Patching WebLogic Server Software

Determining which WebLogic Server patches to apply to which WebLogic Server installations across a distributed data center can be a rather tedious and error-prone endeavor for an administrator – not to mention the amount of time needed to actually apply the patches to the relevant managed servers that could span multiple domains. Through its tight integration with My Oracle Support (MOS), Oracle Enterprise Manager simplifies the patching process by automatically recommending WebLogic Server patches for specific installations in the enterprise. In addition, administrators can then apply the patch recommendations via patch plans. By using patch plans to apply WebLogic Server patches, administrators have an option to deploy patches in a rolling manner to prevent application downtime (parallel mode is also supported). Administrators can also be assured that automated validation

checking will occur as part of the patch plan; so any patch conflicts or dependencies are brought to the administrators' attention prior to any patches actually being applied. In cases where patches that have already been applied have introduced new, unwanted behavior, Oracle Enterprise Manager's patch plans support patch rollback to quickly remedy the problem.

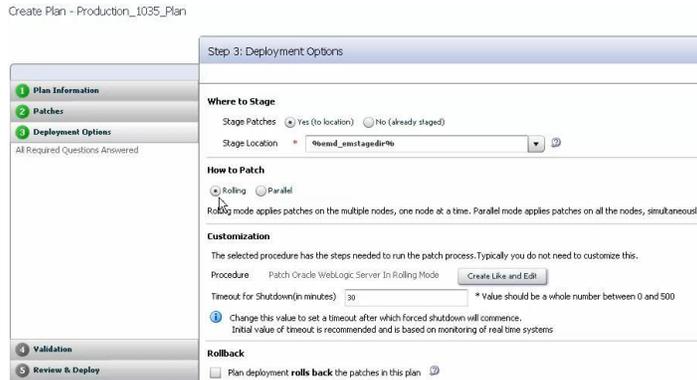


Figure 11. Deployment options for applying multiple patches to one or more domains

## Streamlining Interactions with Support via Support Workbench

When problems arise with Oracle WebLogic Server that the IT organization cannot resolve on their own, they must reach out to Oracle Support for assistance. To help Oracle Support more quickly triage an issue, it is important to provide them with the necessary information to diagnose the problem. Oracle Enterprise Manager simplifies the process of collecting diagnostic data by providing the Support Workbench for Oracle WebLogic Server. This facility provides a self-service means for administrators to gather first-failure diagnostic data; obtain a service request (SR) number, and upload diagnostic data to Oracle Support with a minimal amount of effort and in a very short time, thereby reducing time-to-resolution for Oracle WebLogic Server problems that require assistance from Oracle Support.

## Business Application Management

A business application is a logical entity that represents a single business application within the Oracle Enterprise Manager Cloud Control 12c console. The business application target brings together data from different areas of the Oracle Enterprise Manager product family to create a consolidated view of the monitored application.

In the business application dashboard, administrators can view end user data (both real as well as synthetic users), business transaction data, and underlying system monitoring data. Additional information – such as Service Level Agreement (SLA) data, incident data and JVM performance data – can be displayed on the dashboard to meet unique needs. The dashboard is typically used as the starting point for a triage process in case problems are seen. Administrators often use the business application dashboard as a starting point for triaging a performance problem as they can quickly understand the health of the application from three key dimensions:

- Current status – Key performance indicators (KPIs) from Oracle Real User Experience Insight and business transaction statuses from Business Transaction Management represent the current health of the application as it is relevant to the business the application is serving. Errors that end users see when accessing application pages, slow or hung business transactions, high rate of real users not completing a user flow – each may represent a current problem with the application that requires immediate action.
- Long term status – SLAs can be set on a variety of metrics, from the response time of a web page to the number of times a web page was not available. Seeing how the SLA calculation progresses through the agreement period enables administrators to identify if an application is at risk of not meeting the SLA – while there is still time to fix the problem.
- Future status – By observing the system status, administrators are able to identify potential problems before they impact business activity (which maps directly to the application’s current status) and effect SLAs (which impacts the application’s long term status). Failure of an infrastructure component (e.g. a single WebLogic Server out of several that is load balanced) may not cause an immediate outage, but does put the application at risk if another component fails or the load pattern changes.

## User Experience Management

Today’s businesses applications are used to automate and simplify virtually all business functions. To improve the returns on those investments, the applications need to deliver superior performance, availability, and user experience. Otherwise the business will suffer due to lost revenue from frustrated users, lower employee productivity and possibly even higher support costs from users calling the service desk after abandoning their online interactions. Oracle Real User Experience Insight (RUEI), a key product in the Oracle Enterprise Manager solution set for top-down application management, can help meet these challenges.

### Passive, Zero-touch Monitoring of All Application Users

RUEI uses state-of-the-art technology for data collection which does not require any modification, changes, or instrumentation of the applications monitored. Its passive monitoring approach allows enterprises to deploy in production without requiring costly test/QA environment validations.

### Integrated Problem Diagnostics

RUEI shortens the time needed to identify and fix problems, as administrators are able to quickly exclude insignificant problem areas, and zoom in on the critical ones. Once such a problem area is identified, RUEI provides integrated diagnostic flows directly into Oracle Enterprise Manager Cloud Control’s interface, while keeping the context of the identified problem and timeframe. This helps the administrators retrace specific user sessions and verify any user problem, simplifying problem reproduction.

### Application-Oriented Reporting

RUEI helps administrators determine: Which parts of their application are creating performance issues; discover how long an entire business transaction takes; how long it takes to search, select, and pay for a product; and analyze each page, object, and argument to see how different components are contributing to the overall response time.

RUEI provides an extensive set of dashboard creation features. Dashboards can be pre-built by administrators and presented to specific user groups. Any dashboard can be completely customized to show data from a single application. Access to information stored in the integrated BI data store can be assigned per user /application combination. This ensures a central monitoring solution for the entire organization.

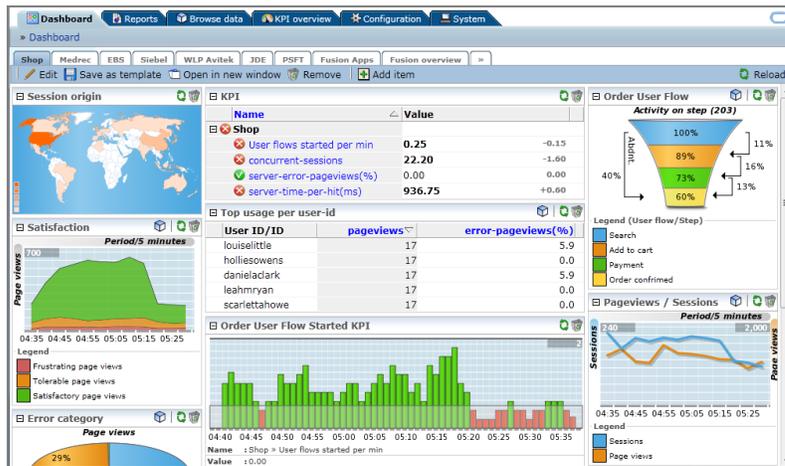


Figure 12. Example application-oriented dashboard from Oracle Real User Experience Insight

### User Session Diagnostics and Replay

RUEI allows administrators to review complete user sessions based on user id or IP address for a specified timeframe. Administrators can easily identify any user session and review all interaction the user had with an application, from functionality perspective or from object perspective, the session diagnostics capability allows administrators to review and replay the complete session as the user experienced it.

Besides reviewing all the information related to a session in a report, the session can be replayed and shared across departments using the export functions. This allows administrators to share viable insights regarding a user's session with developers, for example, having them learn from actual user behavior and help trouble shoot issues.

### Business Transaction Management

If administrators do not know what is deployed in their environment, how applications and services are interconnected, and how business is flowing through the system, they lack the basic information required for management. To help bootstrap management, Oracle Enterprise Manager discovers application components and the dependencies between them, providing a comprehensive bird's-eye-view across standard web and composite applications that span multiple servers across different

platforms. The application map provided by the business transaction management features within Oracle Enterprise Manager makes critical information available at a glance, enabling operations staff to identify their application topology, key components, network hot spots, and rogue applications — the information they need to make informed decisions when managing change within their environments.

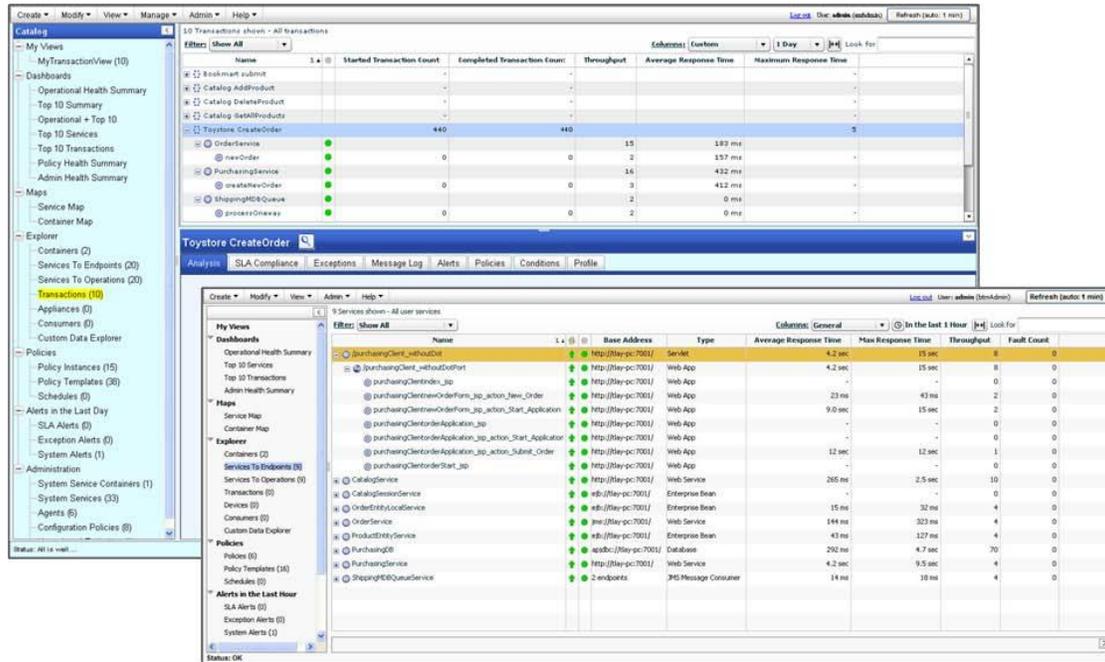


Figure 13. Application service-level relationships are identified and tracked at the individual transaction level for web applications and web services

These “always on” discovery capabilities reflect ongoing changes and updates in the runtime environment. The system auto-discovers service components in every container, the deployments and associated metadata, and continuously tracks changes as service components are updated. Oracle Enterprise Manager also provides end-to-end insight into applications to help manage dependencies, by continuously discovering service dependencies and relationships. These dependencies are mapped using the live interactions of application components. The global dependency map across all web applications and services is complemented by a local dependency map for individual services. Administrators can view the entire service networks of multiple composite applications, or individual component or operation-level dependencies. Since Oracle Enterprise Manager provides the real-time view of application interaction, it is useful for reconciling design objectives with the reality of the applications at runtime.

### Tracking End-to-End Performance, Availability and Service Level Management

Oracle Enterprise Manager monitors system traffic in real time, providing live views of in-flight transactions, keeping administrators apprised of the behavior of each application component. It provides a rich snapshot of vital runtime data—such as throughput, availability, response times and

faults—across a range of time intervals and within the context of the business transaction and the business user.

Oracle Enterprise Manager brings predictability, visibility and control to applications by delivering comprehensive service level management for services, transactions and business processes across heterogeneous environments. It monitors all flavors of application services, ranging from SOAP and XML services to virtually any application service or legacy component—such as JSP/Servlets, EJBs and Plain Old Java Objects (POJOs). Oracle Enterprise Manager can instrument virtually any distributed application service.

Oracle Enterprise Manager continuously monitors message exchange and application invocations—both synchronous and asynchronous—to collect data on the operational health of application components and to relate that behavior to the higher level construct of the associated business transactions. Oracle Enterprise Manager extends visibility to primary application services, such as web applications (usually front-ended by JSP, servlets, or a standard MVC framework like ADF or JSF), SOAP and REST web services, to underlying implementation components such as EJBs, POJOs, and JMS queues components, right down to database queries.

With Oracle Enterprise Manager, administrators can:

- Define different SLAs for discrete business segments
- Prioritize service use by any business criteria
- Focus on the most valuable users (e.g. customers and partners)
- Deliver the best quality of service during peak hours
- Set and monitor SLAs for individual services as well as composites such as processes and transactions

Knowing the business user is a critical aspect of understanding and controlling systems that execute business transactions. Oracle Enterprise Manager shows who is consuming the services and segments these consumers for SLA-driven quality of service. Its support for detailed usage analysis and reporting over time helps organizations to identify trends and revenue opportunities.

### **Transaction Diagnostics and Root-cause Analysis**

Oracle Enterprise Manager provides sophisticated instrumentation for real-time detection, alerting, and remediation of various types of unexpected technical exceptions or business conditions. Using Oracle Enterprise Manager, application support personnel can quickly search transactions based on message content and context—such as time of arrival, message type, customer ID, or part number—to locate the transaction in question and rapidly nail down the root cause of a problem. They can examine the full set of messages or correlated application invocations to understand the full context of any anomaly. These capabilities mean that Oracle Enterprise Manager slashes the time it takes to diagnose runtime issues from hours to minutes.

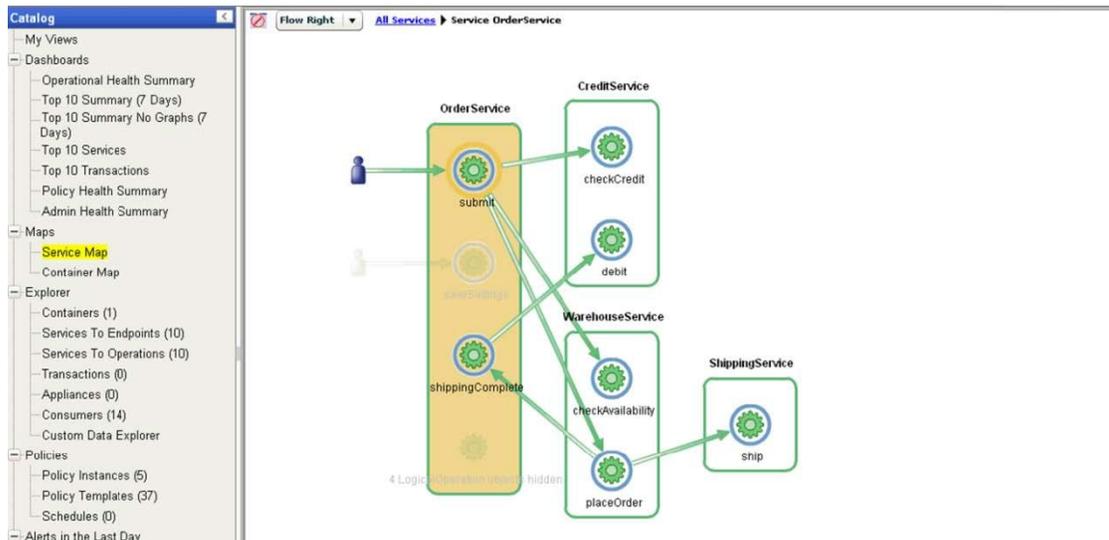


Figure 14. Root cause analysis is simple via Oracle Enterprise Manager's ability to trace transactions for web services and other key entities within an application ensuring full visibility from a business transaction perspective

Users can quickly drill down to find the root cause of transaction failures and other unexpected conditions—significantly reducing mean time to repair. Oracle Enterprise Manager's root-cause analysis capabilities address a range of issues common in business transactions, such as stalled transactions, missing steps, faults, and application exceptions, as well as low-level issues such as incorrect data values, boundary conditions, and so on. It does this flexibly, enabling users to define the conditions of interest. Oracle Enterprise Manager then monitors all the traffic flowing across the system, waiting for the moment an exceptional event occurs.

In complex transactions, such an exercise can be difficult. Usually, application teams have little choice but to cull information from widely dispersed log files. Oracle Enterprise Manager solves this problem by automatically aggregating and organizing messages from all participating components, while automatically tagging faults or exceptional conditions. This contextualized, real-time visibility into transactions makes it easy for operations personnel to rapidly locate offending components, while providing application support teams with detailed information useful for reproducing, analyzing, and repairing the problem, thus slashing mean time to repair.

## Conclusion

Today's IT organizations are increasingly adopting Java EE, SOA, composite application, and cloud computing that enable them to quickly connect disparate applications and fulfill ever-changing business needs. Although these applications offer unprecedented flexibility and agility, they now are more challenging to manage. To effectively manage this new breed of applications, IT organizations need a new breed of management solutions. Oracle Enterprise Manager Cloud Control 12c provides a new approach that enables Oracle WebLogic administrators to stay focused on business priorities, using the most comprehensive management solution for the entire system stack in order to reduce the effort and

cost of managing sophisticated applications built on Oracle WebLogic Server and Oracle Fusion Middleware.



Managing Oracle WebLogic Server with Oracle  
Enterprise Manager Cloud Control 12c

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